Final

Second Five-Year Review Report Basin Mining Area Superfund Site, Jefferson County, Montana

Prepared for:

U.S. Environmental Protection Agency
Region 8, Montana Office
Helena, Montana

May 2013

CH2MHILL

Boise, Idaho

Second Five Year Review Report

for

Basin Mining National Priority List Site

Basin Montana

May 2013

Prepared by:
U.S Environmental Protection Agency, Region 8
Helena, Montana

Approved by:

____

Martin Hestmark
Assistant Regional Administrator
Office of Ecosystems Protection and Remediation

____

Date:

KE 8MO 5/2/13 JSV 8MO 5/7/2013 JAD 5/13/13 mor ENF-RC 6/17/13 DSL 6/17/13 ENF-L

Edwards, Kristine

From: Hopkins, Tracy
Sent: Monday, May 06, 2013 7:25 AM
To: Edwards, Kristine
Subject: RE: Basin 5YR

Hi, Kris,
I compared the final version of the document with my comments made April, and my comments have been addressed. Thanks for the opportunity to review the draft FYR for Basin Mining Area.

Tracy Hopkins, P.E., Office of Superfund Remediation and Technology Innovation, 703-603-8788
" Greatness lies not in being strong, but in the right use of strength." Henry Ward Beecher

---

From: Edwards, Kristine
Sent: Thursday, May 02, 2013 2:33 PM
To: Hopkins, Tracy
Subject: Basin 5YR

Hi Tracy. Here is the final version ready for signatures. Could you send me an email back stating that your comments have been addressed, if you feel that they have been? I will then include that email as it routes for signatures.

Any problems, let me know.

Thanks, Kris

From: Sloan, Richard [mailto:RSloan@mt.gov]
Sent: Monday, April 29, 2013 8:25 AM
To: Edwards, Kristine
Subject: Basin, 5-year review

Kris,
Thanks for the opportunity to review the 5-year report for Basin(OU1).
The DEQ does not have any specific comments.
The OU1 remedial action has been and continues to be effective in protecting public health and the environment in the short term.
Attached are some general observations concerning IC's.
Dick Sloan

Richard Sloan
Superfund Project
Montana Department of Environmental Quality
1100 N. Last Chance Gulch
Helena, Mt 59620-0901
406-841-5046

Second Five Year Review Report

for

Basin Mining National Priority List Site

Basin Montana

May 2013

Prepared by:
U.S Environmental Protection Agency, Region 8
Helena, Montana

Approved by:

Martin Hestmark
Assistant Regional Administrator
Office of Ecosystems Protection and Remediation

6/27/13

Date:

Final

Second Five-Year Review Report Basin Mining Area Superfund Site, Jefferson County, Montana

Prepared for:

U.S. Environmental Protection Agency
Region 8, Montana Office
Helena, Montana

May 2013

CH2MHILL

Boise, Idaho

Second Five Year Review Report

for

Basin Mining National Priority List Site

Basin Montana

May 2013

Prepared by:
U.S Environmental Protection Agency, Region 8
Helena, Montana

Approved by:

_____

Martin Hestmark
Assistant Regional Administrator
Office of Ecosystems Protection and Remediation

_____

Date:

Contents

Appendixes

Tables

Figures

Acronyms and Abbreviations

µg/L	micrograms per liter
ARARs	applicable or relevant and appropriate requirements
ASL	maximum concentration above screening level
bgs	below ground surface
BSL	maximum concentration below screening level
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	contaminant of concern
COPC	contaminant of potential concern
cy	cubic yards
DEQ	Department of Environmental Quality
E&E	Ecology and Environment, Inc.
EPA	U.S. Environmental Protection Agency
ESI	Expanded Site Inspection
FS	Feasibility Study
GSA	General Services Administration
IC	institutional control
IEUBK	Integrated Exposure Uptake Biokinetic
MCL	maximum contaminant level
MDHES	Montana Department of Health and Environmental Services
MDSL AMRB	Montana Department of State Lands, Abandoned Mine Reclamation Bureau
MDT	Montana Department of Transportation
mg/kg	milligrams per kilogram
mg/kg-d	milligrams per kilogram per day
mg/L	milligrams per liter
MGWDCS	Montana Groundwater Discharge Control System
MGWPCS	Montana Groundwater Pollution Control System
NA	not available
NCP	National Contingency Plan
ND	not detected
NPL	National Priorities List
NSL	no screening level—chemical is retained as a chemical of potential concern
OU	Operable Unit

PA	Preliminary Assessment
PRG	preliminary remediation goal
QA/QC	quality assurance/quality control
RA	remedial action
RAO	remedial action objectives
RfD	reference dose
RI	remedial investigation
ROD	Record of Decision
SAP	Sampling and Analysis Plan
SSI	Screening Site Inspection
EPA	U. S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U. S. Fish and Wildlife Service
WWTP	wastewater treatment plant

Executive Summary

Beginning in September 2012, the U.S. Environmental Protection Agency (EPA) Region 8 conducted a second Five-Year Review of the remedial actions implemented at the Basin Mining Area site. The purpose of the Five-Year Review is to determine whether the remedy is still protective of human health and the environment. This Five-Year Review is required by statute because hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unrestricted use and unlimited exposure. The Town of Basin OU1 is part of the Basin Mining Area Superfund site (CERCLIS ID MTD982572562) which EPA added to the Superfund National Priorities List (NPL) in October 1999 because of mining waste problems in the town and in the watershed (OU2) (see Figure 3-1). EPA prioritized its response action by designating the Town of Basin as OU1, which includes contaminated residential soils, a former smelter area, streamside tailings, several tailings piles spread throughout town, and a mill site. Contaminated media included surface and subsurface soil, residual tailings, ore piles, and waste rock piles. Surface water and stream sediment were not addressed by the OU1 Record of Decision, and were deferred to the watershed OU2. No other operable units in the Basin Mining Area Superfund site have progressed to remedial action, although some have undergone limited removal actions.

The Record of Decision (ROD) for the Town of Basin OU1 was signed in March 2001. The selected remedy addressed the direct exposure of the human population to elevated concentrations of contaminants found in the residential soil and residual mine wastes by removal and placement of these source materials in an offsite repository (Luttrell Repository OU3). Clean borrow material was imported to replace excavated contaminated material and the excavated areas (both residential and nonresidential) were revegetated.

This second Five-Year Review determined that the remedy was implemented in a manner consistent with the requirements of the ROD. The remedy at OU1 currently protects human health and the environment because the response actions carried out for the Town of Basin OU1 have addressed the immediate threats, and no exposures are occurring. However, in order for the remedy to be protective in the long-term, the following action needs to be taken: Work with Jefferson County to develop an IC to address potential exposure to buried mine waste during future excavation projects (who to notify, and appropriate handling and disposal processes).

Five-Year Review Summary Form

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Basin Mining Area		
EPA ID: MTD 982572562		
Region: 8	**State:** MT	**City/County:** Town of Basin/ Jefferson County

SITE STATUS	
NPL Status: Final	
Multiple OUs? Yes	**Has the site achieved construction completion?** No

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): Kristine Edwards
Author affiliation: U.S. EPA, Region 8
Review period: 09/19/12 – 05/28/13
Date of site inspection: 09/19/12
Type of review: Statutory
Review number: 2
Triggering action date: 05/28/08
Due date *(five years after triggering action date)*: 05/28/13

ISSUES AND RECOMMENDATIONS IDENTIFIED IN THE FIVE-YEAR REVIEW:

OU(S): 1	ISSUE CATEGORY: **INSTITUTIONAL CONTROLS**			
	ISSUE: **MINING CONTAMINATED SOILS COULD BE EXCAVATED IN FUTURE.**			
	RECOMMENDATION: **DEVELOP AN INSTITUTIONAL CONTROL WITH JEFFERSON COUNTY TO ASSURE THAT MINING CONTAMINATED SOILS POTENTIALLY FOUND DURING FUTURE EXCAVATIONS IN BASIN RECEIVE PROPER HANDLING AND DISPOSAL.**			
AFFECT CURRENT PROTECTIVENESS	AFFECT FUTURE PROTECTIVENESS	IMPLEMENTING PARTY	OVERSIGHT PARTY	MILESTONE DATE
NO	**YES**	**EPA/STATE**	**EPA**	**SEPT. 30, 2014**

PROTECTIVENESS STATEMENT(S)

OPERABLE UNIT:	***PROTECTIVENESS DETERMINATION:***	***ADDENDUM DUE DATE (IF APPLICABLE):***
OU1	**SHORT-TERM PROTECTIVE**	**CLICK HERE TO ENTER DATE.**

PROTECTIVENESS STATEMENT:

THE REMEDY AT OU1 CURRENTLY PROTECTS HUMAN HEALTH AND THE ENVIRONMENT BECAUSE THE RESPONSE ACTIONS CARRIED OUT FOR THE TOWN OF BASIN OU1 HAVE ADDRESSED THE IMMEDIATE THREATS, AND NO EXPOSURES ARE OCCURRING. HOWEVER, IN ORDER FOR THE REMEDY TO BE PROTECTIVE IN THE LONG-TERM, EPA AND THE STATE SHOULD WORK WITH JEFFERSON COUNTY TO DEVELOP AN IC TO ADDRESS POTENTIAL EXPOSURE TO BURIED MINE WASTE DURING FUTURE EXCAVATION PROJECTS IN BASIN (WHO TO NOTIFY, AND APPROPRIATE HANDLING AND DISPOSAL PROCESSES).

This page intentionally left blank.

SECTION 1

Introduction

The purpose of Five-Year Reviews is to determine whether the remedy at a site is 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 include recommendations to address them.

The U. S. Environmental Protection Agency (EPA) Region 8 has conducted a statutory Five-Year Review of the Basin Mining Area Site, located in Jefferson County, Montana. This review was conducted from September 2012 through May 2013 and is the second Five-Year Review for this Site.

EPA is preparing this Five-Year Review pursuant to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121 and the National Contingency Plan (NCP). CERCLA Section 121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the Site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such Site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

EPA interpreted this requirement further in the NCP; 40 Code of Federal Regulation (CFR) 300.430(f)(4)(ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the Site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

EPA conducted this second Five-Year Review of the Remedial Actions (RA) implemented at the Town of Basin OU1 located in Jefferson County, Montana. EPA used a General Services Administration contract to access CH2M HILL, who assisted with the onsite review in September of 2012, and with report writing activities that continued through May of 2013. The State of Montana Department of Environmental Quality (MDEQ) also participated in the review, including community interviews.

The Basin Mining Area Superfund Site consists of six operable units: the Town of Basin OU1, the Basin Watershed OU2, the Luttrell Repository OU3, the Buckeye/Enterprise mines OU4, the Crystal mine OU5, and the Bullion mine OU6. Only OU1 has progressed to a Record of Decision and a completed Remedial Action.

This is the second Five-Year Review for the Basing Mining Area Site, focusing on OU1. The triggering action for this review is the signature date of the previous Five-Year Review report. This second Five-Year Review is required because hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure.

This page intentionally left blank.

SECTION 2

Site Chronology

Table 2-1 presents the chronology of Site events at Basin Mining Area.

TABLE 2-1
Chronology of Site Events at the Basin Mining Area

Event	Date
Timberline Reclamations, Inc. completed an environmental analysis on the mill tailings dispersal in Basin along the Boulder River for the Montana Highway Department (now Montana Department of Transportation [MDT]).	May 1980
The Montana Department of Health and Environmental Sciences (MDHES, now Department of Environmental Quality [DEQ]) prepared a Preliminary Assessment (PA) for the Site. Based on the findings of the PA, a Screening Site Inspection (SSI) was performed to characterize waste sources in and around the Town of Basin.	September 1989
EPA collected surface soil samples from the Basin schoolyard, two fields near the schoolyard, houses near the schoolyard, and areas outside of the town.	January 1990
MDHES collected surface soil samples from the southwest corner of the Basin schoolyard.	April 1990
MDHES collected subsurface soil samples from eight of the previous sample locations in the southwest schoolyard. MDHES recommended that the Basin School Board take preventive actions to limit exposure to children. Oral communication with a representative of the School Board revealed that clean fill was placed over the southwest corner of the schoolyard.	June 1990
EPA completed an Expanded Site Inspection (ESI) to develop additional data for site characterization.	August 1992
Montana Department of State Lands, Abandoned Mine Reclamation Bureau (MDSL AMRB) conducted a Preliminary Assessment (PA) for the OT Mining Corporation, owner of the Basin Mill Site.	1993
EPA conducted a Removal Action in an area at the south end of Valley Street. Approximately 5,000 cubic yards (cy) of contaminated soil/tailings were excavated and disposed at the mine waste repository in Butte, Montana. The excavated areas were backfilled with clean soil, graded, fertilized, seeded, and mulched.	1998
EPA collected soil samples throughout the Town of Basin. Both surface (0-6 inches) and subsurface (6-12 inches) soil samples were collected.	1999
The Basin Mining Are Site was placed on National Priorities List.	October 1999
EPA conducted a field investigation at the Town of Basin OU1 to collect data from areas that were not sampled during previous investigations and to collect additional samples where historical data were questionable. EPA collected and analyzed surface soil samples and groundwater samples, and excavated five test pits in the area east of the Wastewater Treatment Plant (WWTP) to determine the depth of the mining waste material and if there was direct contact between the mining waste material and groundwater.	April through July 2000
EPA completed the final human health risk assessment report and the final remedial investigation report for OU1. The ROD for OU1 deferred ecological risk assessment to the Basin Watershed OU2.	October 2000
Remedial Investigation/Feasibility Study (RI/FS) complete for OU1	December 2000
Proposed Plan for OU1 was issued for public comment.	December 27, 2000
Because of ongoing operation of the tailings impoundment at the Basin Mill, and a possibility of reclamation actions by the mill operator, the Basin Mill Site was excluded from the OU1 ROD.	2001
OU1 ROD signature	March 2001
OU1 Remedial design complete	September 2001
Superfund State Contract Agreement signed	December 27, 2001
OU1 Remedial Action start	September 2002
OU1 Remedial Action complete	October 2004

TABLE 2-1
Chronology of Site Events at the Basin Mining Area

Event	Date
OU2 RI/FS work performed	2002 through 2005
OU3 Luttrell Repository construction initiated	2000
OU4 Buckeye/Enterprise removal action completed	2006
OU5 Crystal Mine removal action completed	2006
OU6 Bullion Mine removal action completed	2006
OU5 & 6 RI/FS work initiated	2010

SECTION 3

Background

3.1 Physical Setting and Characteristics

The Basin Mining Area Superfund Site is located within and around the Town of Basin in Jefferson County, Montana. The Site includes the Town of Basin OU1 (see Figure 3-2), and approximately 300 individual abandoned mine sites in the surrounding watersheds of Basin Creek, Cataract Creek, and part of the upper Boulder River (collectively referred to as the Basin Watershed OU2, encompassing approximately 77 square miles). This report focuses on OU1 because a remedial action was performed at OU1, and the remedy results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure.

The Town of Basin, an unincorporated municipality, is located within the Boulder River watershed and has a population of approximately 212 permanent residents according to the 2010 U.S. Census Bureau. The Town is situated at an approximate elevation of 5,350 feet above mean sea level within the watershed valley. Steep foothills rise approximately 500 feet above the surrounding valley on the east and west sides of Basin Creek and the south side of the Boulder River. Interstate Highway 15 crosses the town in an east-west direction and generally parallels the Boulder River within the watershed valley. The Town of Basin is located in Sections 17 and 18, Township 6 North, Range 5 West in the Basin quadrangle (Figure 3-1). The coordinates of the Site are approximately 46°16’10” north latitude and 112°16’46” west longitude (Ecology & Environment, Inc. [E&E], 1991).

Additional relevant operable units are located within the Basin Watershed OU2 and include the Buckeye/Enterprise Mines OU4, the Crystal Mine OU5, and the Bullion Mine OU6. These are inactive mine sites that contribute to surface water degradation within the Basin Watershed OU2, and have undergone some limited removal actions. The mine waste repository for the Basin Mining Area Superfund Site is the Luttrell Repository OU3.

3.2 Land and Resource Use

Residential, small commercial and recreational activities continue in the Town of Basin. The community includes residential homes, restaurants, small businesses, and a WWTP (CDM 2000).

Currently, the Town is unincorporated and government is administered by the Jefferson County Board of Commissioners. Three commissioners represent the different districts in the County. The Town of Basin is in District 2. As an unincorporated community within the County, Basin residents receive county services, such as road maintenance, solid waste collection, public health and safety service, and extension services. The Board of Commissioners is also responsible for managing local land use planning, disaster and emergency services, district courts, tax collection, and maintaining libraries. Jefferson Valley Conservation District provides leadership in the wise use of soil, water, and related resources within the District.

The Town of Basin is committed to preservation of a strong historic and environmental heritage. The Town has applied for nomination for listing on the National Register of Historic Places.

3.3 History of Contamination

The following sections discuss the history of contamination at the Basin Mining Area NPL Site.

3.3.1 Basin Mining Area

Hard rock mining in the Basin Watershed began in the 1870s and continued intermittently into the late 1960s. Primary sources of contamination consist of numerous scattered mine waste rock piles and tailings piles resulting from historical mining in the watershed, and ore processing in the Town of Basin in the late 1800s and early

1900s. Releases from mining and ore processing sources have resulted in contamination of soil, surface water, sediment, groundwater, air, and biota. Evidence of these releases includes elevated concentrations of contaminants in soil, surface water, and sediment; visual staining of stream sediments; observed mine wastes on streambanks; and noticeable erosion of wastes from source piles. The contaminants of potential concern (COPCs) for the Basin Mining Area are antimony, arsenic, cadmium, copper, iron, lead, manganese, mercury, thallium, and zinc.

