

**SECOND FIVE-YEAR REVIEW REPORT FOR
MOUAT INDUSTRIES SUPERFUND SITE
COLUMBUS, MONTANA**



Prepared by

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Date

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LIST OF ABBREVIATIONS

AMC	Anaconda Minerals Company
ARARs	Applicable or Relevant and Appropriate Requirements
ARCO	Atlantic Richfield Company
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
Cr	Chromium
Cr III or Chromium III	Trivalent chromium
Cr VI or Chromium VI	Hexavalent chromium
cy	Cubic Yards
DEQ	Montana Department of Environmental Quality
EPA	United States Environmental Protection Agency
EE/CA	Engineering Evaluation Cost Analysis
FMC	FMC Corporation
FR	Federal Register
Ft/min	feet per minute
IC	Institutional Control
K	Hydraulic Conductivity
MBMG	Montana Bureau of Mines and Geology
MCL	Maximum Contaminant Level
mg/Kg	Milligram Per Kilogram
mg/L	Milligram Per Liter
MNA	Monitored Natural Attenuation
MPWN	Monitoring Plan Well Network
MVC	Monte Vista Company
NCP	National Contingency Plan
NPL	National Priority List
NTCRA	Non Time Critical Removal Action
O&M	Operation and Maintenance
OSWER	EPA Office of Solid Waste and Emergency Response
POC	Point of Compliance
PRP	Potentially Responsible Party
RCRA	Resource Conservation and Recovery Act
SOD	Superfund Overlay District
TBC	To Be Considered
TCLP	Toxicity characteristic leaching procedure
Timberweld	Timberweld Manufacturing
Town	Town of Columbus
UAO	Unilateral Administrative Order
ug/L	Microgram per Liter
USPCI	Union Pacific hazardous waste landfill at Grassy Mountain, Utah
WQS	Water Quality Standards

EXECUTIVE SUMMARY

The U.S. Environmental Protection Agency (EPA), Region 8, with support from the Omaha District of the United States Army Corps of Engineers has conducted the second Five-Year Review of the Mouat Industries National Priorities List Site, located in Columbus, Montana. This is the second policy review at the Site. Policy reviews are being conducted because all response actions were conducted as removal actions and hazardous substances, pollutants, or contaminants were left on site above levels that allow for unlimited use and unrestricted exposure. The triggering action for this second Five-Year Review was the completion of the first Five-Year Review report on March 18, 2008.

The Town of Columbus (Town) has owned the eastern portion of the Site since 1933. A chromium processing plant was constructed on the Site in 1957 by Mouat Industries. Under a five year lease agreement with the Town, Mouat operated the plant beginning in 1957. The process subsequently generated sodium sulfate process wastes containing sodium chromate and sodium dichromate, which resulted in chromium contaminated soil, surface water, and groundwater contamination. Chromium wastes were not generated after 1962. The Town is past owner of the block placement area and surrounding buffer zone and at present is a partial owner. A Record of Decision (ROD) has not been prepared for the Site.

Areas of environmental concern and selected remedies are as follows:

- Groundwater: Monitored Natural Attenuation (MNA) and Institutional Controls (ICs) to limit public exposure to contaminated groundwater. Monitoring occurs annually and ICs have been in place at the site since 1995. Both will continue to be in effect for the Site.
- Surface Water: No further action, as the Applicable or Relevant and Appropriate Requirements (ARAR) have been met.
- Surface and Subsurface soil: FMC Corporation excavated and treated soil by a proprietary process using sulfuric acid and ferrous sulfate to reduce hexavalent chromium to trivalent chromium. The treated soil was mixed with Portland cement and placed in steel bins to solidify. Treated soil blocks were placed in the excavation located within the Site fenced area. Some minimally-contaminated soils {toxicity characteristic leaching procedure (TCLP) extractable chromium less than 0.5 mg/L} that were excavated as part of the removal action were also placed among the stabilized blocks without treatment. Work completed in 1995. Partially deleted in 2008.

All response actions identified in the Action Memorandums (1991 and 1996) have been successfully performed. As part of their Potentially Responsible Party (PRP) requirements, the Town implemented the Superfund Overlay District (SOD), which contains various ICs to prevent human exposure to treated blocks and groundwater. The agreement by the Town to provide access to the Site and to enforce ICs satisfies their portion of any response costs.

The response actions implemented at OU1 currently protect human health and the environment because all caps are still intact, which is protective of human health and the environment in the short-term. Even though the Town has conducted some recent activities that are inconsistent with the ICs, these actions do not impact short-term protectiveness because the blocks excavated were

replaced on Town property within the block placement area and this issue is easily remedied. However, in order for the response actions to be protective in the long-term, the following actions need to be taken (the Post Removal Site Control Plan needs to be modified; and the EPA and DEQ need to ensure that the Town operates, maintains, and enforces the zoning ordinance that implements the ICs for the Site) to ensure protectiveness.

Because the response actions at all OUs are protective, the site is protective of human health and the environment.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Mouat Industries		
EPA ID: MTD021997689		
Region: 8	State: MT	City/County: Columbus/Stillwater
SITE STATUS		
NPL Status: Final		
Multiple OUs? No	Has the site achieved construction completion? Yes	
REVIEW STATUS		
Lead agency: EPA If "Other Federal Agency" was selected above, enter Agency name: Click here to enter text.		
Author name (Federal or State Project Manager): Roger Hoogerheide		
Author affiliation: US EPA Region 8		
Review period: April 25, 2012 – March 18, 2013		
Date of site inspection: August 31, 2012		
Type of review: Policy		
Review number: 2		
Triggering action date: March 18, 2008		
Due date (five years after triggering action date): March 18, 2013		

Five-Year Review Summary Form (continued)

Issues/Recommendations

OU(s) without Issues/Recommendations Identified in the Five-Year Review:
Not applicable

Issues and Recommendations Identified in the Five-Year Review:

OU(s): 1- Groundwater	Issue Category: Institutional Controls			
	Issue: Excavated waste blocks were placed into a non-waste block area (utility corridor), which is inconsistent with the IC.			
	Recommendation: Clarify whether the blocks are solid or hazardous waste and develop proper procedures for handling and disposing of any excavated blocks to ensure blocks are handled in accordance with RCRA, CERCLA, and Montana disposal requirements.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	Yes	EPA	EPA	June 30, 2014
OU(s): 1- Groundwater	Issue Category: Operations and Maintenance			
	Issue: The vegetative cover, gravel, and asphalt caps do not have a formalized inspection and maintenance plan.			
	Recommendation: Modify the Post Removal Site Control Plan to clearly outline scheduled inspection and maintenance responsibilities for the vegetative cover, gravel and asphalt caps. These actions should be written to assure compliance with institutional controls.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	Yes	EPA	EPA	June 30, 2014
OU(s): 1- Groundwater	Issue Category: Institutional Controls			
	Issue: Soil and gravel covers constructed have not been maintained to prevent degradation. Block areas with a vegetated soil cover are being utilized as an equipment and vehicular storage area and soil and gravel are stockpiled. In addition, damage from vehicles and other means was evident and unrepaired.			
	Recommendation: Town of Columbus will regrade the cover to facilitate runoff and maintenance. Surplus equipment, vehicles, soil, and gravel will be taken off the cap. Once completed, the area will be reseeded, EPA and DEQ notified, and an inspection conducted.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date

No	Yes	Other: Town, DEQ, EPA R8	EPA/State	June 30, 2013
OU(s): 1- Groundwater	Issue Category: Operations and Maintenance			
	Issue: Monitoring wells used to monitor the completed response action have not been abandoned. Some of these wells are damaged and may act as surface water conduits.			
	Recommendation: Abandon all monitoring wells not included in the post closure monitoring.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	Yes	EPA	EPA	December 31, 2013

Protectiveness Statement

<i>Operable Unit:</i> OU 1	<i>Protectiveness Determination:</i> Short-term Protective	<i>Addendum Due Date (if applicable):</i> Click here to enter date.
<i>Protectiveness Statement:</i> The response actions implemented at OU 1 currently protect human health and the environment because all caps are still intact, which is protective of human health and the environment in the short-term. Even though the Town has conducted some recent activities that are inconsistent with the ICs, these actions do not impact short-term protectiveness because the blocks excavated were replaced on Town property within the Block placement area and this issue is easily remedied. However, in order for the response actions to be protective in the long-term, the following actions need to be taken (the Post Removal Site Control Plan needs to be modified; and the EPA and DEQ need to ensure that the town operates, maintains, and enforces the zoning ordinance that implements the ICs for the Site) to ensure protectiveness.		

Sitewide Protectiveness Statement

<i>Protectiveness Determination:</i> Short-term Protective	<i>Addendum Due Date (if applicable):</i> Click here to enter date.
<i>Protectiveness Statement:</i> Because the response actions at all OUs are protective, the site is protective of human health and the environment.	

**Mouat Industries Superfund Site
Columbus, Montana
Second Five-Year Review Report**

I. Introduction

The purpose of the Five-Year Review is to determine whether the response actions implemented at a site are protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and makes recommendations to address them.

The response actions conducted at this Site were removal actions rather than remedial actions. Therefore, a Five-Year Review is not required under Statute or regulation. This policy Five-Year Review is required because the Site is on the National Priorities List and the removal actions left hazardous substances, pollutants, or contaminants on Site above levels that allow for unlimited use and unrestricted exposure.

The U. S. Environmental Protection Agency, Region 8, with support from the Omaha District of the United States Army Corps of Engineers, has conducted the second Five-Year Review of the Mouat Industries National Priorities List Site (the Site) in Columbus, Montana. This review was conducted for the entire Site from April 2012 through March 2013. The triggering action for this review is the signature date of the previous Five-Year Review, March 18, 2008.

II. Site Chronology

A chronology of significant events in the history of the site is presented in **Table II-1**.

Table II-1: Chronology of Site Events

Event	Date
The town of Columbus (Town) purchases the eastern portion of the Site.	1933
A chromium processing plant was constructed on the Site by William G. Mouat and Mouat Industries, under a 5 year lease agreement with the Town.	1957
The Town purchases the western portion of the Site.	1960
The Mouat lease with the Town was extended through August 6, 1967 and operations were changed such that no chromium wastes were created after this time.	1962
The Monte Vista Company (MVC) purchased the plant and equipment, and received an assignment of Mouat's lease for a portion of the Site.	1963
Mouat assigned its interest in the agreements it had with MVC to the Anaconda Minerals Company (AMC). AMC is involved at the Site until 1973.	1968
MVC executed a five year lease directly with the Town	1969
In response to Town concerns, Anaconda Minerals Company (AMC) collected some waste materials from the Site and placed them inside a building that had been used for sodium dichromate production. The former location of the material was graded and covered with gravel.	1969
In response to Town concerns, AMC rerouted storm water away from Site structures and the yard. In addition, AMC removed material from the Site and treated soils, in place.	1973
MVC removed plant equipment, buildings and machinery from the Site.	1974
Timberweld Manufacturing (Timberweld) leased space at the Site from the Town and covered the former chromium processing plant footprint with two-feet of gravel.	1975
Site investigations conducted, which included a Preliminary Assessment/Site Inspection by EPA.	1977, 1980, 1983, 1984, 1985, 1989 and 1992
EPA sends letter to the Town indicating that the chromium in groundwater exceeded drinking water standards and recommended that the contaminated groundwater not be used for human and animal consumption.	1984

Table II-1: Chronology of Site Events

Event	Date
Site proposed for NPL	1984
NPL listing	June 1986
Action Memorandum requiring a time-critical removal action to secure the Site with fencing and to control storm water run-on and run-off	1990
Action Memorandum requiring a time-critical removal action to remediate chromium contaminated soils	September 1991
Unilateral Administrative Order (UAO) issued to several potentially responsible parties (PRPs) requiring implementation of the 1991 Action Memorandum	November 1991
Excavation and treatment of chromium-containing soils on-Site	1993
Excavation and disposal of chromium-containing soils to Resource Conservation and Recovery Act (RCRA)-C and RCRA-D permitted off-site facilities	1994
Superfund Overlay District (SOD) with groundwater and land use restrictions as institutional controls adopted as Town of Columbus Ordinance	April 1995
Engineering Evaluation/Cost Analysis Report for groundwater completed	1996
Human Health Risk and Ecological Risk Assessment completed	January 1996
Action Memorandum issued for a non-time-critical removal action to address groundwater.	June 1996
UAO issued requiring implementation of the 1996 Action Memorandum	July 1996
Preliminary Closeout Report issued and Site declared Construction Complete	September 1996
Semi-annual groundwater monitoring of Monitoring Plan Well Network (MPWN) under the UAO (1996)	November 1996- October 2002
Chromium concentrations in MPWN wells remain below the Maximum Contaminant Level (MCL) of 0.1 milligram per liter (mg/L) for three consecutive years, thus meeting the performance standards required by the 1996 Action Memorandum	October 2002
Chromium (Cr) concentrations in non-network wells within the SOD were below the MCL, as required by the performance standards established in the 1996 Action Memorandum	December 2003
Final Completion Report	November 2004

Table II-1: Chronology of Site Events

Event	Date
Final Site Evaluation Report, investigation to determine the potential for chromium VI to leach from remediated chromium contaminated soils.	September 2007
Town amends SOD to reflect the removal of the groundwater use restrictions from the SOD, “excepting the block placement area“	March 2008
First Five Year Review completed.	March 2008
Close-out of Unilateral Administrative Orders (Docket #VIII-92-05 and VII-96-22)	April 2008
Action Memorandum Amendment to the June 21, 1996 Action Memorandum for the non-time critical removal action (NTCRA)	June 2008
Post Removal Site Control Plan completed.	February 2009
Notice of Partial Deletion from NPL-soils medium issued in Federal Register	March 2009
Town amends Subsections F, G, and H of SOD that allows for a building to be constructed within the block placement area and for excavation within the block area.	March 2010
Building of Town’s Public Works Building commences on the treated block area as per signed contract agreement	August 12 2011

III. Background

Physical Characteristics

The Site is located in Stillwater County, Montana, north of the Columbus Airport on the south side of the Town of Columbus. It can be located on the United States Geological Survey Columbus East Quadrangle Map, Section 27, Range 20 East, Township 2 South. The Site is approximately 4.5-acres and is located on 1st Avenue South, approximately 0.6 miles north of the Yellowstone River. The Site is bordered by Clough Avenue, 13th Street, 1st Avenue South, Timberweld, the railroad, and the municipal airport (**FMC EECA, 1996**).

The geologic strata beneath the Site consist of alluvial deposits of the Quaternary Period underlain by nearly flat lying shale beds of the Upper Cretaceous Period. It is likely that bedrock is a shale member of the Judith River Formation of the Montana Group and is located near the contact with the overlying Bear Paw Shale Formation.

Bedrock underlying the Site ranges between 13 and 35 feet below ground surface. Immediately overlying the shale bedrock are alluvial gravels. These gravels are brown to gray, moderately dense to very dense, and consist of clean, poorly sorted, and well-rounded gravel and contain some fine to coarse sand, trace cobbles and boulders, and trace silt. The gravel is typically of igneous origin, but occasionally contains gray sandstone. The thickness of the gravel layer encountered at the Site ranges between approximately 7 to 27 feet. Above the gravel, fine-grained sediments consisting of alluvial clay, silt, and fine sand horizons, typical of flood plain deposits, are encountered. Frequently, the fine-grained sediments are observed to increase in grain size with depth. The total thickness of the fine sediment horizons range between 0 and 10 feet.

There are no surface water areas or channels within the Site; however, the Yellowstone River is approximately half a mile south of the Site. In addition, a pond on the local golf course is located between the river and the Site (**FMC EECA, 1996**).

The hydrogeologic investigations at the Site have focused on the alluvial sand and gravel formation described above. The base of the aquifer is located at approximately 13 to 35 feet below ground surface at the alluvial/shale interface. The aquifer appears to be unconfined; however, the overlying fine-grained clay and silt layers may act locally to confine the aquifer. Static water levels are typically between 6 and 13 feet below ground surface. The saturated thickness of the shallow aquifer ranges between approximately 8 to 27 feet at the Site and thins to the south, near the Yellowstone River. The hydraulic gradient of the shallow aquifer averages 0.003 feet per foot with flow towards the southeast. The hydraulic gradient and flow direction do not exhibit significant temporal variability. Aquifer hydraulic conductivity (K) values for the alluvial deposits were estimated from monitoring well slug tests resulting in an estimated median value of 0.075 ft/min. Using the average hydraulic gradient (0.075 ft/min), the median hydraulic conductivity (0.003), and a typical porosity for well-sorted gravels (25%), the estimated average horizontal groundwater velocity within the alluvial sand and gravel formation is 470 feet per year (**FMC EECA, 1996**).

Land and Resource Use

Land use at the Site is designated as light and heavy industrial with residential areas within 0.5 miles of the Site (**Attachment III-1**). A location map is provided in **Attachment A**. The Site is owned by the Town and Timberweld.

The Town's portion of the Site has a new public works building, parking lots and the remaining portion of the repository has a vegetated cover. Timberweld owns the portion of the Site to the west, which has been surfaced with a gravel cover to allow vehicular and storage use of this area and has a fence to the south. Timberweld manufactures laminated wood structural elements and composite wood beams.

The north boundary of the Site is a public street (Clough Avenue). Across this street is an active railroad right-of-way, portions of which are leased for concrete production and timber storage. Property east of the Site is owned by the Town and is currently open space. The south boundary of the Site is First Avenue South; across this street is an active general aviation airport, also owned by the Town.

Groundwater near the Site is not presently used as a drinking water source because city water is available. However, groundwater down gradient from the Site is a potential source of irrigation water for the golf course, crops, and nearby lawns.

The current and projected land uses for the surrounding area is light and heavy industrial, with residential, and recreational (the golf course) use.

History of Contamination

The Site was first developed for industrial use in the mid-1950's. A chromium processing facility was constructed in 1957 by William G. Mouat and Mouat Industries and was leased from the Town continuously by various owners until about 1973. From about 1957 to 1962, the facility processed chromite ore mined in south-central Montana into high-grade sodium dichromate generating sodium sulfate process wastes containing sodium chromate and sodium dichromate. These hexavalent chromium (chromium VI) containing compounds leached from the sodium sulfate waste piles into underlying soils and eventually into Site groundwater creating a chromium plume extending off-Site in a southerly direction. In addition, normal facility operations resulted in sodium dichromate spills. The area and volume of affected soil was estimated at approximately 3.3 acres and 46,700 cubic yards, respectively (**Baker, 1992, which is denoted as a reference in the EECA**).

In response to concerns expressed by the Town, several actions were taken beginning in 1969 by AMC, the owner of the processing facility at the time. These included containerization and/or relocation of wastes and contaminated soils and the treatment of soils with acids and ferrous sulfate in an attempt to convert chromium VI to trivalent chromium (chromium III). Demolition of the formerly used processing facility was completed in 1974 and the former processing plant footprint was covered with approximately 2 feet of gravel.

Site investigations were conducted in 1977, 1980, 1983 and 1984 leading to the Site being

proposed for the NPL in 1984. In 1986, the Site was placed on the NPL. Further studies at the Site led the EPA to undertake a removal action in 1990 to secure the Site with a perimeter fence and to control storm water run-on and run-off.

Basis for Taking Action

Hazardous substances that have been released at the Site include hexavalent chromium and trivalent chromium. Hexavalent and trivalent chromium are hazardous substances as defined by CERCLA Section 101 (14), and designated as such under 40 CFR 117 and 40 CFR 302. Chromium III and VI have been found at levels above health based or regulatory levels for soil, surface water, and groundwater. Prior to implementation of any response actions, total chromium levels in soils were above the toxicity characteristic level of 5 mg/L in the waste extract; total chromium levels in groundwater exceeded state and federal MCLs of 0.1 mg/L, and chromium levels in surface water exceeded the State WQB-7 (DEQ-7) standards aquatic life chronic standard of 0.011 mg/L for Chromium VI and 0.1 mg/L for Chromium III.

IV. Response Actions

This section presents the response actions implemented at the Site, including any follow-on post removal Site control activities to assure protectiveness of the response actions conducted to date. Several clean-up actions were taken prior to the Action Memorandums and prior to listing on the National Priorities List. Although these actions are not reviewed as part of this Five-Year Review, they are described below for completeness.

Pre-NPL Listing Actions

AMC took several steps to isolate wastes from the environment and to treat contaminated soils before NPL listing. These steps were taken in response to concerns expressed by the Town and included:

- Removing stockpiled chromium salts from the Site yard. A portion of the waste was drummed and relocated to the processing plant building. The remainder of the waste was stored openly on the concrete floor of the processing plant building. The former location of the material was graded and covered with gravel.
- Excavating and transporting chromium contaminated soil from the Site. Applying acids and ferrous sulfate to remaining in-place soils and “working” the reagents into the soil. The treatment was intended to reduce chromium VI to chromium III.

Site Security Removal Action

In March and April 1990, EPA Region 8 Emergency Response Branch secured the Site by surrounding it with 1400-feet of six-foot-high industrial chain link fencing with two, twenty-foot-wide locked gates. At the same time, at the request of EPA’s On-Scene Coordinator, the Town re-routed the drainage ditch that had carried storm water through the center of the Site to perimeter locations.

Soil Removal Action

Pursuant to a 1992 UAO FMC implemented the soil removal action selected under the 1991 Action Memorandum. Excavation of Site soils was conducted to a clean-up performance standard established in the 1991 Action Memorandum and was based on the results of TCLP performed on Site soils. Soils within the fence constructed under the Site 1991 Removal Action were excavated based on a TCLP extract total chromium concentration threshold of 0.5 mg/L. Soils outside the fence (largely on Timberweld property) were excavated based on a TCLP extract total chromium concentration threshold of 0.1 mg/L.

After the soil was excavated, it was treated by a proprietary process using sulfuric acid and ferrous sulfate to reduce chromium VI to chromium III. The treated soil was mixed with Portland cement and placed in steel bins to solidify. Treated soil blocks were placed in the excavation located within the Site fenced area described above. Some minimally-contaminated soils (TCLP extractable chromium <0.5 mg/L) that were excavated as part of the removal action were also placed among the stabilized blocks without treatment. Approximately 14,000 cubic yards (cy) of chromium-containing soils (as approximately 7,000 solidified soil blocks) were excavated and

treated in 1993.

In response to the Town's concern over potential size of the repository, approximately 19,400 cy of soils exhibiting chromium above cleanup standards were excavated and transported for off-Site disposal during 1994. Soil that tested as hazardous (TCLP>5.0 mg/L) was sent to the Union Pacific hazardous waste treatment and disposal facility at Grassy Mountain, Utah. Soil that was tested as non-hazardous (TCLP<5.0 mg/L) was sent to East Carbon Development Corporation non-hazardous waste disposal facility at East Carbon, Utah.

Final cover over backfilled areas consisted of gravel on the Timberweld property (to allow vehicle access for material lay-down) and two-feet of soil and a vegetated cover in the fenced area.

EPA has determined that all appropriate response actions for the surface and subsurface soils at the Site have been completed. In March 2009, EPA did a partial deletion of the surface and subsurface soil components of the Site from the NPL.

Surface Water Component

The 1996 Action Memorandum addressed surface water by identifying surface water performance standards for the Golf Course pond and ditches as a result of contaminated groundwater discharges to surface water. The Action Memorandum identified surface water performance standards to meet once groundwater performance standards had been met. The surface water monitoring network consisted of a single station (GDSURF-1) along a Golf Course ditch. While chromium levels at this station never exceeded the groundwater cleanup level of 0.1 mg/L, cleanup levels were based on the state of Montana DEQ-7 aquatic life chronic standard of 0.011 mg/L for Chromium VI and 0.1 mg/L for Chromium III. This station was monitored semi-annually between November 1996 and October 2002 although no chronic life standard exceedance was detected after October 2000.

Groundwater Component

Pursuant to the 1996 UAO, Atlantic Richfield Corporation (ARCO), as the corporate successor to AMC, began formal implementation of the removal action described in the 1996 Action Memorandum. The removal action for groundwater consisted of natural attenuation (MNA) with groundwater monitoring. Semi-annual monitoring and hence operation of the removal action was required for at least five years and then could be terminated once the following groundwater standards were met:

- 1) It was demonstrated that the MCL for chromium in groundwater (0.1 mg/L total chromium in unfiltered samples) and the DEQ-7 standards for chromium in groundwater (0.1 mg/L hexavalent chromium and 0.1 mg/L trivalent chromium in filtered samples) have not been exceeded for a period of three consecutive years. Because neither the hexavalent nor the trivalent chromium concentration can be greater than the total chromium concentration, and because the MCL and DEQ-7 standards have the same

numerical values, ARAR compliance with the DEQ-7 standards was demonstrated with total chromium data for filtered samples; and

- 2) It was demonstrated that all remaining wells not included in the monitoring plan network but within the SOD, do not exceed the MCL for chromium and the DEQ-7 standards for chromium in groundwater as determined by a single sample taken after Item 1 is satisfied.

The monitoring plan network for the removal action consisted of 12 wells. The well network included one upgradient well (RMIS-1), five wells within the plume (RMIS-4, RMIS-6, MIS-11A, MIS-15, and MIS-16), three wells laterally adjacent to the plume (R-1, RMIS-7, and RMIS-9), and three wells near the leading edge of the plume, as defined by the groundwater standard of 0.1 mg/L (MIS-12, MIS-13, and MIS-14).

The EPA issued an Action Memorandum Amendment to the 1996 Non-Time Critical Removal Action Memorandum in June 2008. The Amended Action Memorandum had four purposes:

- First, it clarified the Points of Compliance (POC) for groundwater at the Site.
- Second, it ensured that the restriction on groundwater use in the Block Placement Area will be maintained as long as institutional controls are necessary. This has been done through a modification in the Town's ordinance.
- Third, it clarified the 30 year groundwater monitoring requirement identified in the June 21, 1996 Action Memorandum. The 1996 Action Memorandum specified that following completion of the surface and groundwater response actions, EPA would monitor the four wells nearest to the block placement area on an annual basis. The 1996 Action Memorandum required that annual groundwater monitoring be conducted for 30 years as a result of waiving Montana's Class II landfill ARAR requirement. This monitoring began in 1996 and was suspended in 2002 because the groundwater performance standard had been met for three consecutive years.
- Fourth, it stated the need for post removal site control and provided that MDEQ and EPA would prepare a Post Removal Site Control Plan pursuant to Section 300.415(1)(3) of the NCP.

In May 2008 annual groundwater monitoring resumed. The 2009 Post Removal Site Control Plan (**EPA & MDEQ, 2009**) contains the current monitoring requirements, consistent with the 2008 Action Memorandum Amendment. This plan also provides statistical criteria for modifying the frequency of groundwater monitoring based on evaluation of analytical results. The ICs are also described in the Post Removal Site Control Plan. These requirements are described in more detail below.

Institutional Controls

Institutional controls are administrative and legal instruments that help minimize the potential for human exposure to contamination and protect the integrity of the remedy. Institutional controls work by limiting land or resource use and by providing information that helps modify or guide behavior at properties where hazardous substances at a site prevent unlimited use and

unrestricted exposure. Institutional controls are a critical component of the cleanup process, used to ensure both short- and long-term protection of human health and the environment.

Institutional Controls over land use within the block placement and buffer areas and restricting groundwater use throughout the Site were required under the 1996 Action Memorandum and include restrictions to:

- Prohibit excavation into blocks of treated soils.
- Limit vehicle loads on the gravel-covered portions of the block placement area.
- Prohibit any use of the soil-covered block placement area unless those areas are paved or covered with gravel.
- Require the property owner to maintain the Site cover, drainage facilities and fences.
- Establish specifications for construction on the block placement area.
- Restrict groundwater use.

These ICs were implemented through the establishment of a zoning ordinance (**Attachment IV-1**). The Town adopted the ordinance (Chapter 17.76) creating the Superfund Overlay District in March 1995, after discussions with EPA.

The intent of the SOD is to:

1. Assure that land use in the SOD is compatible with protecting and providing for permanent preservation and maintenance of response actions pursuant, including soil caps, treated concrete blocks, and other response action structures;
2. Require that any development in the block placement area (treated soil repository) of the SOD be preceded by submittal of detailed Site and construction plans, prepared by an architect or engineer, for review and approval by the Town, EPA, and DEQ;
3. Require submittal of as-built drawings with certification from an architect or engineer that Site development and construction in the block placement area (treated soil repository) was completed in compliance with zoning title;
4. Limit well use and prohibit drilling of wells (except for monitoring) within the SOD; and
5. Place a notice to purchasers on any deed, contract for sale, or other instrument of conveyance before any lot or parcel in the SOD is conveyed (Ordinance 321 (2004); Ordinance 298 (1997)).