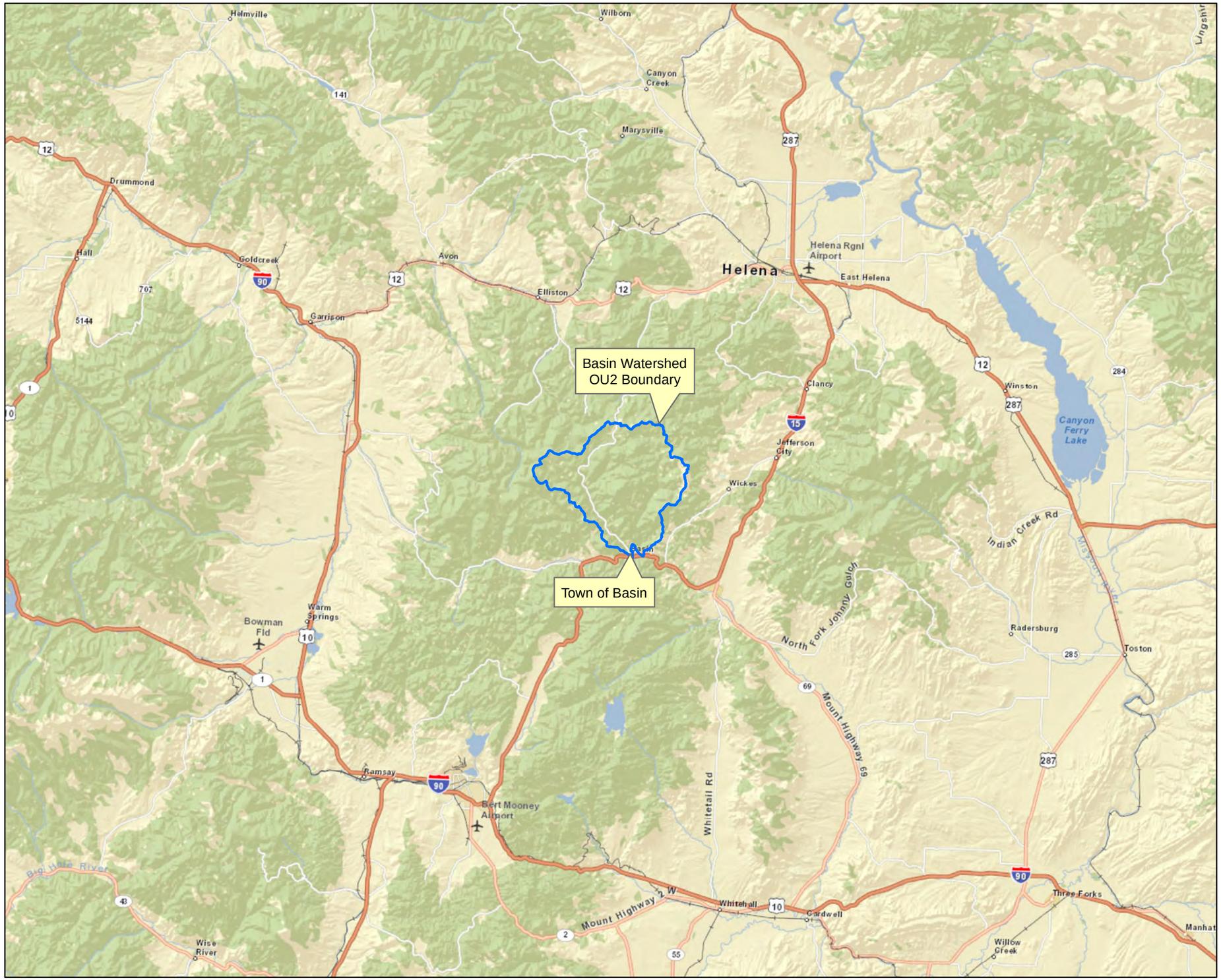
Historical mining activities in the Basin Watershed OU2 are the primary source of surface water contamination. Approximately 300 abandoned mine waste areas impact two main tributaries in the watershed, Basin Creek and Cataract Creek. Both Basin and Cataract creeks discharge to the Boulder River, which flows east-west along the south edge of the Town of Basin. Results of surface water sampling in the Boulder River Watershed during the OU1 remedial investigation indicated a number of contaminants of concern (COCs) above water quality standards as shown in Table 3-1.

TABLE 3-1
Surface Water Sample Results Presented in the Record of Decision (CDM, 2001a)

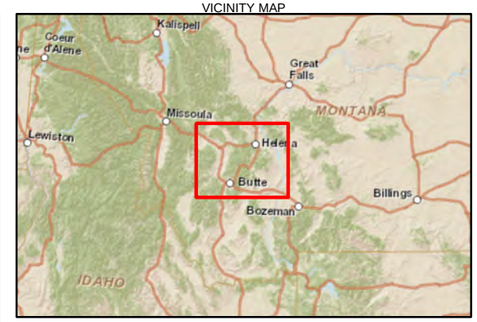
Chemical	Minimum Detected Concentration (µg/L)	Maximum Detected Concentration (µg/L)	Montana WQB7 Surface Water Standards (µg/L)	Detection Frequency	Rationale for Contaminant Deletion or Selection
Antimony	52.4	52.4	6.0	1/9	ASL
Arsenic	3.1	10.0	18.0	8/9	ASL
Barium	24.3	133.0	2,000	4/9	BSL
Cadmium	0.49	237.0	5.0	2/9	ASL
Chromium	2.35	6.0	100	3/9	BSL
Copper	10.6	12,600	1,300	4/9	ASL
Iron	148.0	2,760	300*	8/9	BSL
Lead	1.0	1,420	15	8/10	NSL
Manganese	29.9	8,390	24*	4/9	ASL
Mercury	ND	ND	0.05	0/9	NSL
Silver	ND	ND	35	0/9	BSL
Thallium	ND	ND	1.7	0/9	ASL
Zinc	17.8	5,020	2,100	9/9	BSL

NOTES:
* = secondary maximum contaminant level based on Acute Aquatic Life Standard based on taste, odor, and staining for guidance.
µg/L = micrograms per liter
ND = not detected
NE = not established
ASL = maximum concentration above screening level
BSL = maximum concentration below screening level
NSL = no screening level; chemical is retained as a chemical of potential concern

EPA has decided to first address the two mine sites in the watershed that contribute the most to water quality degradation; the Crystal and the Bullion Mine Sites. Draft focused RI/FS reports are currently being prepared and will be followed by Interim RODs. Upon completion of the Interim Remedies at these two mine sites, a final ROD for the remainder of the watershed will be written.



VICINITY MAP



LEGEND

OU2 Boundary

Notes:
1. Background - ArcGIS Street Map Streaming Map Service

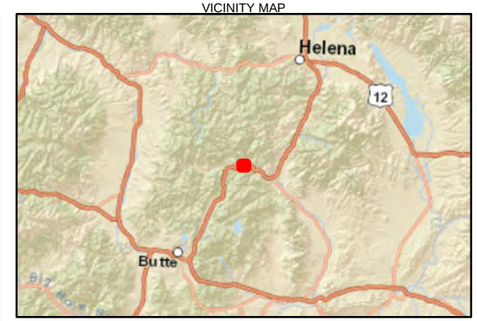
N

0 10 20
Miles

FIGURE 3-1
Location Map
Town of Basin OU1
2nd Five Year Review
Jefferson County, MT

This page intentionally left blank.

VICINITY MAP



LEGEND

Approximate Operable Unit 1 Boundary

Notes:
1. Aerial Imagery - ArcGIS Bing Maps Streaming map service

N

0 500 1,000
Feet

FIGURE 3-2
Operable Unit Boundary
Town of Basin OU1
2nd Five Year Review
Jefferson County, MT

CH2MHILL

This page intentionally left blank.

3.3.2 Town of Basin

The Town of Basin OU1 consisted of contaminated residential soils, a former smelter, streamside tailings, several tailings pile areas, and a mill site as shown in Figure 3-3. Results of the surface soil sampling for COPCs within the Town of Basin are presented in Table 3-2.

TABLE 3-2
Surface Soil Sample Results Presented in the Record of Decision (CDM, 2001a)

Chemical	Minimum Detected Concentration (mg/kg)	Maximum Detected Concentration (mg/kg)	Screening Toxicity Concentration* (mg/kg)	Detection Frequency	Rationale for Contaminant Deletion or Selection
Antimony	4.6	329	31	24 / 272	ASL
Arsenic	1.3	2,840	0.43	352 / 352	ASL
Barium	40.4	2,020	5,500	272 / 272	BSL
Cadmium	0.18	103	78	197 / 272	ASL
Copper	5.2	963	3,100	272 / 272	BSL
Iron	3,370	200,000	23,000	272 / 272	ASL
Lead	6.9	27,600	400	330 / 330	ASL
Manganese	6.5	5,950	1,600	272 / 272	ASL
Mercury	0.01	2.2	NA	25 / 42	NSL
Silver	0.63	24	390	70 / 267	BSL
Thallium	0.16	3.2	5.5	194 / 267	BSL
Uranium	9.2	14.5	230	14 / 230	BSL
Zinc	15.7	77,500	23,000	272 / 272	ASL

NOTES:
* EPA Region III risk based concentrations October 1999.
mg/kg = milligrams per kilogram
NA = not available
NE = not established
ASL = maximum concentration above screening level
BSL = maximum concentration below screening level
NSL = no screening level; chemical is retained as a chemical of potential concern

The town's water supply comes from a series of groundwater wells. Sampling of the wells during the remedial investigation resulted in no detections above drinking water standards. Table 3-3 presents a summary of the remedial investigation groundwater sampling results.

TABLE 3-3
Groundwater Sample Results Presented in the Record of Decision (CDM, 2001a)

Chemical	Minimum Detected Concentration (mg/L)	Maximum Detected Concentration (mg/L)	Safe Drinking Water MCLs (mg/L)	Detection Frequency	Rationale for Contaminant Deletion or Selection
Antimony	0.0023	0.0023	0.006	1/8	BSL
Arsenic	0.00196	0.0034	0.05	4/9	ASL
Barium	0.0243	0.0685	2.0	7/8	BSL
Cadmium	0.001	0.001	0.005	1/9	BSL
Chromium	ND	ND	0.1	0/8	BSL
Copper	0.0014	0.0911	1.3	6/9	BSL

TABLE 3-3
Groundwater Sample Results Presented in the Record of Decision (CDM, 2001a)

Chemical	Minimum Detected Concentration (mg/L)	Maximum Detected Concentration (mg/L)	Safe Drinking Water MCLs (mg/L)	Detection Frequency	Rationale for Contaminant Deletion or Selection
Iron	0.0122	0.376	0.3	7/8	BSL
Lead	0.0011	0.003	0.015	2/9	NSL
Manganese	0.0117	0.107	0.05	2/8	BSL
Mercury	ND	ND	0.002	0/8	NSL
Silver	ND	ND	0.035	0/8	BSL
Thallium	0.0018	0.0018	0.002	2/8	BSL
Zinc	0.0139	0.45	2.1	9/9	BSL

NOTES:
mg/L = milligrams per liter
NA = not available
ND = not detected
ASL = maximum concentration above screening level
BSL = maximum concentration below screening level
NSL = no screening level; chemical is retained as a chemical of potential concern

During the remedial investigation/feasibility study (RI/FS) process, approximately 28 residences were identified as having contaminated soils resulting from historic mining-related activities.

As shown in Figure 3-3, the residences are scattered through town and, in some cases, the older structures were built on existing mine waste associated with local mills.

In addition to the 28 residential areas identified as having contaminated soils from historic mining-related activities, several other mining impacted sites existed in OU1. These sites, displayed in Figure 3-3, are as follows:

- The Jib Mill/Hope-Katie Mine complex is located on the south side of the Boulder River immediately southwest of town. This waste source area was originally used as an ore extraction site and a small milling operation. Remnants of former structures remain in this area. The Jib Tailings were located east of the Jib Mill site. This area consisted of two impoundments that contained milling waste materials. Tailings were also present along the edges of the pits.
- A smelter stack flue is located on a steep hill on the west edge of town north of I-15. The smelter stack has visibly poor structural integrity. It has been reported that the smelter stack was never used for any mining operations. Samples collected during the remedial investigation eliminated the flue as a waste source.
- The Basin Mill is a former ore processing facility owned by OT Mining Corporation and is located immediately east of town. Several structures related to the ore processing operation are still located onsite, including the main process building, a crusher, and a tailings pond. Tailings piles and waste rock piles remain at the site. The Basin Mill was included in the Proposed Plan for remediation. However, this area was omitted from the OU1 RA Plan because the OT Mining Corporation applied to renew their Montana Groundwater Discharge Control System (MGWDCS) permit as an action toward potentially re-opening the mill. It was expected that the cleanup of the Basin Mill would be completed by the owner as a requirement of the MGWDCS permit.
- A WWTP is located south of I-15, east of Basin Creek. This facility was constructed in a former tailings pond in 1975. The WWTP has one aeration pond approximately 15 feet deep and four percolation ponds each approximately 5 feet deep. The facility also contains a control building, a water supply well, and three monitoring wells (Morrison-Maierle, 1978).

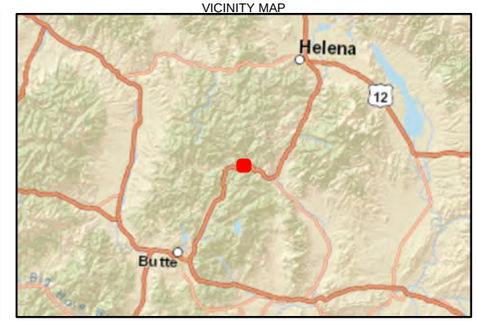
- The area east of the WWTP was historically used as a tailings impoundment for upstream milling operations. This property is currently part of the Merry Widow Health Mine and Campground.
- The Atwater Mill reportedly stood immediately west of the access road to the Merry Widow Health Mine, and the tailings pond lay roughly west of that access road. The exact location of the mill ruins cannot be identified from historical research or existing remains. This mill operated in the early 1900s and reworked the tailings from the Katie/Jib Mill.
- The Basin Street Tailings were located near the center of town north of Basin Street and west of Quartz Avenue. The area located at the base of a hill contained a large pile of mining waste material. A collapsed mine head frame structure is located on the top of the former waste pile.

3.4 Initial Response

EPA completed a Time Critical Removal Action in 1998 in an area located at the south end of Valley Street in the Town of Basin. Approximately 5,000 cy of contaminated soil/tailings were excavated and disposed of at the mine waste repository in Butte, Montana. After confirmation sampling, the excavated areas were backfilled with clean soil, graded, fertilized, seeded, and mulched. Cleanup of the early removal site was performed to ROD specifications.

This page intentionally left blank.

VICINITY MAP



LEGEND

- Sample with Lead or Arsenic Exceedence of Cleanup Criteria (80% of PRG)
- Proposed Mine Waste Remediation Area
- Site Boundary

Notes:
1. Aerial Imagery - ArcGIS Bing Maps Streaming map service

N

0 500 1,000
Feet

FIGURE 3-3
Properties Proposed for Remedial Action (2002)
Town of Basin OU1
2nd Five Year Review
Jefferson County, MT

CH2MHILL

This page intentionally left blank.

3.5 Basis for Taking Remedial Action

On October 22, 1999, EPA placed the Basin Mining Area Site on the Superfund NPL. A human health risk assessment conducted as part of the RI/FS process was completed in 2000. Based on the current and anticipated future land and water uses at the Site, EPA identified human receptors potentially exposed to COPCs. These populations consist of residents, recreational users, and workers (for example, people involved in mining, including reclamation and remediation). Residents who live in areas affected by mining wastes and who engage in recreational activities within the Site were presumed to have the most exposure. The results of the risk assessment indicated that exposure to elevated levels of metals as a result of historical mining activities could pose an unacceptable health risk to humans. The greatest risk is attributable to arsenic, lead, and manganese.

Considering the potential health concerns identified, EPA determined that a response action for the Town of Basin OU1 was warranted to protect human health. The process for selecting a remedy for OU1 was detailed in the FS and ROD and is summarized in the following sections. Ecological risk was deferred to the Basin Watershed OU2.

This page intentionally left blank.

SECTION 4

Remedial Actions

4.1 Remedy Selection

The Remedial Action Objectives, as described in the March 30, 2001, ROD for the Town of Basin OU1 included the following:

- Prevent direct exposure of the residents to elevated contaminant concentrations in soil and mine waste
- Control erosion of contaminated soil by wind and water from the source locations
- Control airborne transport of mine waste particles, especially fine-grained materials such as tailings
- Control erosion of mine waste into local water courses
- Control leaching and migration of contaminants from mine waste into surface water and groundwater

The selected remedy described in the ROD included Removal/Transportation/Disposal/ Institutional Controls. As part of the selected remedy, the contaminated soil and mine wastes were to be removed to a single-lined, fully encapsulated repository (Luttrell Repository).

The principal components of the selected alternative as presented in the ROD included the following:

- Residential cleanup goals applied to remediated sites were defined under the guidance of the Human Health Risk Assessment as 120 mg/kg arsenic and 1,000 mg/kg lead.
- Removal of all of the contaminated soil from the residential yards, the streamside tailings, the WWTP tailings, the area east of the WWTP, Basin Street Tailings, the ore pile north of Basin, and the Jib Tailings; and placement in the Luttrell Repository.
- Backfilling with clean soil and revegetation of all excavations.
- Implementation of ICs, which are measures to control or prevent future land use, or other measures to provide information to current/future landowners, only if wastes remain in inaccessible areas, such as beneath residential structures, and if risks associated with such mine waste are identified.
- Allocation of a portion of the operation and maintenance of the Luttrell Repository to OU1 based on an estimate of the waste from OU1 in proportion to the estimated total volume of the Luttrell Repository.
- Three locations known to have contaminated materials onsite were not included in the RA for OU1 for the reasons summarized below:
- **Basin Mill.** Although the Basin Mill included waste piles and a tailings impoundment, the site was omitted from the Selected Remedy until EPA and the State could investigate and determine the scope of any reclamation that could be addressed by the owner under an operating permit or a Montana Groundwater Pollution Control System (MGWPCS) permit. At the time the ROD was written, EPA was unsure if either permit would require full reclamation of the impacts of historic milling activities. However, since the Basin Mill site was still operational, EPA decided to rely on the State permits to achieve interim protection. When EPA determined what, if any, reclamation would be accomplished under the State permit(s) at the Basin Mill site, a decision would then be made on how to address any remaining contaminants at the site. If necessary, other RAs would be modified to include remediation of the remaining contaminant sources at the Basin Mill. These actions would include, but not be limited to, complete removal of all contaminated materials to the Luttrell Repository or other actions to prevent the migration of contaminants from any waste materials left in place at the mill site.
- **Two Residential Properties.** Information collected during residential interviews and property surveys completed as part of the remedial design, indicated that contaminated areas existed under structures at two

residential properties. A garage had been built over contaminated soils at 86 Frontage Road and a cabin was constructed over contaminated soils at 46 Quartz. No remediation was planned at these sites (CDM, 2001b).

EPA decided the Selected Remedy was protective of human health through the following:

- All of the contaminated soil would be removed from the residential yards, the streamside tailings, Basin Street Tailings, the Jib Tailings, and the source areas near the WWTP. The ore pile located north of Basin and the upper 2 feet of contaminated soil beneath this pile would also be removed.
- All excavations would be backfilled with clean soil and revegetated, preventing direct exposure of the Basin residents to contaminants in surficial soil.
- Placement of the waste material in the Luttrell Repository would control both erosion and airborne transport of contaminants in the town. Removal would also reduce leaching and migration of contaminants from mine waste into groundwater and erosion of contaminants into surface water.
- While the removal of waste material could cause a short-term exposure to airborne contamination during excavation and transportation, this exposure risk would be reduced by dust control measures implemented during the actual construction of this Selected Remedy.
- The IC component to address small areas of mine waste left in place (proprietary controls, information, and educational programs) would continue to control direct exposure to the contaminants that may be inaccessible, if risks associated with such mine waste were identified.

4.2 Remedy Implementation

4.2.1 2002 Activities

Construction activities were initiated on September 16, 2002 and continued to November 8, 2002. Remediation activities were completed at 26 residential properties and the Basin schoolyard. Remediation activities were initiated, though not completed, at the Basin Street Tailings site in 2002. Remediation was performed according to the specifications and design drawings, except for the following deviations:

- The property at 10 Gold was not remediated because the property owner declined to grant access for work.
- The property at 76 Basin was not originally included in the cleanup plans, but was added when arsenic and lead contamination was discovered along the property boundary with 78 Basin.
- The initial excavation limits at 2 Silver were significantly increased in the field based on sampling performed before cleanup on this property.
- Reclamation types were changed (for example driveway replaces grass area, etc) for several properties at the request of property owners.
- Plans for site fixture (for example, fences, rock walls, etc) removal and restoration were changed for several properties at the request of property owners.
- Streamside source area T-2b along the Boulder River was excluded from the remedial action described in the 2001 Final Basis of Design Report because of its inaccessible location (along interstate right-of-way between the fence and the river) and small volume (approximately 52 cubic yards), both of which limit potential human exposure. Furthermore, mobilization of contaminants into the river would be gradual, and occur primarily during flood events, which would also act to dilute the material reducing any potential ecological impact.

During the 2002 construction season, at the request of property owners, soil samples were collected from 23 additional properties. Remediation was recommended for 11 more properties within the Town of Basin. These recommendations were made based on the soil sample results for arsenic and lead concentrations. The 11 sites recommended for remediation during the 2003 construction season were as follows:

- Basin Street tailings
- Alley north of 76 Basin
- Lot east of 114 Basin/parking area between 110 Basin and 114 Basin
- 123 Basin
- 2 Basin Creek Road
- Equipment yard
- 11 Pine
- 2 Silver horse corral
- 35 Valley
- 40 Valley
- Horse pasture east of Valley

Confirmatory sampling was performed in accordance with the final Sampling and Analysis Plan (SAP) (CDM, 2002). All initial excavations were completed to minimum depths of 2 feet below ground surface (bgs) in accordance with the property-specific cleanup plans. Confirmation samples were collected from the excavation floor and sidewalls to verify cleanup goals (120 mg/kg for arsenic and 1,000 mg/kg for lead) were met. If laboratory results indicated that cleanup goals were not met, an additional 1 foot of soil from the excavation floor and/or sidewalls was excavated and an additional round of samples was collected. In some instances, mine waste was identified visually and excavation proceeded horizontally and/or vertically until the waste was removed before samples were collected. This process would continue until laboratory results indicated cleanup levels were met, unless groundwater, streambanks, building structures, property boundaries, or slope stability issues were encountered. Quality assurance protocols as described in the SAP were followed.

4.2.2 2003 Activities

Construction activities were initiated on June 24, 2003, and continued to October 29, 2003. Remediation activities were completed at 21 individual cleanup areas (6 residential properties, 6 source areas classified as nonrecreational-use properties, and 9 source areas classified as recreational-use properties).

Residential cleanup areas were located directly adjacent to occupied homes or businesses and usually required moderate to extensive coordination with affected property owners during cleanup because of site fixtures and controlled property access (for example, fences and gates). The six residential areas included the following:

- 123 Basin
- 2 Basin Creek Road
- 35 Valley
- 40 Valley
- Alley north of 76 Basin
- Lot east of 114 Basin

Nonrecreational source areas were located near occupied homes or businesses and usually required some coordination with affected property owners during cleanup because of controlled access. Nonrecreational source areas do not have the potential for continual recreational use (for example, all-terrain vehicle use) because of their proximity to occupied homes or businesses. The six nonrecreational areas included the following:

- 11 Pine
- 2 Silver horse corral
- Basin Street tailings
- Equipment yard
- Horse pasture east of Valley
- Parking area between 110 Basin and 114 Basin

Recreational source areas were generally located away from occupied homes and businesses and required minimal coordination with affected property owners during cleanup. Recreational source areas have the potential

for continual recreational use because of their distance from occupied homes and businesses and the lack of controlled access. These areas are generally located within the stream corridor of Boulder River. The nine recreational areas included the following:

- Jib Tailings
- Area southwest of Source Area T-5
- Source Area T-1
- Source Area T-2a
- Source Area T-3
- Source Area T-4
- Source Area T-5
- Source Area T-6
- Source Area T-7

Excavated wastes were hauled to the Luttrell Repository from the Town of Basin starting the last week of June 2003 through the last week of September 2003. Excavated wastes were stockpiled to maximize efficiency of construction equipment, and stockpiled wastes were loaded on "belly dump" trailers for hauling to the Luttrell Repository.

Remediation was performed according to the specifications and design drawings, except for the following deviations approved by EPA and the Montana Department of Environmental Quality (DEQ):

- Variances from gradation and contaminant concentration specifications for backfill were approved to allow the use of specific sources. Variances allowed the use of local soil borrow areas that varied from the original gradation and contaminant concentration specifications, but did not exceed arsenic- or lead-based standards defined in the ROD.
- Three streamside areas adjacent to Source Areas T-5, T-6, and T-7 were not originally included in the cleanup plans, but were added when arsenic and lead contamination was discovered adjacent to these source areas.
- The initial excavation limits at the horse pasture east of Valley Road were significantly changed in the field based on sampling performed before cleanup of this property.
- The initial excavation limits at four streamside source areas (Source Areas T-3, T-5, T-6, and the horse pasture east of Valley Road) were reduced to protect lowland and streambank areas currently stabilized with vegetation.
- Reclamation types were changed for several properties at the request of property owners.
- Plans for site fixture removal and restoration (for example, fences and rock walls) were changed for several properties at the request of property owners.
- The final grade and drainage and erosion protection measures for Jib Tailings were modified from the original cleanup plan because of technical and logistical constraints.
- The shallow river crossing and the deep river crossing designs were modified to address comments from the U. S. Fish and Wildlife Service (USFWS).
- Seed and vegetative revetment reclamation was not completed in 2003 because of the onset of winter weather. Seed reclamation was completed on April 14, 2004. Vegetative revetment reclamation was completed on May 12, 2004, after spring runoff from snowmelt had receded.

Confirmatory sampling was performed to verify that soils remaining after excavation within cleanup areas met cleanup goals for arsenic and lead (120 mg/kg and 1,000 mg/kg, respectively). Soils within recreational source areas were also required to meet the cleanup goal for manganese of 469 mg/kg. Confirmatory sampling was performed in accordance with the final SAP (CDM, 2002).

Characterization soil samples were collected from several cleanup areas before and during excavation. The purpose of these samples was to determine whether potentially contaminated soils identified by color variations (either within or outside initial excavation limits) had concentrations of arsenic, lead, or manganese above cleanup goals. The results were used to either justify exclusion of soils from removal (cleanup goals were met) or were used to expand initial excavation limits. Excavation then proceeded to minimum depths within the initial excavation limits in accordance with the area's cleanup plan. In some instances, subsurface mine wastes were visually identified and excavation of these wastes proceeded horizontally and/or vertically until the wastes were removed before samples were collected. If the visually identified subsurface wastes comprised a large volume of soil, characterization samples were collected to confirm the wastes exhibited contaminant concentrations above cleanup goals. After excavation limits were reached and visually identifiable wastes were removed, confirmation samples were collected from grids established on the excavation floor and sidewalls to verify that cleanup goals were met for each grid. If laboratory results indicated that cleanup goals were not met for a sample location, then soil from the excavation floor and/or sidewalls represented by the sample was excavated and additional samples were collected. If laboratory results indicated that cleanup goals were met for all sample locations within a grid, then excavation within the grid was deemed complete. Additional samples were not collected if groundwater was reached or if samples were not representative of the soil matrix (for example, rocky subsoil composed of cobbles and boulders). This iterative excavation/sampling process continued until laboratory results indicated cleanup goals were met or technical constraints prevented further soil removal. Technical constraints included the following:

- Building foundations
- Groundwater
- Paved areas
- Property boundaries without a signed access agreement
- Rocky subsoil composed of cobbles and boulders
- Steep hillsides that provide a clean soil cover over wastes
- Streambanks or lowland areas currently stabilized by vegetation
- Roads or streets that are heavily traveled (paved areas are considered capped, unpaved areas do not represent a major exposure pathway because of the traffic deterrent and because they are capped with gravel and compacted)

EPA and DEQ also agreed that additional vertical excavation was not required in recreational source areas for manganese in floor samples that met cleanup goals for arsenic and lead and were at least 12 inches bgs. Clean backfill placed over the excavation surface reduced the risk of recreational exposure to residual manganese contamination. Confirmation sampling was not performed at three cleanup areas south of Boulder River. These areas included the following:

- Area East of Source Area T-7
- Area Southeast of Source Area T-6
- Area Southwest of Source Area T-5

Contaminated soil within these areas was limited in horizontal and vertical extent and was easily identifiable visually. These areas were adjacent to larger cleanup areas (Source Areas T-5, T-6, and T-7) that had been sampled extensively, and technical constraints (steep hillsides or vegetated streambanks) prevented additional soil removal. EPA decided that confirmation sampling was not required in these areas because of these issues. Quality assurance/quality control (QA/QC) protocols as described in the final SAP (CDM, 2002) were followed. QC duplicate samples were collected during confirmation sampling as specified in the final SAP.

4.2.3 2004 Activities

Construction activities were initiated on June 7, 2004, and continued to October 7, 2004.

Remediation activities were completed at six individual cleanup areas (two source areas classified as nonrecreational-use properties, and four source areas classified as recreational-use properties).

The two nonrecreational source areas included the following:

- 11 Pine
- Area west of the WWTP

The four recreational source areas included the following:

- Source Area T-8
- Source Area T-9
- Source Area T-10
- Montana Department of Transportation (MDT) right-of-way north of Source Area T-9

Excavated wastes were hauled to Luttrell Repository from the Town of Basin.

Remediation was performed according to the specifications and design drawings, except for the following deviations approved by EPA and DEQ:

- Variances from gradation and contaminant concentration specifications for backfill were approved to allow the use of specific sources. Variances allowed the use of local soil borrow areas that varied from the original gradation and contaminant concentration specifications, but did not exceed arsenic or lead based standards defined in the ROD.
- One streamside area to the west of the WWTP in the Basin Creek floodway was not originally included in the cleanup plans. This area was added to the cleanup plans when arsenic and lead contamination was discovered in surface soils above initial excavation criteria in 2003 (CDM, 2004a).
- An area in the MDT right-of-way to the north of Source Area T-9 was not originally included in the cleanup plans. This area was added to the cleanup plans when arsenic, lead, and manganese contamination was discovered in surface soils above initial excavation criteria.
- One nonrecreational source area (11 Pine) was not originally included in the cleanup plans for 2004. This property had been previously remediated during the 2003 and 2004 construction seasons, except for contaminated soil and mine waste beneath buildings. The property changed ownership between 2003 and 2004, and the new owners decided to demolish two of the structures on the property, which exposed the underlying contaminated soils and mine waste. These areas of the property were added to the cleanup plans because of the newly exposed contaminated soils and mine waste.
- The initial excavation limits at Source Areas T-8 and T-9 were increased in the field based on minimal characterization sampling performed during excavation of these areas, as well as visual identification of contaminated soils at vertical and horizontal design limits.
- The initial excavation limits at Source Area T-10 were reduced to protect lowland and streambank areas currently stabilized with vegetation and mature growth conifer trees to be left in place at the request of the property owner. The initial excavation limits were also reduced since large portions of the source area were predominantly larger cobble with little or no fine-grained soil.
- Oversized rock and structural wood timbers were placed within deep excavation areas at Source Area T-9.
- Reclamation type for a portion of streamside source area T-8 was changed from river rock to native seed to protect a streambank area currently stabilized with vegetation.
- Reclamation type for streamside source area T-10 was changed from vegetative revetment to grading and river rock to match the surrounding area once the excavation limits were significantly reduced.

- A herbicide mixture (Tordon™ and ammonium sulphate) was applied to large fields adjacent to the equipment and materials staging to control noxious weed infestations from vehicle and equipment movement.
- The contractor applied 88.7 tons of hot mix asphalt to sections of Basin Street at the end of the 2004 construction season at the request of MDT. Certain areas of asphalt on this street had become stressed and cracked from the 3 years of haul truck traffic in this area associated with this project.
- Cleanup activities were performed at 19 Gold in 2002. Contaminated soil in the west yard was removed, and clean fill and growth media was replaced. A small retaining wall composed of loose rock separated this yard (at a higher elevation) from the lower driveway at the adjacent residence to the west. The retaining wall became unstable in 2003 and started sloughing into the adjacent property to the west. The probable cause of the sloughing was excessive watering of the new sod lawn, which caused saturated soils to exert pressure on the loose wall. Attempts in 2003 to restack the rock wall were unsuccessful. EPA decided in 2004 to replace the loose rock wall with a new concrete retaining wall. Preparation work for this wall began on October 1, 2004. The new concrete retaining wall was completed by October 6, 2004.

Appendix A provides photographs documenting site conditions, historic and post remedy, at various residences and waste source areas.

4.3 Conclusions and Recommendations

The RA for the Town of Basin OU1 was initiated in 2002 and completed in fall 2004. Properties addressed by the remedial actions are presented in Figure 1 in Appendix A. All the mine waste source areas identified in the Final Basis of Design Report (CDM, 2001c) were remediated except source area T-2b which was determined to be no risk to human health and minimal risk ecologically. All but one of the residential properties identified in the report were remediated. Additional residential and mine waste source area properties were identified through sampling during RA construction. These properties were added for remediation as directed by EPA.

At the conclusion of construction, it was recommended that mine waste source areas remediated during the 2004 construction season be periodically monitored through June 2005 for the following potential issues, and if necessary, maintained:

- Lack of vegetation (native seed) establishment at reclamation areas
- Presence of noxious weeds in reclamation areas
- Compromised integrity of placed backfill because of excessive erosion or settlement

EPA followed-up with periodic visual inspections through 2005.

Contaminated materials remain in place in three residential locations. Though included in the Final Basis of Design Report (CDM, 2001c), the property located at 10 Gold was not remediated because the owner would not grant EPA access for cleanup activities. Two other residential properties (86 Frontage Road and 42 Quartz) with source contaminants located under structures were not included in the remediation plan because contamination was inaccessible. The ROD calls for ICs to be implemented to protect human health and the environment.

One streamside source area, T-2b, was left in place. However, because of its small size and inaccessible location, it was determined not to represent a human health risk, and only a minimal ecological risk.

Lastly, the Basin Mill was identified in the ROD as having waste rock piles and a tailings pond onsite, but was not included as part of the RA. It is an operational facility, and remediation will be addressed in accordance with the site's Montana Groundwater Pollution Control System (MGWPCS) permit or operating permit. Furthermore, ore piles at the Mill were removed in 2011 and placed in the Luttrell repository, reducing any risks from those piles.

4.4 Operation and Maintenance

The operation and maintenance activities needed to protect the remedy at OU1 are minimal, since nearly all of the mine contamination was removed and placed in the Luttrell Repository OU3. The Luttrell Repository was

constructed to store mining wastes from both the Basin Mining Area Superfund Site and the Upper Tenmile Superfund Site, and it is managed under the Tenmile Site. A final allocation of the cost of maintaining the Luttrell Repository has not been determined; however, these costs will be shared by the Agencies using the repository (the State, the U.S. Forest Service, and EPA).

Therefore, the only O&M work performed to assure remedy protection were the annual visual inspections of areas where remedial action occurred. These areas were inspected to assure that revegetation was successful and erosion is not occurring in a manner that would threaten the remedy.

To date, no other work has been needed to assure remediated areas remain vegetated. Vegetation is well established and EPA has determined that the frequency of monitoring can be reduced to once every 5 years to coincide with the Five Year Review.

SECTION 5

Progress Since Last Five-Year Review

5.1 Protectiveness Statement from Last Review

Region 8 believes that the response actions carried out for the Town of Basin OU1 have addressed the immediate threats, but the remedy is not yet fully protective until institutional controls (ICs) are fully implemented.

The remedy at the Town of Basin OU1 currently protects human health because of the removal of contaminant source material. Contaminant source material is no longer a direct contact, ingestion, or inhalation threat because the remedy was properly implemented. Ecological risks will be addressed by the ROD for the Basin Watershed OU2.

5.2 Status of Recommendations from Last Review

Issue/Recommendation Item No. 1 – Institutional Controls

The previous Five-Year Review recommended that to provide long-term protectiveness, some Institutional Controls needed to be developed and implemented. The first ICs recommended were property-specific to address one property where EPA was denied access for remedial action, and two properties that had contamination under existing structures. At the time of the second Five-Year Review, property-specific ICs had been considered but not implemented for the reasons described below.

In an attempt to address the issue of applying ICs to the three residential properties with waste left in place (46 Quartz, 86 Frontage, 10 Gold), EPA sent letters (in January 2013) to each of the property owners explaining EPA's intent to attach a notice to their property deeds. The purpose of the notice was to disclose to potential buyers that the property had contaminated soils that, if exposed, must be removed and disposed of in a controlled and specific manner.

In early February 2013, one of the residential property owners that received a letter from EPA replied indicating that EPA had the Quartz addresses mixed up. The owner of 46 Quartz had been notified by EPA during the remedial construction (2002-2004), that sample results on their property were below the threshold of concern for soil arsenic and lead. EPA determined that the deed notice letter should have been sent to the owner of 42 Quartz owned by Jim Culbert, rather than 46 Quartz. Sampling documentation in EPA's file had apparently been mislabeled during the remedial construction.

Upon review of historic soil sampling information from EPA's administrative record for each property in question, and correspondence from Mr. Culbert, EPA determined that 42 Quartz Ave was indeed the property with soil contamination left in place under a cabin. Mr. Culbert acknowledged the soil contamination, and said it was provided as fill material by Delbert "Hap" Bullock, owner of the Crystal Mine. Mr. Culbert indicated this was common practice, and that Hap supplied the fill material for several properties in town. Mr. Culbert stated that Hap brought the fill into town from the Crystal Mine property in the Cataract Creek Watershed.

By coincidence, EPA had performed soil arsenic and lead bioavailability assessments of soils at the Crystal Mine site in 2012 under a Remedial Investigation of the Crystal Mine. Therefore, EPA decided to apply the new arsenic bioavailability data from the Crystal Mine to the original soil sampling data collected at the three properties in Basin to re-assess the risk posed by those soils. The original risk assessment for the Town of Basin used a default 50 percent bioavailability value, while the bioavailability of arsenic from Crystal Mine site soils was determined to be 9 percent.

EPA directed CH2M HILL to recalculate the human health risk using the original surface soil sample data, and assuming the same dermal and inhalation components, but using the updated arsenic bioaccessibility value of 9 percent rather than the 50 percent default value used in the original assessment. The results of the risk re-assessment were reviewed and approved by EPA Region 8's Senior Toxicologist, Susan Griffin.

The results indicated ranges of risk estimates all within or below the EPA risk management range of 1×10^{-6} to 1×10^{-4}, and ranges of hazard quotients well below the EPA regulatory threshold value of 1 (See Appendix B). These results support the conclusion that these three properties in the Town of Basin remain protective and that deed notices for long-term protectiveness are not needed.

Given the conclusion of the risk re-assessment and the fact that two of these properties have structures built over the contaminated soil, limited exposure would **only** occur in the event those structures and foundations were demolished, and excavation occurred to uncover the buried contaminated soils. The other property (10 Gold) is well vegetated and the original soil contaminant concentrations were very low even without adjusting for bioavailability.

Therefore, the property-specific deed notices envisioned by the first Five-Year Review were replaced by an IC that would require the proper removal and disposal of mining contaminated soils in Basin uncovered in any future excavation. This should provide long-term protection for these three properties and any others where buried mining contamination may be encountered in the future.