The 1996 Action Memorandum included ICs as a component of the response action and acknowledged that the ordinance adopted by the Town meets the purpose of the ICs selected in the Action Memorandum. The 1996 UAO requires that the Town implement, maintain, and enforce the ICs at the Site. In an institutional control letter agreement dated January 20, 2009 with EPA and DEQ, the Town reiterated its commitment to implement, maintain, and enforce ICs at the Site.

The 1996 Action Memorandum allowed for later loosening of groundwater use restrictions. Based on improvement in groundwater quality since adoption of the SOD, the EPA approved the lifting of groundwater use restrictions within the SOD in a May 20, 2005 letter to the Town. The

ICs were amended by the Town in March 2008 to minimize the size of groundwater use restrictions to the block placement area.

The Post Removal Site Control Plan aligns with the Action Memorandum Amendment of 2008, explicitly with regard to how the town will ensure compliance with the CERCLA as provided in the SOD. Specifically, the Town agrees to notify EPA and DEQ in writing sufficiently in advance of any action by the Town to approve any proposed land use change and/or development of the Site that would affect the block placement area or remedial structures such as vegetative caps, drainage facilities, or fences. The advance notification would allow EPA and DEQ to determine whether the proposed changes could adversely affect the maintenance or protectiveness of the Superfund response actions. This agreement was outlined in the January 20, 2009 Institutional Controls letter agreement between EPA, DEQ, and Town outlining that the Town will provide building specifications, etc. prior to excavating or building on the treated block area.

In March 2010, the Town amended Subsections F, G, and H of SOD that allows for a building to be constructed within the block placement area and for excavation within the block area. These revisions were recommendations from the “Final Report Mouat Industries Superfund Site Structural Capacity and Institutional Controls Reassessment, November 2009” and subsequent meetings with the Town, Timberweld, EPA and DEQ (**MT Tech, 2009**). The changes include:

- Subsection F: “If a building is constructed within the block placement area, excavation required for this construction and trenching for utilities is allowed. Excavated waste may be placed back into the foundation excavation and compacted as backfill to support the foundation and/or disposed of according to state of Montana approved methods. Any building or structure, including the related utilities, must meet all applicable requirements of the Montana State Building Code and the Town of Columbus zoning code. Load limits for buildings or structures will not exceed six thousand (6000) pounds per square foot as long as waste is left in place”
- Subsection G: “Asphalt paving can be substituted for the uppermost four inches of gravel cover. In this case, the asphalt will be placed in three courses—a minimum two-inch gravel base course, a four-inch asphalt base course, and a two-inch surface wearing course.”
- Subsection H: “Maintenance of fences around the soil cover areas as well as locked gates are no longer deemed necessary. However, the property owner must maintain the vegetated soil cover or gravel cover on the site.”

Post Removal Site Control Groundwater Monitoring

The groundwater monitoring component of the 2009 Post Removal Site Control Plan is intended to ensure there are no negative impacts on human health and the environment through exposure to contaminated groundwater. It is also intended to fulfill the post-closure monitoring of the treated block placement area as specified in the 1996 Action Memorandum. The 1996 Action Memorandum included provisions to monitor the four wells nearest the block area (RMIS-4S, RMIS-5, MIS-15, and MIS-16) on an annual basis for a period of 30 years (**EPA, 1996**).

The Post Removal Site Control Plan identifies background, down-gradient, and source area monitoring points, sampling frequency and duration; as well as analytical and statistical methods that will be employed to review collected data. Four wells down-gradient of the source area have also been identified as the POC for groundwater. Under CERCLA, the groundwater POC is generally at the waste management unit boundary as noted in the preamble to the NCP: “The EPA believes that groundwater remediation levels should generally be attained throughout the contaminated plume, or at and beyond the edge of the waste management area, when the waste is left in place (55 Federal Register (FR) 8753).” As such, the POC for groundwater is at the boundary of the block disposal area. The Post Removal Site Control Plan also establishes trigger values for chromium concentrations in groundwater that, if realized, may require additional monitoring. Statistical procedures were also developed to help modify or maintain sampling frequency.

The groundwater monitoring network consists of a total of eleven monitoring wells screened between 10 and 26 feet. The network includes one well (RMIS-1) up-gradient of the block placement area (i.e. the background well). Four wells are within or adjacent to the block placement area (MO-09, MO-25, MO-26, and RMIS-2), and six wells are immediately down-gradient of the block placement area (MO-10, MO-11, MIS-15, MIS-16, RMIS-4S, and RMIS-5). Down-gradient monitoring wells MIS-15, MIS-16, RMIS-4S, and RMIS-5 are designated as the POC wells. Well construction details and a more detailed summary of monitoring well network objectives are included in **Attachment IV-2**.

The groundwater monitoring network is scheduled to be sampled annually through 2018 at which time a single well statistical analysis will be conducted. If the trend analysis performed as part of the 3rd Five-Year Review demonstrates that chromium concentrations are stable or are decreasing, then sampling will be modified. If the trend analysis demonstrates no trend or an increasing trend at the 95% confidence level, then sampling will continue annually until a future Five Year Review trend analysis demonstrates stability or a decreasing trend and/or Site conditions allow for unlimited use and unrestricted exposure. An increasing trend in a well will not automatically be a concern to EPA and DEQ, as some seasonal fluctuation is expected, causing groundwater to come in direct contact with the blocks and backfill soil containing chromium below TCLP.

Post Removal Site Control

All response actions at this Site were conducted as removal actions; therefore, activities that would be considered Operation and Maintenance (O&M) at a site where remedial actions are conducted are instead conducted as post removal site control at this Site. Post removal site control activities currently being conducted at the Site are monitoring and maintenance of the vegetative and gravel soil covers, monitoring and maintenance and enforcement of the ICs and groundwater monitoring. The vegetative and gravel cover maintenance is specified in the SOD, Subsection H of Section 17.76.030, and more in-depth requirements are outlined throughout the SOD. The groundwater monitoring is specified in the Post Removal Site Control Plan.

V. Progress Since The Last Review

Protectiveness Statements from the First Five Year Review

The removal actions as implemented are currently protective of human health and the environment. Protectiveness is achieved through the meeting of ground and surface water performance standards at the points of compliance. Additional protection is achieved through groundwater and land use restrictions within the block placement area.

However, long-term protectiveness cannot be ensured unless monitoring of groundwater quality and ICs remain in place. These remedy elements require clarification (number and location of monitoring wells, etc.) in an Action Memorandum Amendment.

Status of recommendations and follow-up actions from the First Five Year Review are discussed in Table V-1.

Table V-1 Actions Taken Since the Last Five Year Review

Issues from Previous Review	Recommendations/ Follow-up Actions	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
Perimeter fence in need of repair	Consider relaxation of fencing requirement	EPA/DEQ	September 30, 2010	Completed. Town of Columbus revised the SOD ordinance, stating that the fence surrounding the site is no longer needed.	April 14, 2010
Monitoring well is missing a manhole cover	Repair well.	Montana Bureau of Mines and Geology (MBMG)	December 31, 2007	Completed prior to the submittal of the First Five Year Review	October 11, 2007
Groundwater use restrictions were relaxed across the SOD. However, the ICs for groundwater use restrictions should be re-established and maintained within the treated block placement area.	Restore groundwater use restrictions within the treated block placement area under town ordinance (Section 17.76.010)	Town of Columbus	December 31, 2008	Ordinance 328 of the Town Council of the Town of Columbus, amending Subsection D of Section 17.76.010 and Section 17.76040	April 1, 2008
Long term compliance monitoring of groundwater quality has not been formally detailed in a decision document	Prepare an Action Memorandum clearly identifying the number and location of compliance monitoring wells as well as monitoring frequency	EPA/DEQ	June 30, 2008	An Action Memo was issued in 2008	July 11, 2008

Issues from Previous Review	Recommendations/ Follow-up Actions	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
Performance standards required under the decision documents have been met. Site may be eligible for deletion	Consider deleting the site from NPL	EPA	April 30, 2009	Complete. A partial deletion of the surface and subsurface soils component of the Mouat Industries Site was published in the Federal Register. The groundwater component will remain on the NPL and is not being considered for deletion.	March 10, 2009

VI. Five-Year Review Process

Administrative Components

The Mouat Industries Five-Year Review team was led by Roger Hoogerheide, EPA Remedial Project Manager for the Site. The following Team Members also participated in the review:

- Daryl Reed, DEQ Remedial Project Officer
- US Army Corps of Engineers, Omaha District
- Montana Bureau of Mines and Geology (MBMG), DEQ Contractor

This Five-Year Review consisted of the following activities: community involvement, a review of relevant documents, data review, site inspection, local interviews, and the second Five-Year Review Report Development and Review.

The schedule for the review extended through March 2013.

Community Involvement

A Five Year Review notice was placed in the Billings Gazette on September 7, 2012. The notice described the intent of the review; let members of the public know where they could find more information about the Site and/or request a copy of the report. EPA also invited members of the public to submit their questions or comments regarding the review to EPA.

Upon completion of the Five Year Review, a notice will be placed in the Billings Gazette announcing that the Five-Year Review has been completed and that copies of the report are available for the public to review at U.S. EPA Region 8 Montana Office Records Center and EPA's web page at <http://www.epa.gov/region8/superfund/mt/mouat/index.html>.

Interviews

A list of individuals interviewed and associated interview records are provided as Attachment **VI-6**. The following is a summary of these interviews.

Mr. Hoogerheide EPA PM voiced concern for the future long term management of the Site and who will perform on Site inspections and annual groundwater monitoring. He indicated that the Town is responsible for implementation of the institutional controls. He added that because a removal action was conducted rather than a remedial action, and no ROD was written, the state may not concur on accepting O&M. Mr. Hoogerheide recommended a ROD be written so EPA can delete the groundwater operable unit from the NPL once O&M is addressed. Also he recommended abandonment of the monitoring wells on the south side of the airport. He recommends, and has implemented, increased visits to the Site to improve communication with the Town. Mr. Hoogerheide said EPA and the DEQ should have been notified prior to the public works building being constructed in the area of ICs over the SOD. He further noted that all agencies were surprised by the building being constructed on the cap. Mr. Hoogerheide said the requirement for notification is stated in a letter dated January 2009 from EPA and DEQ to the Town, and was signed by the Mayor of Columbus, EPA and DEQ. Despite this agreement,

notification did not take place. Mr. Hoogerheide believes the notification requirement was not enforceable because it was not promulgated into the ordinance on IC/SOD, but if the letter were made part of the Town's SOD, then it would be enforceable. Mr. Hoogerheide recommends notification be promulgated into the Town's SOD. He added that a further requirement was placed in the SOD pertaining to the Timberweld portion; specifically, when the Town transferred the property to Timberweld, the IC's transferred as well. He suggested a recommendation of adding notification to the Town's SOD that also affects Timberweld. Mr. Hoogerheide stated that the majority of the public works building is not on the repository. He stated that while the excavated blocks being reburied in the utility corridor is not an ideal location; (the blocks) are considered to be solid waste not hazardous waste and the CERCLA Off-Site Rule still applies. When questioned on the functionality of the remedy, Mr. Hoogerheide said the remedy in regards to soils is as designed and met the cleanup goals for soils. He added significant reduction has been observed in the size of the controlled groundwater. With regard to groundwater, Mr. Hoogerheide acknowledged that when water contacts the waste, the chromium can dissolve; and that is why trigger values were placed into the Post Removal Site Control Plan, 2008: 3 times the MCLs in the source area and/or half of the MCLs down-gradient triggers more frequent (semiannual) monitoring. Mr. Hoogerheide indicated that there are many unknowns during high groundwater to include: when groundwater saturates the block, how much dissolves, where steady state is, and transport time from the source area to the Point of Compliance wells.

Daryl Reed, DEQ Remedial Project Officer, was positive about the amount of communication lately on this Site. Mr. Reed was on Site in 2010 when the EPA and DEQ participated in the briefing by MBMG and Montana Tech on the Structural Capacity of the cap and repository concrete soil blocks (**Final Report Mouat Industries Superfund Site Structural Capacity and Institutional Controls Reassessment, November, 2009**). He said he had worked with the Town on their ICs to allow re-development. In the "Post Removal Site Closure Plan for Mouat Industries National Priority List Site, Columbus, Stillwater County, Montana, February 2009" and also in the letter dated January 2009 from the EPA and DEQ to the Town, the Town is supposed to notify the EPA and State before building. A violation of the notification occurred when the Town built their Public Works building on part of the repository. Because the notification requirements are not in the Town ordinance, Mr. Reed recommends that the ordinance language be changed to require notification before future redevelopment is planned. The Town is now aware of the requirement to notify EPA and DEQ before any future redevelopment. He feels regular communication, minimum annually, with EPA, DEQ and the Town is necessary. Mr. Reed said the Public Works building is a great re-use of the Site, the Town could expand or add a storage yard if they needed. Mr. Reed mentioned a significant change in O&M and sampling occurred in the last 5 years. The sampling intervals are triggered by the language in the "Post Removal Site Control Plan, February 2009", normally there is annual groundwater monitoring, but there is a trigger value of 3 times the MCL (100 µg/L) for Chromium, which is 300 µg/L that was exceeded significantly in the source wells in June 2011, and moderately exceeded in 2010. That triggered more frequent semi-annual monitoring until the levels decrease. Mr. Reed says it may be worth considering increasing the 300 µg/L trigger value to a higher concentration. This is because the hydrogeology shows that even if there are high concentrations in the source wells, that there are not high concentrations down gradient in the compliance wells.

Mr. Holton, the Director of Public Works for the Town was interviewed. He indicated the Town has utilized the Site since it was released to them. He said they use the old water treatment plant building for cold storage and they park on an existing concrete pad left in place behind (east) the new building and they store materials on the part of cap. He said Public Works upkeep the area and mows the cap. Mr. Holton said the SOD is part of the city's zoning regulations but he suggests the ordinance be updated and clarified. Mr. Holton would like a determination on if the actual solidified treated soil blocks are considered solid waste and that they are not hazardous waste. Mr. Holton recommended clarification and the proper procedures be written for handling the blocks. Mr. Holton would appreciate further education on, what the City is allowed to do; how "EPA law" affects reuse of the area; on the moving of the blocks and on how much gravel is required to be added over the soil cap to park or store materials on parts of the cap. Mr. Holton suggested putting everything related to future use of the Site in one O&M type manual rather than a zoning code. He added the manual should explain the proper procedures to dispose of the blocks if a block is removed. For future land use, Mr. Horton's concern is the Site is hard to reuse with all the blocks in place, frost depth is 42 inches so the blocks are in the way for future building construction. The Town's Public Works department doesn't have current plans for another building, but Timberweld may want to build a building. He added that EPA has been doing a good job and has been easy to work with. Mr. Holton said the only incident on Site, was the Town learned that the Town is to ask in advance of building on an area that will affect the blocks. He added, there were two or three documents about the soil-concrete blocks and only one, a letter from EPA to the Mayor, that mentioned the need to inform the EPA in advance of building, so it was unintentionally missed.

Rob Barton, Town of Columbus Treasurer, felt the Town was not provided enough information from EPA, during the original removal action and treatment on Site; the Town would have forced the relocation of all block to go off Site for disposal. Because of the lack of information, the Town requested help from Montana state senators who assisted. Mr. Barton said early on in the project the EPA said Columbus, MT could be charged a \$500,000/day penalty if they did not comply. Mr. Barton said because the Town owned the land (where the process took place) they were considered a PRP. Now the Town can't sell the property, although they did build a public works building on the Site. On further education, Mr. Barton said the institutional knowledge is still here, as most of the persons who were involved are still around, but education may be needed in another five years, if new persons are hired. Mr. Barton said it is difficult to re-use the Site because of the block remaining on Site in the repository, the ground is higher than the ground around it, and if a business wants to use the block area, they are required to add 2-feet more cover, so it gets pretty high for re-use, especially considering there is an adjacent airport. He added the project originally planned a second layer of soil concrete blocks in the repository, but instead those block were shipped off Site for disposal, due to the potential of the repository getting too high.

Mr. Hucke, Timberweld, owns some of the property in the SOD area. Mr. Hucke's overall impression of the project is that it is very successful and he understands that the concentrations of hexavalent chromium are decreasing. He attended a public meeting about 4 years ago and had the impression that the entire Site would be considered for deletion. He mentioned that, as a business, he would like the Site deleted, and deletion is better for other businesses and the Town. He feels continued NPL/Superfund status is an impediment to procurement of financing and

investment capital. Mr. Hucke had questions on if groundwater amounts of chromium are decreasing, and by how much; how long ground water monitoring will continue and, on the criteria that would allow deletion. Mr. Hucke feels Site operations have severely impeded Timberweld operations. The presence of the NPL Site has hurt the economy and tax base of the Town. The repository area (block area) of the SOD, has been taken out of service for unrestricted development. Mr. Hucke is aware that Montana Tech wrote a report on building in the block repository area. He added that in the original remediation specifications, for the initial laying of the block, the block were supposed to have bearing capacity to be used with a mat and slab on grade foundation. When the Town built their public works building, Montana Tech recommended the block be removed and footings go to undisturbed grade for support. Mr. Hucke recommends as much flexibility as possible as to foundation types allowed over the blocks including but not limited to: mat foundations, thickened edge slabs, grouting of the voids in the block, piers, footings, etc. He added Timberweld has contemplated an expansion toward the Town's land, over the repository (blocks). Mr. Hucke recommends a written set of rules on how to handle the blocks, if they are excavated and removed for any reason: a building or utilities etc.

Mr. Jordan, British Petroleum, feels deleting the Site is the right direction for the Site, and that current groundwater restrictions are protective.

Mr. Nguyen, EPA On-Scene Coordinator, said he was only involved at the beginning of activities commencing on the Mouat Site. Mr. Nguyen said he was able to put an EPA Order on the FMC for cleanup of the Site. Then FMC did a voluntary cleanup – but only addressed the soil contamination not the groundwater contamination. He said FMC were able to avoid groundwater cleanup. He said FMC produced a model arguing after the soil contamination was addressed, that the groundwater would be cleaned up without any action in 10-years. He added that FMC did do a good job of the soil treatment on Site. Mr. Nguyen feels the area where they (blocks) are buried should have a restriction that lasts well into the future. He said for beneficial reuse of the Site, the blocks should be grouped together and he recommends not disturbing the block area, and only developing the rest of the Site. Mr. Nguyen said he was unaware of current Site activities.

Mr. Icopini, MBMG, was interviewed, and his overall impression of the Site is good, the remedy appears to be fairly effective, with no downgradient exceedances of drinking water standards. MBMG has been doing the monitoring at the Site since 2007. He said MBMG monitors 3 weeks after the peak in ground water in the spring (hydrograph) yearly and that levels last year triggered more frequent monitoring, to twice a year. The trigger values are below MCL. Mr. Icopini said the Post Removal Site Control Plan is good for the Site needs. He added MBMG also conducted sampling and installation of the remote groundwater monitors.

Mr. Michael Shannon, FMC, provided written answers to the questions. FMC agrees with EPA's 2009 determination to delete the soil component at the Site from the NPL. This partial deletion pertained to the surface and subsurface soil components of the Site that FMC addressed through a remediation project between 1991-1994. In answering the question "Did you know that the ground water restrictions were lifted by the town in 2008", Mr. Shannon responded that FMC understands that the groundwater use restrictions were relaxed for the SOD, however they remain intact for the treated block placement area.

Document Review

This Five-Year Review consisted of a review of relevant documents including IC's, ARARs, Action Memoranda, Post Removal Site Control Plan, Five-Year Review guidance, and monitoring data. A list of site documents used in the preparation of this Five-Year Review is included as **Attachment VI-I**.

Data Review

In preparing 2nd Five-Year Review Report, data from the following reports were reviewed and evaluated to ensure compliance with the 2009 Post Removal Site Control Plan:

- Mouat Industries Superfund Site, 2008 Groundwater Monitoring Results, Revised Final Report, December 2008.
- Mouat Industries Superfund Site, 2009 Groundwater Monitoring Results, Final Report, September 2009
- Mouat Industries Superfund Site, 2010 Groundwater Monitoring Results, Final Report, December 2010.
- Mouat Industries Superfund Site 2011 Groundwater Monitoring Results Final Report, March 2012.

Conclusions from the 2008 groundwater monitoring report were as follows. The DEQ Circular 7 drinking water standard for Cr is 100 µg/L; while the highest observed dissolved Cr concentration was 229 µg/l with a corresponding total recoverable Cr concentration of 235 µg /L. The MCL was exceeded in three monitoring wells within the repository/source area of the Site; while no exceedences were noted in any of the downgradient wells. Based upon the results between the two 2008 sample periods it appears that Cr concentrations in the groundwater system are dependent upon local groundwater levels and climatic conditions. This indicates that the residual Cr in soil is leaching to the groundwater but the plume is being dispersed by the highly transmissive aquifer and/or geochemically attenuated. It is also possible that sampling occurred at a time when the plume had not fully reached the downgradient wells, or had already passed by. Chromium concentrations increased in all but one of the downgradient wells between low-water and high-water level conditions.

Conclusions from the 2009 groundwater monitoring report were as follows. The concentrations of Cr from wells within the repository this year were much lower than those observed in samples collected in June 2008 with the highest concentration of 101 µg/L dissolved Cr, which was the only sample from any of the wells to exceed the 100 µg/L performance standard. All samples collected from the down-gradient wells had Cr concentrations below 100 ug/L. However, one down-gradient well (MO-11) shows a trend of increasing Cr concentrations for the last three years with the highest down-gradient concentration of 42 µg/L dissolved Cr and 42.6 µg/L total recoverable Cr. Chromium concentrations in the other down-gradient wells do not show a consistent trend for the last three years and concentrations from this year were similar to those from previous years. However, based on the last three years of data it appears that it would be advisable in the future to select sample times that

coincide with somewhat elevated water levels to ensure that the data collected represent the maximum potential contamination of the aquifer. This approach will ensure that exceedences of the MCL are unlikely to be missed or occur down gradient of the sampling sites.

Conclusions from the 2010 groundwater monitoring report were as follows. The Cr concentrations in samples from the wells down-gradient of the repository site, including the compliance wells, were well below the action limit of 100 µg/L with all dissolved and total recoverable Cr concentrations below 25 µg/L. However, one compliance well (MIS-15) could not be found during the June sampling and had been buried during a fencing project on the airport property. The Cr concentrations in samples from the wells within the repository were relatively high with total recoverable Cr concentrations ranging from 23.5 to 283 µg/L and dissolved Cr concentrations ranging from 4.33 to 306 µg/L. The high sample was from well MO-25. The value of 306 µg/L Cr from MO-25 exceeds the source area well trigger value specified in the Post Removal Site Control Plan. No other trigger values were exceeded. In accordance with the Post Removal Site Control Plan the source area and downgradient well were re-sampled in January 2011.

Conclusions from the 2011 groundwater monitoring report were as follows. The 2011 report included results from the January 2011, June 2011, and November 2011 sampling events. Trigger values were exceeded in samples collected during the January 2011 and June 2011 sampling events. The January 2011 sampling was conducted because a chromium concentration of 306 µg/L was detected in a sample from well MO-25 collected during the June 2010 sampling, which exceeded the trigger value for source area wells. The January 2011 sampling also resulted in an exceedance of the downgradient trigger value. A chromium concentration of 52.5 µg/L was detected in the total recoverable sample from MO-11. The trigger value for downgradient wells is ½ the MCL or 50 µg/L chromium. The exceedance of this trigger necessitated semi-annual sampling for at least two sampling events (June and November). The June 2011 sampling event resulted in exceedances of the trigger in 3 of the source area wells and one downgradient well. The block-area wells MO-25, MO-26, and RMIS-2 had dissolved chromium concentrations of 518, 1500, and 805 µg/L (respectively) and total recoverable chromium concentrations of 561, 1520, and 773 µg/L (respectively). The downgradient well MIS-16 had dissolved and total recoverable chromium concentrations of 71 and 71 µg/L, respectively. The spring and summer of 2011 were exceptionally wet for Columbus, MT. This unusual recharge provided for more than normal flushing of the block area and is likely the cause for the very high concentrations and the trigger exceedances observed during the June 2011 sampling. There were no trigger exceedances in the samples collected during the November 2011 event. Assuming no exceedances in the next sample event scheduled for the June 2012 timeframe, annual sampling is planned to resume in 2013.

Table VI-1. Highest Total Chromium Concentrations (2008 to 2011)

Monitoring Well Type	Chromium Triggering Concentration (µg/L)	HIGHEST TOTAL CHROMIUM CONCENTRATIONS (µg/L)						
		May 2008	Jun 2008	Jun 2009	Jun 2010	Jan 2011	Jun 2011	Nov 2011
Background	>25	1.1	0.7	1.27	NS	NS	NS	0.550 J
Block Placement Area	>300	6.7	235	96.8	283	61.5	1520.1	75.3
Down-gradient POC	>50	10.8	28	27.4	18.5	15	71.15	45.9
Down-gradient	>50	14.9	28.3	42.6	24.6	52.5	24.03	16.1

Background Wells = RMIS-1

Block Placement Area Wells = MO-9, MO-25, MO-26, RMIS-2

Down-gradient POC Wells = MIS-15, MIS-16, RMIS-4S, RMIS-5

Down-gradient Wells = MO-10, MO-11

MCL for Chromium = 100 µg/L

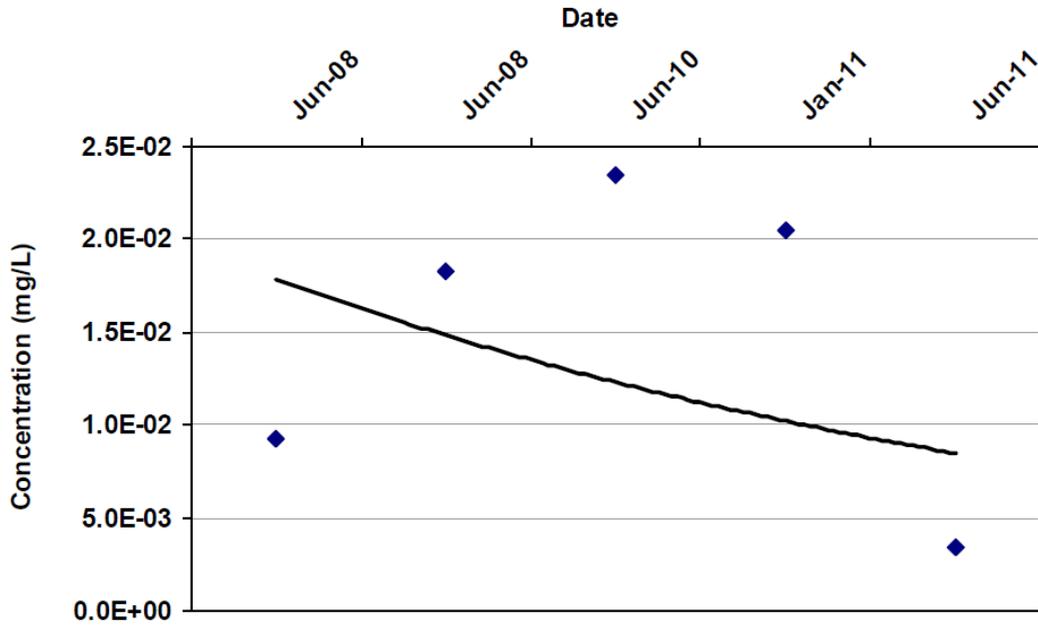
Chromium concentration exceeding the MCL in background or down-gradient wells triggers re-sampling and corrective action measures if data verifies a concentration increase above the MCL.

NS = not sampled

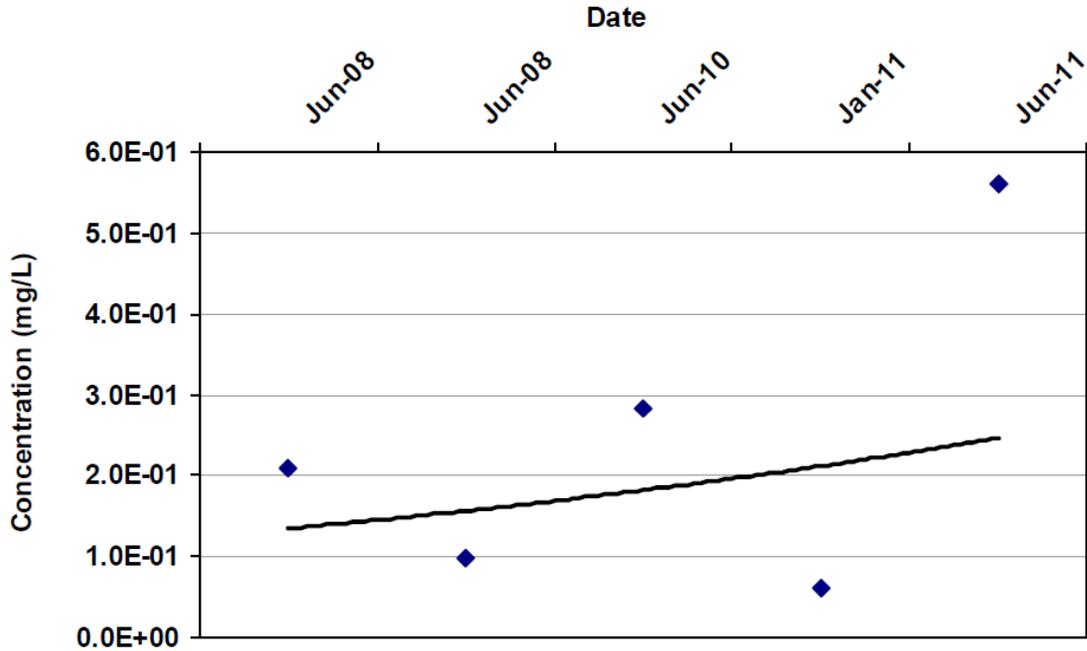
J = Estimated Value

Trend Analysis

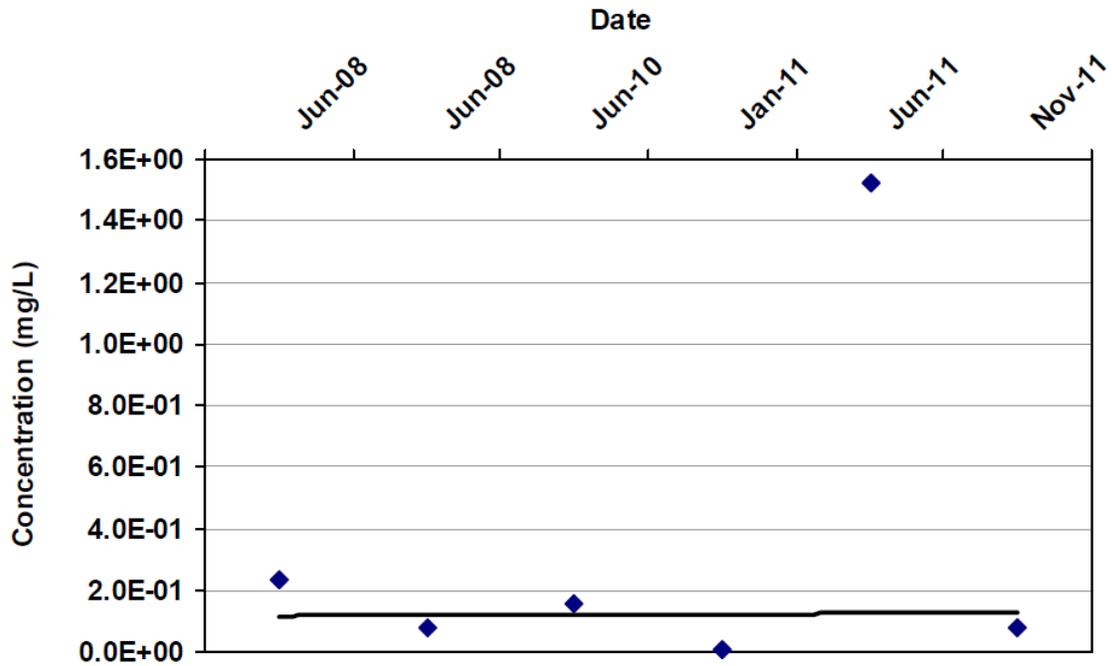
A recent and overall trend analysis of total chromium data was conducted for each monitoring well included in the current monitoring program. The assessment of data trends were facilitated by the use of the MAROS package version 2.2 (Groundwater Services Inc. for the Air Force Center of Environmental Excellence, 2006). The trend analysis procedure and results for all monitoring wells are included in **Attachment VI-4**. Recent trends for the source wells within the block placement area (MO-9, MO-25, MO-26, and RMIS-2) and three of the downgradient wells (MO-11, MIS-16, and RMIS-5) are included below.



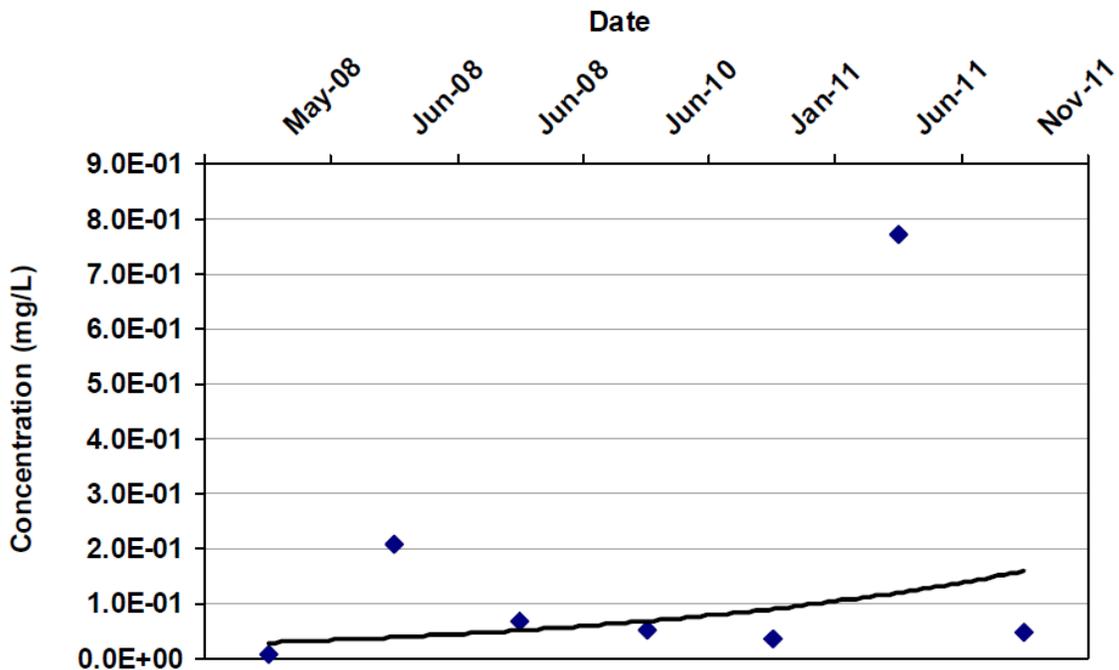
**Monitoring Well MO-9 (Source Well)
Chromium Concentration Trend**



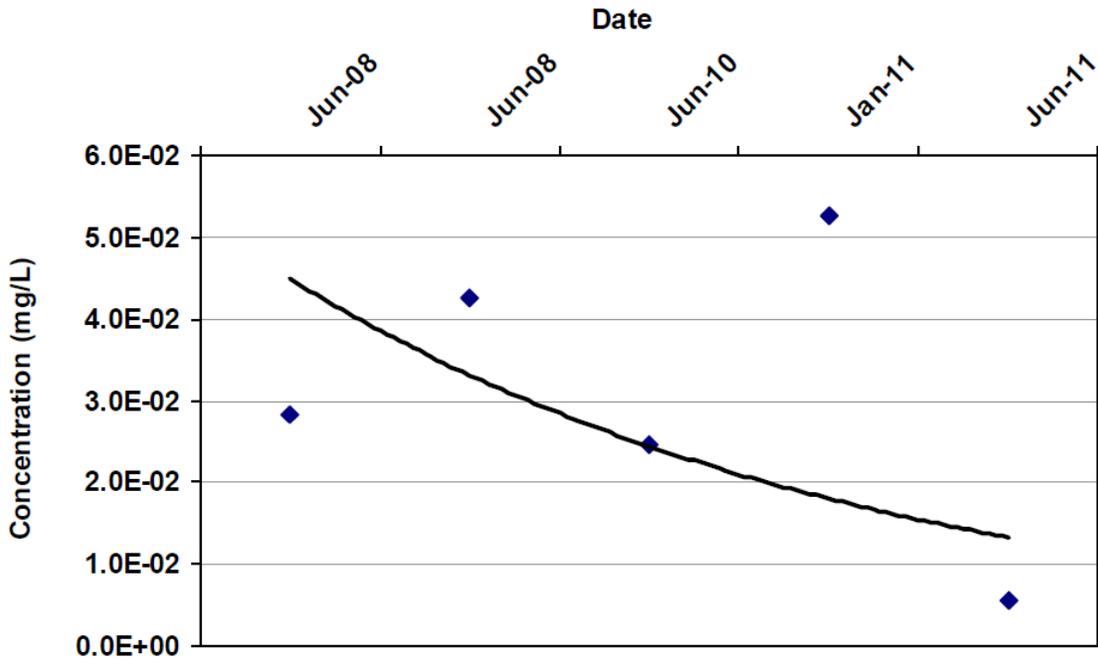
**Monitoring Well MO-25 (Source Well)
Chromium Concentration Trend**



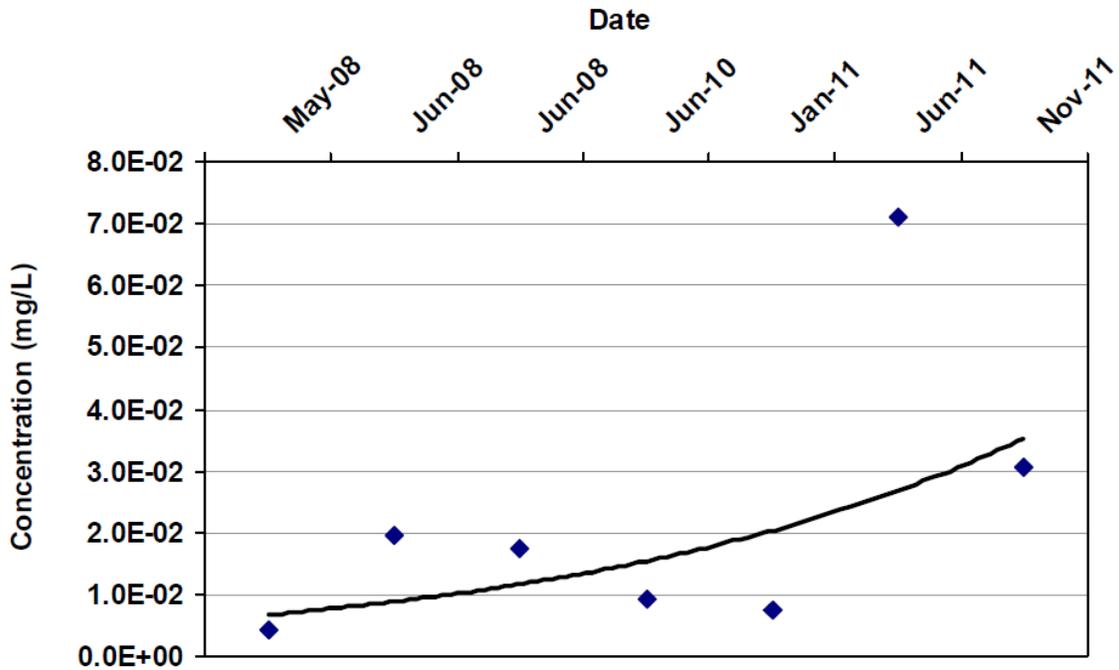
**Monitoring Well MO-26 (Source Well)
Chromium Concentration Trend**



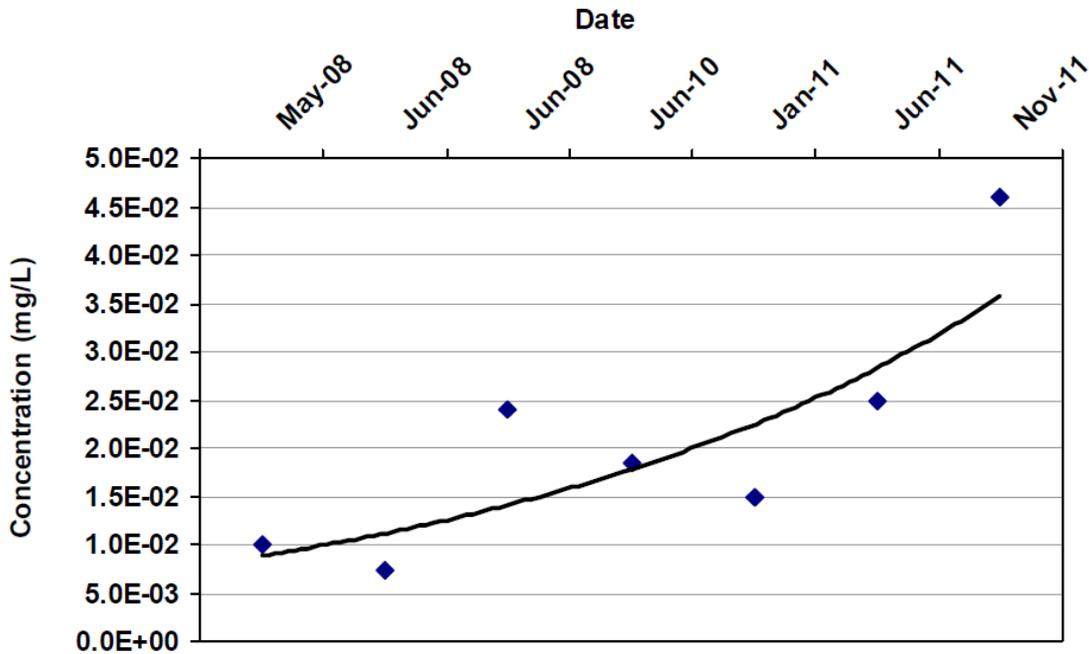
**Monitoring Well RMIS-2 (Source Well)
Chromium Concentration Trend**



**Monitoring Well MO-11 (Downgradient Well)
Chromium Concentration Trend**



**Monitoring Well MIS-16 (Downgradient Well)
Chromium Concentration Trend**



**Monitoring Well RMIS-5 (Downgradient Well)
Chromium Concentration Trend**

Site Inspection

The Site inspection was performed on August 31, 2012. The following personnel attended the Site inspection:

- Roger Hoogerheide, EPA Remedial Project Manager
- Daryl Reed, DEQ Remedial Project Officer
- Gary Icopini, MBMG
- Nicholas Tucci, MBMG
- Dennis Holton, Town of Columbus
- Mary Darling, USACE Omaha District Project Manager
- Jennifer Grimm, USACE Project Geologist
- Melissa Kemling, USACE Project Regulatory Specialist
- Gordon Lewis, USACE Project Geotechnical Engineer
- James Tiehen, USACE Project Chemist

The purpose of the Site inspection was to assess the protectiveness of the remedy, observe current Site conditions and removal action elements (**Attachment VI-2**). Site activities currently are limited to monitoring, maintenance, and enforcement of ICs, monitoring and maintenance of gravel and vegetative caps on the block placement area; and sampling of monitoring wells as specified in the Post Removal Site Control Plan.

Groundwater Monitoring Well Inspection

The above ground features of the on and off Site monitoring wells were inspected as part of the Site inspection. Many of the off-Site monitoring wells sampled during the removal action phase, but not included in the current monitoring program, are in poor condition. Even though some covers and locks have been replaced, the covers could often be lifted off the well riser while still locked. Riser pipes were noted as damaged and concrete pads intended to divert surface water drainage away from wells are often cracked and disintegrating (**Attachment VI-3, photos 13 and 14**).

Vegetative Cover and Drainage Structures Inspection

Vehicles and other heavy equipment were parked on the vegetated soil cover (**Attachment VI-3, photos 1 and 2**). Tire tracks were noted, indicating that vehicles had been driven over this area. Stockpiles of soil and gravel for use in backfilling areas outside of the perimeter fence were present on the block area surface (**Attachment VI-3, photo 3**). Holes that are likely due to the fill material settling between the blocks (**Attachment VI-3, photo 9**) and tire tracks were observed throughout the vegetated cover.

Drainage structures appeared to be clear of debris and functioning as intended based on the absence of alternate drainage paths.

Waste Excavation Inspection

A building was built on the eastern third of the “East Block” since the last Five-Year Review. Prior to construction, some waste blocks were excavated and re-buried on-Site. During the Site inspection, it was explained that excavated waste blocks from the East Block degraded quickly at the surface and were additionally broken up with an excavator bucket before being placed into a ravine between the center block and the east block (the utility corridor); and the entire ravine was filled in, until level with the surrounding topography (**Attachment VI-3, photos 4 through 7**).

Institutional Controls Inspection

Institutional controls were evaluated by comparing the condition of the property and/or interview answers with the Town versus the ICs documented in the Action Memorandum Amendment from 2008, as well as the revised Town Ordinance No. 336 from 2010. During the Site visit the following concerns with the monitoring, maintenance and enforcement of ICs were noted:

- Fill material without TCLP confirmation for chromium was placed in the excavation under the Town’s public works building;
- Excavated waste blocks were placed into the utility corridor;
- Soil and gravel caps have not been maintained or repaired to prevent degradation; and
- Heavy equipment and vehicles were stored on the soil cap.

VII. Technical Assessment

Question A: Is the response action functioning as intended by the decision documents?

Yes, the review of documents, ARARs, ICs, and the results of the Site inspections indicate that the response actions for the block area are functioning as intended. The excavation, treatment, and containment of contaminated soils in the on-Site repository with the addition of the ICs implemented at the Site have achieved and continue to achieve the objectives set out in the Site decision documents to restore groundwater, prevent migration, and prevent exposure.

Removal Action Performance

All removal actions called for in the 1992 and 1996 Action Memoranda have been completed. The 1992 removal action, which addressed the source of contamination, was declared complete on October 1, 1994. The surface and subsurface soils component of the Site was deleted from the NPL in 2009. As discussed in **Sections III and IV**, the groundwater and surface water removal action was certified complete in 2004.

System Operations/Post Removal Site Control

The Town and Timberweld own the property containing the repository. The Town has agreed to implement and enforce the ICs at the Site and placed a deed restriction on the Timberweld property to ensure compliance with the ICs. The ICs require the Town to maintain the vegetative cap and drainage features on this property and Timberweld maintains the gravel cover. It was noted in the Site inspection that there were holes in the vegetative cap and that a portion of the vegetative cap area was being used for storage of materials and vehicles. However, none of these issues seriously affected the proper functioning of the vegetative cap. The drainage features appear to be functioning as designed.

To date, groundwater monitoring data shows that the response actions continue to maintain groundwater protectiveness by maintaining remediation levels within the point-of-compliance, as defined in the 2008 Action Memorandum and Post Removal Site Control Plan as, the boundary of the block disposal area.

Implementation of Institutional Controls

The implementation of institutional controls in the Block Placement Area over land use and groundwater use have been established by the Town of Columbus as part of its response actions as a responsible party under Superfund. A zoning ordinance (17.76) was approved by Town Council in March 1995 and created the SOD. Based on a review of correspondence and discussions with the Town during the site inspection, minor infractions to the ICs were determined:

Subsection D of Section 17.76.020 (2005). “Test results that confirm that any fill material proposed to be imported to the block placement area has less than 0.1 mg/L total chromium in TCLP extracts or written certification that no fill material will be imported”. During the Site inspection, the Town stated that fill material had been placed in the excavation, and that no test

results existed. EPA received TCLP results from the Town for the fill in the excavation on March 13, 2013, see results in **Attachment VII-1**. The analytical results demonstrate that the fill material (soil matrix) had a non-detect for chromium. Therefore, the requirements of this IC have been met and this is no longer considered to be an issue.

Subsection A of Section 17.76.030 (2005) states that no excavation will be permitted through the 24 inch soil or gravel cover, except for building or utility construction as described in subsection F of the section. Note: excavation is permitted at the existing sanitary sewer only for purposes of sewer maintenance and improvement. Subsection F of Section 17.76.030 of Ordinance No. 336 (March 2010) indicates that if a building is constructed within the block placement area (treated soil repository), excavation required for this construction and trenching for this construction and trenching for utilities is allowed. However, excavated waste may be placed back into the foundation excavation and compacted as backfill to support the foundation and/or disposed of according to state of Montana approved methods. No option is provided for excavated waste to be placed in any other area. As detailed in Section VI, prior to construction of a new building, waste blocks were excavated and re-buried in a new location on-site (see **Attachment VII-2** for original cross-section). The excavated waste blocks were neither placed back into the foundation excavation as per the IC, nor were the excavated waste blocks disposed of according to state of Montana approved methods and Section 121 (d)(3) of CERCLA.

Subsection C of Section 17.76.030 (2005) states that areas with a vegetated soil cover cannot be used for any purpose unless a gravel cover or a gravel and asphalt overlay is placed over the twenty-four (24) inch thick soil cover or a gravel cover that meets criteria specified in the SOD.” Vehicles, heavy equipment, and gravel stockpiles were observed on the vegetated cover. It did not appear as if the additional criteria, as specified in the SOD had been met.

Subsection D of Section 17.760.030 (2005) indicates that soil and gravel covers constructed pursuant to subsection C of this section must be maintained by the property owner to prevent degradation. Damage due to erosion, wind, burrowing animals, vehicles, or other causes must be repaired promptly by the property owner. Damage due to tire tracks and the settling of fill between blocks were noted during the Site inspection.

Even though the Town has conducted some recent activities that are inconsistent with the ICs, these actions do not impact short-term protectiveness because the blocks excavated were replaced on Town property within the Block placement area and this issue is easily remedied. All caps are still intact, which is protective of human health and the environment in the short-term. However, if EPA and DEQ cannot ensure that the town operates, maintains, and enforces the zoning ordinance that implements the ICs for the Site, long-term protectiveness may not be ensured.

Opportunities for Optimization

To assure adherence with established institutional controls, modify the Post Closure Site Control Plan to include specific actions for monitoring and maintenance of the vegetative cap and gravel covers. It is also recommended that proper procedures for handling and disposing of any excavated blocks to ensure waste is handled in accordance with RCRA, CERCLA and/or

Montana disposal requirements be included in the Post Removal Site Control Plan.

There also seems to be a correlation between seasonally high precipitation events and leaching of chromium to groundwater during periods of water table rise. Transducers are placed in several wells to continuously monitor groundwater levels and data can be accessed remotely. It is recommended that modeling be used to determine the length of time it would take for groundwater in the source area to reach the points of compliance to ensure sampling captures these releases. The Post Removal Site Control Plan should also be modified to provide additional sampling mobilizations when a trigger groundwater elevation is reached in the source area.

Early indicators of potential removal action problems

The removal actions have been operating for more than a decade and their performance is within expected limits. However, ICs have been functioning for more than a decade, but their efficacies need to be tweaked based on findings from the Site inspection. Even though the Town has conducted some recent activities that are inconsistent with the ICs, these actions do not impact short-term protectiveness. However, if EPA and DEQ cannot ensure that the Town operates, maintains, and enforces the zoning ordinance that implements the ICs for the Site, long-term protectiveness may not be ensured.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the response action selection still valid?

Yes, the exposure assumptions, toxicity data, cleanup levels, and objectives for the response actions used at the time of the response action selection are still valid.

Changes in Standards and To Be Considereds (TBC)

Surface water and groundwater performance standards are based on chemical-specific ARARs. The Federal drinking water MCL is currently 0.1 mg/L and the State water quality standard for chromium is also 0.1 mg/L. Surface water cleanup levels were based on the DEQ-7 aquatic life chronic standard of 0.011 mg/L for Chromium VI and 0.1 mg/L for Chromium III. While the Chromium III aquatic life chronic standard has been lowered to 0.027 mg/L, all surface water samples were analyzed for total chromium and met the more stringent aquatic life chronic standard for Chromium VI.

Although EPA is currently considering establishing an enforceable MCL for hexavalent chromium, the chromium VI assessment milestone for draft development is tentatively set to be completed by second quarter of Fiscal Year 2013. At the time of this Five-Year Review, there have been no changes in the ARARs or TBCs that affect the overall protectiveness of the remedy.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics

The 1996 Baseline Risk Assessment assumed no exposure was to occur between humans and the treated soils/wastes. In addition, the MCL for groundwater is the performance standard,

and is not risk based. Therefore cleanup levels would not be affected by any changes in toxicity values so it does not affect remedy protectiveness. These assumptions are considered to be protective and reasonable in evaluating risk for this Site since the land use is expected to remain industrial. Therefore, there have been no changes to these assumptions that could affect the protectiveness of the remedy.

Changes in Risk Assessment Methods

There has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy.

Expected Progress Towards Meeting Objectives of the Selected Response Actions

The objectives of the selected response actions at this Site are summarized in the Post Removal Site Control Plan as follows: 1) restore groundwater quality; 2) prevent migration; and 3) prevent exposure through administrative controls. These objectives are currently being met.

Question C: Has any other information come to light that could call into question the protectiveness of the response actions?

As discovered during the Site visit and interviews, there appears to be a lack of understanding of the ICs, what the Town can/cannot do, and their ongoing PRP responsibilities. This was evinced by a few ICs that were not met during the building of the new public works building, and are outlined in detail in Section VIII. It may be prudent to educate the Town on the Enforcement Memorandum dated September 29, 1997, particularly on their liability for past and future response actions.

Technical Assessment Summary

The review of documents, ARARs, risk assumptions, IC's, PRP responsibilities, and the results of the Site inspections indicate that the selected response actions are functioning as intended. There have been no changes in the ARARs that would affect the protectiveness of the remedy and there have been no changes in standards that would affect existing cleanup levels. Changes in the toxicity factors that were used in calculation of cleanup levels did not result in the need for additional or changed remedies. There has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy.

VIII. Issues

The following issues were raised during the second Five-Year Review at Mouat Industries. These issues are presented in **Table VIII-1**. Recommendations and follow-up actions are presented in **Section IX** of this report.

Table VIII-1
Issues Raised During the Second Five-Year Review

Item No.	Issues	Affects Current Protectiveness (Y/N)?	Affects Future Protectiveness (Y/N)?
1	Excavated waste blocks were placed into a non-waste block area (utility corridor), which is incongruent with the IC.	N	Y
2	The vegetative cover, gravel, and asphalt caps do not have a formalized inspection and maintenance plan.	N	Y
3	Soil and gravel covers constructed have not been maintained to prevent degradation. Block areas with a vegetated soil cover are being utilized as an equipment and vehicular storage area and soil and gravel are stockpiled. In addition, damage from vehicles and other means was evident and unrepaired.	N	Y
4	Monitoring wells used to monitor the completed response action have not been abandoned. Some of these wells are damaged and may be acting as surface water conduits.	N	Y

IX. Recommendations and Follow-up Actions

This section presents the recommendations in response to the issues presented in **Section VIII**.

**Table IX-1
Recommendations and Follow-Up Actions**

Item No.	Issues	Recommendations and Follow-up Actions	Party Responsible	Due Date
1	Excavated waste blocks were placed into a non-waste block area (utility corridor), which is inconsistent with the IC.	Clarify whether the blocks are solid or hazardous waste and develop proper procedures for handling and disposing of any excavated blocks to ensure blocks are handled in accordance with RCRA, CERCLA and Montana disposal requirements.	EPA Region 8	June 30, 2014
2	The vegetative cover, gravel, and asphalt caps do not have a formalized inspection and maintenance plan.	Modify the post closure plan to clearly outline scheduled inspection and maintenance responsibilities for the vegetative cover, gravel and asphalt caps. These actions should be written to assure compliance with institutional controls.	EPA Region 8	June 30, 2014
3	Soil and gravel covers constructed have not been maintained to prevent degradation. Block areas with a vegetated soil cover are being utilized as an equipment and vehicular storage area and soil and gravel are stockpiled. In addition, damage from vehicles and other means was evident and unrepaired.	Town of Columbus will regrade the cover to facilitate runoff and maintenance. Surplus equipment, vehicles, soil and gravel will be removed from the cap. Once these actions are completed, the area will be reseeded and EPA and DEQ notified and an inspection conducted.	Town of Columbus, DEQ, and EPA Region 8	June 30, 2013
4	Monitoring wells used to monitor the completed response action have not been abandoned. Some of these wells are damaged and may act as surface water conduits to groundwater.	Abandon all monitoring wells not included in the post closure monitoring.	EPA Region 8	December 31, 2013

X. Protectiveness Statement(s)

The response actions implemented at OU1 currently protect human health and the environment because all caps are still intact, which is protective of human health and the environment in the short-term. Even though the Town has conducted some recent activities that are inconsistent with the ICs, these actions do not impact short-term protectiveness because the blocks excavated were replaced on Town property within the Block placement area and this issue is easily remedied. However, in order for the response actions to be protective in the long-term, the following actions need to be taken (the Post Removal Site Control Plan needs to be modified; and the EPA and DEQ need to ensure that the Town operates, maintains, and enforces the zoning ordinance that implements the ICs for the Site) to ensure protectiveness.