In addition, the first Five-Year Review recommended the need for EPA to develop and implement a process for informing residents about the dangers of ingesting or using Basin Creek and Boulder River water for lawn and garden irrigation. The first Five-Year Review suggested EPA prepare informational fliers for distribution to residents. In the fall of 2012, EPA prepared and distributed an informational brochure informing residents of potential risks associated with Basin Creek and Boulder River water, and contaminated mine tailings in the Basin Watershed OU2. However, during the second Five-Year Review, EPA determined that this is not an issue affecting protectiveness of the OU1 remedy because the OU1 ROD deferred surface water contamination to OU2, the source of the contamination. EPA will continue to update this brochure periodically and distribute it to residents and recreationists frequenting the NPL Site as part of OU2 activities.

The first Five-Year Review also recommended that a periodic monitoring process (by EPA or the State of Montana) be created to assess wind and runoff erosion impacts to remediated and unremediated properties in Basin. At the time of the second Five-Year Review, EPA determined that, because remediated properties no longer represent a risk, they will not be subject to annual reviews. Only one non-residential area in town (area T-2b) was identified as having mining contaminated waste. EPA decided not to remediate area T-2b because it is very small (approximately 52 cubic yards), relatively inaccessible (located between Interstate and Boulder River), and it is vegetated, all of which limit potential human exposure. Furthermore, as part of an historic over bank bridge abutment, mobilization of contaminants into the Boulder River from area T-2b would be gradual, and occur primarily during flood events, which would also act to dilute the material reducing any potential ecological impact. Area T-2b will be evaluated under subsequent Five-Year Reviews, but it does not represent an issue that affects remedy protectiveness.

Issue/Recommendation Item No. 2 – Basin Mill

The first Five-Year Review recommended that EPA order the property owner of the Basin Mill site to complete a cleanup, or alternatively, EPA was to include cleanup of the Basin Mill in the ROD for the Basin Watershed. This recommendation was partially implemented, and remaining issues will be dealt with as part of OU2. In 2010, EPA requested the assistance of the State of Montana, and the waste rock piles at the Mill were subsequently excavated and hauled to the Luttrell Repository (Tetra Tech EM Inc., 2011). The contaminated tailings pond remains unremediated. If a full cleanup of the Basin Mill site is not conducted under the State permit programs, it could be conducted under the Basin Watershed OU2 ROD. These actions would include, but not be limited to, complete removal of all contaminated materials to the Luttrell Repository or other actions to prevent the migration of contaminants from any waste materials left in place at the Mill Site. A copy of the active State permit for the Mill is presented in Appendix C. This recommendation is therefore not retained as an issue for the second Five Year Review.

SECTION 6

Five-Year Review Process

6.1 Administrative Components

Activities associated with the Town of Basin second Five-Year Review were led by Kristine Edwards, EPA Region 8 Project Manager for OU1. Dick Sloan of DEQ participated in the Five-Year Review. The following EPA Contractor CH2M HILL team members assisted in the review:

- P. Dennis Smith/Project Manager
- Deanne Fischer/Project Engineer
- Jeff Schut/Risk Assessor
- John Lincoln/Senior Reviewer

The second Five-Year Review consisted of the following activities:

- Review of relevant project documents by the project team.
- A site visit of the Town of Basin was conducted on September 11, 2012. Those in attendance included EPA's Project Manager, Montana DEQ Project Manager, and two CH2M HILL representatives.
- Interviews with community members and current property owners were conducted by EPA and DEQ on September 19, 2012 and October 24, 2012.
- Review of Federal and State applicable or relevant and appropriate requirements (ARARS) was performed.

6.2 Site Inspection

On September 11, 2012, EPA, DEQ, and CH2M HILL travelled to the Town of Basin and visited areas of the Town that had undergone remedial action. Site inspection efforts focused on the three residences where waste was left in place as described previously in this report, area T-2b, and the Basin Mill site.

The three residences with waste left in place were found to be in good condition. The 42 Quartz residence was still in place, and mining contamination that had been left under the building had not been disturbed. The residence at 86 Frontage was also still in place with no disturbance of the buried mine waste under the garage. The property at 10 Gold was observed to be well vegetated, with no bare areas or signs of disturbance.

Area T-2b was observed and found to be in the same condition; well vegetated and undisturbed with no evidence of erosion. Other areas of town where removals had occurred were also observed to be well vegetated with no signs of erosion.

The Basin Mill site appeared to be vacant and unused. The area where the ore piles had been removed was observed, and the removal appeared to be complete. Ore processing buildings and a dry tailings pond remain at the site. The tailings pond may contain contaminated soils, but no data is available to allow a determination. The soils in the tailings pond are at a lower elevation because the pond area was excavated to accommodate the process water from the Mill. The soils in the tailings pond also appear to be somewhat crusted over, and do not appear to be a significant source of windblown dust. The Mill is on the eastern edge of town, and not readily accessible by the public. It is a private industrial/commercial use property, and no permanent residences were observed.

The site inspection was completed in the late afternoon, and no new issues or concerns were identified during the inspection.

6.3 Community Involvement

EPA prepared and posted, in three local newspapers (Butte Standard, Boulder Monitor, and Helena Independent Record), a public notice describing the Five-Year Review process for the Town of Basin OU1. Interviews with community representatives and local residents were performed to obtain insight and local perspective on the performance of the remedy. Copies of comments from support agencies are included in Appendix D. Copies of public notices and results of public interviews are included in Appendixes E.

6.4 Town of Basin Interviews

On September 19, 2012, and October 24, 2012, Kris Edwards/EPA and Dick Sloan/DEQ interviewed five community residents to determine their interest or concerns regarding the second Five-Year Review of the remedy that EPA concluded in 2004. In general, those residents interviewed were aware of EPA's remedy performed in Basin, and had no concerns with the effectiveness of the remedy. The individuals interviewed were:

- Megan Bullock, Jefferson County Sanitarian
- Timmon Hayes, Jefferson County Sanitarian
- Dave Kirsch, Jefferson County Commissioner
- Jim Culbert, Jefferson County Water Board
- Tammy Ulrich, Basin School teacher

Listed below is a summary of comments from the interview process. The actual questions and responses from the interviews are presented in Appendix E.

- All interviewees were familiar with Basin's Superfund history and the implementation of the cleanup.
- One person thought that because the Basin community is fairly transient, the population may not be very aware of the remedial action.
- One person suggested that the community would be interested in having children tested and their water supply tested.
- One person was interested in the status of the Merry Widow Health Mine. He said it used to have a tailings pond that flooded and breached. He also mentioned that a new bridge had been constructed over Basin Creek.
- One person mentioned there were a couple of areas with some tailings on his property, but he covered them and built a cabin over one of the areas (owner of 42 Quartz).
- Those interviewed understand how to contact EPA if they have future questions.
- Most people interviewed seemed to prefer to get future information from email or the newspaper.

EPA and the State will need to work on development of an IC with Jefferson County to assure the proper removal and disposal of mining contaminated soils in Basin uncovered in any future excavation to assure long-term protectiveness. EPA will continue to update and distribute informational fliers to inform residents of potential risks from contaminated soils and water in the Basin Watershed. EPA will also continue to evaluate area T-2b during future Five-Year Reviews.

SECTION 7

Technical Assessment

7.1 Question A: Is the remedy functioning as intended by the Record of Decision?

Yes. The review of documents, applicable or relevant and appropriate requirements (ARARs), risk assumptions, and the results of the Site inspection by EPA, DEQ, and EPA Contractor CH2M HILL, indicates that the remedy as a whole is functioning as intended by the ROD. Review of remedial action objectives revealed the following:

1) The remedial action continues to function as designed as indicated by:
   a) Residential yards involved in the remedy are vegetated and showed little or no signs of localized erosion.
   b) Former waste source piles and tailings, previously scattered throughout OU1, have been removed and replaced with top soil and vegetation.
   c) Removal of contaminated soils and replacement with clean material and vegetation have achieved remedial objectives by eliminating:
      - Direct residential exposure (ingestion and inhalation) to contaminant sources, and by controlling localized runoff and wind erosion of the remediated areas;
      - the potential for Basin Creek and the Boulder River to be directly contaminated from over-land flow from snowmelt and stormwater runoff; and
      - the infiltration of contaminated surface water into the shallow groundwater by the removal of contaminated source materials.
2) The remedial action only requires minimal visual inspection of remediated areas for erosion. Because of successful revegetation, the inspection frequency will coincide with five-year reviews. Favorable site conditions and the absence of evidence of excessive erosion supports a five-year assessment. No other operational and maintenance monitoring costs have been incurred beyond the Five Year inspection.
3) The ICs identified as an issue in the first Five-Year Review were considered but are not yet fully implemented.
   a) During the assessment of the remedy under the first Five-Year Review, it was noted that one residential property was not remediated at the request of the landowner (10 Gold Street), and that two residential properties (86 Frontage Road and 42 Quartz) have contaminated soils remaining in place under existing structures.

      During the second Five-Year Review, EPA found that the status of these residential properties remain unchanged. To sustain long-term protection at these locations and for the remedy in general, some form of IC should be implemented. Therefore, EPA has decided to work with Jefferson County to develop an IC to inform those performing future soil excavation projects in Basin of the potential to uncover mining contaminated soils, and who to contact if such soils are found to assure proper handling and disposal.
   b) ICs were also suggested to educate townspeople about acceptable uses of Basin Creek and the Boulder River water until the remedies for Basin Watershed OU2 have been successfully implemented. EPA developed an Informational Brochure in the fall of 2012 and has distributed it to the Jefferson County sanitarian, to residents in Basin, and to the Basin school.
4) The site does not currently lend itself to optimization of remedial performance activities.
5) Indicators of remedial performance problems would show up in areas of erosion. Erosion of remediated properties is not a concern as evidenced by site inspection results.

7.2 Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives (RAOs) Used at the Time of Remedy Selection Still Valid?

Yes. The exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy are still valid. The narrative below describes changes that have occurred since the remedy was selected, and why those changes have not affected the validity of the remedy.

7.2.1 Changes to Standards and Criteria

First Five Year Review:

In January 2006, EPA lowered the arsenic MCL from 0.050 to 0.010 milligrams per liter (mg/L) (Table 7-1). Maximum detected concentrations of arsenic in both groundwater and surface water samples used for the risk assessment were at or below the new MCL and therefore the EPA revision did not affect the remedy selected. EPA's current drinking water standard for lead is based on a treatment technique action level of 0.015 mg/L. The maximum detected concentration of lead in surface water (1.42 mg/L), used for the risk assessment is above the action level. Potential remedies for surface water contamination were not addressed in the OU1 ROD. Instead, the ROD for OU2 was expected to address the potential risks from exposure to contaminants in surface water. There have been no additional changes in federal standards or criteria that affect the protectiveness of the remedy for groundwater.

TABLE 7-1
Changes in Chemical-Specific Standards

Contaminant	Media	Cleanup Level	Standard		Citation/Year
Arsenic	Groundwater and surface water	NA	Previous 0.05 mg/L	New 0.010 mg/L	EPA, 2009
Lead	Groundwater and surface water	NA	Previous NA	New 0.015 mg/L	EPA, 2009

NOTES:
mg/L = milligrams per liter
NA = not available
EPA (May 2009) = 816-F-09-0004

In 2008, DEQ performed an evaluation of the State of Montana ARARs during the first Five-Year Review to identify recent changes in state laws or contaminant standards that might influence the acceptability of the existing remedy (See Appendix F). The conclusions of that ARARs evaluation were as follows:

- Various citations and references have changed since the identification of the ARARs in the ROD. For example, WQB-7 is now known as Circular DEQ-7 (February 2006).
- Two groundwater standards changed. However, since the scope of the remedy was mine waste removal, the changes to groundwater standards (arsenic and zinc standards now at 10 and 2000 µg/L, respectively) would not affect the remedy.
- General Permits for Stormwater Discharge were updated for construction activities, the reference is now to Permit No. MTR 100000 (April 16, 2007); for mining activities, the reference would be to Permit No. MTR 300000 (November 17, 2002); and for industrial activity, the reference is now to Permit No. MTR 000000 (October 1, 2006).

Following this review, the State concluded that none of the substantive requirements that apply to the remedy at this Site have changed in any manner that would affect the protectiveness of the remedy.

Second Five Year Review:

For this Second Five-Year Review, applicable Federal ARARS were reviewed for changes that would affect the protectiveness of the remedy. No Federal ARARS that apply to the remedy at this Site have changed including surface water or groundwater federal standards or criteria. In November 2012, DEQ performed another evaluation of the State of Montana ARARs evaluation for the second Five-Year Review to identify any recent changes in State laws or contaminant standards that might influence the acceptability of the existing remedy (See Appendix F). The conclusions of the second Five-Year Review of State ARARs applicable to human health were as follows:

- The Montana Circular DEQ-7 (October 2012) surface water standard for antimony is now 5.6 µg/L (formerly 6.0 µg/L).
- As previously noted during the first Five-Year Review, the Montana Circular DEQ-7 (October 2012) surface water standard for arsenic is now 10 µg/L (formerly 18.0 µg/L).
- The Montana Circular DEQ-7 (October 2012) surface water standard for cadmium is now 0.271 µg/L (formerly 5.0 µg/L).
- The Montana Circular DEQ-7 (October 2012) surface water standard for iron is now 1,000 µg/L(formerly 300 µg/L).
- The Montana Circular DEQ-7 (October 2012) surface water standard for thallium is now 0.24 µg/L (formerly 1.7 µg/L).

The State again concluded that no relevant changes were identified that would affect the protectiveness of the remedy.

7.2.2 Changes to Exposure Pathways

Current and anticipated future land and water uses at or near the Town of Basin OU1 Site have not changed since the ROD; therefore, the exposure pathways evaluated remain valid at this time. Contaminated soil areas with metals concentrations above cleanup levels have been excavated to a minimum of 2 feet and backfilled with clean soil. This eliminated the exposure to contaminated soils at those locations and reduced the overall risk to residents. Additionally, the soil removal reduced the potential migration of metals to groundwater.

Three properties within the Town of Basin have known subsurface contamination (it is possible that other areas of buried mine wastes exist in the Town). Two of these, are paved or have existing buildings covering them. The third is well vegetated, and re-evaluation of the original soil sample concentrations by applying a more representative bioavailability factor showed an acceptable level of risk. As long as these structures or paved areas remain in place, a complete exposure pathway is absent.

One very small streamside source area known as T-2b was not remediated. However, it is inaccessible between a highway right-of-way fence and the Boulder River, which virtually eliminates any exposure pathway. It is also well vegetated.

The human health exposure assumptions and exposure scenarios were reviewed and were found to be sufficiently consistent with current regulatory guidance. Common practice for calculating soil preliminary remediation goals (PRGs) for cleanup goals include ingestion, inhalation, and dermal routes of exposure. The Basin area risk assessment and PRGs do not quantitatively account for the dermal and inhalation route of exposure to contaminants in soil. The risk assessment correctly indicates that these routes would not contribute significantly to overall risk; however, it should be noted that dermal absorption factors are available for COPCs at the Site. Although exclusion of these exposure routes may have slightly underestimated risk, the remedy in place is still considered protective because the portion of risk attributable to these routes of exposure would be marginal for the metals of concern. Furthermore, bioavailability data collected from the Crystal mine site suggests that the default value of 50 percent for arsenic used during the original risk assessment was overly conservative. Considering this, the exposure evaluations used are still considered reliable for decision-making at the Town of

Basin OU1 Site. Additionally, the removal of surface soil containing elevated COPC concentrations and subsequent backfilling with clean soil effectively removes these exposure pathways.

7.2.3 Changes to Toxicity Factors or Contaminant Characteristics

A review of the most current toxicity factors (EPA, 2012) was conducted to determine if changes have occurred since the ROD and whether the changes would be significant enough to warrant a change to the remedy. Cancer slope factors used for COPCs during the human health risk assessment and the development of PRGs have not changed since the ROD. The oral reference doses (RfD) for several COPCs have changed slightly. The changes are as follows:

- The oral RfD for iron has changed from 0.3 to 0.7 milligrams per kilogram per day (mg/kg-d).
- The oral RfD for thallium has changed from 0.00007 to 0.00001 mg/kg-d.

Soil PRGs were developed in the ROD for three COPCs (arsenic, lead, and manganese). The toxicity factors for arsenic remain unchanged; however, the RfD for manganese is approximately two times lower, indicating the PRG should be lower. However, actions taken to reduce the risk of exposure to the COPCs in soil posing the greatest risk (arsenic and lead) are expected to have addressed the potential for unacceptable exposure to manganese. For lead, revisions to EPA's Integrated Exposure Uptake Biokinetic (IEUBK) model for lead have been made since completion of the risk assessment; however, these changes would not result in meaningful changes in the remedial decisions.

7.2.4 Changes in Risk Assessment Methodology

As noted in the first Five-Year Review, EPA has published several new risk assessment guidance documents since the ROD. The following new guidance documents were reviewed to verify that the remedy at the Basin Site is valid:

- U.S. Environmental Protection Agency. 2002. *Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites*.
- U.S. Environmental Protection Agency. 2003. *Adult Lead Model Spreadsheet*. OSWER Directive 9285.7-54.
- U.S. Environmental Protection Agency. 2004b. *Risk Assessment Guidance for Superfund–Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final*. July.
- U.S. Environmental Protection Agency. 2005a. *Guidelines for Carcinogen Risk Assessment.* March.
- U.S. Environmental Protection Agency. 2005b. *Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens*. March.
- U.S. Environmental Protection Agency. 2009. *Risk Assessment Guidance for Superfund: Volume I Human Health Evaluation Manual – Part F, Supplemental Guidance for Inhalation Risk Assessment*. January.
- U.S. Environmental Protection Agency. 2010. *Integrated Exposure Uptake Biokinetic Model for Lead in Children (IEUBK)*.
- U.S. Environmental Protection Agency. 2011. *Exposure Factors Handbook: 2011 Edition.*

Considering the Basin Site potential receptors, routes of exposure, contaminants of concern, more recent guidance, exposure assumptions, and toxicity data, it is not anticipated that changes since the first Five-Year Review would change the validity of cleanup levels and remedial decisions at the Town of Basin OU1 Site. The exception to this is the three properties described in Section 5.2.

Changes in Remedial Action Objectives.

Remedial action objectives remain consistent with those proposed in the Record of Decision (EPA, 2001). No changes are anticipated as a result of this Five-Year Review.

7.3 Question C: Has any Other Information Come to Light That Could Call Into Question the Protectiveness of the Remedy?

No. The lack of an IC to address potential future excavation of buried mine contamination represents the only significant issue, affecting the long-term protectiveness of the remedy.

7.4 Technical Assessment Summary

According to the data reviewed, the site inspection, and the interviews, the remedy is functioning as intended by the ROD, with the exception of ICs. No changes to the physical conditions of OU1 have affected the protectiveness of the remedy. Most ARARs for soil contamination cited in the ROD have been met. No changes in the toxicity factors for the COCs used in the baseline risk assessment and no changes to the standardized risk assessment methodology affect the protectiveness of the remedy. No new information calls into question the protectiveness of the remedy.

This page intentionally left blank.

SECTION 8

Issues

As presented in Table 8-1, one issue of concern was identified in the second Five-Year Review.