Because the response actions at all OUs are protective, the site is protective of human health and the environment.

XI. Next Review

The next policy Five-Year Review for Mouat Industries Superfund Site is scheduled to be completed in March 2018, five years from the signature date of this review.

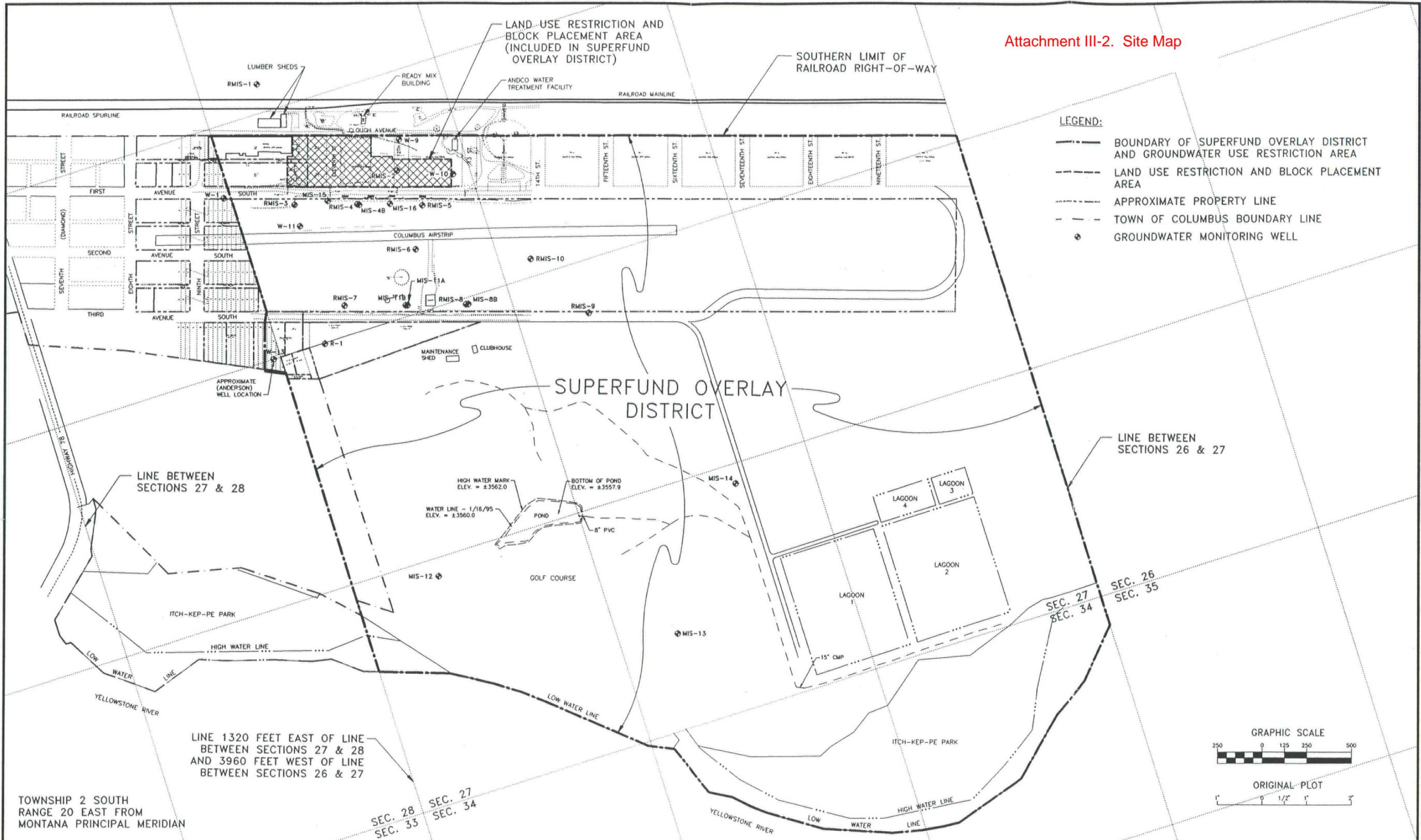
Second Five-Year Review Report
for
Mouat Industries NPL Site
Columbus, Montana

Attachments

Attachment III-1	Site Location Map
Attachment III-2	Site Map
Attachment IV-1	Institutional Controls
Attachment IV-2	List of Monitoring Wells
Attachment IV-3	Map of Monitoring Wells
Attachment VI-1	List of Documents Reviewed
Attachment VI-2	Site Inspection Checklist
Attachment VI-3	Site Photographs
Attachment VI-4	MAROS Analysis
Attachment VI-5	Interview List
Attachment VI-6	Interview Documentation
Attachment VII-1	TCLP Results for Fill Material
Attachment VII-2	Cross Section of Block Areas

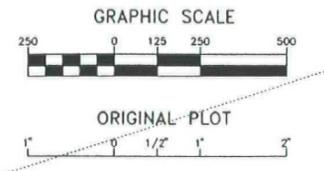


Figure 1 Mouat Industries NPL Site -- Post Removal Site Control Plan



LEGEND:

- BOUNDARY OF SUPERFUND OVERLAY DISTRICT AND GROUNDWATER USE RESTRICTION AREA
- - - LAND USE RESTRICTION AND BLOCK PLACEMENT AREA
- APPROXIMATE PROPERTY LINE
- · - · TOWN OF COLUMBUS BOUNDARY LINE
- ⊕ GROUNDWATER MONITORING WELL



TOWNSHIP 2 SOUTH
 RANGE 20 EAST FROM
 MONTANA PRINCIPAL MERIDIAN

LINE 1320 FEET EAST OF LINE
 BETWEEN SECTIONS 27 & 28
 AND 3960 FEET WEST OF LINE
 BETWEEN SECTIONS 26 & 27

REVISIONS 1 2 3 4 5 6 7 8		DSN/DWN: EHR/CEB CHK: S.O. NO.: 18978 FILE: 18978L29	NORTH 	FMC CORPORATION PHILADELPHIA, PENNSYLVANIA Baker Environmental, Inc. Coraopolis, Pennsylvania		SUPERFUND OVERLAY DISTRICT MOUAT INDUSTRIES NPL SITE COLUMBUS, MONTANA SCALE: AS SHOWN DATE: MARCH 30, 1995	FIGURE NO. 5-1
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TOWN OF COLUMBUS

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P.O. BOX 549
COLUMBUS, MONTANA 59019
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ENVIRONMENTAL
PROTECTION AGENCY

MAR 17 2010

MONTANA OFFICE

March 16, 2010

Roger Hoogerheide
USEPA Superfund Project Manager
United State Environmental Protection Agency
Region 8, Montana Office
Federal Building, 10 West 15th Street, Suite 3200
Helena, MT 59626

Daryl Reed
DEQ Superfund Project Manager
Montana Department of Environmental Quality
PO Box 200901
Helena, MT 59620-0901

RE: Mouat Industries NTL Site

Dear Roger and Daryl:

Enclosed please find a copy of Town Ordinance No. 336 that was adopted by the Columbus Town Council on second reading during its March 15, 2010, regular meeting for the purpose of amending the institutional controls pertaining to the block placement area within the Mouat Industries Superfund Site overlay district as recommended by your agencies. The Ordinance will become effective April 15, 2010.

Please contact me if there are any further questions or concerns.

Sincerely yours,

Douglas D. Howard

DDH-mah

ORDINANCE NO. 336

AN ORDINANCE OF THE TOWN COUNCIL OF THE TOWN OF COLUMBUS,
MONTANA, AMENDING SUBSECTIONS F, G AND H OF SECTION 17.76.030
OF THE COLUMBUS MUNICIPAL CODE

WHEREAS, the Montana Department of Environmental Quality and the US Environmental Protection Agency have recommended changes to Subsections F, G and H of Section 17.76.030, of the Columbus Municipal Code pertaining to performance standards for the block placement area within the Mouat Industries Superfund Site overlay district based on the November, 2009, Mouat Industries Superfund Site Structural Capacity and Institutional Controls Reassessment Final Report prepared by the Bureau of Mines and Geology Montana Tech of the University of Montana; and

WHEREAS, the Town Council is agreeable to making the recommended changes.

NOW, THEREFORE, be it ordained by the Town Council of the Town of Columbus, Montana:

1) Subsection F of Section 17.76.030 of the Columbus Municipal Code is hereby amended to read as follows:

“F. If a building is constructed within the block placement area, excavation required for this construction and trenching for utilities is allowed. Excavated waste may be placed back into the foundation excavation and compacted as backfill to support the foundation and /or disposed of according to state of Montana approved methods. Any building or structure, including the related utilities, must meet all applicable requirements of the Montana State Building Code and the Town of Columbus zoning code. Load limits for buildings or structures will not exceed six thousand (6,000) pounds per square foot as long as waste is left in place”

2) Subsection G of Section 17.76.030 of the Columbus Municipal Code is hereby amended to read as follows:

“G. Asphalt paving can be substituted for the uppermost four inches of gravel cover. In this case, the asphalt will be placed in three courses— a minimum two-inch gravel base course, a four-inch asphalt base course, and a two-inch surface wearing course.

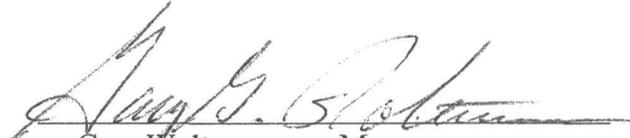
3) Subsection H of Section 17.76.030 of the Columbus Municipal Code is hereby amended to read as follows:

“H. Maintenance of fences around the soil cover areas as well as locked gates are no longer deemed necessary. However, the property owner must maintain the vegetated soil cover or gravel cover on the site.

4) That all Ordinances or parts of Ordinances in conflict herewith shall be repealed upon the effective date of this Ordinance.

5) This Ordinance shall become effective thirty (30) days after its passage and approval.

PASSED by the Town Council and approved by the Mayor on second reading this 15th day March, 2010.


Gary Woltermann - Mayor

ATTEST:


Ronald D. Barndt - Town Clerk





ORDINANCE NO. 328

AN ORDINANCE OF THE TOWN COUNCIL OF THE TOWN OF COLUMBUS, MONTANA, AMENDING SUBSECTION D OF SECTION 17.76.010 AND SECTION 17.76.040 OF THE COLUMBUS MUNICIPAL CODE

WHEREAS, the U.S. Environmental Protection Agency has allowed the removal of groundwater use restrictions from the Superfund overlay district (SOD), excepting the block placement area; and

WHEREAS, the U.S. Environmental Agency Protection Agency has requested that the Town amend Subsection D of Section 17.76.010 and Section 17.76.040 of the Columbus Municipal Code to reflect the removal of the groundwater use restrictions from the SOD, excepting the block placement area.

NOW, THEREFORE, be it ordained by the Town Council of the Town of Columbus, Montana:

1) Subsection D of Section 17.76.010 of the Columbus Municipal Code is hereby amended to read as follows:

“D. Limiting well use and prohibiting drilling of wells within the SOD block placement area; and ...”

2) The first sentence under Section 17.76.040 of the Columbus Municipal Code is hereby amended to read as follows:

“17.76.040 Limitations on groundwater use.

The following limitations apply to groundwater use and related activities within the Superfund overlay district block placement area:...”

3) This Ordinance shall become effective thirty (30) days after its passage and approval.

PASSED by the Town Council and approved by the Mayor this 3rd day March, 2008.


Gary Woltermann - Mayor

ATTEST:


Ronald D. Barndt - Town Clerk

Chapter 17.76

MAY 19 2005

SOD SUPERFUND OVERLAY DISTRICT

Sections:

- 17.76.010 Intent.**
- 17.76.020 Additional application requirements.**
- 17.76.030 Performance standards for block placement area.**
- 17.76.040 Limitations on groundwater use.**
- 17.76.050 Sunset provision.**

17.76.010 Intent.

The intent of the Superfund overlay district (SOD) is to protect public health, safety and welfare while allowing appropriate use of lands within the district. This intent will be accomplished by:

A. Assuring that land use in the Superfund overlay district is compatible with protecting, and providing for permanent preservation and maintenance of remedial actions implemented pursuant to the Superfund law, including soil caps, treated concrete blocks, and other remedial structures;

B. Requiring that any development in the block placement area of the SOD be preceded by submittal of detailed site and construction plans, prepared by an architect or engineer, for review and approval by the town as an institutional control in the context of the federal Superfund law;

C. Requiring submittal of as built plans with certification from an architect or engineer that site development and construction in the block placement area was completed in compliance with this zoning title and federal Superfund law;

D. Limiting well use and prohibiting drilling of wells within the SOD; and

E. Placing a notice to purchasers on any deed, contract for sale, or other instrument of conveyance before any lot or parcel, or any interest in any lot or parcel, in the Superfund overlay district is conveyed. (Ord. 321 (part), 2004; Ord. 298 § 1 (part) (11.02.191), 1997)

17.76.020 Additional application requirements.

All applications for uses and development in the Superfund overlay area shall include the following information:

A. As with other permit applications, an application form, an accurate site plan and review fees;

B. A detailed grading and drainage plan prepared by an engineer showing the location, dimensions and depth of all excavations, volumes of material to be moved, and other drainage features;

C. Detailed plans prepared by an architect or engineer showing how remedial structures such as soil caps, treated concrete blocks, and other structures will be protected and maintained in relation to the proposed development in the block placement area;

D. Test results that confirm that any fill material proposed to be imported to the block placement area has less than 0.1 mg/l total chromium in toxicity characteristic leaching procedure (TCLP) extracts or written certification that no fill material will be imported; and

E. Bearing capacities, design loads and wheel loads resulting from uses proposed for the block placement area. (Ord. 321 (part), 2004: Ord. 298 § 1 (part) (11.02.192), 1997)

17.76.030 Performance standards for block placement area.

The following standards apply to the block placement area within the Superfund overlay district:

A. No excavation will be permitted through the twenty-four (24) inch thick soil or gravel cover except for building or utility construction as described in subsection F of this section. (Excavation is permitted at the existing sanitary sewer only for purposes of sewer maintenance and improvement.)

B. Areas with gravel cover and block placement can be used for vehicle parking, material storage and related traffic. This includes trucks up to the maximum gross vehicle weight and axle loads permitted under the Montana Department of Highways adopted "Federal Bridge Formula," forklifts up to fifty thousand (50,000) pounds gross weight with up to thirty-seven thousand (37,000) pounds on a single axle with four tires, and construction equipment with up to seven thousand two hundred (7,200) pounds per square foot under the actual tire or track contact area.

C. Areas with a vegetated soil cover cannot be used for any purpose unless a gravel cover or a gravel and asphalt overlay is placed over the twenty-four (24) inch thick soil cover or a gravel cover that meets the following criteria:

1. The gravel will be select road stone from a local source. Gravel already on the site will be used to the extent possible; off-site gravel sources will be used only if on-site quantities of suitable gravel are not sufficient. This gravel will be well sorted with a range of particle sizes to facilitate close compaction and to minimize voids and permeability in the cover after placement and compaction.

2. The gravel will be separated from the underlying blocks and soils by a woven geotextile designed to reduce migration of gravel particles downward into the block-south layer and of block pieces upward into the gravel layer.

3. The gravel layer will be approximately two feet (twenty-four (24) inches) thick.

4. The gravel will be placed in six to twelve (12) inch lifts to facilitate grading and compaction. Each lift will be compacted with a motorized road construction type roller.

5. The finished surface of gravel will be graded to promote precipitation runoff to perimeter diversion ditches. The center elevation of the gravel surface will be approximately one foot above the perimeter elevations, and the average surface slope will be one percent.

6. The gravel surface will be designed and installed to accommodate vehicular traffic and open storage of materials. Operation of vehicles such as trucks and forklifts will promote compaction of the surface gravel and further reduce infiltration.

7. Maintenance of the gravel cover will be by the landowner or lessee.

D. The soil and gravel covers constructed pursuant to subsection C of this section must be maintained by the property owner to prevent degradation. Damage due to erosion, wind, burrowing animals, vehicles, or other causes must be repaired promptly by the property owner.

E. The perimeter drainage channels and culverts must be maintained by the city of Columbus public works department in an open, free-flowing condition.

F. If any building or structure (including related utilities) is to be constructed on the block placement areas, sufficient soil must be placed over initial cover so that any excavation required for this construction does not penetrate the placed blocks. Any building or structure, including the related utilities, must meet all applicable requirements of the Montana State Building Code and the city of Columbus zoning code. Load limits for buildings or structures will not exceed six thousand (6,000) pounds per square foot.

G. Asphalt paving can be substituted for the uppermost six inches of the gravel cover. In this case, the asphalt will be placed in two courses—a four inch base course and a two inch surface wearing course.

H. The fences around the soil cover areas must be maintained by the property owner and the gates must be kept locked. To protect the soil cover, wheeled vehicles must be excluded from soil cover areas except for soil cover and vegetation maintenance. (Ord. 298 § 1 (part) (11.02.193), 1997)

17.76.040 Limitations on groundwater use.

The following limitations apply to groundwater use and related activities within the Superfund overlay district:

A. Installation or operation of new groundwater wells, groundwater fed ponds or channels, and other groundwater extraction or recovery systems will not be permitted.

B. Use of groundwater from existing wells, ponds, springs, seeps or any other groundwater recovery or extraction system will not be permitted, except for lawn irrigation use, use of the existing golf course pond, and groundwater monitoring of wells.

C. Excavation below the groundwater table (static groundwater level) for any purpose will not be allowed except for temporary excavation work necessary for construction purposes including placement of footings and utilities. Such temporary excavation work shall require a permit from the town of Columbus. (Ord. 298 § 1 (part) (11.02.194), 1997)

17.76.050 Sunset provision.

Application requirements and limitations for groundwater use shall sunset and will no longer be applicable after the U.S. Environmental Protection Agency allows the removal of these restrictions from the Superfund overlay district. (Ord. 321 (part), 2004)

Table 1
Groundwater Wells to be Sampled

Well Name	Elevation (ft)	Location	Casing Size and Type	Total Depth (ft)	Screen Interval (ft)
RMIS-1	3575.40	Up-gradient	2-in PVC	18.3	8-18
MO-09	3579.73	West block area	2-in PVC	13	8-13
MO-25	3580.77	East block area	2-in PVC	13	8-13
MO-26	3580.97	Center block area	2-in PVC	14	9-14
RMIS-2	3571.18	Between East & Center block area	2-in PVC	14.5	4.2-14.2
MO-10	3575.33	Down-gradient	2-in PVC	10	5-10
MO-11	3574.62	Down-gradient	2-in PVC	11	6-11
MIS-15	3575.28	Down-gradient	2-in PVC	25.6	9-25.6
MIS-16	3574.36	Down-gradient	2-in PVC	26	5.5-25.6
RMIS-4S	3574.91	Down-gradient	2-in PVC	15.6	5.3-15.3
RMIS-5	3574.21	Down-gradient	2-in PVC	14.9	4.6-14.6

Table 2
Monitoring Objectives

Well Name	Designation	Objective
RMIS-1	Background Well	Monitor the quality of the groundwater that is unaffected by impacts in the block placement source area and the relevant points of compliance in the down-gradient attenuated plume.
MO-09, MO-25, MO-26, RMIS-2	Block Area Wells	Monitor the water quality impacts from the treated soil cement blocks as the blocks degrade over time and determine if the remaining Cr VI will regenerate a groundwater plume in the future. Source area wells will also serve as the Site's sentinel wells to identify changes in groundwater conditions before observed in down-gradient POC wells.
MIS-15, MIS-16, RMIS-4S, RMIS-5	Points of Compliance	Ensure detection of groundwater contamination in the uppermost aquifer.
MO-10, MO-11	Additional wells	Ensure that the POC wells are representative of aquifer conditions and to compare concentrations with the POC wells

Attachment IV-3. Map of Monitoring Wells



Figure 1. This map shows the Moutat Site long-term monitoring well locations.

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Attachment VI-1
List of Documents Reviewed

Action Memorandum Amendment, Request for an Amendment to the Action Memorandum dated June 21, 1996 for a NTCRA at the Mouat Industries Superfund Site, Town of Columbus (Town), Montana, June 23, 2008

Action Memorandum, Request for Adequate Funding to Perform Soil Stabilization Non-Time-Critical Removal Action at Mouat Industries Site, Columbus, Montana, August 12, 1991

Action Memorandum, Request for Removal Action Approval at the Mouat Industries Site, Columbus, Montana, March 26, 1990.

Additional Delineation of Chromium Containing Soils at the Mouat Industries Site, Draft (Baker, 1992)

Close Out Procedures for National Priority List Sites, OSWER Directive 9320.2-22, May 2011

Comprehensive Five-Year Review Guidance, OSWER Directive 9355-7-03-BP. June 2001

Energy Laboratories, Analytical Results for Fill Material, February 19, 2013

Enforcement/ Action Memorandum, Request for Non-Time-Critical Removal Action at Mouat Industries Site, Columbus, Montana, June 21, 1996

Final Engineering Evaluation and Cost Analysis Report, May 9, 1996

First Five-Year Review Report for Mouat Industries National Priority List Site. Columbus, Montana. March 2008

Five Year Review Tracking Issues and Recommendations. CERCLIS Accessed February 11, 2013.

Institutional Controls at Mouat Industries NPL Site, agreement between EPA, MDEQ, and Town of Columbus, January 20, 2009

Letter to EPA Region 8 from Town regarding analytical results for the fill material and soil sample used to fill holes and improve drainage, March 13, 2013

Letter to EPA Region 8 on behalf of the Town of Columbus outlining Public Works office and shop building construction on top of the waste repository. November 30, 2011

Letter to EPA Region 8 from MDEQ concurring with the partial delisting of Mouat Industries, February 10, 2009

Letter from EPA Region 8 regarding Notice of Completion for a Non-Time Critical Removal Action (UAO Docket No. CERCLA-VII-96-22) at the Mouat Industries NPL Site, Columbus Montana, April 20, 2005

Letter from Daryl Reed of MDEQ to Ronald Bertram of USEPA in connection with funding for long-term monitoring and ICs, May 6, 2005

Letter from Douglas Howard of the Town of Columbus to Ronald Bertram of USEPA responding to the May 6, 2005 letter from Daryl Reed, May 18, 2005

Letter from Ronald Bertram of USEPA to Douglas Howard of the Town of Columbus approving the lifting of ground water use restrictions in accordance with the 1996 UAO, May 20, 2005

Letter from EPA to FMC Corporation approving the Final EECA, May 10, 1996

Memorandum from EPA Request for Approval of Construction Completion at Mouat Industries NPL Site, Columbus, Montana, September 16, 1996

Mouat Industries National Priority List Site Post Removal Site Control Plan, February 2, 2009

Mouat Industries NPL Site Response Action Fieldwork Completion Report, March 16, 1995

Mouat Industries Site Preliminary Site Close-Out Report, September 1996

Mouat Industries Site Final Baseline Human Health Risk and Ecological Risk Assessment, January 1996

Mouat Industries Site Human Health and Ecological Screening Level Risk Assessment, April 1995

Mouat Industries Superfund Site Final Closure Report, November 15, 2004

Mouat Industries Superfund Site Final Site Evaluation Report, September 27, 2007

Mouat Industries Superfund Site Groundwater Monitoring Results, 2008, 2009, 2010, 2011

Mouat Industries Superfund Site Update, January 2011

Notice of Intent for Partial Deletion of the Mouat Industries Superfund Site from the National Priorities List, Federal Register, Volume 74, Issue 55, March 24, 2009

Public Notice for Five-Year Review at the Mouat Superfund Site, Billings Gazette, September 7, 2012

Town of Columbus Superfund Overlay District Zoning Ordinance and Institutional Controls, Chapter 17.76, March 1995

Town Ordinance No. 328 Town of Columbus Ordinance Amending Subsection D of Section 17.76.010 and Section 17.76.040 of the Columbus Municipal Code, March 3, 2008

Town Ordinance No. 336 Town of Columbus Amending Subsections F, G and H of Section 17.76.030 of the Columbus Municipal Code, March 16, 2010

Unilateral Administrative Order, EPA Docket No. CERCLA-VIII-96-22, July 23, 1996

Water Well Regulations, Montana Chapter 15.08,

Warranty Deed from Mayor Gary Woltermann Town of Columbus to Timberweld Manufacturing Company, January 3, 2006

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Attachment VI-2
Site Inspection Checklist

Agency <u>Town of Columbus</u>	<u>Doug Howard</u>	<u>City Attorney</u>	<u> </u>	<u>(406)322-4429</u>
Contact	Name	Title	Date	Phone no.
Problems; suggestions; Report attached				
Agency <u>EPA Region 8 OSC</u>	<u>Tien Nguyen</u>	<u>Former EPA OSC</u>	<u> </u>	<u>(303) 312-6280</u>
Contact	Name	Title	Date	Phone no.
Problems; suggestions; Report attached				

4. Other interviews (optional)

- a) Timberweld Manufacturing Co: 406-652-3600. Doug Hucke
- b) ARCO: 406-723-1836. Rob Jordan
- c) FMC Corporation: 215-299-6125. Michael Shannon
- d) ERM (consultant to FMC): 808-521-4404. Bill Cutler
- e) Columbus Montana Airport: 406-322-5974. Alan Rickman

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. O&M Documents

- | | | | |
|---|--|-------------------------------------|---|
| <input type="checkbox"/> O&M manual | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date | <input checked="" type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> As-built drawings | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date | <input type="checkbox"/> N/A |
| <input type="checkbox"/> Maintenance logs | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date | <input checked="" type="checkbox"/> N/A |
- Remarks:

- 2. Site-Specific Health and Safety Plan** Readily available Up to date N/A
- Contingency plan/emergency response plan Readily available Up to date N/A

Remark:

- 3. O&M and OSHA Training Records** Readily available Up to date N/A
- Remarks: Do monitoring technicians hold current OSHA training? 8-hour Hazwoper as of May 2012

4. Permits and Service Agreements

- | | | | |
|---|--|-------------------------------------|---|
| <input type="checkbox"/> Air discharge permit | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date | <input checked="" type="checkbox"/> N/A |
| <input type="checkbox"/> Effluent discharge | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date | <input checked="" type="checkbox"/> N/A |
| <input type="checkbox"/> Waste disposal, POTW | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date | <input checked="" type="checkbox"/> N/A |
| <input type="checkbox"/> Other permits _____ | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date | <input checked="" type="checkbox"/> N/A |
- Remarks: When monitoring wells are purged, how is investigation derived waste (liquid) disposed?
None exceeded tCLP-chromium

- 5. Gas Generation Records** Readily available Up to date N/A
- Remarks: _____

- 6. Settlement Monument Records** Readily available Up to date N/A
- Remarks: _____

- 7. Groundwater Monitoring Records** Readily available Up to date N/A
- Remarks: _____

8.	Leachate Extraction Records Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	√ N/A
9.	Discharge Compliance Records <input type="checkbox"/> Air <input type="checkbox"/> Water (effluent) Remarks _____	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	√ N/A √ N/A
10.	Daily Access/Security Logs Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	√ N/A
IV. O&M COSTS				
1.	O&M Organization <input type="checkbox"/> State in-house <input type="checkbox"/> PRP in-house <input type="checkbox"/> Federal Facility in-house <input type="checkbox"/> Other	<input checked="" type="checkbox"/> Contractor for State via funding through EPA R8 <input type="checkbox"/> Contractor for PRP <input type="checkbox"/> Contractor for Federal Facility		
2.	O&M Cost Records <input checked="" type="checkbox"/> Readily available <input type="checkbox"/> Up to date <input type="checkbox"/> Funding mechanism/agreement in place Original O&M cost estimate \$5000/year_ <input type="checkbox"/> Breakdown attached Total annual cost by year for review period if available			
3.	Unanticipated or Unusually High O&M Costs During Review Period			
V. ACCESS AND INSTITUTIONAL CONTROLS <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A				
A. Fencing				
1.	Fencing damaged Remarks: SOD 17.76.030H was amended. Fencing no longer required.	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Gates secured	√ N/A
B. Other Access Restrictions				
1.	Signs and other security measures Remarks:	<input type="checkbox"/> Location shown on site map	√ N/A	
C. Institutional Controls (ICs)				
1.	Implementation and enforcement Site conditions imply ICs not properly implemented Site conditions imply ICs not being fully enforced Type of monitoring (e.g., self-reporting, drive by) Drive by (EPA/MDEQ); Self-reporting by meeting SOD: .	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		