TABLE 8-1
Issues of Concern

Item No.	Issue	Affects Current Protectiveness	Affects Future Protectiveness
1	Residents and commercial interests could excavate buried contaminated soils.	No. Three properties with known mining contamination were re-assessed for risk and found to be below response action thresholds. No current exposure is occurring because of structures and vegetation.	Yes. Should contaminated soils be excavated in Basin in the future, they should be properly removed and disposed of to minimize future exposures.

This page intentionally left blank.

SECTION 9

Recommendations and Follow-up Actions

The corresponding recommendations/follow-up actions are summarized in Table 9-1.

TABLE 9-1
Recommendations and Follow-up Actions

Issue	Recommendations and Follow-up Actions	Responsible Party	Oversight Agency	Affects Protectiveness? (Y/N)	
				Current	Future
Institutional Controls	Develop an IC with Jefferson County to assure that mining contaminated soils potentially found during future excavations in Basin receive proper handling and disposal.	EPA/State/Jefferson County	EPA	N	Y

This page intentionally left blank.

SECTION 10

Protectiveness Statement

The remedy at the Town of Basin OU1 currently protects human health and the environment as a result of the excavation of contaminant source material from areas designated for removal by the ROD (residential yards, streamside tailings, the WWTP tailings, the area east of the WWTP, the Basin Street tailings, the ore pile north of Basin, and the Jib tailings) and placement of the material in the Luttrell Repository. The remedy has also mitigated shallow groundwater contamination from the infiltration of water leaching through contaminated wastes.

However, for the remedy to be protective in the long term, the following action needs to be taken to ensure protectiveness:

- Work with Jefferson County to develop an IC to address potential exposure to buried mine waste during future excavation projects, whom to notify, and appropriate handling and disposal procedures.

This page intentionally left blank.

SECTION 11

Next Review

The next Five-Year Review for Basin Mining Area is required by ___ May 2018, five years from the date of this review.

This page intentionally left blank.

SECTION 12

Documents Cited and Reviewed

CDM Federal Programs Corporation. 2000. *Community Relations Plan for Basin Mining Area Superfund Site, Town of Basin Operable Unit 1 (OU1), Watershed Operable Unit 2 (OU2), Jefferson County, Montana*. March.

CDM Federal Programs Corporation. 2001a. *Record of Decision, Town of Basin Project, Operable Unit 1, Basin Mining Area, Jefferson County, Montana*. March.

CDM Federal Programs Corporation. 2001b. *Meeting Summary. Town of Basin Project Meeting*. March 29.

CDM Federal Programs Corporation. 2001c. *Final Basis of Design Report for Basin Mining Area Superfund Site, Town of Basin Operable Unit 1 (OU1), Mine Waste Source Area Remediation, Jefferson County, Montana*. August.

CDM Federal Programs Corporation. 2002. *Final Sampling and Analysis Plan for Basin Mining Area Superfund Site, Town of Basin Operable Unit 1 (OU1), Residential Remediation, Jefferson County, Montana*. September.

CDM Federal Programs Corporation. 2003. *Cleanup Status Report, Residential Remediation, Town of Basin Operable Unit (OU1)*. May.

CDM Federal Programs Corporation. 2004a. *Cleanup Status Report, Residential Remediation, Town of Basin Operable Unit (OU1)*. June.

CDM Federal Programs Corporation. 2004b. *Cleanup Status Report, Residential Remediation, Town of Basin Operable Unit (OU1)*. December.

CDM. See CDM Federal Programs Corporation.

CH2M HILL. 2012a. *Town of Basin Second Five-Year Review Post Site Visit Discussion Memorandum*. September.

CH2M HILL. 2012b. *Town of Basin Operable Unit Activities Performed During the Remedial Action Beyond the Scope of the Record of Decision Memorandum*. November.

DEQ. See Montana Department of Environmental Quality, Remediation Division.

E&E. See Ecology and Environment, Inc.

Ecology and Environment, Inc. (E&E). 1991. *Field Activities Report, Expanded Site Inspection, Basin Schoolyard, Basin, Montana*. October.

Farag, Aida M., Daniel F. Woodward, Don Skaar, and William G. Brumbaugh. 2004. *Characterizing the Aquatic Health in the Boulder River Watershed, Montana*.

Montana Department of Environmental Quality, Remediation Division. 2011. *Construction Report for the OT Mill Waste Removal and Transport to the Luttrell Repository, Jefferson County, Montana*. September.

Morrison-Maierle. 1978. *Wastewater Collection and Treatment Facility and Water system Improvements for Basin, Montana. Construction Plans*. January.

Tetra Tech EM, Inc. 2011. *Construction Report for the OT Waste Removal and Transport to the Luttrell Repository, Jefferson County, Montana*. Prepared for Montana Department of Environmental Quality. Contract No. 411020.

U.S. Environmental Protection Agency. 2001. *Administrative Order on Consent for Removal Action*. August 21.

U.S. Environmental Protection Agency. 2002. *Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites*.

U.S. Environmental Protection Agency. 2003. *Adult Lead Model Spreadsheet. OSWER Directive 9285.7-54*.

U.S. Environmental Protection Agency. 2004a. *Integrated Exposure Uptake Biokinetic Model for Lead in Children (IEUBK)*.

U.S. Environmental Protection Agency. 2004b. *Risk Assessment Guidance for Superfund–Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final*. July.

U.S. Environmental Protection Agency. 2004c. *Remedial Action Completion Report, Town of Basin, Operable Unit 1 of the Basin Mining Area Superfund Site, Montana*. December 16.

U.S. Environmental Protection Agency. 2005a. *Guidelines for Carcinogen Risk Assessment.* March.

U.S. Environmental Protection Agency. 2005b. *Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens*. March.

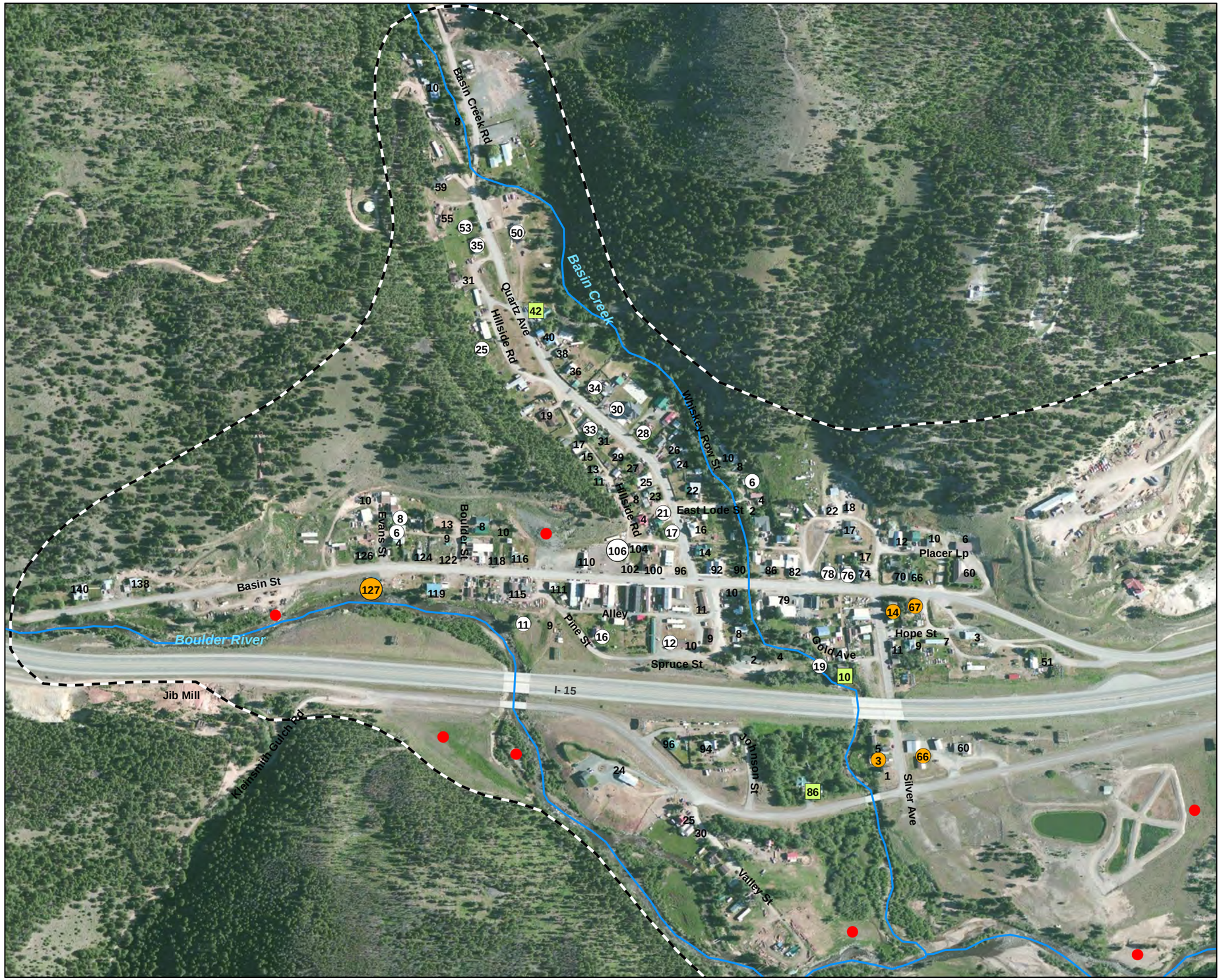
U.S. Environmental Protection Agency. 2011a. *Focused Remedial Investigation, Bullion Mine, Operable Unit 6, Jefferson County, Montana*. August.

U.S. Environmental Protection Agency. 2011b. *Crystal Mine, Operable Unit 5, Focused Remedial Investigation, Jefferson County, Montana*. November.

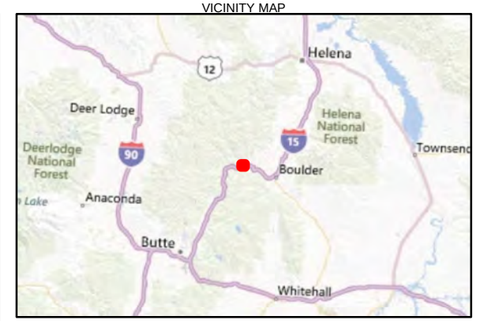
U.S. Environmental Protection Agency. 2012. *Regional Screening Levels Table*. November. http://www.epa.gov/region9/superfund/prg/

U.S. Army Corps of Engineers and U.S. Environmental Protection Agency. 2008. *First Five-Year Review Report for Town of Basin Project Operable Unit 1 Basin Mining Area*.

Appendix A
Photographs Documenting Site Conditions



VICINITY MAP



LEGEND

- Remediated Mine Waste Area - Observed During 5 Year Review
- Site Boundary
- 2 Unimpacted
- (2) Remediated
- 2 Contaminated; Not Remediated - Observed During 5 Year Review
- 2 Remediated Residence - Observed During 5 Year Review

Notes:
1. Aerial Imagery - ArcGIS Bing Maps Streaming map service

N

0 200 400 800
Feet

APPENDIX A
FIGURE 1
Residential Addresses
Town of Basin OU1
2nd Five Year Review
Jefferson County, MT

CH2MHILL

Residences

- 3 Silver Ave.
- 66 Frontage
- 14 Silver Ave.
- 67 Basin Street
- 127 Basin (Main) Street

Note: Both 2007 and 2012 photos included when possible

3- Silver Ave.
September 2012

66 Frontage
September 2012

14 Silver Ave.
September 2012

67 Basin Street

127 Basin (Main) Street
Inspection Photo is November 2007

127 Basin (Main) Street
September 2012

Unremediated Residences

- 10 Gold Street
- 86 Frontage Road

Properties that Refused Remediation

Photos taken in November 2007 and 2012

10 Gold Street
November 2007

10 Gold Street
September 2012

86 Frontage Road
(2007) Buildings Covering Contaminated Soils

86 Frontage Road 2012

Source Areas

- Jib Tailings Source Area
- Area T-9 East
- T-10 Source Area
- T-5 & T-6 Source Area
- Basin Street Tailings
- Basin Street at Former Mining Waste Source Piles T-1 and T-2A
- Area T-1
- Area T-2

Jib Tailings Source Area
October 2007

Jib Tailings Source Area
September 2012

Area T-9 East
October 2007—Looking West

Area T-9 East
September 2012 Looking South and Southwest

T-10 Source Area
September 2007 – Looking East

T-10 Source Area
September 2012

T-5 and T-6 Source Area
September 2012

Basin Street Tailings
October 2007

Basin Street Tailings
September 2012

Looking Across at Basin Street at Former Mining Waste Source Piles T-1 and T-2A (2007)

Area T-1
September 2012

Area T-2
September 2012

Appendix B
Human Health Revised Risk Assessment/ EPA Review Comments

Revised Assessment of Residential Risk from Arsenic in Surface Soil at Three Properties in the Town of Basin, Montana

PREPARED FOR: Kristine Edwards USEPA Region 8

PREPARED BY: Dennis Shelton CH2M HILL
Dennis Smith CH2M HILL

DATE: March 14, 2013

Purpose

The purpose of the memorandum is to provide the results of revised risk estimates for potential residential exposure to arsenic in surface soil detected at three properties in the Town of Basin, Montana. These three properties include:

- 42 Quartz (Jim Culbert, former and current owner)
- 86 Frontage Road (Ric Oberholz, former owner; Robert & Priscilla Ryan, current owner)
- 10 Gold Street (Leonard Saarinen, former owner; Mike & Bonnie Jellison, current owner)

The arsenic levels in soil detected at these properties were evaluated to estimate excess lifetime cancer risks and noncancer hazards, incorporating recent information on site-specific arsenic bioavailability into the exposure estimates. The revised risk and hazard estimates are intended to support risk management decisions for these properties as part of the five-year review process under CERCLA, to determine whether deed notices for long term protectiveness are needed.

Approach

Analytical data for arsenic in surface soil were obtained for samples collected on July 1999 and analyzed on January 2000. Cancer risks and noncancer hazards were estimated for each sample collected at each of the three properties, to identify the range of potential risks for each property. The risks and hazards were computed using current toxicity factors for arsenic, and the same residential exposure assumptions that were used to derive central tendency exposure (CTE) estimates as reported in the *Final Human Health Risk Assessment Report for Basin Mining Area Superfund Site, Town of Basin Operable Unit 1 (OU1), Jefferson County, Montana*. (CDM Federal, October 2000). These exposure assumptions also provided the basis for derivation of the Preliminary Remediation Goal (PRG) for arsenic of 120 mg/kg that has been used to support remedial action at the site.

Based on communication between USEPA and Jim Culbert (property owner), it has been reported that soil from the Crystal Mine site was historically used as fill material for the Town of Basin. Based on this understanding, it was assumed that the estimated site-specific bioavailability for arsenic in soil at the Crystal Mine, as reported in the *Crystal Mine, Operable Unit 5 Focused Remedial Investigation, Jefferson County, Montana* (CH2M HILL January 2013), would be suitably representative of the form of arsenic detected in surface soil from the three properties in the Town of Basin.

Site-Specific Arsenic Bioaccessibility. During the Remedial Investigation for Crystal Mine, a mine-specific bioavailability study was conducted to provide a better understanding of the bioavailability of arsenic in selected Crystal Mine Site soils. The ability of inorganic arsenic in these soils to be extracted under laboratory conditions that simulate physiological conditions (for example, gastric pH, buffering, and temperature) approximated the relative bioavailability of arsenic from the soil. This measured extracted fraction is referred to as bioaccessible arsenic. The test results indicated that of the 11 site soil samples (not including duplicates) tested, the measured bioaccessiblity ranged from 2.1 to 15.2 percent, with a mean of 5.8 percent. These results indicate that the forms

of arsenic in soil at Crystal Mine (and the soil used as fill at properties in the Town of Basin) are of lower bioavailability relative to the default of 50 percent that was used to derive the PRG for arsenic of 120 mg/kg that has been used to support remedial action at the site. This newer site-specific arsenic bioaccessibility information was used to develop revised risk and hazard estimates for residual levels of arsenic in soil at the three properties in the Town of Basin. In accordance with USEPA Region 8 practice, the average measured bioaccessible fraction (conservatively represented by the 95 percent upper confidence limit on the mean) from these samples (8.0 percent) is used to derive the site-specific adjustment value for incidentally ingested arsenic in soil, for the risk and hazard estimates. This value was computed using USEPA's ProUCL statistical tool, Version 4.1.01.

Results

Table 1 provides the concentrations of arsenic detected in surface soil, and a summary of the results of the risk and hazard estimates for the three properties. The risk calculation data sheet is provided as Attachment A. The ranges of the risk and hazard estimates are as follows:

- For the 42 Quartz property, risk estimates range from 4×10^{-7} to 5×10^{-6} and noncancer hazard quotients range from 0.007 to 0.09.
- For the 86 Frontage Road property, risk estimates range from 4×10^{-7} to 1×10^{-5} and noncancer hazard quotients range from 0.007 to 0.2.
- For the 10 gold Street property, risk estimates range from 7×10^{-7} to 3×10^{-6} and noncancer hazard quotients range from 0.01 to 0.05.

These ranges of risk estimates are all within or below the USEPA risk management range of 1×10^{-6} to 1×10^{-4}, and the ranges of hazard quotients are all well below the USEPA regulatory threshold value of 1. These results support the conclusion that these three properties in the Town of Basin remain protective and that deed notices for long term protectiveness are not needed.

TABLE 1
Residential Surface Soil Arsenic Concentrations and Summary of Risk and Hazard Results for the Residential Exposure
Town of Basin, Montana Second Five-Year Review

Sample	Depth (inches)	Arsenic Concentration (mg/kg)	Excess Lifetime Cancer Risk	Noncancer Hazard Quotient
42 Quartz Property				
B0046QZE	0-6	18.5	4E-07	0.007
B0046QZN	0-6	58.5	1E-06	0.02
B0046QZS	0-6	27.3	6E-07	0.01
B0046QZSS	0-6	248	5E-06	0.09
86 Frontage Road Property				
B0086FRE	0-6	330	7E-06	0.1
B0086FRE*	0-6	580	1E-05	0.2
B0086FRG	0-6	23.5	5E-07	0.009
B0086FRN	0-6	40.1	8E-07	0.02
B0086FRS	0-6	18.0	4E-07	0.007
B0086FRW	0-6	26.0	5E-07	0.01
10 Gold Street Property				
B0009GOE	0-6	33.6	7E-07	0.01
B0009GOG	0-6	33.1	7E-07	0.01
B0009GON	0-6	128	3E-06	0.05
B0009GOS	0-6	35.3	7E-07	0.01
B0009GOW	0-6	80.1	2E-06	0.03

Norred, Amy/BOI

From: Edwards, Kristine [Edwards.Kristine@epa.gov]
Sent: Monday, March 11, 2013 10:37 AM
To: Griffin, Susan
Cc: Smith, Dennis/BOI
Subject: RE: Town of Basin 2nd Five Year Review - Re-assessment of Risk for three Residences

Thanks Susan!

From: Griffin, Susan
Sent: Monday, March 11, 2013 10:05 AM
To: Edwards, Kristine
Subject: RE: Town of Basin 2nd Five Year Review - Re-assessment of Risk for three Residences

Hi Kristine,

The memo provided by CH2M Hill does a good job of explaining why the three properties do not require further remediation. They might which to modify the numbers slightly based on the last set of comments I sent on the Crystal Mine RI this morning. Otherwise I think you are good to go.

Sincerely,
Susan

From: Edwards, Kristine
Sent: Monday, March 11, 2013 8:48 AM
To: Griffin, Susan
Subject: FW: Town of Basin 2nd Five Year Review - Re-assessment of Risk for three Residences

Hi Susan. EPA is conducting a second 5 Yr Review for the Town of Basin. Three properties had waste left in place in small areas where they had imported soil that came from the Crystal Mine site. Hap Bullock operated the Crystal mine and often provided fill material to his neighbors, property owners in Basin. I wrote letters to the three current owners of the properties indicating that EPA planned to place notices on their deeds unless they had information that would not support our taking that action. The owners do not want the deed notices, and since we now have bioavailability factors for the Crystal mine site soils, I asked CH2MHill to re-evaluate the risk posed by these soils. The attached documentation explains Hill's evaluation and conclusions. Both the 42 Quartz and 86 Frontage properties have structures that were built over the contaminated fill after EPA sampled. The 10 Gold Street owners refused us access for removal. However, if you are comfortable with the evaluation and conclusion, I think we can explain our re-evaluation in the 2nd 5YR report and the Town of Basin can move forward towards delisting. Please let me know what you think.

From: Dennis.Smith2@CH2M.com [mailto:Dennis.Smith2@CH2M.com]
Sent: Friday, March 08, 2013 4:54 PM
To: Edwards, Kristine
Cc: Dennis.Shelton@CH2M.com; Jeff.Schut@CH2M.com; Deanne.Fischer@CH2M.com
Subject: Town of Basin 2nd Five Year Review - Re-assessment of Risk for three Residences

Kris,
Attached is a memo explaining the process our risk assessor (Dennis Shelton and Jeff Schut) used to re-assess the three residential properties in question (42 Quartz, 86 Frontage, 10 Gold). The re-assessment was done with an understanding of how the original risk assessment was calculated. My understanding is that our assessment followed the original methodology using the surface soil sample values collected during remedial construction, with the exception

of using a bioavailability percentage consistent with the sample results from the Crystal Mine soils, as we had agreed to do. Our assumptions are presented in the TM.

Don't hesitate to contact me if you have questions.

Thanks
Dennis

P. Dennis Smith
CH2M HILL Inc
Senior Project Manager
Environmental Services
322 East Front Street, Suite 200
Boise, ID 83702
Phone 208-383-6335
Cell 208-890-0148
dennis.smith2@ch2m.com

Attachment A
Risk Calculations

ATTACHMENT A

Sample-Specific Risk and Hazard Estimates for the Residential Exposure Scenario - Arsenic in Surface Soil

Town of Basin, Montana Five-Year Review

			Carcinogenic Risk							Noncancer Hazard						
COC	Sample	Concentration	Intake Oral (mg/kg-day)	Intake Dermal (mg/kg-day)	Intake Inhale (ug/m3)	Oral Risk	Dermal Risk	Inhale Risk	Total ELCR	Intake Oral (mg/kg-day)	Intake Dermal (mg/kg-day)	Intake Inhale (mg/m3)	Oral HQ	Dermal HQ	Inhale HQ	Total HQ
42 Quartz Property																
Arsenic	B0046QZE	18.5	2.5E-07	0.0E+00	1.1E-06	3.7E-07	0.0E+00	3.7E-09	4E-07	1.9E-06	0.0E+00	8.7E-09	6.4E-03	0.0E+00	5.8E-04	0.007
Arsenic	B0046QZN	58.5	7.8E-07	0.0E+00	3.5E-06	1.2E-06	0.0E+00	1.2E-08	1E-06	6.1E-06	0.0E+00	2.8E-08	2.0E-02	0.0E+00	1.8E-03	0.02
Arsenic	B0046QZS	27.3	3.6E-07	0.0E+00	1.7E-06	5.4E-07	0.0E+00	5.5E-09	6E-07	2.8E-06	0.0E+00	1.3E-08	9.4E-03	0.0E+00	8.6E-04	0.01
Arsenic	B0046QZSS	248	3.3E-06	0.0E+00	1.5E-05	4.9E-06	0.0E+00	5.0E-08	5E-06	2.6E-05	0.0E+00	1.2E-07	8.6E-02	0.0E+00	7.8E-03	0.09
86 Frontage Property																
Arsenic	B0086FRE	330	4.4E-06	0.0E+00	2.0E-05	6.6E-06	0.0E+00	6.6E-08	7E-06	3.4E-05	0.0E+00	1.6E-07	1.1E-01	0.0E+00	1.0E-02	0.1
Arsenic	B0086FRE*	580	7.7E-06	0.0E+00	3.5E-05	1.2E-05	0.0E+00	1.2E-07	1E-05	6.0E-05	0.0E+00	2.7E-07	2.0E-01	0.0E+00	1.8E-02	0.2
Arsenic	B0086FRG	23.5	3.1E-07	0.0E+00	1.4E-06	4.7E-07	0.0E+00	4.7E-09	5E-07	2.4E-06	0.0E+00	1.1E-08	8.1E-03	0.0E+00	7.4E-04	0.009
Arsenic	B0086FRN	40.1	5.3E-07	0.0E+00	2.4E-06	8.0E-07	0.0E+00	8.0E-09	8E-07	4.1E-06	0.0E+00	1.9E-08	1.4E-02	0.0E+00	1.3E-03	0.02
Arsenic	B0086FRS	18.0	2.4E-07	0.0E+00	1.1E-06	3.6E-07	0.0E+00	3.6E-09	4E-07	1.9E-06	0.0E+00	8.5E-09	6.2E-03	0.0E+00	5.7E-04	0.007
Arsenic	B0086FRW	26.0	3.5E-07	0.0E+00	1.6E-06	5.2E-07	0.0E+00	5.2E-09	5E-07	2.7E-06	0.0E+00	1.2E-08	9.0E-03	0.0E+00	8.2E-04	0.01
10 Gold Property																
Arsenic	B0009GOE	33.6	4.5E-07	0.0E+00	2.0E-06	6.7E-07	0.0E+00	6.7E-09	7E-07	3.5E-06	0.0E+00	1.6E-08	1.2E-02	0.0E+00	1.1E-03	0.01
Arsenic	B0009GOG	33.1	4.4E-07	0.0E+00	2.0E-06	6.6E-07	0.0E+00	6.6E-09	7E-07	3.4E-06	0.0E+00	1.6E-08	1.1E-02	0.0E+00	1.0E-03	0.01
Arsenic	B0009GON	128	1.7E-06	0.0E+00	7.8E-06	2.6E-06	0.0E+00	2.6E-08	3E-06	1.3E-05	0.0E+00	6.0E-08	4.4E-02	0.0E+00	4.0E-03	0.05
Arsenic	B0009GOS	35.3	4.7E-07	0.0E+00	2.1E-06	7.0E-07	0.0E+00	7.1E-09	7E-07	3.7E-06	0.0E+00	1.7E-08	1.2E-02	0.0E+00	1.1E-03	0.01
Arsenic	B0009GOW	80.1	1.1E-06	0.0E+00	4.9E-06	1.6E-06	0.0E+00	1.6E-08	2E-06	8.3E-06	0.0E+00	3.8E-08	2.8E-02	0.0E+00	2.5E-03	0.03

Notes:

ELCR = excess lifetime cancer risk

HQ = noncancer hazard quotient

mg/kg-day = milligram per kilogram per day

mg/m3 = milligram per cubic meter

µg/m3 = microgram per cubic meter

Appendix C
OT MILL Montana Operating Permit

Permit No.: MTX000014

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

AUTHORIZATION TO DISCHARGE UNDER THE MONTANA GROUND WATER POLLUION CONTROL SYSTEM

In compliance with Montana Water Quality Act, Title 75, Chapter 5, Montana Code Annotated (MCA) and the Administrative Rules of Montana (ARM) 17.30. Subchapter 5, Subchapter 7, and Subchapter 10 *et seq.*,

OT Mining Corporation

is authorized to discharge from its **Basin Mill tailings impoundment**,

located at **1/4 Southeast, Section 17, Township 6 North, Range 5 West, Jefferson County,**

to receiving waters, **Class I ground water,**

in accordance with discharge point(s), effluent limitations, monitoring requirements and other conditions set forth herein. Authorization for discharge is limited to those outfalls specifically listed in the permit. The numeric effluent limits, water quality standards, and trigger values/nonsignificance criteria specified herein support the protection of the affected receiving water.

This permit shall become effective: **December 1, 2009.**

This permit and the authorization to discharge shall expire at midnight, **November 30, 2014**.

FOR THE MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

Jenny Chambers

Jenny Chambers, Chief
Water Protection Bureau
Permitting & Compliance Division

Issuance Date: October 15, 2009

TABLE OF CONTENTS

I. EFFLUENT LIMITATIONS, MONITORING REQUIREMENTS & OTHER CONDITIONS

A. Description of Discharge Points and Mixing Zone

The authorization to discharge provided under this permit is limited to those outfalls specially designated below as discharge locations. Discharges at any location not authorized under an MGWPCS permit is a violation of the Montana Water Quality Act and could subject the person(s) responsible for such discharge to penalties under the Act. Knowingly discharging from an unauthorized location or failing to report an unauthorized discharge within a reasonable time from first learning of an unauthorized discharge could subject such person to criminal penalties as provided under Section 75-5-632 of the Montana Water Quality Act.

Outfall	Description
001	**Location:** From the tailings impoundment located east of Basin, in Tom Benton Gulch, located at N 45° 41" 34" latitude, W 112° 17' 47" longitude. **Mixing Zone:** 150 feet from the tailings impoundment, as defined by the monitoring wells. Mixing depth is 15 feet and the width is 375 feet. **Treatment:** Primary settling in tailings impoundment.

B. Effluent Limitations

Monitoring wells – Compliance points

Effective immediately and lasting through the term of the permit, the ground water quality, as a minimum, shall meet the compliance limitations as set forth in Table 1.

Table 1: Compliance Limitations – Monitoring Wells		
Parameter	Units	Daily Maximum Limit (1)
pH	s.u.	Within the range 6.0 – 9.0
Specific Conductivity (SC)	µS/cm	1,000
Nitrate plus Nitrite as N	mg/L	10.0
Antimony, dissolved	mg/L	0.006
Arsenic, dissolved	mg/L	0.010
Beryllium, dissolved	mg/L	0.004
Cadmium, dissolved	mg/L	0.005
Chromium, dissolved	mg/L	0.100
Copper, dissolved	mg/L	1.30
Iron, dissolved	mg/L	0.300
Lead, dissolved	mg/L	0.015
Manganese, dissolved	mg/L	0.050
Mercury, dissolved	mg/L	0.002
Nickel, dissolved	mg/L	0.100
Selenium, dissolved	mg/L	0.050
Silver, dissolved	mg/L	0.100
Thallium, dissolved	mg/L	0.002
Zinc, dissolved	mg/L	2.00
Footnotes: 1. See definitions, Part V of the permit		

C. Self-Monitoring Requirements

1. Monitoring wells

Effective upon issuance and during milling operation, the permittee shall monitor the ground water in the middle and east monitoring wells for the parameters and at the frequency specified in Table 2. Samples or measurements shall be representative of the volume and nature of the monitored activity. If no discharge occurs during the entire monitoring period, it shall be stated on the Discharge Monitoring Report Form (EPA No. 3320-1) that no discharge or overflow occurred.

When the mill is not operating, the parameters in Table 2 will be monitored annually, as a minimum frequency.

Analytical methods must be 40 CFR 136 approved methods unless otherwise approved by the Department. Analysis must meet the Required Reporting Values listed in DEQ-7 (February 2008). PQL (Practical Quantification Limits) are not acceptable substitutions for RRV.

Table 2: Ground Water Monitoring Requirements – Middle and East Wells

Parameter	Unit	Sample Frequency	Sample Type[1]	RRV [2]
Static Water Level	Feet (elevation above sea level)	1/Month [3]	Instantaneous	---
pH	s.u.	1/Month [3]	Instantaneous	---
Specific Conductivity	µS/cm	1/Month [3]	Instantaneous	---
Nitrate plus Nitrite as N	mg/L	1/Month [3]	Grab	0.010
Total Ammonia as N	mg/L	1/Month [3]	Grab	0.050
Antimony, dissolved	mg/L	1/Quarter [4]	Grab	0.003
Arsenic, dissolved	mg/L	1/Month [3]	Grab	0.003
Beryllium, dissolved	mg/L	1/Quarter [4]	Grab	0.001
Cadmium, dissolved	mg/L	1/Month [3]	Grab	0.00008
Chromium, dissolved	mg/L	1/Quarter [4]	Grab	0.001
Copper, dissolved	mg/L	1/Month [3]	Grab	0.001
Iron, dissolved	mg/L	1/Month [3]	Grab	0.050
Lead, dissolved	mg/L	1/Month [3]	Grab	0.0005
Mercury, dissolved	mg/L	1/Quarter [4]	Grab	0.00001
Nickel, dissolved	mg/L	1/Quarter [4]	Grab	0.010
Selenium, dissolved	mg/L	1/Quarter [4]	Grab	0.001
Silver, dissolved	mg/L	1/Quarter [4]	Grab	0.0005
Thallium, dissolved	mg/L	1/Quarter [4]	Grab	0.0002
Zinc, dissolved	mg/L	1/Month [3]	Grab	0.010

Footnotes:

1. See Definitions section at end of permit for explanation of terms.
2. The Required Reporting Value (RRV) is the detection level that must be achieved in reporting ground water monitoring or compliance data to the Department. The RRV is the Department's best determination of a level of analysis that can be achieved by the majority of the commercial, university, or governmental laboratories using EPA approved methods or methods approved by the Department. PQL (Practical Quantification Limits) are not acceptable substitutions for RRV.
3. During mill operation, the required monitoring frequency is monthly; during periods of shutdown, the required monitoring frequency is annually.
4. During mill operation, the required monitoring frequency is quarterly; during periods of shutdown, the required monitoring frequency is annually.

D. Special Conditions

1. Response Ground Water Monitoring:

If a ground water quality sample result from any monitoring well is in exceedance of a water quality standard, as given for a parameter(s) in Table 1 of this permit, the permittee is required to re-sample the well(s) within 72

hours of receiving laboratory results and notify the Department within 24 hours of receiving the results of the conformational sampling.

Based on the re-sample results, the Department may direct the permittee to implement one or more contingency measures. Said measures could include, but are not necessarily limited to:

a. In coordination with the Department, review water quality trends, discharge data, and other site activities to identify the probable cause and extent of the water quality changes;

b. Increase sampling (frequency and/or constituents);

c. Installation of additional ground water monitoring wells, including upgradient wells;

d. Installation of additional treatment to the tailings slurry and/or other wastewater streams used during milling prior to wastewater disposal to lower the exceeded parameter concentration(s);

e. Suspension of all milling operations until the cause of the exceedance(s) has been determined, remediation measures taken, and/or measures implemented to prevent a reoccurrence;

f. Supply drinking water to residences, business and irrigation districts located downgradient of mill site; and/or

g. Implement other measures as determined by the Department, which may include invoking provisions set forth in Part IV. Section O of the renewed permit.

2. Monitoring Well Installation

By **October, 1, 2010**, the permittee will complete a replacement well for the non-functioning west well. Monitoring for the parameters and at the frequencies stated in Table 2 will begin immediately after installation and continue through the duration of the permit.

The monitoring well must be sited near (50 feet) the existing west well and on the perceived mixing zone boundary (150 feet from the tailings impoundment). The wells must be on permittee property and always accessible to assure continued accessibility for monitoring purposes.

The wells must be completed in the top 15 feet of the first ground water-bearing zone and shall be screened from the top of the high water table to 15 feet below the low water table.

All monitoring wells shall be installed by a licensed monitoring well constructor. Completed well logs shall be retained by the permittee and submitted to the Department upon well completion.

By **October 28, 2010, t**he applicant must submit a written report to the Water Protection Bureau that documents the completion of the installation/rehabilitation.

3. Standard Operating Procedures (SOP) and Sampling and Analysis Plan (SAP):

   By **October 1, 2010**, the permittee shall develop and maintain a copy of a Standard Operating Procedure (SOP) and Sampling and Analysis Plan (SAP) to address ground water monitoring. At a minimum, the SOP and SAP should address: well purging; equipment and procedures used for sample collection or field parameter measurement; sample collection, specifying sampling equipment and procedures; equipment decontamination procedures and storage; sample preservation and storage; and transportation to lab.

   By **October 28, 2010,** the applicant must submit a written report to the Water Protection Bureau that documents the preparation and implementation of the SOP and SAP. Copies of the SOP and SAP do not need to be submitted to the Department by the required report date, but a copy of the SOP and SAP must be maintained on-site.

4. Other:

   a. All topsoil must be salvaged from disturbed areas and stockpiled for use during reclamation.

   b. Upon termination of the operation, the impoundment must be reclaimed by recontouring and crowning the material in such a way as to promote positive runoff. The impoundment must be covered with a minimum of two (2) feet of soil material and revegetated. O.T. Mining may request a change in this requirement if it can be documented by a qualified soil scientist with data submitted to a qualified laboratory that the tailings in the impoundment at the end of the impoundment life will not adversely affect revegetation efforts. Monitoring shall also verify that the entire site meets state and federal soil standards for human health and environmental protection.

c. A minimum of two (2) feet of freeboard must be maintained in the impoundment at all times.

d. Tailings impoundment dikes must be maintained to prevent erosion and transport of materials off the property of the permittee or into state waters.

e. Tailings impoundment dikes must be revegetated concurrent with tailings disposal.

f. Best management practices (BMPs) shall be utilized to control fugitive dust emissions from the facility. The following BMPs are examples of what may be required on wind erosive sites: watering, temporary seeding, topsoiling and revegetation, wind breaks, chemical amendments, soil amendments and/or stabilization fabric.

g. Best management practices (BMPs) shall be utilized to control sedimentation and erosion. These include berms to prevent surface run-on and runoff from ore stockpiles and all other process materials.

h. All spills of process solutions must be immediately reported to the Department.

i. Reclamation must be monitored and a report submitted yearly to the Department for a period of two years following cessation of operations. The report must be submitted in writing for each calendar year and must be received by the Department no later than March 15th of the year following the report period. . Responsibility for reclamation success shall remain with the company until such time that the Department agrees in writing that the reclamation is complete.

j. The reclaimed areas must be reseeded, stabilized, and irrigated, if necessary, upon the request of the Department. The Department may release O. T. Mining from this reclamation monitoring responsibility at an earlier date upon review of the reclamation success.

E. Reporting Schedule

The following table is a summary of reporting requirements stated in this part (Part I) of the permit. Refer to the specific permit section for additional submittal requirements and specific information.

Submittal Date [1]	Frequency	Required Item	Permit Section
28th day of the month following each completed monitoring period	1/Quarter	Monitoring well water quality	Part. I. C
October 28, 2010	Single event	Report monitoring well installation/rehabilitation	Part I.D.2
	Single event	Report completion of development and implementation of an SOB and SAP.	Part I.D.3

1. Specific dates shown are for Special Conditions and/or Compliance Schedule Items.
2. Quarterly monitoring shall commence with the first full calendar quarter following permit effective date.