Frequency _____				
Responsible party/agency _____				
Contact _____				
	Name	Title	Date	Phone no.
Reporting is up-to-date			<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A
Reports are verified by the lead agency			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A
Specific requirements in deed or decision documents have been met			<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A
Violations have been reported			<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A
Other problems or suggestions:				
<input type="checkbox"/> Report attached				
2.	Adequacy	<input type="checkbox"/> ICs are adequate	<input checked="" type="checkbox"/> ICs are inadequate	<input type="checkbox"/> N/A
Remarks: <u>IC's are misunderstood.</u>				
D. General				
1.	Vandalism/trespassing	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No vandalism evident	
Remarks:				
2.	Land use changes on site	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> N/A	
Remarks:				
3.	Land use changes off site	<input type="checkbox"/> N/A		
Remarks: None				
VI. GENERAL SITE CONDITIONS				
A. Roads	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A		
1.	Roads damaged	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Roads adequate	<input type="checkbox"/> N/A
Remarks:				
B. Other Site Conditions				
Remarks: _____				
VII. LANDFILL COVERS				
<input checked="" type="checkbox"/> Applicable-for block placement area <input type="checkbox"/> N/A				
A. Landfill Surface				
1.	Settlement (Low spots)	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Settlement not evident	
Areal extent _____		Depth _____		
Remarks _____ _____				

2.	Cracks Lengths _____ Widths _____ Depths _____ Remarks _____	<input type="checkbox"/> Location shown on site map	√ Cracking not evident
3.	Erosion Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map	√ Erosion not evident
4.	Holes Areal extent _____ Depth _____ Remarks _____Some animal burrows were noted.	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Holes not evident
5.	Vegetative Cover Remarks _____cars and equipment parked on cover where not allowable; grass is stressed.	√ Grass <input type="checkbox"/> Cover properly established	<input type="checkbox"/> No signs of stress
6.	Alternative Cover (armored rock, concrete, etc.) √ N/A Remarks _____		
7.	Bulges Areal extent _____ Height _____ Remarks _____	<input type="checkbox"/> Location shown on site map	√ Bulges not evident
8.	Wet Areas/Water Damage <input type="checkbox"/> Wet areas <input type="checkbox"/> Ponding <input type="checkbox"/> Seeps <input type="checkbox"/> Soft subgrade Remarks _____	√ Wet areas/water damage not evident <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Location shown on site map	Areal extent _____ Areal extent _____ Areal extent _____ Areal extent _____
9.	Slope Instability <input type="checkbox"/> Slides Areal extent _____ Remarks _____	<input type="checkbox"/> Location shown on site map	√ No evidence of slope instability
B. Benches <input type="checkbox"/> Applicable √ N/A (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)			
1.	Flows Bypass Bench Remarks _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay

2.	Bench Breached	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay
Remarks _____			
3.	Bench Overtopped	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay
Remarks _____			
C. Letdown Channels <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A (Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)			
1.	Settlement	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of settlement
Areal extent _____ Depth _____			
Remarks _____			
2.	Material Degradation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of degradation
Material type _____ Areal extent _____			
Remarks _____			
3.	Erosion	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of erosion
Areal extent _____ Depth _____			
Remarks _____			
4.	Undercutting	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of undercutting
Areal extent _____ Depth _____			
Remarks _____			
5.	Obstructions	Type _____	<input type="checkbox"/> No obstructions
<input type="checkbox"/> Location shown on site map Areal extent _____ Size _____			
Remarks _____			
6.	Excessive Vegetative Growth	Type _____	
<input type="checkbox"/> No evidence of excessive growth			
<input type="checkbox"/> Vegetation in channels does not obstruct flow			
<input type="checkbox"/> Location shown on site map Areal extent _____			
Remarks _____			
D. Cover Penetrations <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
1.	Gas Vents	<input type="checkbox"/> Active	<input type="checkbox"/> Passive
<input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition			
<input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs Maintenance			
<input type="checkbox"/> N/A			
Remarks _____			

2.	Gas Monitoring Probes	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled	<input type="checkbox"/> Good condition
		<input type="checkbox"/> Evidence of leakage at penetration		<input type="checkbox"/> Needs Maintenance	<input type="checkbox"/> N/A
Remarks _____					
3.	Monitoring Wells (within surface area of landfill)	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled	<input type="checkbox"/> Good condition
		<input type="checkbox"/> Evidence of leakage at penetration		<input type="checkbox"/> Needs Maintenance	<input type="checkbox"/> N/A
Remarks _____					
4.	Leachate Extraction Wells	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled	<input type="checkbox"/> Good condition
		<input type="checkbox"/> Evidence of leakage at penetration		<input type="checkbox"/> Needs Maintenance	<input type="checkbox"/> N/A
Remarks _____					
5.	Settlement Monuments	<input type="checkbox"/> Located	<input type="checkbox"/> Routinely surveyed	<input type="checkbox"/> N/A	
Remarks _____					
E. Gas Collection and Treatment		<input type="checkbox"/> Applicable	√ N/A		
1.	Gas Treatment Facilities	<input type="checkbox"/> Flaring	<input type="checkbox"/> Thermal destruction	<input type="checkbox"/> Collection for reuse	
		<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs Maintenance		
Remarks _____					
2.	Gas Collection Wells, Manifolds and Piping	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs Maintenance		
Remarks _____					
3.	Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings)	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs Maintenance	<input type="checkbox"/> N/A	
Remarks _____					
F. Cover Drainage Layer		<input type="checkbox"/> Applicable	√ N/A		
1.	Outlet Pipes Inspected	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A		
Remarks _____					
2.	Outlet Rock Inspected	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A		
Remarks _____					
G. Detention/Sedimentation Ponds		<input type="checkbox"/> Applicable	√ N/A		
1.	Siltation Areal extent _____	Depth _____		<input type="checkbox"/> N/A	
	<input type="checkbox"/> Siltation not evident				
Remarks _____					

2.	Erosion	Areal extent _____	Depth _____
Remarks _____			
3.	Outlet Works	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____			
4.	Dam	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____			
H. Retaining Walls		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	Deformations	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Deformation not evident
Horizontal displacement _____		Vertical displacement _____	
Rotational displacement _____			
Remarks _____			
2.	Degradation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Degradation not evident
Remarks _____			
I. Perimeter Ditches/Off-Site Discharge		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	Siltation	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Siltation not evident
Areal extent _____		Depth _____	
Remarks _____			
2.	Vegetative Growth	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Vegetation does not impede flow			
Areal extent _____		Type _____	
Remarks _____			
3.	Erosion	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Erosion not evident
Areal extent _____		Depth _____	
Remarks _____			
4.	Discharge Structure	<input checked="" type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____			
VIII. VERTICAL BARRIER WALLS		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	Settlement	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Settlement not evident
Areal extent _____		Depth _____	
Remarks _____			
2.	Performance Monitoring	Type of monitoring _____	Performance not monitored _____
Frequency _____		<input type="checkbox"/> Evidence of breaching	
Head differential _____			
Remarks _____			

IX. GROUNDWATER/SURFACE WATER REMEDIES <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A	
A. Groundwater Extraction Wells, Pumps, and Pipelines <input type="checkbox"/> Applicable <input type="checkbox"/> N/A	
1.	Pumps, Wellhead Plumbing, and Electrical <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells properly operating <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks _____
2.	Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____
3.	Spare Parts and Equipment <input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks _____
B. Surface Water Collection Structures, Pumps, and Pipelines <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A	
1.	Collection Structures, Pumps, and Electrical <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____
2.	Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____
3.	Spare Parts and Equipment <input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks _____
C. Treatment System <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A-see MNA groundwater monitoring below	
1.	Treatment Train (Check components that apply) <input type="checkbox"/> Metals removal <input type="checkbox"/> Oil/water separation <input type="checkbox"/> Bioremediation <input type="checkbox"/> Air stripping <input type="checkbox"/> Carbon adsorbers <input type="checkbox"/> Filters _____ <input type="checkbox"/> Additive (<i>e.g.</i> , chelation agent, flocculent) _____ <input type="checkbox"/> Others _____ <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> Sampling ports properly marked and functional <input type="checkbox"/> Sampling/maintenance log displayed and up to date <input type="checkbox"/> Equipment properly identified <input type="checkbox"/> Quantity of groundwater treated annually <input type="checkbox"/> Quantity of surface water treated annually Remarks _____
2.	Electrical Enclosures and Panels (properly rated and functional) <input checked="" type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____

3. Tanks, Vaults, Storage Vessels
 N/A Good condition Proper secondary containment Needs Maintenance
 Remarks _____

4. Discharge Structure and Appurtenances
 N/A Good condition Needs Maintenance
 Remarks _____

5. Treatment Building(s)
 N/A Good condition (esp. roof and doorways) Needs repair
 Chemicals and equipment properly stored
 Remarks _____

6. Monitoring Wells (pump and treatment remedy)
 Properly secured/locked Functioning Routinely sampled Good condition
 All required wells located Needs Maintenance N/A
 Remarks _____

D. Monitoring Data

1. Monitoring Data
 Is routinely submitted on time Is of acceptable quality

2. Monitoring data suggests:
 Groundwater plume is effectively contained Contaminant concentrations are declining
 Remarks ___See monitoring natural attenuation. _____

E. Monitored Natural Attenuation

1. Monitoring Wells (natural attenuation remedy)
 Properly secured/locked Functioning Routinely sampled Good condition
 All required wells located Needs Maintenance N/A
 Remarks:

Monitoring Data
 Is routinely submitted on time Is of acceptable quality

Monitoring Data suggests:

 Groundwater plume is effectively contained Contaminant concentrations are declining

 Other Remarks: Concentrations are generally declining; however, there are outliers.

X. OTHER REMEDIES

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

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

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

See Report

B. Adequacy of O&M

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

See Report

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

See Report

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

See Report

Second Five-Year Review Report
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Attachment VI-3
Site Photographs

Second Five-Year Review Report
Mouat Industries NPL Site, Columbus, MT



Photo 1: (W) Vehicles parked on landfill cap

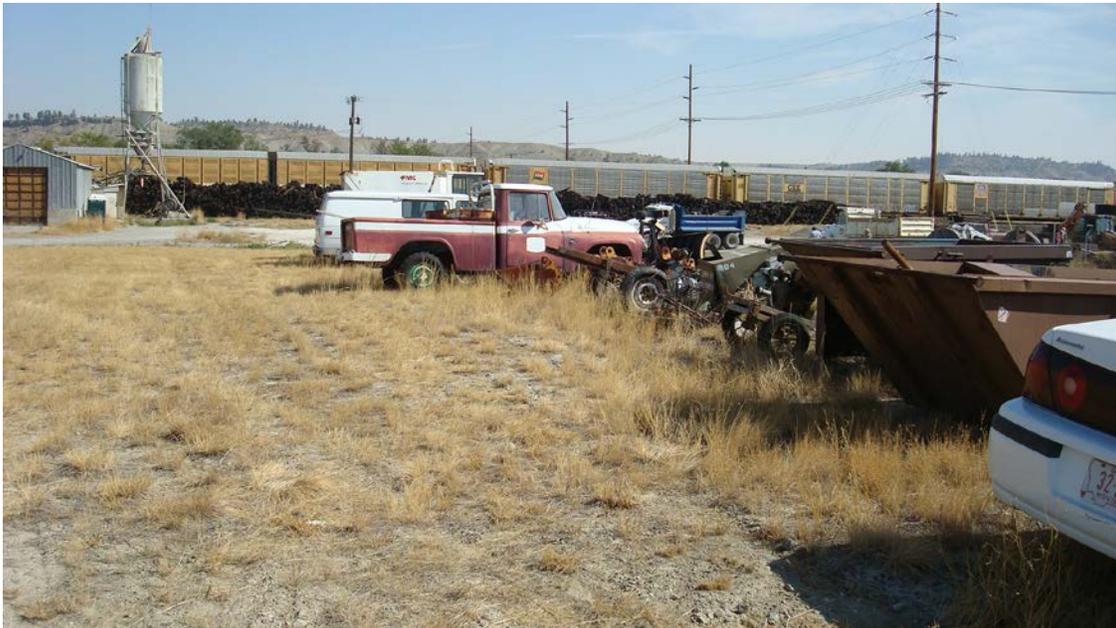


Photo 2: (N) Vehicles parked on landfill cap



Photo 3: (S) Stockpiled soil on landfill cap



Photo 4: (N) Backfilled utilities corridor



Photo 5: (S) Backfilled utilities corridor



Photo 6: Exposed landfill cover and block



Photo 7: Exposed concrete block



Photo 8: Exposed landfill cap material



Photo 9: Animal burrow in landfill cover



Photo 10: (S) Vegetative cap over Block Placement Area along Timberwell fence



Photo 11: (NW) RMIS-2 with pressure transducer for water level monitoring



Photo 12: (W) Adjacent property (Timberwell) and monitoring well MO-9



Photo 13: Broken pad of RMIS-7



Photo 14: Damaged well MIS-8B



Photo 15: Unknown well



Photo 16: Monitoring Well W-9



Photo 17: Monitoring Well W-10



Photo 18: Monitoring Well RMIS-5



Photo 19: Monitoring Well MIS-11A



Photo 20: Monitoring Well MO-25



Photo 21: Monitoring Well MO-26

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Attachment VI-4
Data Trend Analyses

DATA TREND ANALYSIS

As part of the trend analyses required in the post removal plan for the Mouat Site, the Monitoring and Remediation Optimization System (MAROS) software was used to assist in identifying chromium trends in both recent and overall data. A qualitative review to develop final recommendations for changes to the monitoring program was not included in this (the second) 5-year Review because this is planned for execution during the next (the third) 5-year review. In addition, a spatial analysis of the chromium “plume” configuration was not conducted because a plume is not currently defined at the site. The following is a summary of the MAROS results. MAROS output files are included at the end of this attachment.

The assessment of data trends were facilitated by the use of the MAROS package version 2.2 (Groundwater Services Inc. for the Air Force Center of Environmental Excellence, 2006). The MAROS software includes the capability to assess trends in concentrations over time using the non-parametric Mann-Kendall test for trend. In addition, it allows the presentation of concentration versus time plots for individual wells which in turn can be used for qualitative assessment of the trends. As a non-parametric test, the Mann-Kendall analysis is not dependent on having a normal distribution of data, can handle a reasonable number of non-detect results, and can analyze data collected on an irregular basis. The MAROS software identifies trends according to the calculated Mann-Kendall statistic (S) and the coefficient of variation (COV, the standard deviation divided by the mean) and indicates if there is an increasing trend (with 95% confidence), a decreasing trend, a probably increasing trend (90-95% confidence), a probably decreasing trend, a stable trend ($S \leq 0$ and a COV of <1), or no trend ($S > 0$ but confidence less than 90%, or $S < 0$ and $COV > 1$).

Analytical sampling results from 1992 to 2011 were obtained from the Environmental Protection Agency. A trend analysis was performed on both recent and overall data. Recent data is defined as chromium data collected from 2008 through 2011. Overall data is all available data collected at a well location through 2011. Recent data was available for all 11 wells in the current sampling program. Overall data trends were evaluated in five wells: RMIS-2, MIS-15, MIS-16, RMIS-4S, and RMIS-5 due to a more extensive historic data set. Trends were not evaluated in the background well (RMIS-1) due to its location outside of a theoretical plume which, by definition, is not included in the MAROS data set (i.e. cannot be defined as either a plume source or tail well).

MAROS allows the simultaneous analysis of up to five contaminants of concern and, if desired, will help guide the selection of COCs. For the Mouat analysis, chromium was selected for analysis because it is the only COC identified at the site.

Mann-Kendall and Linear Regression Analysis

2008-2011 Data Set

According to the Mann-Kendall and Linear Regression analyses of recent 4 year data, only one well location (RMIS-5) had an increasing chromium trend; all other wells had either a stable trend or no trend.

Mann-Kendall and Linear Regression Analysis

1992-2011 Data Set

According to the Mann-Kendall and Linear Regression analyses of the overall dataset for the five wells with historic chromium data, none of the well locations were identified as having an increasing trend. Both analytical methods indicate either no trend or a decreasing/probably decreasing trend.

Discussion

A qualitative review of the well shown to have an increasing trend was performed. Based on the recent data, RMIS-5 appears to show an increasing chromium trend since the May 2008 sample event. However, it should be noted that the highest recent chromium concentration of 0.0459 mg/L at this location remains below the compliance level of 0.1 mg/L. In addition, this increasing trend is only notable in the short term.

MAROS Mann-Kendall Statistics Summary

Project: geology

User Name: jennyj

Location: Columbus

State: Montana

Time Period: 5/20/2008 to 11/16/2011

Consolidation Period: No Time Consolidation

Consolidation Type: Geometric Mean

Duplicate Consolidation: Average

ND Values: 1/2 Detection Limit

J Flag Values : Actual Value

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
CHROMIUM, TOTAL								
RMIS-2	S	7	7	1.60	1	50.0%	No	NT
MO-26	S	6	6	1.68	-1	50.0%	No	NT
MO-25	S	5	5	0.82	2	59.2%	No	NT
MO-09	S	5	5	0.56	0	40.8%	No	S
RMIS-5	T	7	7	0.62	13	96.5%	No	I
RMIS-4	T	7	7	0.57	1	50.0%	No	NT
MO-11	T	5	5	0.59	-2	59.2%	No	S
MO-10	T	7	7	0.30	3	61.4%	No	NT
MIS-16	T	7	7	1.02	7	80.9%	No	NT
MIS-15	T	6	6	0.52	-3	64.0%	No	S

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A)- Due to insufficient Data (< 4 sampling events); Source/Tail (S/T)

The Number of Samples and Number of Detects shown above are post-consolidation values.

MAROS Linear Regression Statistics Summary

Project: geology

User Name: jennyj

Location: Columbus

State: Montana

Time Period: 5/20/2008 to 11/16/2011

Consolidation Period: No Time Consolidation

Consolidation Type: Geometric Mean

Duplicate Consolidation: Average

ND Values: 1/2 Detection Limit

J Flag Values : Actual Value

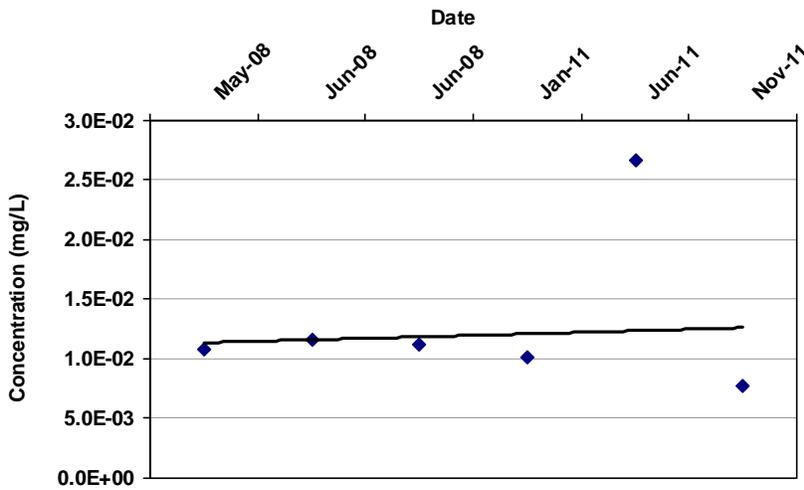
Well	Source/ Tail	Average Conc (mg/L)	Median Conc (mg/L)	Standard Deviation	All Samples "ND" ?	Ln Slope	Coefficient of Variation	Confidence in Trend	Concentration Trend
CHROMIUM, TOTAL									
RMIS-2	S	1.7E-01	5.2E-02	2.7E-01	No	8.1E-04	1.60	74.8%	NT
MO-26	S	3.5E-01	1.2E-01	5.8E-01	No	2.2E-05	1.68	50.5%	NT
MO-25	S	2.4E-01	2.1E-01	2.0E-01	No	5.1E-04	0.82	68.7%	NT
MO-09	S	1.5E-02	1.8E-02	8.4E-03	No	-4.1E-04	0.56	66.8%	S
RMIS-5	T	2.1E-02	1.8E-02	1.3E-02	No	7.6E-04	0.62	95.9%	I
RMIS-4	T	1.7E-02	1.3E-02	9.9E-03	No	-1.5E-04	0.57	61.4%	S
MO-11	T	3.1E-02	2.8E-02	1.8E-02	No	-8.4E-04	0.59	79.8%	S
MO-10	T	1.7E-02	1.6E-02	5.0E-03	No	-6.1E-05	0.30	59.6%	S
MIS-16	T	2.3E-02	1.7E-02	2.3E-02	No	8.0E-04	1.02	85.7%	NT
MIS-15	T	1.3E-02	1.1E-02	6.8E-03	No	9.8E-05	0.52	60.6%	NT

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); COV = Coefficient of Variation

MAROS Linear Regression Statistics

Well: MIS-15
 Well Type: T
 COC: CHROMIUM, TOTAL

Time Period: 5/20/2008 to 11/16/2011
 Consolidation Period: No Time Consolidation
 Consolidation Type: Geometric Mean
 Duplicate Consolidation: Average
 ND Values: 1/2 Detection Limit
 J Flag Values : Actual Value



COV:
 Confidence in Trend:
 Ln Slope:
 LR Concentration Trend:

Consolidation Data Table:

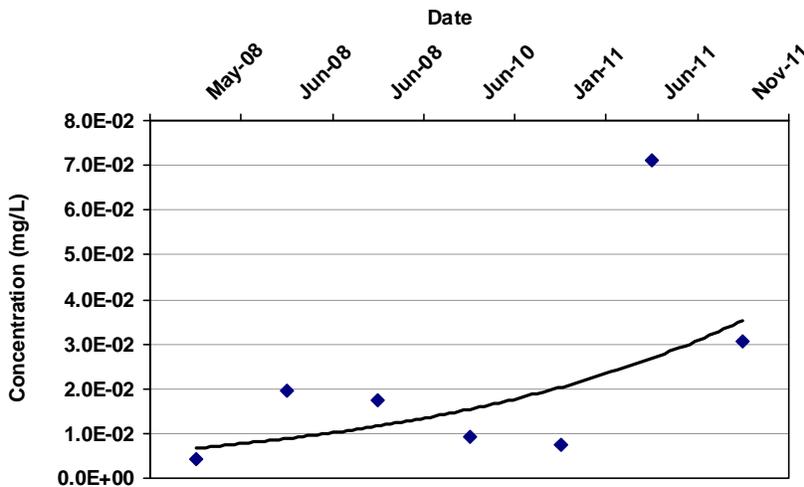
Well	Well Type	Consolidation Date	Constituent	Result (mg/L)	Flag	Number of Samples	Number of Detects
MIS-15	T	5/20/2008	CHROMIUM, TOTAL	1.1E-02		1	1
MIS-15	T	6/27/2008	CHROMIUM, TOTAL	1.2E-02		1	1
MIS-15	T	6/29/2008	CHROMIUM, TOTAL	1.1E-02		1	1
MIS-15	T	1/8/2011	CHROMIUM, TOTAL	1.0E-02		1	1
MIS-15	T	6/15/2011	CHROMIUM, TOTAL	2.7E-02		1	1
MIS-15	T	11/16/2011	CHROMIUM, TOTAL	7.7E-03		1	1

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); ND = All Samples are Non-detect

MAROS Linear Regression Statistics

Well: MIS-16
 Well Type: T
 COC: CHROMIUM, TOTAL

Time Period: 5/20/2008 to 11/16/2011
 Consolidation Period: No Time Consolidation
 Consolidation Type: Geometric Mean
 Duplicate Consolidation: Average
 ND Values: 1/2 Detection Limit
 J Flag Values : Actual Value



COV:
 Confidence in Trend:
 Ln Slope:
 LR Concentration Trend:

Consolidation Data Table:

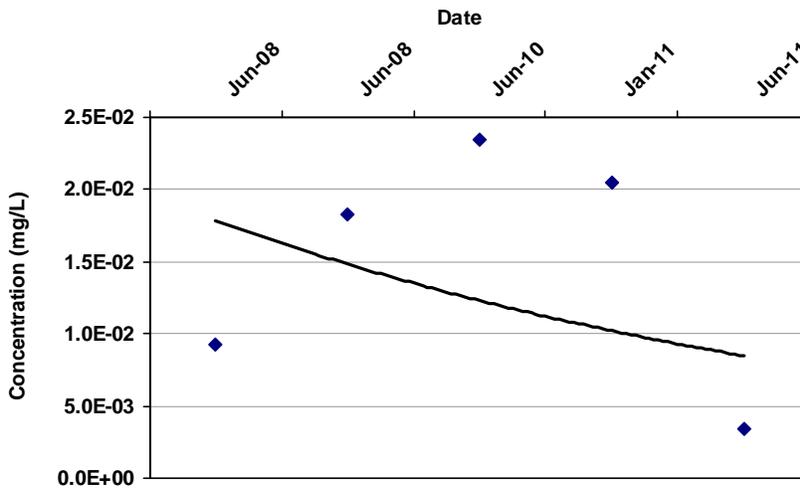
Well	Well Type	Consolidation Date	Constituent	Result (mg/L)	Flag	Number of Samples	Number of Detects
MIS-16	T	5/20/2008	CHROMIUM, TOTAL	4.1E-03		1	1
MIS-16	T	6/27/2008	CHROMIUM, TOTAL	2.0E-02		1	1
MIS-16	T	6/29/2008	CHROMIUM, TOTAL	1.7E-02		1	1
MIS-16	T	6/22/2010	CHROMIUM, TOTAL	9.1E-03		1	1
MIS-16	T	1/8/2011	CHROMIUM, TOTAL	7.4E-03		1	1
MIS-16	T	6/15/2011	CHROMIUM, TOTAL	7.1E-02		1	1
MIS-16	T	11/16/2011	CHROMIUM, TOTAL	3.0E-02		1	1

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); ND = All Samples are Non-detect

MAROS Linear Regression Statistics

Well: MO-09
 Well Type: S
 COC: CHROMIUM, TOTAL

Time Period: 5/20/2008 to 11/16/2011
 Consolidation Period: No Time Consolidation
 Consolidation Type: Geometric Mean
 Duplicate Consolidation: Average
 ND Values: 1/2 Detection Limit
 J Flag Values : Actual Value



COV:
 Confidence in Trend:
 Ln Slope:
 LR Concentration Trend:

Consolidation Data Table:

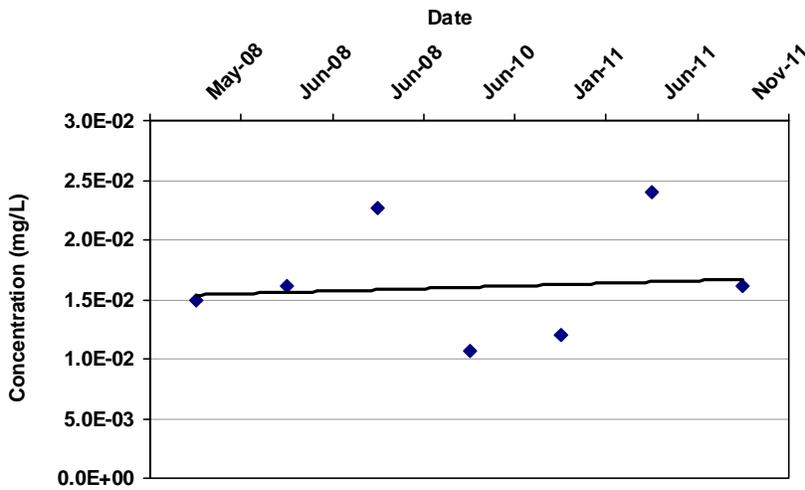
Well	Well Type	Consolidation Date	Constituent	Result (mg/L)	Flag	Number of Samples	Number of Detects
MO-09	S	6/27/2008	CHROMIUM, TOTAL	9.3E-03		1	1
MO-09	S	6/29/2008	CHROMIUM, TOTAL	1.8E-02		1	1
MO-09	S	6/22/2010	CHROMIUM, TOTAL	2.4E-02		1	1
MO-09	S	1/8/2011	CHROMIUM, TOTAL	2.1E-02		1	1
MO-09	S	6/15/2011	CHROMIUM, TOTAL	3.4E-03		1	1