II. MONITORING, RECORDING AND REPORTING REQUIREMENTS

A. Representative Sampling

Samples taken in compliance with the monitoring requirements established under Part I of the permit shall be collected from the effluent stream prior to discharge into the receiving waters. Samples and measurements shall be representative of the volume and nature of the monitored discharge.

B. Monitoring Procedures

Monitoring must be conducted according to test procedures approved under Part 136, Title 40 of the Code of Federal Regulations, unless other test procedures have been specified in this permit. All flow-measuring and flow-recording devices used in obtaining data submitted in self-monitoring reports must indicate values within 10 percent of the actual flow being measured.

C. Penalties for Tampering

The Montana Water Quality Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $25,000, or by imprisonment for not more than six months, or by both.

D. Reporting of Monitoring Results

Self-monitoring results shall be submitted to the Department monthly. Monitoring results obtained during the previous monitoring period shall be summarized and reported on a Discharge Monitoring Report Form (EPA No. 3320-1), postmarked no later than the 28th day of the month following the completed reporting period. If no discharge occurs during the reporting period, "no discharge" shall be reported on the report form. Legible copies of these, and all other reports required herein, shall be signed and certified in accordance with the "Signatory Requirements" (see Part IV.G of this permit), and submitted to the Department at the following address:

Montana Department of Environmental Quality
Water Protection Bureau
PO Box 200901
Helena, Montana 59620-0901
Phone: (406) 444-3080

E. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any Compliance Schedule of this permit shall be submitted no later than 14 days following each schedule date.

F. Additional Monitoring by the Permittee

If the permittee monitors any pollutant more frequently than required by this permit, using approved analytical methods as specified in this permit, the results of this

monitoring shall be included in the calculation and reporting of the data submitted in the Discharge Monitoring Report. Such increased frequency shall also be indicated.

G. Records Contents

Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements;

2. The initials or name(s) of the individual(s) who performed the sampling or measurements;

3. The date(s) analyses were performed;

4. The time analyses were initiated;

5. The initials or name(s) of individual(s) who performed the analyses;

6. References and written procedures, when available, for the analytical techniques or methods used; and

7. The results of such analyses, including the bench sheets, instrument readouts, computer disks or tapes, etc., used to determine these results.

H. Retention of Records

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report or application. This period may be extended by request of the Department at any time. Data collected on site, copies of Discharge Monitoring Reports, and a copy of this MPDES permit must be maintained on site during the duration of activity at the permitted location.

I. Twenty-four Hour Notice of Noncompliance Reporting

1. The permittee shall report any serious incidents of noncompliance affecting the environment as soon as possible, but no later than twenty-four (24) hours from the time the permittee first became aware of the circumstances. The report shall be made to the Water Protection Bureau at (406) 444-3080 or the Office of Disaster and Emergency Services at (406) 841-3911. The following examples are considered serious incidents:

   a. Any noncompliance which may seriously endanger health or the environment;

   b. Any unanticipated bypass which exceeds any effluent limitation in the permit (See Part III.G of this permit, "Bypass of Treatment Facilities");

   c. Any upset which exceeds any effluent limitation in the permit (See Part III.H of this permit, "Upset Conditions").

2. A written submission shall also be provided within five days of the time that the permittee becomes aware of the circumstances. The written submission shall contain:

   a. A description of the noncompliance and its cause;

   b. The period of noncompliance, including exact dates and times;

   c. The estimated time noncompliance is expected to continue if it has not been corrected; and

   d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

3. The Department may waive the written report on a case-by-case basis if the oral report has been received within 24 hours by the Water Protection Bureau, by phone, at (406) 444-3080.

4. Reports shall be submitted to the addresses in Part II.D of this permit, "Reporting of Monitoring Results".

J. Other Noncompliance Reporting

Instances of noncompliance not required to be reported within 24 hours shall be reported at the time that monitoring reports for Part II.D of this permit are submitted. The reports shall contain the information listed in Part II.I.2 of this permit.

K. Inspection and Entry

The permittee shall allow the head of the Department or the Director, or an authorized representative thereof, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance, any substances or parameters at any location.

III. COMPLIANCE RESPONSIBILITIES

A. Duty to Comply

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Montana Water Quality Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. The permittee shall give the Department advance notice of any planned changes at the permitted facility or of an activity which may result in permit noncompliance.

B. Penalties for Violations of Permit Conditions

The Montana Water Quality Act provides that any person who violates a permit condition of the Act is subject to civil or criminal penalties not to exceed $25,000 per day or one year in prison, or both, for the first conviction, and $50,000 per day of violation or by imprisonment for not more than two years, or both, for subsequent convictions. MCA 75-5-611(a) also provides for administrative penalties not to exceed $10,000 for each day of violation and up to a maximum not to exceed $100,000 for any related series of violations. Except as provided in permit conditions on Part III.G of this permit, "Bypass of Treatment Facilities" and Part III.H of this permit, "Upset Conditions", nothing in this permit shall be construed to relieve the permittee of the civil or criminal penalties for noncompliance.

C. Need to Halt or Reduce Activity not a Defense

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

E. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit. However, the permittee shall operate, as a minimum, one complete set of each main line unit treatment process whether or not this process is needed to achieve permit effluent compliance.

F. Removed Substances

Collected screenings, grit, solids, sludges, or other pollutants removed in the course of treatment shall be disposed of in such a manner so as to prevent any pollutant from entering any waters of the state or creating a health hazard.

G. Bypass of Treatment Facilities

1. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Parts III.G.2 and III.G.3 of this permit.

2. Notice:

   a. Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least 10 days before the date of the bypass.

   b. Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required under Part II.I of this permit, "Twenty-four Hour Reporting".

3. Prohibition of bypass:

   a. Bypass is prohibited and the Department may take enforcement action against a permittee for a bypass, unless:

      1) The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

      2) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgement to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

      3) The permittee submitted notices as required under Part III.G.2 of this permit.

   b. The Department may approve an anticipated bypass, after considering its adverse effects, if the Department determines that it will meet the three conditions listed above in Part III.G.3.a of this permit.

IV. GENERAL REQUIREMENTS

A. Planned Changes

The permittee shall give notice to the Department as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

1. The alteration or addition could significantly change the nature or increase the quantity of pollutant discharged. This notification applies to pollutants which are not subject to effluent limitations in the permit; or

2. There are any planned substantial changes to the existing sewage sludge management practices of storage and disposal. The permittee shall give the Department notice of any planned changes at least 180 days prior to their implementation.

B. Anticipated Noncompliance

The permittee shall give advance notice to the Department of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

C. Permit Actions

This permit may be revoked, modified and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

D. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The application must be submitted at least 180 days before the expiration date of this permit.

E. Duty to Provide Information

The permittee shall furnish to the Department, within a reasonable time, any information which the Department may request to determine whether cause exists for revoking, modifying and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Department, upon request, copies of records required to be kept by this permit.

F. Other Information

When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Department, it shall promptly submit such facts or information with a narrative explanation of the circumstances of the omission or incorrect submittal and why they weren't supplied earlier.

G. Signatory Requirements

All applications, reports or information submitted to the Department shall be signed and certified.

1. All permit applications shall be signed by either a principal executive officer or ranking elected official.

2. All reports required by the permit and other information requested by the Department shall be signed by a person described above or by a duly authorized representative of that person. A person is considered a duly authorized representative only if:

   a. The authorization is made in writing by a person described above and submitted to the Department; and

   b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters. (A duly authorized representative may thus be either a named individual or an individual occupying a named position.)

3. Changes to authorization. If an authorization under Part IV.G.2 of this permit is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Part IV.G.2 of this permit must be submitted to the Department prior to or together with any reports, information, or applications to be signed by an authorized representative.

4. Certification. Any person signing a document under this section shall make the following certification:

   "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

H. Penalties for Falsification of Reports

The Montana Water Quality Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction be punished by a fine of not more that $25,000 per violation, or by imprisonment for not more than six months per violation, or by both.

I. Availability of Reports

All reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Department and the EPA. Permit applications, permits and effluent data shall not be considered confidential and shall also be available for public inspection.

J. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Clean Water Act.

K. Property or Water Rights

The issuance of this permit does not convey any property or water rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

L. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

M. Transfers

This permit may be automatically transferred to a new permittee if:

1. The current permittee notifies the Department at least 30 days in advance of the proposed transfer date;

2. The notice includes a written agreement between the existing and new permittees containing a specific date for transfer of permit responsibility, coverage, and liability between them;

3. The Department does not notify the existing permittee and the proposed new permittee of an intent to revoke or modify and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in Part IV.M.2 of this permit; and

4. Required annual and application fees have been paid.

N. Fees

The permittee is required to submit payment of an annual fee as set forth in ARM 17.30.201. If the permittee fails to pay the annual fee within 90 days after the due date for the payment, the Department may:

1. Impose an additional assessment consisting of 15% of the fee plus interest on the required fee computed at the rate established under 15-31-510(3), MCA, or

2. Suspend the processing of the application for a permit or authorization or, if the nonpayment involves an annual permit fee, suspend the permit, certificate or authorization for which the fee is required. The Department may lift suspension at any time up to one year after the suspension occurs if the holder has paid all outstanding fees, including all penalties, assessments and interest imposed under this sub-section. Suspensions are limited to one year, after which the permit will be terminated.

O. Reopener Provisions

This permit may be reopened and modified (following proper administrative procedures) to include the appropriate effluent limitations (and compliance schedule, if necessary), or other appropriate requirements if one or more of the following events occurs:

1. Water Quality Standards: The water quality standards of the receiving water(s) to which the permittee discharges are modified in such a manner as to require different effluent limits than contained in this permit.

2. Water Quality Standards are Exceeded: If it is found that water quality standards or trigger values, excluding mixing zones designated by ARM 17.30.501-518, for parameters included in the permit or others, the department may modify the effluent limits or water management plan.

V. DEFINITIONS

1. **"30-day (and monthly) average"** other than for fecal coliform bacteria, means the arithmetic average of all samples collected during a consecutive 30-day period or calendar month, whichever is applicable. Geometric means shall be calculated for fecal coliform bacteria. The calendar month shall be used for purposes of reporting self-monitoring data.

2. **"Bypass"** means the intentional diversion of waste streams from any portion of a treatment facility.

3. **"Composite samples"** shall be flow proportioned. The composite sample shall, as a minimum, contain at least four (4) samples collected over the compositing period. Unless otherwise specified, the time between the collection of the first sample and the last sample shall not be less than six (6) hours nor more than 24 hours. Acceptable methods for preparation of composite samples are as follows:

   a. Constant time interval between samples, sample volume proportional to flow rate at time of sampling;

   b. Constant time interval between samples, sample volume proportional to total flow (volume) since last sample. For the first sample, the flow rate at the time the sample was collected may be used;

   c. Constant sample volume, time interval between samples proportional to flow (i.e. sample taken every "X" gallons of flow); and,

   d. Continuous collection of sample, with sample collection rate proportional to flow rate.

4. "**Continuous**" means the measurement of effluent flow which occurs without interruption throughout the operating hours of the facility, except for infrequent shutdowns for maintenance process changes, or other similar activities.

5. **"Daily Discharge"** means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the daily discharge is calculated as the average measurement of the pollutant over the day.

6. **"Daily Maximum Limit"** means the maximum allowable discharge of a pollutant during a calendar day. Expressed as units of mass, the daily

discharge is cumulative mass discharged over the course of the day. Expressed as a concentration, it is the arithmetic average of all measurements taken that day.

7. **"Department"** means the Montana Department of Environmental Quality.

8. **"Discharge"** means the injection, deposit, dumping, spilling, leaking, placing, or failing to remove any pollutant so that it or any constituent thereof may enter into state waters, including ground water.

9. **"Grab"** sample means a sample which is taken from a waste stream on a one-time basis without consideration of flow rate of the effluent or without consideration for time.

10. **"Instantaneous"** measurement, for monitoring requirements, means a single reading, observation, or measurement.

11. "**Load Limits**" are mass-based discharge limits expressed in units such as lb/day

12. **"Mixing zone"** means a limited area of a surface water body or aquifer where initial dilution of a discharge takes place and where certain water quality standards may be exceeded.

13. **"Nondegradation"** means the prevention of a significant change in water quality that lowers the quality of high-quality water for one or more parameters. Also, the prohibition of any increase in discharge that exceeds the limits established under or determined from a permit or approval issued by the Department prior to April 29, 1993.

14. **"Severe property damage"** means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

15. **"TMDL"** means the total maximum daily load limitation of a parameter, representing the estimated assimilative capacity for a water body before other designated uses are adversely affected. Mathematically, it is the sum of wasteload allocations for point sources, load allocations for non-point and natural background sources, and a margin of safety.

16. **"TSS"** means the pollutant parameter total suspended solids.

Appendix D
Comments Received from Support Agencies and/or the Community

From: Sloan, Richard [mailto:RSloan@mt.gov]
Sent: Monday, April 29, 2013 8:25 AM
To: Edwards, Kristine
Subject: Basin, 5-year review

Kris,
Thanks for the opportunity to review the 5-year report for Basin(OU1).
The DEQ does not have any specific comments.
The OU1 remedial action has been and continues to be effective in protecting public health and the environment in the short term.
Attached are some general observations concerning IC's.
Dick Sloan

Richard Sloan
Superfund Project
Montana Department of Environmental Quality
1100 N. Last Chance Gulch
Helena, Mt 59620-0901
406-841-5046

Basin (OU1)
2nd 5-year review observations
April 23, 2013

The remedial action completed in OU1 has been and continues to be effective in protecting the public health and the environment in the short term.
To achieve long-term protectiveness, IC's must be implemented that address the proper handling and disposal of buried mine contamination that could be excavated in the future. Also the appropriate remedial actions need to be completed in the Basin Watershed (OU2) in order to insure that the metal loading in OU2 surface water is reduced to the level such that OU2 is no longer a potential source of contamination to OU1.
Based on the recent bioavailability data and on the updated risk assessment, the soil remediation objectives for OU1 of 120ppm As and 1000 ppm Pb are adequate to protect the public health and the environment.
The IC's, which address the proper handling and disposal of buried mine contamination that could be excavated in the future, would apply to all properties in Basin.
In section 7.2.2, paragraph 2: The statement "Three properties within the Town of Basin have subsurface contamination" is incorrect. Many of the properties in Basin, if not most of the properties in Basin, could have subsurface mining contamination exposed by future excavation projects, hence the need for the IC which applies to all properties in Basin in order to protect current and future property owners.

Appendix E
Community Interview Responses and Public Notice

Town of Basin Interviews

On September 19 and October 24, 2012, Kris Edwards of EPA and Dick Sloan of MDEQ interviewed five residents of the Town of Basin to determine their interest or concerns regarding the 5-year review of the remedy that EPA concluded in 2004. In general, those interviewed were aware of EPA's remedy performed in Basin, and had very few concerns with the effectiveness of that remedy. The individuals interviewed were:

1. Megan Bullock, Jefferson County Sanitarian
2. Timmon Hayes, Jefferson County Sanitarian
3. Dave Kirsch, Jefferson County Commissioner
4. Jim Culbert, Basin Resident, Water Board Member
5. Tammy Ulrich/ Principal Basin School

Listed below are the questions asked in each of the interviews, with a summary of the responses provided.

Q1. Are you aware of the history and remedial efforts concerning the Town of Basin Superfund Site?

A1: All of the interviewees were aware of Basin's Superfund history and the remedy that was performed there. One person thought that because the Basin community is fairly transient, the population may not be very aware of the remedial action.

Q2. Do you have any concerns or issues with the cleanup efforts that have been conducted to date?

A2. One person suggested that the community would be interested in having children tested and their water supply tested. Another person was interested in the status of the Merry Widow Health Mine. He said it used to have a tailings pond that flooded and breached the tailings impoundment. He also mentioned that a new bridge had been constructed over Basin Creek. A third person mentioned there were a couple of areas with some tailings on his property, but he covered them and built a cabin over one of the areas and removed stream bank deposits.

Q3. Do you need any information about the Town of Basin Superfund Site 5-year review process?

A3. Most did not feel they needed any additional information. Megan Bullock requested a copy of the 5-year Review Report for her files.

Q4. Do you have any information that may be helpful for the 5-year review?

A4. Most did not have any information to offer.

Q5. Do you know how to contact the US Environmental Protection Agency with any questions that may arise?

A5. All interviewees understood how to contact the EPA. A business card was given to all interviewees.

Q6. What do you think the community wants to know?

A6. Most did not think others in the community wanted much more than a simple explanation of what the 5-year review findings are.

Q7. How do you prefer to get information about important issues?

A7. Interviewees prefer to get information through email, or the newspaper.

Q8. Who else should we be talking to?

A8. Some names were provided, see interview forms.

Q9. Is there anything else you would like to add?

A9. Most did not have anything further to add.

LEGAL 12-113
AFFIDAVIT OF PUBLICATION
STATE OF MONTANA
COUNTY OF JEFFERSON

I, **Janice Anderson**, of Boulder, Jefferson County, Montana, being first duly sworn according to law, deposed and says: That I am the publisher and printer of the **BOULDER *MONITOR***, a weekly newspaper of general circulation, printed and published at Boulder, Jefferson County, Montana, and that the attached notice:

REVIEW OF CLEANUP BASIN MINING AREA
MONTANA EPA OFFICE

was published in the said **Boulder *Monitor*** for ONE successive week(s). That the first publication of said notice was on the 12th day of SEPTEMBER, 2012: that the last publication of said notice will be on the 12th day of SEPTEMBER, 2012. That the notice was printed and published each week during the time above mentioned, in the regular and entire issue(s) of said **Boulder *Monitor***, and not in a supplement.

Janice Anderson, Editor & Publisher

Subscribed and sworn before me this 13 day of SEPTEMBER, 2012, at my office in Boulder, Jefferson County, Montana.

HELEN AUCH
NOTARY PUBLIC for the
State of Montana
Residing at Jefferson, MT
My Commission Expires
October 15, 2012

Page	:	1 of 1 10/04/2012 10:53:08	Ad Number	:	10850964
			Ad Key	:	20331421
Order Number	:	20331421	Salesperson	:	MS01 - Kristen Lloyd
PO Number	:		Publication	:	Montana Standard
Customer	:	60024107 US EPA REGION 8	Section	:	ROP
Contact	:	DEBBIE CLEVENGER	Sub Section	:	ROP
Address1	:	10 W 15TH STREET SUITE 3200	Category	:	Default ROP
Address2	:		Dates Run	:	09/09/2012-09/09/2012
City St Zip	:	HELENA MT 59626	Days	:	1
Phone	:	(406) 457-5004	Size	:	3 x 5.00, 35 lines
Fax	:		Words	:	0
	:		Ad Rate	:	Non Profit/Thank You
Printed By	:	butsharo	Ad Price	:	297.25
Entered By	:	butlloyk	Amount Paid	:	0.00
			Amount Due	:	297.25
Keywords	:	Basin Mining			
Notes	:				
Zones	:				

Proof of Publication

STATE OF MONTANA
COUNTY OF SILVER BOW sa.