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); ND = All Samples are Non-detect

MAROS Linear Regression Statistics

Well: MO-10
 Well Type: T
 COC: CHROMIUM, TOTAL

Time Period: 5/20/2008 to 11/16/2011
 Consolidation Period: No Time Consolidation
 Consolidation Type: Geometric Mean
 Duplicate Consolidation: Average
 ND Values: 1/2 Detection Limit
 J Flag Values : Actual Value



COV: 0.30
 Confidence in Trend: 59.6%
 Ln Slope: -6.1E-05
 LR Concentration Trend: S

Consolidation Data Table:

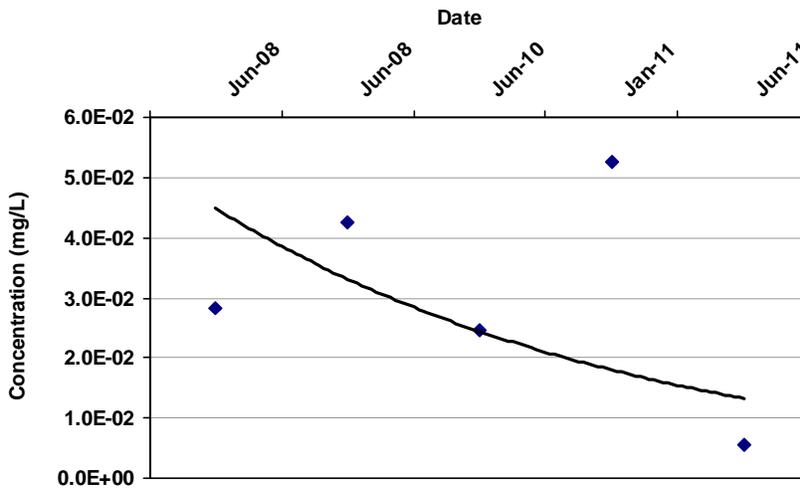
Well	Well Type	Consolidation Date	Constituent	Result (mg/L)	Flag	Number of Samples	Number of Detects
MO-10	T	5/20/2008	CHROMIUM, TOTAL	1.5E-02		1	1
MO-10	T	6/27/2008	CHROMIUM, TOTAL	1.6E-02		1	1
MO-10	T	6/29/2008	CHROMIUM, TOTAL	2.3E-02		1	1
MO-10	T	6/22/2010	CHROMIUM, TOTAL	1.1E-02		1	1
MO-10	T	1/8/2011	CHROMIUM, TOTAL	1.2E-02		1	1
MO-10	T	6/15/2011	CHROMIUM, TOTAL	2.4E-02		1	1
MO-10	T	11/16/2011	CHROMIUM, TOTAL	1.6E-02		1	1

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); ND = All Samples are Non-detect

MAROS Linear Regression Statistics

Well: MO-11
 Well Type: T
 COC: CHROMIUM, TOTAL

Time Period: 5/20/2008 to 11/16/2011
 Consolidation Period: No Time Consolidation
 Consolidation Type: Geometric Mean
 Duplicate Consolidation: Average
 ND Values: 1/2 Detection Limit
 J Flag Values : Actual Value



COV:

Confidence in Trend:

Ln Slope:

LR Concentration Trend:

Consolidation Data Table:

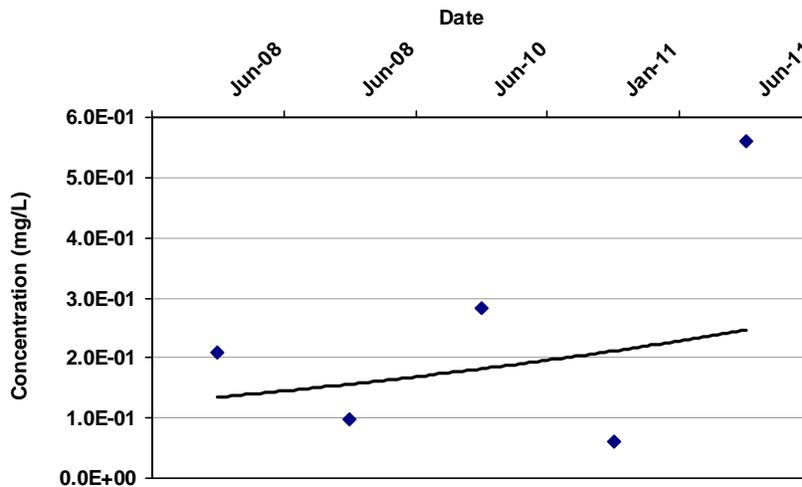
Well	Well Type	Consolidation Date	Constituent	Result (mg/L)	Flag	Number of Samples	Number of Detects
MO-11	T	6/27/2008	CHROMIUM, TOTAL	2.8E-02		1	1
MO-11	T	6/29/2008	CHROMIUM, TOTAL	4.3E-02		1	1
MO-11	T	6/22/2010	CHROMIUM, TOTAL	2.5E-02		1	1
MO-11	T	1/8/2011	CHROMIUM, TOTAL	5.2E-02		1	1
MO-11	T	6/15/2011	CHROMIUM, TOTAL	5.6E-03		1	1

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); ND = All Samples are Non-detect

MAROS Linear Regression Statistics

Well: MO-25
 Well Type: S
 COC: CHROMIUM, TOTAL

Time Period: 5/20/2008 to 11/16/2011
 Consolidation Period: No Time Consolidation
 Consolidation Type: Geometric Mean
 Duplicate Consolidation: Average
 ND Values: 1/2 Detection Limit
 J Flag Values : Actual Value



COV:
 Confidence in Trend:
 Ln Slope:
 LR Concentration Trend:

Consolidation Data Table:

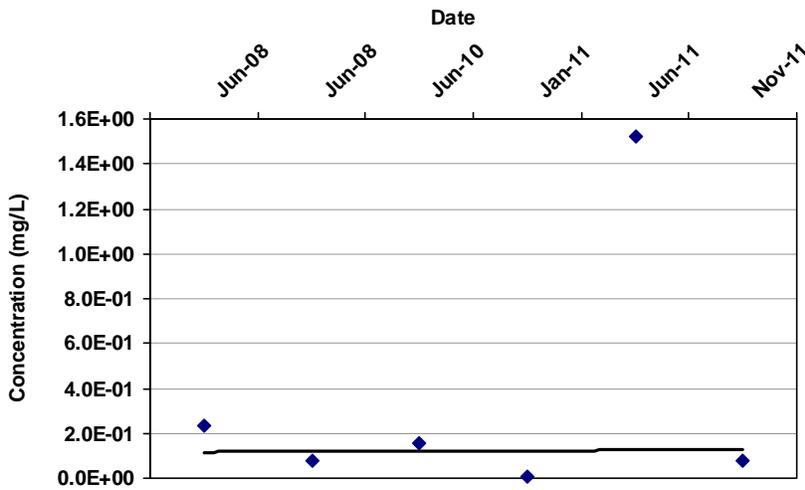
Well	Well Type	Consolidation Date	Constituent	Result (mg/L)	Flag	Number of Samples	Number of Detects
MO-25	S	6/27/2008	CHROMIUM, TOTAL	2.1E-01		1	1
MO-25	S	6/29/2008	CHROMIUM, TOTAL	9.7E-02		1	1
MO-25	S	6/22/2010	CHROMIUM, TOTAL	2.8E-01		1	1
MO-25	S	1/8/2011	CHROMIUM, TOTAL	6.1E-02		1	1
MO-25	S	6/15/2011	CHROMIUM, TOTAL	5.6E-01		1	1

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); ND = All Samples are Non-detect

MAROS Linear Regression Statistics

Well: MO-26
 Well Type: S
 COC: CHROMIUM, TOTAL

Time Period: 5/20/2008 to 11/16/2011
 Consolidation Period: No Time Consolidation
 Consolidation Type: Geometric Mean
 Duplicate Consolidation: Average
 ND Values: 1/2 Detection Limit
 J Flag Values : Actual Value



COV:
 Confidence in Trend:
 Ln Slope:
 LR Concentration Trend:

Consolidation Data Table:

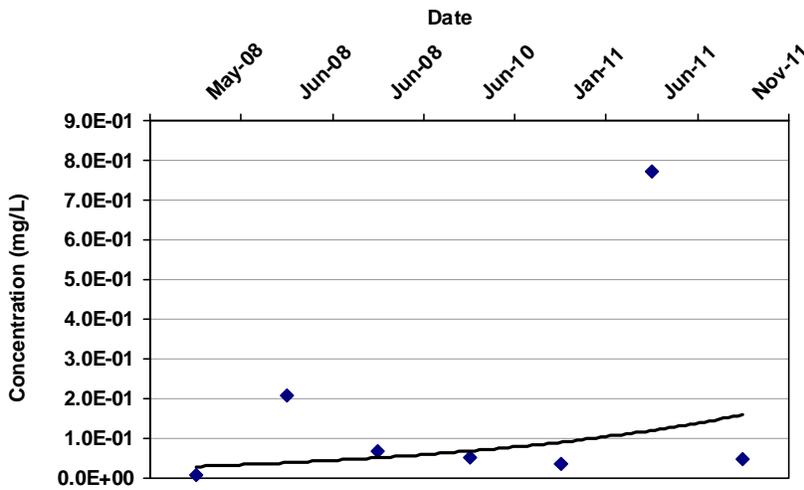
Well	Well Type	Consolidation Date	Constituent	Result (mg/L)	Flag	Number of Samples	Number of Detects
MO-26	S	6/27/2008	CHROMIUM, TOTAL	2.3E-01		1	1
MO-26	S	6/29/2008	CHROMIUM, TOTAL	7.5E-02		1	1
MO-26	S	6/22/2010	CHROMIUM, TOTAL	1.6E-01		1	1
MO-26	S	1/8/2011	CHROMIUM, TOTAL	1.0E-02		1	1
MO-26	S	6/15/2011	CHROMIUM, TOTAL	1.5E+00		1	1
MO-26	S	11/16/2011	CHROMIUM, TOTAL	7.5E-02		1	1

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); ND = All Samples are Non-detect

MAROS Linear Regression Statistics

Well: RMIS-2
 Well Type: S
 COC: CHROMIUM, TOTAL

Time Period: 5/20/2008 to 11/16/2011
 Consolidation Period: No Time Consolidation
 Consolidation Type: Geometric Mean
 Duplicate Consolidation: Average
 ND Values: 1/2 Detection Limit
 J Flag Values : Actual Value



COV:
 Confidence in Trend:
 Ln Slope:
 LR Concentration Trend:

Consolidation Data Table:

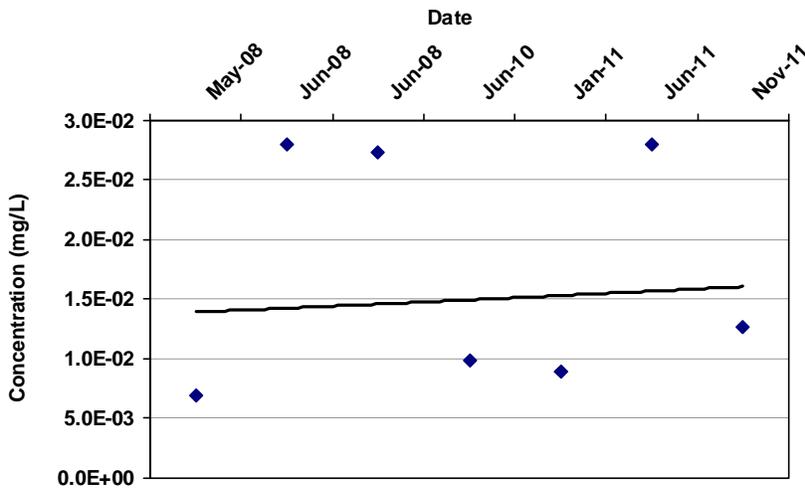
Well	Well Type	Consolidation Date	Constituent	Result (mg/L)	Flag	Number of Samples	Number of Detects
RMIS-2	S	5/20/2008	CHROMIUM, TOTAL	6.7E-03		1	1
RMIS-2	S	6/27/2008	CHROMIUM, TOTAL	2.1E-01		1	1
RMIS-2	S	6/29/2008	CHROMIUM, TOTAL	6.9E-02		1	1
RMIS-2	S	6/22/2010	CHROMIUM, TOTAL	5.2E-02		1	1
RMIS-2	S	1/8/2011	CHROMIUM, TOTAL	3.6E-02		1	1
RMIS-2	S	6/15/2011	CHROMIUM, TOTAL	7.7E-01		1	1
RMIS-2	S	11/16/2011	CHROMIUM, TOTAL	4.9E-02		1	1

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); ND = All Samples are Non-detect

MAROS Linear Regression Statistics

Well: RMIS-4
 Well Type: T
 COC: CHROMIUM, TOTAL

Time Period: 5/20/2008 to 11/16/2011
 Consolidation Period: No Time Consolidation
 Consolidation Type: Geometric Mean
 Duplicate Consolidation: Average
 ND Values: 1/2 Detection Limit
 J Flag Values : Actual Value



COV:
 Confidence in Trend:
 Ln Slope:
 LR Concentration Trend:

Consolidation Data Table:

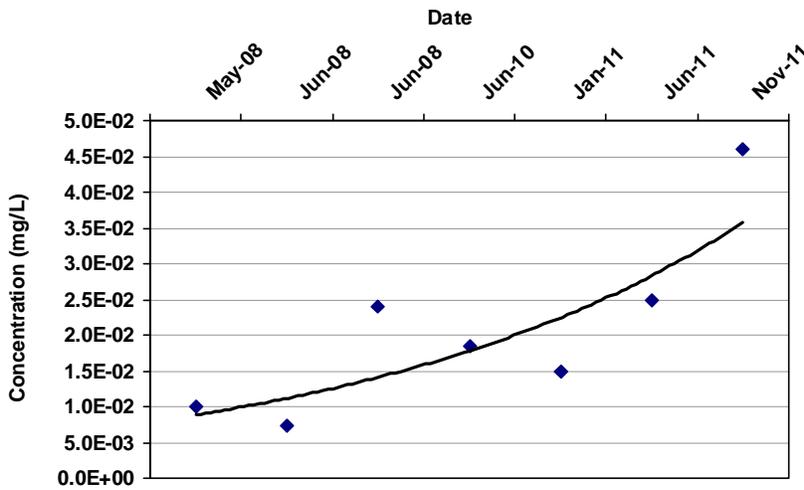
Well	Well Type	Consolidation Date	Constituent	Result (mg/L)	Flag	Number of Samples	Number of Detects
RMIS-4	T	5/20/2008	CHROMIUM, TOTAL	7.0E-03		1	1
RMIS-4	T	6/27/2008	CHROMIUM, TOTAL	2.8E-02		1	1
RMIS-4	T	6/29/2008	CHROMIUM, TOTAL	2.7E-02		1	1
RMIS-4	T	6/22/2010	CHROMIUM, TOTAL	9.9E-03		1	1
RMIS-4	T	1/8/2011	CHROMIUM, TOTAL	8.9E-03		1	1
RMIS-4	T	6/15/2011	CHROMIUM, TOTAL	2.8E-02		1	1
RMIS-4	T	11/16/2011	CHROMIUM, TOTAL	1.3E-02		1	1

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); ND = All Samples are Non-detect

MAROS Linear Regression Statistics

Well: RMIS-5
 Well Type: T
 COC: CHROMIUM, TOTAL

Time Period: 5/20/2008 to 11/16/2011
 Consolidation Period: No Time Consolidation
 Consolidation Type: Geometric Mean
 Duplicate Consolidation: Average
 ND Values: 1/2 Detection Limit
 J Flag Values : Actual Value



COV:
 Confidence in Trend:
 Ln Slope:
 LR Concentration Trend:

Consolidation Data Table:

Well	Well Type	Consolidation Date	Constituent	Result (mg/L)	Flag	Number of Samples	Number of Detects
RMIS-5	T	5/20/2008	CHROMIUM, TOTAL	1.0E-02		1	1
RMIS-5	T	6/27/2008	CHROMIUM, TOTAL	7.4E-03		1	1
RMIS-5	T	6/29/2008	CHROMIUM, TOTAL	2.4E-02		1	1
RMIS-5	T	6/22/2010	CHROMIUM, TOTAL	1.8E-02		1	1
RMIS-5	T	1/8/2011	CHROMIUM, TOTAL	1.5E-02		1	1
RMIS-5	T	6/15/2011	CHROMIUM, TOTAL	2.5E-02		1	1
RMIS-5	T	11/16/2011	CHROMIUM, TOTAL	4.6E-02		1	1

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); ND = All Samples are Non-detect

MAROS Mann-Kendall Statistics Summary

Project: geology

User Name: jennyj

Location: Columbus

State: Montana

Time Period: 6/1/1992 to 11/16/2011

Consolidation Period: No Time Consolidation

Consolidation Type: Geometric Mean

Duplicate Consolidation: Average

ND Values: 1/2 Detection Limit

J Flag Values : Actual Value

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
CHROMIUM, TOTAL								
RMIS-2	S	24	24	0.96	-75	96.7%	No	D
RMIS-5	T	25	25	0.88	-59	91.1%	No	PD
RMIS-4	T	35	35	1.42	-477	100.0%	No	D
MIS-16	T	22	18	1.50	-37	84.3%	No	NT
MIS-15	T	21	21	1.97	-158	100.0%	No	D

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A)-
Due to insufficient Data (< 4 sampling events); Source/Tail (S/T)

The Number of Samples and Number of Detects shown above are post-consolidation values.

MAROS Linear Regression Statistics Summary

Project: geology

User Name: jennyj

Location: Columbus

State: Montana

Time Period: 6/1/1992 to 11/16/2011

Consolidation Period: No Time Consolidation

Consolidation Type: Geometric Mean

Duplicate Consolidation: Average

ND Values: 1/2 Detection Limit

J Flag Values : Actual Value

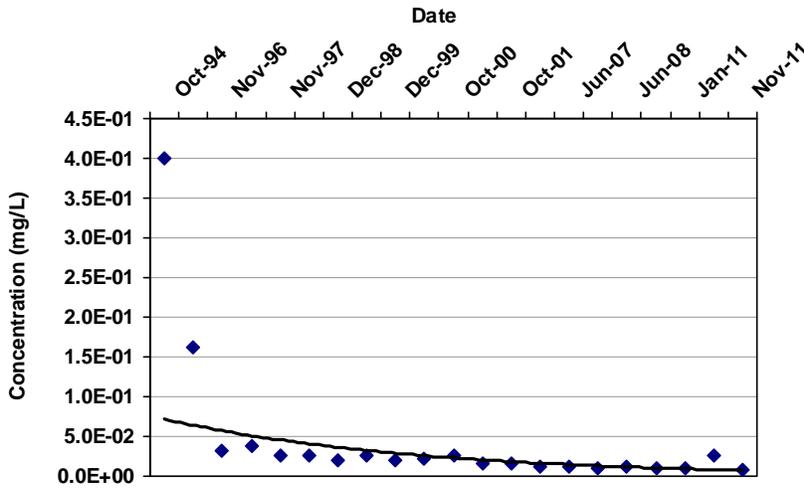
Well	Source/ Tail	Average Conc (mg/L)	Median Conc (mg/L)	Standard Deviation	All Samples "ND" ?	Ln Slope	Coefficient of Variation	Confidence in Trend	Concentration Trend
CHROMIUM, TOTAL									
RMIS-2	S	1.8E-01	1.4E-01	1.7E-01	No	-1.4E-04	0.96	97.7%	D
RMIS-5	T	3.6E-02	3.0E-02	3.2E-02	No	-1.2E-04	0.88	99.6%	D
RMIS-4	T	9.5E-01	7.6E-02	1.4E+00	No	-8.0E-04	1.42	100.0%	D
MIS-16	T	2.6E-02	1.2E-02	3.8E-02	No	-9.4E-05	1.50	80.3%	NT
MIS-15	T	4.5E-02	2.0E-02	8.8E-02	No	-3.2E-04	1.97	100.0%	D

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); COV = Coefficient of Variation

MAROS Linear Regression Statistics

Well: MIS-15
 Well Type: T
 COC: CHROMIUM, TOTAL

Time Period: 6/1/1992 to 11/16/2011
 Consolidation Period: No Time Consolidation
 Consolidation Type: Geometric Mean
 Duplicate Consolidation: Average
 ND Values: 1/2 Detection Limit
 J Flag Values : Actual Value



COV:

Confidence in Trend:

Ln Slope:

LR Concentration Trend:

Consolidation Data Table:

Well	Well Type	Consolidation Date	Constituent	Result (mg/L)	Flag	Number of Samples	Number of Detects
MIS-15	T	10/1/1994	CHROMIUM, TOTAL	4.0E-01		1	1
MIS-15	T	1/1/1995	CHROMIUM, TOTAL	1.6E-01		1	1
MIS-15	T	11/18/1996	CHROMIUM, TOTAL	3.2E-02		1	1
MIS-15	T	5/12/1997	CHROMIUM, TOTAL	3.8E-02		1	1
MIS-15	T	11/19/1997	CHROMIUM, TOTAL	2.6E-02		1	1
MIS-15	T	5/20/1998	CHROMIUM, TOTAL	2.7E-02		1	1
MIS-15	T	12/1/1998	CHROMIUM, TOTAL	1.9E-02		1	1
MIS-15	T	5/24/1999	CHROMIUM, TOTAL	2.5E-02		1	1
MIS-15	T	12/1/1999	CHROMIUM, TOTAL	2.0E-02		1	1
MIS-15	T	5/30/2000	CHROMIUM, TOTAL	2.3E-02		1	1
MIS-15	T	10/17/2000	CHROMIUM, TOTAL	2.7E-02		1	1
MIS-15	T	5/9/2001	CHROMIUM, TOTAL	1.7E-02		1	1
MIS-15	T	10/29/2001	CHROMIUM, TOTAL	1.6E-02		1	1
MIS-15	T	10/22/2002	CHROMIUM, TOTAL	1.3E-02		1	1
MIS-15	T	6/7/2007	CHROMIUM, TOTAL	1.2E-02		1	1
MIS-15	T	5/20/2008	CHROMIUM, TOTAL	1.1E-02		1	1
MIS-15	T	6/27/2008	CHROMIUM, TOTAL	1.2E-02		1	1
MIS-15	T	6/28/2009	CHROMIUM, TOTAL	1.1E-02		1	1
MIS-15	T	1/8/2011	CHROMIUM, TOTAL	1.0E-02		1	1
MIS-15	T	6/15/2011	CHROMIUM, TOTAL	2.7E-02		1	1

MAROS Linear Regression Statistics

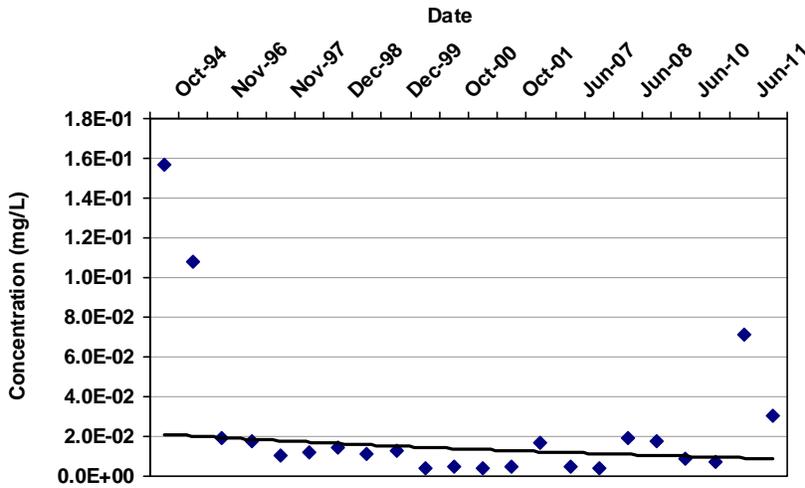
Well	Well Type	Consolidation Date	Constituent	Result (mg/L)	Flag	Number of Samples	Number of Detects
MIS-15	T	11/16/2011	CHROMIUM, TOTAL	7.7E-03		1	1

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); ND = All Samples are Non-detect

MAROS Linear Regression Statistics

Well: MIS-16
 Well Type: T
 COC: CHROMIUM, TOTAL

Time Period: 6/1/1992 to 11/16/2011
 Consolidation Period: No Time Consolidation
 Consolidation Type: Geometric Mean
 Duplicate Consolidation: Average
 ND Values: 1/2 Detection Limit
 J Flag Values : Actual Value



COV:
 Confidence in Trend:
 Ln Slope:
 LR Concentration Trend:

Consolidation Data Table:

Well	Well Type	Consolidation Date	Constituent	Result (mg/L)	Flag	Number of Samples	Number of Detects
MIS-16	T	10/1/1994	CHROMIUM, TOTAL	1.6E-01		1	1
MIS-16	T	1/1/1995	CHROMIUM, TOTAL	1.1E-01		1	1
MIS-16	T	11/18/1996	CHROMIUM, TOTAL	1.9E-02		1	1
MIS-16	T	5/12/1997	CHROMIUM, TOTAL	1.8E-02		1	1
MIS-16	T	11/19/1997	CHROMIUM, TOTAL	1.0E-02		1	1
MIS-16	T	5/20/1998	CHROMIUM, TOTAL	1.2E-02		1	1
MIS-16	T	12/1/1998	CHROMIUM, TOTAL	1.5E-02		1	1
MIS-16	T	5/24/1999	CHROMIUM, TOTAL	1.2E-02		1	1
MIS-16	T	12/1/1999	CHROMIUM, TOTAL	1.3E-02		1	1
MIS-16	T	5/30/2000	CHROMIUM, TOTAL	4.4E-03	ND	1	0
MIS-16	T	10/17/2000	CHROMIUM, TOTAL	4.6E-03	ND	1	0
MIS-16	T	5/9/2001	CHROMIUM, TOTAL	4.0E-03	ND	1	0
MIS-16	T	10/29/2001	CHROMIUM, TOTAL	4.7E-03	ND	1	0
MIS-16	T	10/22/2002	CHROMIUM, TOTAL	1.7E-02		1	1
MIS-16	T	6/7/2007	CHROMIUM, TOTAL	4.5E-03		1	1
MIS-16	T	5/20/2008	CHROMIUM, TOTAL	4.1E-03		1	1
MIS-16	T	6/27/2008	CHROMIUM, TOTAL	2.0E-02		1	1
MIS-16	T	6/28/2009	CHROMIUM, TOTAL	1.7E-02		1	1
MIS-16	T	6/22/2010	CHROMIUM, TOTAL	9.1E-03		1	1
MIS-16	T	1/8/2011	CHROMIUM, TOTAL	7.4E-03		1	1

MAROS Linear Regression Statistics

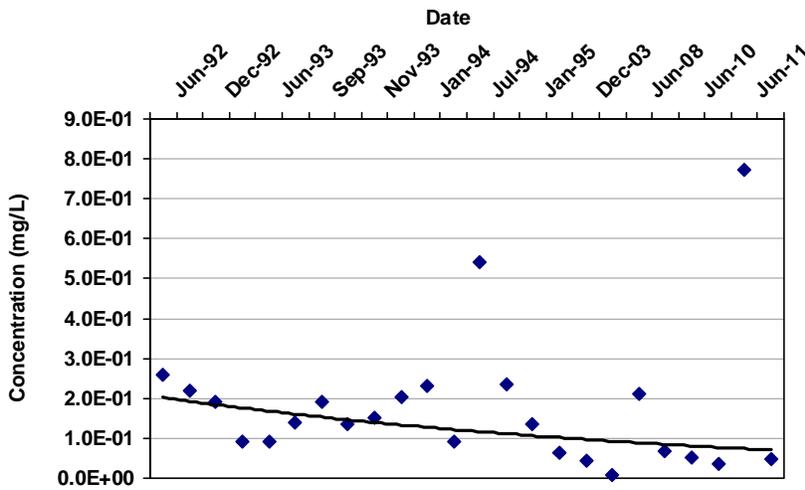
Well	Well Type	Consolidation Date	Constituent	Result (mg/L)	Flag	Number of Samples	Number of Detects
MIS-16	T	6/15/2011	CHROMIUM, TOTAL	7.1E-02		1	1
MIS-16	T	11/16/2011	CHROMIUM, TOTAL	3.0E-02		1	1

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); ND = All Samples are Non-detect

MAROS Linear Regression Statistics

Well: RMIS-2
 Well Type: S
 COC: CHROMIUM, TOTAL

Time Period: 6/1/1992 to 11/16/2011
 Consolidation Period: No Time Consolidation
 Consolidation Type: Geometric Mean
 Duplicate Consolidation: Average
 ND Values: 1/2 Detection Limit
 J Flag Values : Actual Value



COV:
 Confidence in Trend:
 Ln Slope:
 LR Concentration Trend:

Consolidation Data Table:

Well	Well Type	Consolidation Date	Constituent	Result (mg/L)	Flag	Number of Samples	Number of Detects
RMIS-2	S	6/1/1992	CHROMIUM, TOTAL	2.6E-01		1	1
RMIS-2	S	9/1/1992	CHROMIUM, TOTAL	2.2E-01		1	1
RMIS-2	S	12/1/1992	CHROMIUM, TOTAL	1.9E-01		1	1
RMIS-2	S	3/1/1993	CHROMIUM, TOTAL	9.0E-02		1	1
RMIS-2	S	6/1/1993	CHROMIUM, TOTAL	9.0E-02		1	1
RMIS-2	S	8/1/1993	CHROMIUM, TOTAL	1.4E-01		1	1
RMIS-2	S	9/1/1993	CHROMIUM, TOTAL	1.9E-01		1	1
RMIS-2	S	10/1/1993	CHROMIUM, TOTAL	1.4E-01		1	1
RMIS-2	S	11/1/1993	CHROMIUM, TOTAL	1.5E-01		1	1
RMIS-2	S	12/1/1993	CHROMIUM, TOTAL	2.0E-01		1	1
RMIS-2	S	1/1/1994	CHROMIUM, TOTAL	2.3E-01		1	1
RMIS-2	S	4/1/1994	CHROMIUM, TOTAL	9.1E-02		1	1
RMIS-2	S	7/1/1994	CHROMIUM, TOTAL	5.4E-01		1	1
RMIS-2	S	10/1/1994	CHROMIUM, TOTAL	2.4E-01		1	1
RMIS-2	S	1/1/1995	CHROMIUM, TOTAL	1.4E-01		1	1
RMIS-2	S	5/1/1995	CHROMIUM, TOTAL	6.2E-02		1	1
RMIS-2	S	12/1/2003	CHROMIUM, TOTAL	4.4E-02		1	1
RMIS-2	S	5/20/2008	CHROMIUM, TOTAL	6.7E-03		1	1
RMIS-2	S	6/27/2008	CHROMIUM, TOTAL	2.1E-01		1	1
RMIS-2	S	6/28/2009	CHROMIUM, TOTAL	6.9E-02		1	1

MAROS Linear Regression Statistics

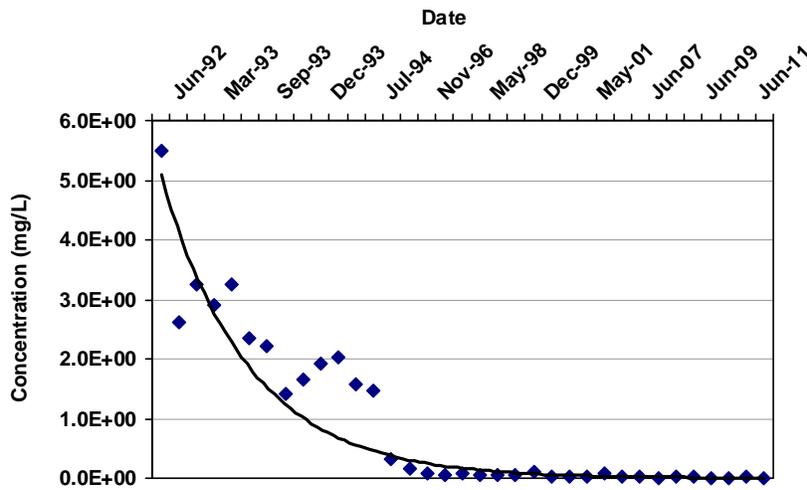
Well	Well Type	Consolidation Date	Constituent	Result (mg/L)	Flag	Number of Samples	Number of Detects
RMIS-2	S	6/22/2010	CHROMIUM, TOTAL	5.2E-02		1	1
RMIS-2	S	1/8/2011	CHROMIUM, TOTAL	3.6E-02		1	1
RMIS-2	S	6/15/2011	CHROMIUM, TOTAL	7.7E-01		1	1
RMIS-2	S	11/16/2011	CHROMIUM, TOTAL	4.9E-02		1	1

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); ND = All Samples are Non-detect

MAROS Linear Regression Statistics

Well: RMIS-4
 Well Type: T
 COC: CHROMIUM, TOTAL

Time Period: 6/1/1992 to 11/16/2011
 Consolidation Period: No Time Consolidation
 Consolidation Type: Geometric Mean
 Duplicate Consolidation: Average
 ND Values: 1/2 Detection Limit
 J Flag Values : Actual Value



COV:
 Confidence in Trend:
 Ln Slope:
 LR Concentration Trend:

Consolidation Data Table:

Well	Well Type	Consolidation Date	Constituent	Result (mg/L)	Flag	Number of Samples	Number of Detects
RMIS-4	T	6/1/1992	CHROMIUM, TOTAL	5.5E+00		1	1
RMIS-4	T	9/1/1992	CHROMIUM, TOTAL	2.6E+00		1	1
RMIS-4	T	12/1/1992	CHROMIUM, TOTAL	3.2E+00		1	1
RMIS-4	T	3/1/1993	CHROMIUM, TOTAL	2.9E+00		1	1
RMIS-4	T	6/1/1993	CHROMIUM, TOTAL	3.3E+00		1	1
RMIS-4	T	8/1/1993	CHROMIUM, TOTAL	2.3E+00		1	1
RMIS-4	T	9/1/1993	CHROMIUM, TOTAL	2.2E+00		1	1
RMIS-4	T	10/1/1993	CHROMIUM, TOTAL	1.4E+00		1	1
RMIS-4	T	11/1/1993	CHROMIUM, TOTAL	1.6E+00		1	1
RMIS-4	T	12/1/1993	CHROMIUM, TOTAL	1.9E+00		1	1
RMIS-4	T	1/1/1994	CHROMIUM, TOTAL	2.0E+00		1	1
RMIS-4	T	4/1/1994	CHROMIUM, TOTAL	1.6E+00		1	1
RMIS-4	T	7/1/1994	CHROMIUM, TOTAL	1.5E+00		1	1
RMIS-4	T	10/1/1994	CHROMIUM, TOTAL	3.1E-01		1	1
RMIS-4	T	1/1/1995	CHROMIUM, TOTAL	1.6E-01		1	1
RMIS-4	T	11/18/1996	CHROMIUM, TOTAL	9.1E-02		1	1
RMIS-4	T	5/12/1997	CHROMIUM, TOTAL	4.5E-02		1	1
RMIS-4	T	11/19/1997	CHROMIUM, TOTAL	7.3E-02		1	1
RMIS-4	T	5/20/1998	CHROMIUM, TOTAL	4.7E-02		1	1
RMIS-4	T	12/1/1998	CHROMIUM, TOTAL	5.7E-02		1	1

MAROS Linear Regression Statistics

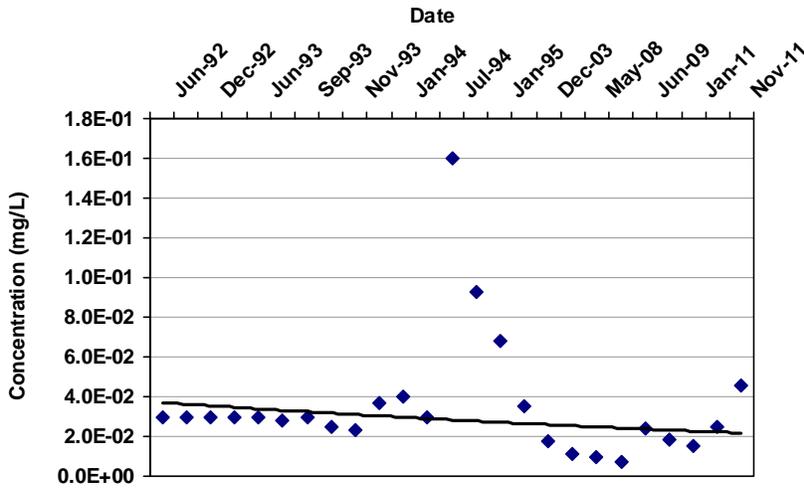
Well	Well Type	Consolidation Date	Constituent	Result (mg/L)	Flag	Number of Samples	Number of Detects
RMIS-4	T	5/24/1999	CHROMIUM, TOTAL	5.1E-02		1	1
RMIS-4	T	12/1/1999	CHROMIUM, TOTAL	9.8E-02		1	1
RMIS-4	T	5/30/2000	CHROMIUM, TOTAL	2.5E-02		1	1
RMIS-4	T	10/17/2000	CHROMIUM, TOTAL	2.0E-02		1	1
RMIS-4	T	5/9/2001	CHROMIUM, TOTAL	1.7E-02		1	1
RMIS-4	T	10/29/2001	CHROMIUM, TOTAL	7.6E-02		1	1
RMIS-4	T	10/22/2002	CHROMIUM, TOTAL	3.5E-02		1	1
RMIS-4	T	6/7/2007	CHROMIUM, TOTAL	1.3E-02		1	1
RMIS-4	T	5/20/2008	CHROMIUM, TOTAL	7.0E-03		1	1
RMIS-4	T	6/27/2008	CHROMIUM, TOTAL	2.8E-02		1	1
RMIS-4	T	6/28/2009	CHROMIUM, TOTAL	2.7E-02		1	1
RMIS-4	T	6/22/2010	CHROMIUM, TOTAL	9.9E-03		1	1
RMIS-4	T	1/8/2011	CHROMIUM, TOTAL	8.9E-03		1	1
RMIS-4	T	6/15/2011	CHROMIUM, TOTAL	2.8E-02		1	1
RMIS-4	T	11/16/2011	CHROMIUM, TOTAL	1.3E-02		1	1

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); ND = All Samples are Non-detect

MAROS Linear Regression Statistics

Well: RMIS-5
 Well Type: T
 COC: CHROMIUM, TOTAL

Time Period: 6/1/1992 to 11/16/2011
 Consolidation Period: No Time Consolidation
 Consolidation Type: Geometric Mean
 Duplicate Consolidation: Average
 ND Values: 1/2 Detection Limit
 J Flag Values : Actual Value



COV:
 Confidence in Trend:
 Ln Slope:
 LR Concentration Trend:

Consolidation Data Table:

Well	Well Type	Consolidation Date	Constituent	Result (mg/L)	Flag	Number of Samples	Number of Detects
RMIS-5	T	6/1/1992	CHROMIUM, TOTAL	3.0E-02		1	1
RMIS-5	T	9/1/1992	CHROMIUM, TOTAL	3.0E-02		1	1
RMIS-5	T	12/1/1992	CHROMIUM, TOTAL	3.0E-02		1	1
RMIS-5	T	3/1/1993	CHROMIUM, TOTAL	3.0E-02		1	1
RMIS-5	T	6/1/1993	CHROMIUM, TOTAL	3.0E-02		1	1
RMIS-5	T	8/1/1993	CHROMIUM, TOTAL	2.8E-02		1	1
RMIS-5	T	9/1/1993	CHROMIUM, TOTAL	3.0E-02		1	1
RMIS-5	T	10/1/1993	CHROMIUM, TOTAL	2.5E-02		1	1
RMIS-5	T	11/1/1993	CHROMIUM, TOTAL	2.3E-02		1	1
RMIS-5	T	12/1/1993	CHROMIUM, TOTAL	3.7E-02		1	1
RMIS-5	T	1/1/1994	CHROMIUM, TOTAL	4.0E-02		1	1
RMIS-5	T	4/1/1994	CHROMIUM, TOTAL	3.0E-02		1	1
RMIS-5	T	7/1/1994	CHROMIUM, TOTAL	1.6E-01		1	1
RMIS-5	T	10/1/1994	CHROMIUM, TOTAL	9.3E-02		1	1
RMIS-5	T	1/1/1995	CHROMIUM, TOTAL	6.8E-02		1	1
RMIS-5	T	5/1/1995	CHROMIUM, TOTAL	3.5E-02		1	1
RMIS-5	T	12/1/2003	CHROMIUM, TOTAL	1.8E-02		1	1
RMIS-5	T	6/7/2007	CHROMIUM, TOTAL	1.1E-02		1	1
RMIS-5	T	5/20/2008	CHROMIUM, TOTAL	1.0E-02		1	1
RMIS-5	T	6/27/2008	CHROMIUM, TOTAL	7.4E-03		1	1

MAROS Linear Regression Statistics

Well	Well Type	Consolidation Date	Constituent	Result (mg/L)	Flag	Number of Samples	Number of Detects
RMIS-5	T	6/28/2009	CHROMIUM, TOTAL	2.4E-02		1	1
RMIS-5	T	6/22/2010	CHROMIUM, TOTAL	1.8E-02		1	1
RMIS-5	T	1/8/2011	CHROMIUM, TOTAL	1.5E-02		1	1
RMIS-5	T	6/15/2011	CHROMIUM, TOTAL	2.5E-02		1	1
RMIS-5	T	11/16/2011	CHROMIUM, TOTAL	4.6E-02		1	1

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); ND = All Samples are Non-detect

Second Five-Year Review Report
for
Mouat Industries National Priority List Site
Columbus, Montana

Attachments VI-5 and VI-6
Interview List and
Interview Documentation

Five –Year Review Interviewees

NAME and ADDRESS	PHONE	AFFILIATION	Questions to ask
Michael Shannon Pennsylvania	215-299-6125 215-279-2469 - c	FMC Corp.	Section 1
Bill Cutler Denver	808-381-9121 - c	Was PM for FMC at time of removal action	Section 1
Dennis Holton 408 East 1 st Ave. North Columbus, MT 59019	406-322-4424 406-321-0796-c	Director Public works	Section 2
Doug Howard 408 East 1 st Ave. North Columbus, MT 59019	406-322-4429	City Attorney	Section 2
Gary Walterman 408 East 1 st Ave. North Columbus, MT 59019	406-322-5313	Mayor	Section 2
Ron Burton 408 East 1 st Ave. North Columbus, MT 59019	406-322-5313	Treasurer	Section 2
Doug Hucke Columbus, MT 59019	406-652-3600	Timberweld	Section 1
Rob Jordan 317 Anaconda Road Butte, MT 59701	406-723-1836 406-491-2304	BP ARCO project manager	Section 1
Alan Rickman Columbus MT 59019	406-322-5974	Airport Manager	Section 1
Tien Nguyen	303-312-6280	EPA OSC at time of removal action	Section 1
Daryl Reed	406-841-5041	MT DEQ	Section 2 and 3
Roger Hoogerheide	406-457-5031	EPA RPM	Section 2 and 3
Gary Icopini	406-496-4841	MBMG	Section 3

Questions asked for second 5 Year Review

Section 1 (Previous EPA Staff/RP Site Mgrs/Impacted Community Members),

1. What is your overall impression of the project?
2. What effects have site operations had on the surrounding community?
3. Do you have any concerns about future land use?
4. What do you envision as a beneficial re-use of the site?
5. Did you know that the ground water restrictions were lifted by the town in 2008? Did you know that EPA deleted the surface and subsurface soils component from the site in 2009?
6. Do you feel well informed about the site's activities and progress?
7. Any comments, suggestions, or recommendations regarding the site's management/operation or other people we should talk with?

Section 2 (State Local Considerations)

1. What is your overall impression of the project?
2. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.
3. The city of Columbus is responsible for maintaining the Institutional Controls as part of the site remedy and must ensure compliance with federal Superfund law as provided in the Superfund Overlay District (SOD). Has this been implemented and followed? What policies are used to enforce institutional controls and is further guidance needed to ensure compliance?
4. Did you know that the ground water restrictions were lifted by the town in 2008? Did you know that EPA deleted the surface and subsurface soils component from the site in 2009?
5. Do you feel that further education is needed on Institutional control implementation and maintenance, and on what a potentially responsible party must do to demonstrate compliance?
6. Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? What constitutes a violation? If so, please give details of the events and results of the responses.
7. Do you feel well informed about the site's activities and progress?
8. Any comments, suggestions, or recommendations regarding the site's management/operation or other people we should talk with?
9. Do you have any concerns about future land use?
10. What do you envision as a beneficial re-use of the site?

Section 3 (Performance, Operation & Maintenance)

1. (Repeat from Section 1) What is your overall impression of the project?
2. Is the remedy (response actions) functioning as expected? How well is the remedy performing?
3. Have there been any significant changes in the O&M requirements or sampling routines in the last five years? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.
4. Have there been unexpected O&M costs in the last five years? If so, please give details.
5. (Repeat from Section 1) Any comments, suggestions, or recommendations regarding the site's management or operation or other people we should talk with?

Second Five-Year Review Report
for
Mouat Industries National Priority List Site
Columbus, Montana

Attachment VI-6
Interview Report

The following sections provide questions and answers for individuals interviewed as part of the Mouat Industries Second Five-Year Review. Where possible, the specific individuals interviewed are identified. (All questions were asked by Mary Darling, Project manager, U.S Army Corps of Engineers.

Interview with Roger Hoogerheide, Site EPA RPM (Interview 01/04/13)

Section 2 (State Local Considerations):

1. What is your overall impression of the project?

A bit disappointed because the site is on the NPL list but no consideration was made for how the site was to be managed long term. Who is ultimately responsible for the site: who will perform on site inspections and annual groundwater GW monitoring. The town (as partial potentially responsible party PRP) is responsible for implementation of the institutional controls ICs. Because this was a removal action rather than a remedial action, and no ROD was written, the state may not concur on accepting O&M.

2. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.

I think, (in the past) we have not had enough site visits. Currently Montana Bureau of Mines and Geology MBMG performs semi annual GW monitoring at Mouat, and I have been making more visits because Mouat is on the way to another EPA site. Prior to the Public Works Department building their building on part of the site there was not enough visits. All agencies were surprised by the building going up.

3. The city of Columbus is responsible for maintaining the Institutional Controls as part of the site remedy and must ensure compliance with federal Superfund law as provided in the Superfund Overlay District (SOD). Has this been implemented and followed? What policies are used to enforce institutional controls and is further guidance needed to ensure compliance?

EPA and the State of Montana should have been notified prior to the building going up (in the area of Institutional Controls ICs over the Superfund Overlay District SOD). A letter signed by the mayor, said that the EPA would be notified, but my view is that was not enforceable because it was not promulgated into the ordinance. (Reference letter dated January 20, 2009 from EPA and Montana DEQ to Town of Columbus with all 3 signatures). If the letter were made part of Town of Columbus ordinance on ICs/SOD then it would be enforceable. The State and EPA need to meet with the (Town of Columbus) Mayor, City Attorney and Public Works Director to ensure ICs are being adhered to. I recommend that be carried forward as a recommendation to promulgate the notification into the Town of Columbus ordinance on ICs/SOD. Also I could mention parking on the cap.

On the Timberweld portion of the SOD when the town transferred the property to Timberweld the IC's went with it. So the recommendation of adding notification to the Columbus ordinance on ICs/SOD also effects Timberweld.

4. Did you know that the ground water restrictions were lifted by the town in 2008? Did you know that EPA deleted the surface and subsurface soils component from the site in 2009?
Yes and yes.

5. Do you feel that further education is needed on Institutional control implementation and maintenance, and on what a potentially responsible party must do to demonstrate compliance?

Yes, I believe it boils down to periodic meetings with the town as the town is responsible for implementing the IC's.

6. Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? What constitutes a violation? If so, please give details of the events and results of the responses.

Building the building may or may not have been a violation. Discounting the building there are no complaints, violations, or other incidents. There is a grey area of starting the building before notification and asking forgiveness later. The majority of the public works building is not on the repository (foot print of where the blocks lie) As far as the blocks (that were excavated) being reburied in the utility corridor, that is not an ideal location; however, (the blocks) are considered to be solid waste not hazardous waste the off-site rule still applies.

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

Yes. Currently the EPA is now regularly stopping in at the site.

8. Any comments, suggestions, or recommendations regarding the site's management/operation or other people we should talk with?

No, there is not much community interest. Recommend regular meetings on the ICs and implementation of a site specific manual. The EPA and MT DEQ should be notified in advance of land use change. And the notification requirements should be put into the Town of Columbus ordinance on IC's and SOD so it is enforceable. Also recommend a ROD be written so EPA can delete the groundwater (From the NPL) once O&M is addressed. Also recommend abandonment of the monitoring wells on the south side of the airport (as they are in poor condition).

9. Do you have any concerns about future land use?

No, except the possibility of earthquake – the Yellowstone area is overdue for a significant earthquake. Earthquake should be a consideration for a new building.

10. What do you envision as a beneficial re-use of the site?

The current use of the site by the city is beneficial re-use (the public works building and parking around the building and use of the remaining storage sheds). As far as the grassy cap area there are not many other uses, a park isn't likely as no trees could be planted in the cap and the area is semi-industrial. Some of the grassy area could be made into a hard stand area for the city to stockpile materials and to park equipments, but that would require a surface other than the grassy cap.

Section 3 (Performance, Operation & Maintenance):

1. (Repeat) What is your overall impression of the project?
2. Is the remedy (response actions) functioning as expected? How well is the remedy performing?

The remedy in regards to soils is as designed and met cleanup goals for soils. For GW when water contacts the waste the chromium can dissolve and that is why we put the contingency triggers into the Post Removal Site Control Plan, 2008: Per the plan: 3 times the mcls in the source area and/or half of the mcls down-gradient triggers more frequent monitoring (semiannual). We don't know during high groundwater when GW saturates the block, how much dissolves and where steady state is. We also don't know how long it takes to get from the source area to the Point of Compliance wells.

3. Have there been any significant changes in the O&M requirements or sampling routines in the last five years? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.

The reduction in the size of the controlled GW was significant. There were also changes in the (Town of Columbus) ordinances in the last 5 years. And there was a land use change due to the public works building partially being on the repository (block area). Finally EPA has a better understanding of the groundwater than 5 years ago.

4. Have there been unexpected O&M costs in the last five years? If so, please give details.

Yes but starting from a low annual O&M cost. Last year (in a recent high groundwater year), additional monitoring was required due to exceedance of the contingency trigger in the source area, this resulted in the semi-annual monitoring going on currently. Performing semi-annual sampling double the sampling cost.

Interview with Daryl Reed, Montana DEQ PM (interview 11/30/12)

Section 2 (State Local Considerations):

1. What is your overall impression of the project?

Favorable. It was a removal action that completed the stated goal of removing contaminants and thus mitigating effects of the Ground water plume.

2. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.

There has been a lot of communication between EPA and the State and also the Montana Bureau of Mines and Geology (MBMG) (contracted by the State to conduct the GW sampling.) The last time I was on site was 2012 with Roger (EPA) for the 2nd 5 year review kick off meeting and before that was 2010 when the EPA and State participated in the briefing by MBMG and

Montana Tech, of the university of Montana (Butch Gerbrandt and Rich McNearny) on the Structural Capacity based on the final report they conducted for Mouat (ie “Final Report Mouat Industries Superfund Site Structural Capacity and Institutional Controls Reassessment, November, 2009.) (MT-DEQ had contracted with MBMG, a department of Montana Tech.)

3. The city of Columbus is responsible for maintaining the Institutional Controls as part of the site remedy and must ensure compliance with federal Superfund law as provided in the Superfund Overlay District (SOD). Has this been implemented and followed? What policies are used to enforce institutional controls and is further guidance needed to ensure compliance?

Part of IC’s reassessment was to look at if land can be re-developed. So I agree that the area could be redeveloped. We also made changes to the IC’s to allow for re-development. In the “Post Removal Site Closure Plan for Mouat Industries National Priority List Site, Columbus, Stillwater County, Montana, February 2009” and also in the letter from the EPA (Roger Hoogerheide); the city is supposed to notify the EPA and State BEFORE building. The notification requirements were not in the city ordinance, so I might recommend that the ordinance language be changed to require notification before future redevelopment is planned.

4. Did you know that the ground water restrictions were lifted by the town in 2008? Did you know that EPA deleted the surface and subsurface soils component from the site in 2009?

Yes aware and agree with both.

5. Do you feel that further education is needed on Institutional control implementation and maintenance, and on what a potentially responsible party must do to demonstrate compliance?

a. The public works director, Dennis Holton, is now aware of the requirement to notify EPA and the state before any future redevelopment, so as long as he is there I don’t believe further education is needed. As the town of Columbus is a PRP and also administers the IC, they are required to give the agencies updates, but I think it is up to the EPA and DEQ to follow up with annual meetings (via phone or in person) to get an update on plans and activities from the city of Columbus, MT.

6. Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? What constitutes a violation? If so, please give details of the events and results of the responses.

No, just the building notification (public works building).

7. Do you feel well informed about the site’s activities and progress?

Yes.

8. Any comments, suggestions, or recommendations regarding the site’s management/operation or other people we should talk with?

No.

9. Do you have any concerns about future land use?

Just that for future land use, the agencies need to be notified prior to any planned activities.

10. What do you envision as a beneficial re-use of the site?

I think the Public works building (city shops) is a great re-use of the site, They could expand or add a storage yard if they need to.

Section 3 (Performance, Operation & Maintenance)

1. (Repeat from Section 1&2) What is your overall impression of the project?

2. Is the remedy (response actions) functioning as expected? How well is the remedy performing?

Yes, it is performing as anticipated. It reduced the GW plume and concentrations.

3. Have there been any significant changes in the O&M requirements or sampling routines in the last five years? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.

The sampling intervals are triggered by the language in the "Post Removal Site Control Plan, ... February 2009", normally there is annual GW monitoring, but there is a contingency trigger of 3 x MCLs or 300ml on Chromium that were exceeded in June 2011 significantly in the source wells, and moderately the year before. That triggers more frequent semi-annual monitoring until the levels go down. It may be worth considering increasing the 300ml "trigger" to a higher concentration. This is because the hydrogeology shows that even if there are high concentrations in the source wells, that there are not high concentrations down gradient in the compliance wells (point of compliance wells).

4. Have there been unexpected O&M costs in the last five years? If so, please give details.

The MBMG task order budget is set up for semi-annual sampling each year, even though some years have only annual sampling so normally there is not a budget exceedance. But this year in 2012 the State and EPA added a new requirement to find all the wells including some that were no longer used anticipating that some should be abandoned due to their poor condition or due to no longer being needed.

Interview with Dennis Holton, Director Public Works Town of Columbus (interview 01/02/13)

Section 2 (State Local Considerations)

1. What is your overall impression of the project?

It has been a long on-going project with a quick startup in 1992 – 1994 or so, when I first came to Columbus public works department. The State guys have been very helpful.

2. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.

Public Works uses the site already so we are always here since the site was released to us. We use the old water treatment plant building, (red wood structure - now empty), for cold storage. Behind (east) of the new building is an existing concrete pad left in place that we use to park on. We park and have material storage on the part of cap. The Public Works upkeeps the area and mows the cap.

3. The city of Columbus is responsible for maintaining the Institutional Controls as part of the site remedy and must ensure compliance with federal Superfund law as provided in the Superfund Overlay District (SOD). Has this been implemented and followed? What policies are used to enforce institutional controls and is further guidance needed to ensure compliance?

They are part of the city's zoning regulations but suggest they are updated and clarified. Determine if the actual (solidified treated soil blocks) "blocks" themselves are considered solid waste and are not hazardous waste. Need clarification and would like proper procedures for handling the blocks written out.

4. Did you know that the ground water restrictions were lifted by the town in 2008? Did you know that EPA deleted the surface and subsurface soils component from the site in 2009?

Yes and yes.

5. Do you feel that further education is needed on Institutional control implementation and maintenance, and on what a potentially responsible party must do to demonstrate compliance? Yes, would like to know what we can do and how EPA law effects reuse of area and moving of blocks. Also how much gravel is required to be added over the soil cap to use parts of it for parking on and/or for storing materials. EPA has been doing a good job and have been easy to work with.

6. Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? What constitutes a violation? If so, please give details of the events and results of the responses.

None, except we learned we are to ask in advance of building something that will affect the blocks. There were 2 or 3 documents (about the soil-concrete blocks) and only one (I think a letter from EPA to the mayor) mentioned the need to inform the EPA in advance of building so it was unintentionally missed.

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

Yes.

8. Any comments, suggestions, or recommendations regarding the site's management/operation or other people we should talk with?

Suggest putting everything related to future use of the site in one O&M type manual rather than a zoning code. It should explain what are the proper procedures to dispose of the blocks if a block is removed.

9. Do you have any concerns about future land use?

Not concerns but hopes to use differently. The site is hard to reuse with all the blocks in place, frost depth is 42 inches so the blocks are in the way for future building construction. Public Works doesn't have current plans for another building but Timberweld may what to build a building.

10. What do you envision as a beneficial re-use of the site?

Public Works already has the new building there, but we do need to store materials and equipment.

Interview with Doug Howard, Attorney to Town of Columbus (interview 01/07/13)
Section 2 (State Local Considerations)

1. What is your overall impression of the project?

We look forward to completion of the project (delisting).

2. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.

Not by my office.

3. The city of Columbus is responsible for maintaining the Institutional Controls as part of the site remedy and must ensure compliance with federal Superfund law as provided in the Superfund Overlay District (SOD). Has this been implemented and followed? What policies are used to enforce institutional controls and is further guidance needed to ensure compliance?

We maintain the IC's through zoning a superfund overlay district SOD ordinance. It states what can or cannot be done on the project. It has been amended a couple times for EPA, with whom we try to comply. We don't need further guidance to ensure compliance.

4. Did you know that the ground water restrictions were lifted by the town in 2008? Did you know that EPA deleted the surface and subsurface soils component from the site in 2009?

Yes and yes.

5. Do you feel that further education is needed on Institutional control implementation and maintenance, and on what a potentially responsible party must do to demonstrate compliance?

No.

6. Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? What constitutes a violation? If so, please give details of the events and results of the responses.

No.

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

Yes.

8. Any comments, suggestions, or recommendations regarding the site's management/operation or other people we should talk with?

No.

9. Do you have any concerns about future land use?

No.

10. What do you envision as a beneficial re-use of the site?

Hope for site is for Timberweld or town to build a structure or use for storage.

**Interview with Ron Barton Town of Columbus Treasurer (interview 01/08/13)
Initial contact was Mayor Gary Walterman who referred me to Ron Barton instead 406-322-5313.**

Section 2 (State Local Considerations)

1. What is your overall impression of the project?

I wish that we had more information to begin with, and had forced the relocation of all the block to Utah or wherever they went (off site). We could not get good information from the first EPA person and later asked for another EPA contact, who was more helpful. We also requested help from our state senators who assisted. Because the city owned the land (where the process took place) we were considered a PRP. Now the City can't sell property. We did build a public works building on the site.

2. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.

MBMA Butte comes and monitors the wells, and Roger Hoogerheide visits, and I have had contact with an EPA person in Denver. Dennis Holton (Public Works) is our site contact.

3. The city of Columbus is responsible for maintaining the Institutional Controls as part of the site remedy and must ensure compliance with federal Superfund law as provided in the Superfund Overlay District (SOD). Has this been implemented and followed? What policies are used to enforce institutional controls and is further guidance needed to ensure compliance?

Yes it has been implemented and is in the zoning, in a section on the Superfund Overlay District, SOD, which is south of Plough Avenue.

4. Did you know that the ground water restrictions were lifted by the town in 2008? Did you know that EPA deleted the surface and subsurface soils component from the site in 2009?

Yes and Yes.

5. Do you feel that further education is needed on institutional control implementation and maintenance, and on what a potentially responsible party must do to demonstrate compliance?

I don't believe so, the institution knowledge is still here as most the persons who were involved are still around. Maybe in another 5-years, if new persons are here.

6. Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? What constitutes a violation? If so, please give details of the events and results of the responses.

Not aware of any violations.

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

Yes.

8. Any comments, suggestions, or recommendations regarding the site's management/operation or other people we should talk with?

Early on when they (EPA) said we (Columbus. MT) could be charged \$500,000/day penalty if we did not comply, definitely got our attention.

9. Do you have any concerns about future land use?

Not at this time.

10. What do you envision as a beneficial re-use of the site?

Because of the block being placed there, the ground is higher than around it, and if you want to use the block area, you are required to add 2-feet more cover, so it gets pretty high for re-use, especially considering there is an adjacent airport. The (planned) second layer of block were shipped off instead (due to the potential of the repository getting to high).

Interview with Doug Hucke, Timberweld (interview 01/07/13)

Section 1 (Previous EPA Staff/RP Site Mgrs/Impacted Community Members),

1. What is your overall impression of the project?

Very Successful as far as I know. My understanding is the Hexavalent Chromium is decreasing. About 4 years ago I attended a public meeting and got the impression that the entire site would be considered for delisting. As a business I would like the site delisted. Continued NPL/Superfund status (although partially delisted) is an impediment to procurement of financing and investment capital. Having all targets met will be a psychological benchmark and will remove barriers for future economic growth. The sooner the site is delisted it is better for the businesses and the Town of Columbus. I would like to know if groundwater amounts of Chromium are decreasing, and how much, I would like to know how long Ground water monitoring will go on. And, I would like to know the criteria that would allow delisting of the site.

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

An argument could be made that the clean-up itself was a temporary boom of local jobs. However, it has severely impeded Timberweld operations. Growth, and modernization were stagnant over the term of the Superfund/PRP status, ~ 1992-today. Although unavoidable, the presence of the NPL site has hurt the economy and tax base of the Town of Columbus. The repository area (block area) of the superfund overlay district SOD, has been taken out of service for unrestricted development. I know Montana Tech wrote a report on building in the block repository area. In the original remediation specifications for the initial laying of the block, (the block) were supposed to have bearing capacity to be used with a mat and slab on grade foundations. When public works built their building Montana Tech recommended the block be removed and footings go to undisturbed grade for support. Recommend a foundation designed by an engineer should be allowed even if it may be a mat foundation or thickened edge slab.. Recommend a written set of rules on how to handle the blocks if they are excavated and removed for any reason: a building or utilities etc.

3. Do you have any concerns about future land use?

No. I would like to see as much flexibility as possible as to foundation types allowed over the blocks including but not limited to: mat foundations, thickened edge slabs, grouting of the voids in the block, piers, footings, etc. Timberweld has contemplated an expansion toward the cities land over the repository (blocks).

4. What do you envision as a beneficial re-use of the site?

To make the site useful to local businesses, including Timberweld. Being able to use and build on the repository area.

5. Did you know that the ground water restrictions were lifted by the town in 2008? Did you know that EPA deleted the surface and subsurface soils component from the site in 2009?

Yes and Yes. I attended the city meeting and spoke with MT Tech. and Roger Hoogerheide.

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

Yes although there is not much activity right now, to that extend I feel well informed. I look forward to the date it is delisted. Maybe the first site in Montana to be delisted?

7. Any comments, suggestions, or recommendations regarding the site's management/operation or other people we should talk with?

No.

Interview with Rob Jordan, BP (British Petroleum) was ARCO project manager (BP purchased ARCO) (interview 01/08/13)

Section 1 (Previous EPA Staff/RP Site Mgrs/Impacted Community Members)

1. What is your overall impression of the project?

I inherited Mouat after it was closed. The site is progressing in the right direction.

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

Do not know.

3. Do you have any concerns about future land use?

I believe the restrictions that we have on GW will give protection. Persons will be aware of what they can and can't do.

4. What do you envision as a beneficial re-use of the site?

In that area, not familiar, but commercial or industrial re-use.

5. Did you know that the ground water restrictions were lifted by the town in 2008? Did you know that EPA deleted the surface and subsurface soils component from the site in 2009?

Yes and Yes. (ARCO was placed under and order for GW cleanup)

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

No.

7. Any comments, suggestions, or recommendations regarding the site's management/operation or other people we should talk with?

Do not have anything.

Interview with Tien Nguyen, EPA OSC (interview 01/03/13)

Section 1 (Previous EPA Staff/RP Site Mgrs/Impacted Community Members)

1. What is your overall impression of the project?

I was involved at the beginning of the NPL (Mouat) Project Site, at the request of the MT EPA office for (on-Scene Coordinator) OSC assistance. I was able to put an EPA Order on the FMC Corporation for cleanup of the site. Then FMC Corp. did a voluntary cleanup – but only addressed the soil contamination not the GW contamination. FMC is huge corporation very connected in Washington DC and were able to avoid GW cleanup. FMC produced a model arguing that after soil contamination was addressed, that the GW would be cleaned up without any action in 10-years. They (FMC) did do a good job of the soil treatment on site. Then an EPA RPM from the MT office took over on-going site management.

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

Community at that time did not raise any concerns or objections to the cleanup.

3. Do you have any concerns about future land use?

Yes the area where they (blocks) are buried should have a restriction almost forever.

4. What do you envision as a beneficial re-use of the site?

The site could be reused if they grouped the blocks together and did not disturb that area. They could then develop the rest of the site.

5. Did you know that the ground water restrictions were lifted by the town in 2008? Did you know that EPA deleted the surface and subsurface soils component from the site in 2009?

No and No.

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

No.

7. Any comments, suggestions, or recommendations regarding the site's management/operation or other people we should talk with?

None.

Interview with Gary Icopini, MBMG (interview 01/04/13)

Section 3 (Performance, Operation & Maintenance)

1. What is your overall impression of the project?

Good. We are involved in the long term monitoring. The remedy appears to be fairly effective, with no downgradient exceedances of drinking water standards.

2. Is the remedy (response actions) functioning as expected? How well is the remedy performing?

Again it is functioning effectively as shown by lack of exceedance downgradient. The wells that were installed at the new residences in the area, are all for irrigation and not drinking water, and the one resident we were unable to contact (mentioned at the 5 year site visit) has now replied that the well is not used (may not be working).

3. Have there been any significant changes in the O&M requirements or sampling routines in the last five years? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.

The Post Removal Site Control Plan, 2008 is a monitoring plan for the site. It has contingencies to increase the frequency of monitoring if monitoring results are a percentage of the mcl. We monitor 3 weeks after the the peak in Ground water in the spring (hydrograph) yearly. Levels last year triggered more frequent monitoring, of twice a year. The contingency triggers are below mcls. Montana Bureau of Mines and Geology MBMG has been doing the monitoring at the site since 2007.

4. Have there been unexpected O&M costs in the last five years? If so, please give details.

Any unexpected cost was due to exceedance triggers and due to the fact we are currently monitoring twice a year.

5. Any comments, suggestions, or recommendations regarding the site's management or operation or other people we should talk with?

The Post Removal Site Control Plan is good for site needs. Nick Tucci MBMG was also at the 5 year review site visit, and he did sampling and installation of the remote GW monitor set up on site. Ted Duaine supervisor MBMG has site knowledge.

Interview with Michael Shannon FMC (written response received 01/09/13)

Section 1 (Previous EPA Staff/RP Site Mgrs/Impacted Community Members),

1. What is your overall impression of the project?

FMC Response: In 2009, the United States Environmental Protection Agency (USEPA) deleted a portion of the Mouat Industries Superfund site from the National Priorities List (NPL). This partial deletion pertained to the surface and subsurface soil components of the site for which FMC Corporation (FMC) addressed through a remediation project between 1991-1994. FMC agrees with USEPA's 2009 determination to delist the soil component at the site from the NPL.

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

FMC Response: FMC believes this question is not applicable based on the current status of the site.

3. Do you have any concerns about future land use?

FMC Response: All institutional controls, including land use restrictions and groundwater use restrictions, should be complied with.

4. What do you envision as a beneficial re-use of the site?

FMC Response: All institutional controls, specifically land use restrictions and groundwater use restrictions, should be complied with.

5. Did you know that the ground water restrictions were lifted by the town in 2008? Did you know that EPA deleted the surface and subsurface soils component from the site in 2009?

FMC Response: FMC understands that the groundwater use restrictions were relaxed for the Superfund Overlay District (SOD) however remains intact for the treated block placement area. FMC supported USEPA's deletion of surface and subsurface soils deletion from the NPL in 2009.

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

FMC Response: FMC remains informed of site activities and progress.

7. Any comments, suggestions, or recommendations regarding the site's management/operation or other people we should talk with?

FMC Response: FMC does not have any comments, suggestions or recommendations.

Five –Year Review Interviewees

NAME and ADDRESS	PHONE	AFFILIATION	Questions to ask
Michael Shannon Pennsylvania	215-299-6125 215-279-2469 - c	FMC Corp.	Section 1

Questions asked for second 5 Year Review

Section 1 (Previous EPA Staff/RP Site Mgrs/Impacted Community Members),

1. What is your overall impression of the project?

FMC Response: In 2009, the United States Environmental Protection Agency (USEPA) deleted a portion of the Mouat Industries Superfund site from the National Priorities List (NPL). This partial deletion pertained to the surface and subsurface soil components of the site for which FMC Corporation (FMC) addressed through a remediation project between 1991-1994. FMC agrees with USEPA’s 2009 determination to delist the soil component at the site from the NPL.

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

FMC Response: FMC believes this question is not applicable based on the current status of the site.

3. Do you have any concerns about future land use?

FMC Response: All institutional controls, including land use restrictions and groundwater use restrictions, should be complied with.

4. What do you envision as a beneficial re-use of the site?

FMC Response: All institutional controls, specifically land use restrictions and groundwater use restrictions, should be complied with.

5. Did you know that the ground water restrictions were lifted by the town in 2008? Did you know that EPA deleted the surface and subsurface soils component from the site in 2009?

FMC Response: FMC understands that the groundwater use restrictions were relaxed for the Superfund Overlay District (SOD) however remains intact for the treated block placement area. FMC supported USEPA’s deletion of surface and subsurface soils deletion from the NPL in 2009.

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

FMC Response: FMC remains informed of site activities and progress.

7. Any comments, suggestions, or recommendations regarding the site's management/operation or other people we should talk with?

FMC Response: FMC does not have any comments, suggestions or recommendations.

TOWN OF COLUMBUS PUBLIC WORKS DEPARTMENT

1258 East 1st Avenue South
P.O. Box 549
Columbus, Mt. 59019

Phone 406-322-4424
Fax 406-322-5452
Email colpwd@qwestoffice.net

March 12, 2013

Roger Hoogerheide
USEPA Region 8 – Montana Operations Office
Federal Building
10 West 15th Street, Suite 3200
Helena, Mt. 59626

**ENVIRONMENTAL
PROTECTION AGENCY**
MAR 13 2013
MONTANA OFFICE

Dear Roger

Please find enclosed the analytical results for the samples collected of the fill material that was used for the construction of the Public Works Building. Also you will find enclosed the analytical results of the soil sample collected from the material that is being used to fill holes and improve drainage on the west portion of the site.

The sample for the Public Works Building material is identified as: 1258 1st Ave. S, ES.

The sample for the soil on the west end is identified as: 1258 1st Ave. S, WS.

If you need any further information feel free to contact me anytime at 322-4424.

Sincerely,



Dennis Holten, DPW

Cc: Darryl Reed, DEQ Remediation Division, P.O. Box 200901, Helena, Mt. 59620

ANALYTICAL SUMMARY REPORT

February 25, 2013

Columbus Town of
PO Box 549
Columbus, MT 59019

Workorder No.: B13021246

Project Name: Not Indicated

Energy Laboratories Inc Billings MT received the following 2 samples for Columbus Town of on 2/19/2013 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B13021246-001	1258 - 1st Ave S. ES	02/19/13 9:30	02/19/13	Soil	Metals by ICP/ICPMS, TCLP TCLP Extraction, Non-volatiles Digestion, Total Metals
B13021246-002	1258-1st Ave S. WS	02/19/13 9:35	02/19/13	Soil	Same As Above

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

The results as reported relate only to the item(s) submitted for testing.

If you have any questions regarding these test results, please call.

Report Approved By:


Supervisor, Wet ChemistryDigitally signed by
Keri Conter

Date: 2013.02.25 14:41:34 -07:00

**ENVIRONMENTAL
PROTECTION AGENCY**
MAR 13 2013
MONTANA OFFICE



LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Columbus Town of
Project: Not Indicated
Lab ID: B13021246-001
Client Sample ID 1258 - 1st Ave S. ES

Report Date: 02/25/13
Collection Date: 02/19/13 09:30
Date Received: 02/19/13
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS, TCLP EXTRACTABLE							
Chromium	ND	mg/L		0.1	5	SW6020	02/22/13 23:07 / jjw

Report Definitions: RL - Analyte reporting limit.
QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Columbus Town of
Project: Not Indicated
Lab ID: B13021246-002
Client Sample ID: 1258-1st Ave S. WS

Report Date: 02/25/13
Collection Date: 02/19/13 09:35
Date Received: 02/19/13
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS, TCLP EXTRACTABLE							
Chromium	ND	mg/L		0.1	5	SW6020	02/22/13 23:13 / jjw

Report Definitions: RL - Analyte reporting limit.
QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Columbus Town of
Project: Not Indicated

Report Date: 02/25/13
Work Order: B13021246

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW6020							Analytical Run: ICPMS203-B_130222A		
Sample ID: QCS Chromium	Initial Calibration Verification Standard								02/22/13 10:34
	0.0500	mg/L	0.0010	100	90	110			
Sample ID: ICSA Chromium	Interference Check Sample A								02/22/13 11:18
	0.00108	mg/L	0.0010						
Sample ID: ICSAB Chromium	Interference Check Sample AB								02/22/13 11:23
	0.0206	mg/L	0.0010	103	70	130			
Method: SW6020							Batch: 69245		
Sample ID: MB-69245 Chromium	Method Blank						Run: ICPMS203-B_130222A		02/22/13 21:59
	0.001	mg/L	9E-05						
Sample ID: B13021363-001ADIL Chromium	Serial Dilution						Run: ICPMS203-B_130222A		02/22/13 23:23
	0.00933	mg/L	0.10		0	0		10	
Sample ID: LCS-69245 Chromium	Laboratory Control Sample						Run: ICPMS203-B_130222A		02/22/13 23:28
	0.531	mg/L	0.10	106	85	115			
Sample ID: LCSD-69245 Chromium	Laboratory Control Sample Duplicate						Run: ICPMS203-B_130222A		02/22/13 23:34
	0.528	mg/L	0.10	105	85	115			
Sample ID: B13021246-001AMS3 Chromium	Sample Matrix Spike						Run: ICPMS203-B_130222A		02/23/13 00:41
	0.508	mg/L	0.10	101	75	125			
Sample ID: B13021246-002AMS3 Chromium	Sample Matrix Spike						Run: ICPMS203-B_130222A		02/23/13 01:07
	0.502	mg/L	0.10	100	75	125			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

Standard Reporting Procedures

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as -dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Workorder Receipt Checklist

Columbus Town of

B13021246

Login completed by: Jill M. Lippard

Date Received: 2/19/2013

Reviewed by: BL2000\lcardreau

Received by: jrj

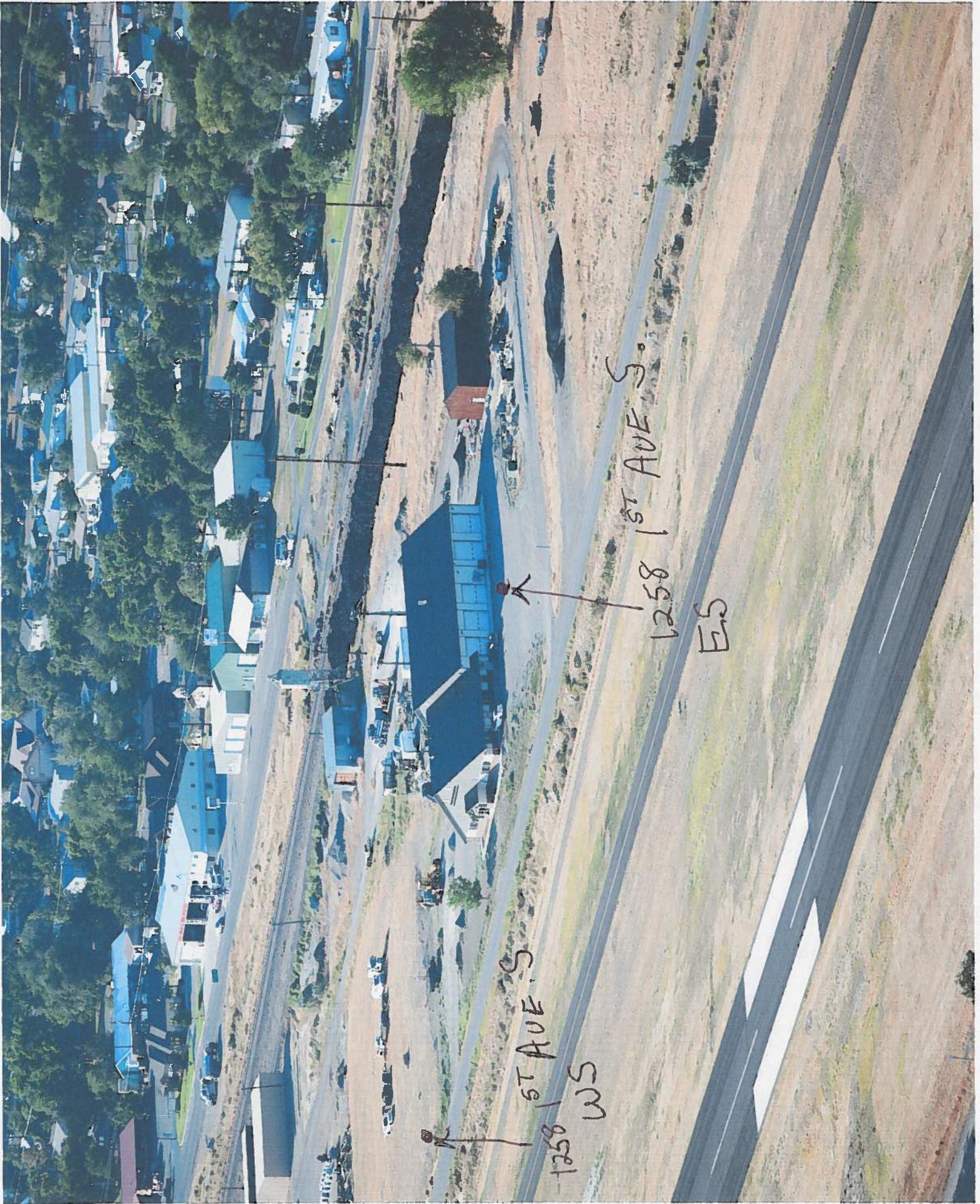
Reviewed Date: 2/19/2013

Carrier Hand Del name:

- | | | | |
|--|---|-----------------------------|--|
| Shipping container/cooler in good condition? | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | Not Present <input type="checkbox"/> |
| Custody seals intact on shipping container/cooler? | Yes <input type="checkbox"/> | No <input type="checkbox"/> | Not Present <input checked="" type="checkbox"/> |
| Custody seals intact on sample bottles? | Yes <input type="checkbox"/> | No <input type="checkbox"/> | Not Present <input checked="" type="checkbox"/> |
| Chain of custody present? | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | |
| Chain of custody signed when relinquished and received? | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | |
| Chain of custody agrees with sample labels? | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | |
| Samples in proper container/bottle? | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | |
| Sample containers intact? | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | |
| Sufficient sample volume for indicated test? | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | |
| All samples received within holding time?
(Exclude analytes that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.) | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | |
| Temp Blank received? | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | Not Applicable <input type="checkbox"/> |
| Container/Temp Blank temperature: | 14.9°C No Ice | | |
| Water - VOA vials have zero headspace? | Yes <input type="checkbox"/> | No <input type="checkbox"/> | No VOA vials submitted <input checked="" type="checkbox"/> |
| Water - pH acceptable upon receipt? | Yes <input type="checkbox"/> | No <input type="checkbox"/> | Not Applicable <input checked="" type="checkbox"/> |

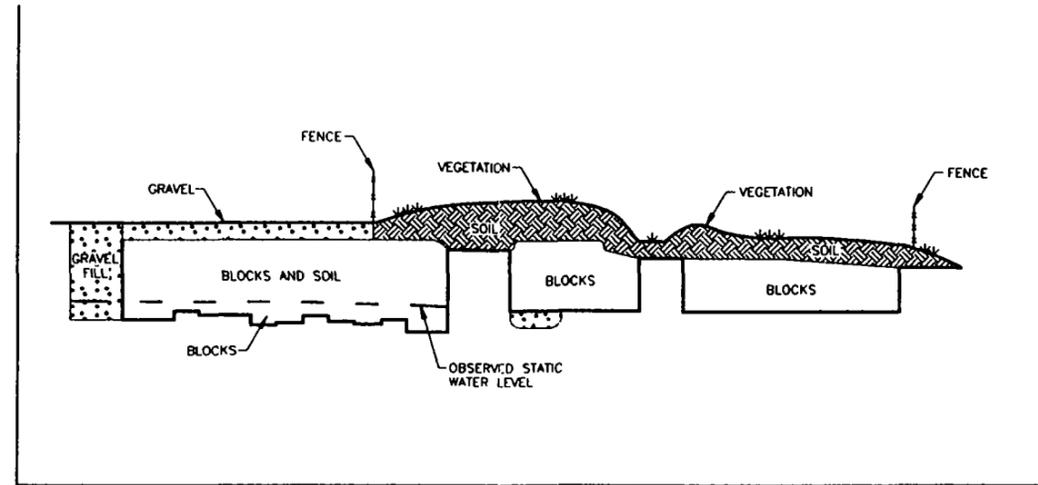
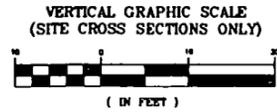
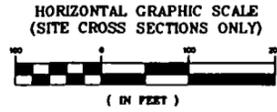
Contact and Corrective Action Comments:

None

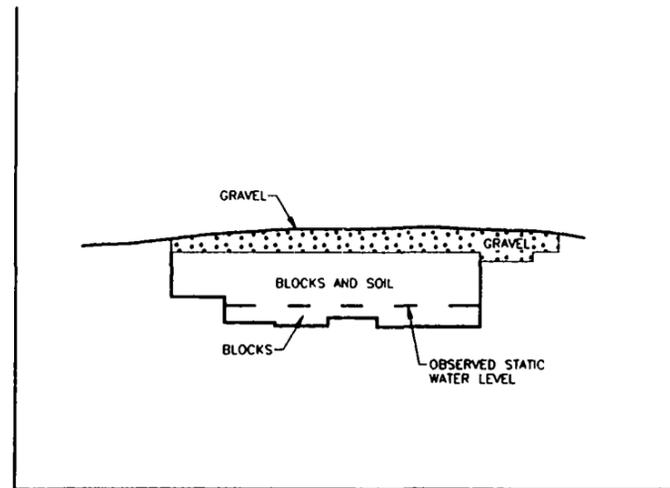
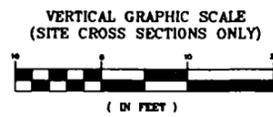
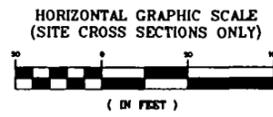


1258 1st Ave S
ES

1258 1st Ave S
WS



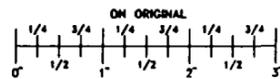
SECTION A-A (FACING NORTH)



SECTION B-B (FACING WEST)

NOTES.

- 1 A MAXIMUM OF ONE LAYER OF BLOCKS ARE PLACED BELOW THE WATER TABLE
- 2 ALL EXCAVATED, UNTREATED SOIL WITH TCLP CHROMIUM RESULTS BETWEEN 0.1 mg/L AND 0.5mg/L WAS PLACED ABOVE THE OBSERVED STATIC WATER TABLE
- 3 THE GRAVEL SURFACE AREA IS NOT FENCED THE VEGETATED AREA IS ENCLOSED WITHIN A SECURITY FENCE
- 4 SEE FIGURE 2-2 FOR LOCATION OF SECTIONS



REVISIONS		DSN/DWN: EHR/CEB CHK: S O NO.: 18978 FILE: 18978X05	NORTH	FMC CORPORATION PHILADELPHIA, PENNSYLVANIA		SITE CROSS SECTIONS A-A AND B-B		FIGURE NO. 2-4
1						MOUAT INDUSTRIES NPL SITE		
2						COLUMBUS, MONTANA		
3						SCALE: AS SHOWN	DATE: MARCH 5, 1996	
4						Baker Environmental, Inc. Coraopolis, Pennsylvania		
5								
6								
7								
8								