I, Gina Shaver being first duly sworn, on oath deposes and says: That S he is the principal clerk of The Montana Standard, Division of Lee Enterprises, Inc. printer and publisher of "The Montana Standard" a daily newspaper of general circulation, printed and published in Butte, in the County of Silver Bow, State of Montana; that the notice of which a copy is hereto attached was first published in said newspaper in its issue dated the 9th day of September 2012 and was published in said newspaper in its issues of MT Standard the last publication being in the issue of said newspaper dated the 9th day of September, 2012.

Gina Shaver

Subscribed and sworn to before me this 4th day of October, 2012.

Kristen A. Lloyd

Notary Public for the State of Montana
Residing at Butte, Montana
My Commission expires Dec 13, 2014

KRISTEN A. LLOYD
NOTARY PUBLIC for the State of Montana
Residing at Butte, Montana
My Comm. Expires December 13, 2014

Page	:	1 of 1 10/04/2012 10:53:08	**Ad Number**	:	10850964
			Ad Key	:	20331421
Order Number	:	20331421	**Salesperson**	:	MS01 - Kristen Lloyd
PO Number	:		**Publication**	:	Montana Standard
Customer	:	60024107 US EPA REGION 8	**Section**	:	ROP
Contact	:	DEBBIE CLEVENGER	**Sub Section**	:	ROP
Address1	:	10 W 15TH STREET SUITE 3200	**Category**	:	Default ROP
Address2	:		**Dates Run**	:	09/09/2012-09/09/2012
City St Zip	:	HELENA MT 59626	**Days**	:	1
Phone	:	(406) 457-5004	**Size**	:	3 x 5.00, 35 lines
Fax	:		**Words**	:	0
	:		**Ad Rate**	:	Non Profit/Thank You
Printed By	:	butsharo	**Ad Price**	:	297.25
Entered By	:	butlloyk	**Amount Paid**	:	0.00
			Amount Due	:	297.25
Keywords	:	Basin Mining			
Notes	:				
Zones	:				

Brunett.

Chotean	0	7	7	6	-20
Boulder	0	7	0	0	-7

Second quarter

B – Tony Butler 22 catch from Alex Brunett, Kyle Lyon kick

Townsend 19, Whitehall 6

TOWNSEND — The Townsend Bulldogs were able to get a 19-6 win against Whitehall at home Friday.

The Buldogs had touchdowns by Znae McArhtur, Dakota Kimbrough and Wyatt Meehan.

No scoring information was available for Whitehall.

Whitehall	0	0	0	6	-6
Townsend	6	7	0	6	-19

First quarter

Towns - Zane McArthur 1 run, kick blocked

Second quarter

Towns - Dakota Kimbrough 25 catch from Ryan Reddick, Kimbrough kick

Fourth quarter

Towns - Wyatt Meehan, 3 run, kick failed

P - Vose 30 pass from Metesh (Metesh run)

BOXES OF INTEREST

Great Falls Russell 28, Helena Capital 27, 3OT

Capital	0	7	0	7	0	7	-27
CMR	0	7	0	7	0	7	-28

Second quarter

CMR – Josh Horner 21 run. (Tanner Olsen kick)

Capital –Andy Waterman 21 pass from Brian Sinrud (Kyle Nickol kick)

Fourth quarter

Capital – Gunnar Brekke 12 run (Kyle Nickol kick)

CMR – Josh Horner 5 run (Tanner Olsen kick)

Double OT

Capital – Brian Sinrud 1 rush (Kyle Nickol kick)

CMR – Josh Horner 3 run (Tanner Olsen kick)

Triple OT

CMR – Eric Dawson 10 yard catch from Josh Horner (Tanner Olsen kick)

Capital – Brian Sinrud 1 run (2-pt conversion failed)

INDIVIDUAL STATISTICS

RUSHING – Capital: Gunnar Brekke 21-99, Brian Sinrud 4-14, Garret Quigley 13-39, Jesse Coker 1-4, Keeley Larson 3-2. CMR: Josh Horner 23-108, Hunter Thomsen 23-95, Eric Dawson 2-(-3).

PASSING – Capital: Brian Sinrud 11-20-0-92. Keeley Larson 4-9-0-29. CMR: Josh Horner 13-20-0-111, Eric Dawson 0-2-0-0.

RECEIVING – Capital: Gunnar Brekke 5-40, Andy Waterman 4-31, Ryan Hauck 3-34, Austin Rensmon 2-7, Garret Quigley 1-9. CMR: Daekwon

Second quarter

GFH – Posey 21 interception return (Posey kick), 9:17

FLA – Tokarz 1 run (Dylan Torgerson kick), 4:54

Third quarter

FLA – Austin Root 2 run (Torgerson kick), 9:52

GFH – Posey 97 kickoff return (Posey kick), 9:38

FLA – Tokarz 75 run (Torgerson kick), 7:38

GFH – Jordan Jernigan 5 pass from Kolby Sukut (Posey kick), 4:17

Fourth quarter

GFH – Posey 3 run (Posey kick), 11:55

GFH – Posey 20 field goal, 4:46

FLA – Tokarz 1 run (kick blocked)

GFH – Posey 35 field goal, 0:00

Individual Statistics

RUSHING – Great Falls: Teylor Smith 26-167, Colter Posey 8-68, Brad Humphreys 4-44, Kolby Sukut 4-5. Flathead: Austin Root 27-135, Matt Tokarz 13-126, Jerum AuClaire 2-5, Dylan Torgerson 1-(-20).

PASSING – Great Falls: Kolby Sukut 6-14-59-1. Flathead: Matt Tokarz 18-30-203-2.

RECEIVING – Great Falls: Jordan Jernigan 2-19, Lukas Vining 1-18, Brad Humphreys 2-17, Dylan Tatarka 1-5. Flathead: Trampus Barton 9-140, Kevin Grosswiler 5-34, Jerum AuClaire 2-14, Tucker Toelke 1-9, Nick Iavicoli 1-6.

Polson 40, Hamilton 12

Polson	10	21	6	3	-40
Hamilton	0	6	6	0	-12

P – Colton Lenz 6 run (Brady Hislop kick)

P – FG Hislop, 21

H – Kris Cleveland 87 pass Josh Bauder (kick failed)

Dillon 42, Frenchtown 14
Drummond 56, Seeley-Swan 6
Ennis 51, Gardiner 24
Fairfield 47, Manhattan 28
Fairview 68, Scobey 24
Florence 54, Thompson Falls 13
Fort Benton 48, Cascade 12
Glasgow -Nashua-Hinsdale 7, Baker 6
Great Falls 47, Kalispell Flathead 33
Great Falls Russell 28, Helena Capital 27
Harlem 51, Poplar 6
Helena 23, Kalispell Glacier 17
Hot Springs 65, St. Regis 14
Hysham 49, Ekalaka 0
Laurel 35, Belgrade 7
Lewistown (Fergus) 28, Sidney 0
Libby 34, Corvallis 12
Lincoln 50, Philipsburg 48
Livingston 44, Glendive 0
Malta 39, Shepherd 7
Miles City 35, Havre 14
Missoula Big Sky 28, Billings Skyview 21
Missoula Loyola 54, Eureka 7
Noxon 29, Darby 22
Polson 40, Hamilton 12
Red Lodge/Belfry 55, Three Forks 14
Reed Point-Rapelje 58, Denton 14
Ronan 36, Troy 14
Roundup 40, Conrad 24
Shelby 48, Plains 0
Stevensville 41, Columbia Falls 14
Superior 54, Victor 46
Terry 44, Savage 22
Townsend 19, Whitehall 6
Twin Bridges 56, Sheridan 6
Whitefish 30, Browning 25

ngnecker, Helena 72-71-143; Ryan Malby, Kalispell 3; Don Conyers, Victor, Idaho 75-69-144; Mike Coeur d'Alene 72-72-144; Russell Grove, Hayden, 9-75-144; Travis Long, Henderson, Nev. 75-69-144; rber, Clinton 71-75-145; Tith McElhinny, Spokane 73- Cameron Milton, Polson 76-69-145; Kyle Mittlestadt, 74-71-145; Matt Bunn, Hayden Lake, Idaho 75- losh Walsh, Butte 75-71-146; Rick Spurgeon, Missoula 7; Cameron Brown, Wright, Wyo. 79-69-148; Eddy Torrance, Calif. 71-77-148; Padrig Barron, Missoula 9; Jason Lehtola, Hamilton 74-75-149; Josh Gold, 74-76-150; Jay Guittard, San Leandro, Calif. 74- Bobby Mazurek, Missoula 72-79-151; Fred Nadeau, dge 74-77-151; David Uyehara, Las Vegas, Nev. 79-72-151; Bret Hurskainen, Missoula 73-79-152; Brady Kirkeby, Helena 75-77-152; Tommy Sanderson, Sun Valley, Idaho 75-77-152; Scott Stephens, Dalton Garden, Idaho 77-75-152; Justin Gallher, Missoula 81-72-153; Bob Gray, Missoula 74-79-153; Jason Kimmell, Coeur d'Alene 77-76-153; Kurt Kueffler, Missoula 77-76-153; Jamie Perlinski, Bozeman 76-77-153; Jim VanFossen, Missoula 77-76-153; Richard Wright, Edmonton, Alberta 78-75-153; Gene Edstrom, Hamilton 71-83-154; Adam Curry, Missoula 76-78-154; Chris Gallher, Missoula 75-79-154; Vince Jimenez, College Place, Wash. 80-74-154; Mark Nord, Missoula 79-75-154; Kirk Wasson, Gillette, Wyo. 78-76-154; Jeff Nord, Missoula 79-76-155; Joel Pearl, Coeur d'Alene 73-82-155; John Beutler, Coeur d'Alene 80-76-156; Robert Ellis, Gooding, Idaho 82-74-156; Ben Focke, Coeur d'Alene 80-76-156; Mike Kasch, Kennewick, Wash. 81-75-156; Bill Mitchell, Billings 77-79-156; Sam Brown, Missoula 78-79-157; Randy Duford, Granger, Wash. 78-79-157; Gary Funston, Florence 78-80-158; Roger Klog, Missoula 76-82-158; Joe Kost, Missoula 81-78-159; John Peterson, Jerome, Idaho 81-78-159; Curtis Starkey, Douglas, Wyo. 78-81-159; Peter Tucker, Missoula 79-80-159; Bob Cummins, Missoula 82-78-160; Seth Enes, Missoula 78-82-160; Scott Newson, Gillette, Wyo. 80-80-160; Art Schilling, Hayden Lake, Idaho 81-79-160; Dan Smith, Lake Stevens, Wash. 82-78-160; Tom Lind, Missoula 81-80-161; Dustin Ainsworth, Coeur d'Alene 80-82-162; Chuck Beagle, Missoula 79-83-162; Scott Galbraith, Sunnyside, Wash. 79-83-162; Yo Shuin, Ronan 80-82-162; Larry Ursa, Missoula 82-80-162; Cory Dobak, Missoula 81-82-162; Brad Dougdale, Coeur d'Alene 76-87-163; John Kelley, Polson 83-81-164; Jon Lowry, Kalispell 82-82-164; Mike Palmer, Manson, Wash. 87-78-165; Dudley Beard, Great Falls 82-84-166; Ed Bezanson, Missoula 82-84-166; Troy Rausch, Missoula 82-84-166; Bryan Flaig, Missoula 81-86-167; Jerimee Maplethorpe, Missoula 87-80-167; Chris Nowlen, Scotts Bluff, Neb. 83-84-167; Bob Cram, Bismark, N.D. 83-85-168; Mike Spurgeon, Great Falls 83-85-168; John Gunderson, San Diego 85-84-169; Duane Larson, Missoula 86-83-169; John Rausch, Polson 77-92-169; John Weekes, Buhl, Idaho 87-82-169; Bryan Day, Missoula 91-79-170; Brian Fogarty, Missoula 83-87-170; Blaine Olson, Lolo 84-86-170; Tom Wheatley Jr., Missoula 86-48-170; Bob Anderson, Missoula 86-85-171.

Review of Cleanup at the Basin Mining Area Superfund Site

5 Year Review for the Town of Basin Mining Area.

The EPA added the Basin Mining Area to the Superfund National Priorities List on October 22, 1999, due to mining waste problems in the watershed and mining waste in the Town of Basin. The mining area includes both the Town of Basin, and the watersheds of Basin and Cataract Creek and portions of the Boulder River below the confluence with these heavily impacted streams. Contaminants of concern include antimony, cadmium, iron, mercury, thallium, lead, copper, zinc, and arsenic. The small historic mining community of Basin is the focus of this 5 Year Review. The EPA and the Montana DEQ issued a Record of Decision in March of 2001 calling for the cleanup of contaminated yard soils, and cleanup of contaminated materials at a former smelter, several tailings piles areas, streamside tailings, and a mill site. The cleanup activities were performed in 2002, 2003, and completed in 2004.

The EPA is beginning a Five Year Review of the cleanup actions taken to date at the Town of the Basin Mining Area Site. This will be the second Five Year Review for this Site.

The Review will include an evaluation of the protectiveness of remediation conducted in the Town, and will verify that the remedy is operating and functioning as designed. The Review will evaluate whether the remedial actions taken to date remain protective of human health and the environment. The Review will also include information collected during recent interviews with community members and local officials.

Anyone wishing to provide information or comments to be considered as part of this review can send them by October 31, 2012 to:

Kris Edwards
US EPA, Montana Office 10 West 15th Street, Suite 3200
Helena, Montana 59626

edwards.kristine@epa.gov
phone: (406) 457-5021
fax: (406) 457-5055

EPA expects to complete the Five Year Review by September 14, 2013.

AFFIDAVIT OF PUBLICATION
STATE OF MONTANA,
County of Lewis & Clark

Billie Jo Williams

Being duly sworn, deposes and says;

That she is the principal clerk of the Independent Record, a newspaper of general circulation published daily in the City of Helena, in the County of Lewis & Clark, State of Montana, and has charge of the advertisement therof:

That the 5 Year Review
Basin Mining Area Superfund Site

a true copy of which is hearto annexed, was published in said newspaper on the following dates: viz.:

September 9, 2012

making in all_1__ publication(s)

Billie Jo Williams

Subscribed and sworn to me this _10__ day of _September__, 2012.

Colleen D. Simkins

Notary Public for the State of Montana
Printed Name: Colleen D. Simkins
Residing at Helena, Montana
My commission expires March 10, 2013

(Notary Seal)

Review of Cleanup at the Basin Mining Area Superfund Site

5 Year Review for the Town of Basin Mining Area

The EPA added the Basin Mining Area to the Superfund National Priorities List on October 22, 1999, due to mining waste problems in the watershed and mining waste in the Town of Basin. The mining area includes both the Town of Basin, and the watersheds of Basin and Cataract Creek and portions of the Boulder River below the confluence with these heavily impacted streams. Contaminants of concern include antimony, cadmium, iron, mercury, thallium, lead, copper, zinc, and arsenic. The small historic mining community of Basin is the focus of this 5 Year Review. The EPA and the Montana DEQ issued a Record of Decision in March of 2001 calling for the cleanup of contaminated yard soils, and cleanup of contaminated materials at a former smelter, several tailings piles areas, streamside tailings, and a mill site. The cleanup activities were performed in 2002, 2003, and completed in 2004.

The EPA is beginning a Five Year Review of the cleanup actions taken to date at the Town of the Basin Mining Area Site. This will be the second Five Year Review for this Site.

The Review will include an evaluation of the protectiveness of remediation conducted in the Town, and will verify that the remedy is operating and functioning as designed. The Review will evaluate whether the remedial actions taken to date remain protective of human health and the environment. The Review will also include information collected during recent interviews with community members and local officials.

Anyone wishing to provide information or comments to be considered as part of this review can send them by October 31, 2012 to:

Kris Edwards
US EPA, Montana Office
10 West 15th Street, Suite 3200
Helena, Montana 59626

edwards.kristine@epa.gov
phone: (406) 457-5021
fax: (406) 457-5055

EPA expects to complete the Five Year Review by September 14, 2013.

Town of Basin 5 Year-Review Interview Questions

Interviewee: Megan Ballock

Date: 9/19/12 **Time:** 10:30am **Location:** Boulder City Sanitarian Office

Interviewer: Kristine Edwards

Q1. Are you aware of the history and remedial efforts concerning the Town of Basin Superfund Site? Yes

Q2. Do you have any concerns or issues with the cleanup efforts that have been conducted to date? No

Q3. Do you need any information about the Town of Basin Superfund Site 5-year review process? No.

Q4. Do you have any information that may be helpful for the 5-year review?

No

Q5. Do you know how to contact the US Environmental Protection Agency with any questions that may arise? Yes

Q6. What do you think the community wants to know? Probably not very aware. A lot of Basin is transient - properties turn over every 2-5yrs.

Q7. How do you prefer to get information about important issues? Email

Q8. Who else should we be talking to? Tammy Ulrich - principal 223-3211
Michelle Letexier - school bd.

Q9. Is there anything else you would like to add?

Discussed J.B Tlgs

225-4294 Jim ? Colbert, lives near school + also in E. Helena

Goodwins

Town of Basin 5 Year-Review Interview Questions

Interviewee: Timmon Hayes

Date: 9/19/12 **Time:** 10:35am **Location:** Boulder - Jeff City Sanitarian Office

Interviewer: Kristine Edwards

Q1. Are you aware of the history and remedial efforts concerning the Town of Basin Superfund Site? yes

Q2. Do you have any concerns or issues with the cleanup efforts that have been conducted to date? No

Q3. Do you need any information about the Town of Basin Superfund Site 5-year review process? No

Q4. Do you have any information that may be helpful for the 5-year review?

No

Q5. Do you know how to contact the US Environmental Protection Agency with any questions that may arise? yes

Q6. What do you think the community wants to know? If kids could be tested. If water could be tested.

Q7. How do you prefer to get information about important issues? Email

Q8. Who else should we be talking to?

Q9. Is there anything else you would like to add?

Leonard Wortman City Com. * Leave fact sheets
Chris Bullock - NRT Tunnels
Mill supervisor

Town of Basin 5 Year-Review Interview Questions

Interviewee: Dave Kirsch

Date: 10/24/12 **Time:** 10:00 am **Location:** Boulder City Commission Bldg

Interviewer: Kristine Edwards, Dirk Sloan

Q1. Are you aware of the history and remedial efforts concerning the Town of Basin Superfund Site? Yes

Q2. Do you have any concerns or issues with the cleanup efforts that have been conducted to date? Merry Widow Mine - used to have a tailings pond there - which flooded + they breached the tailings impoundment. Mary Hagadone wrote a book on this

Q3. Do you need any information about the Town of Basin Superfund Site 5-year review process? NO

Q4. Do you have any information that may be helpful for the 5-year review? ie, any land use changes for properties in Basin? No
They put in a bridge over Basin Creek.

Q5. Do you know how to contact the US Environmental Protection Agency with any questions that may arise? Yes

Q6. What do you think the community wants to know? Nothing really

Q7. How do you prefer to get information about important issues? Newspaper Boulder Monitor

Q8. Who else should we be talking to? Jim Colbert

Q9. Is there anything else you would like to add? ∅

Ask about Deed notice for properties or waste left in place, County authority? Bonnie Ramey Clerk & Recorder
cc: Megan

Ask about mill site area at end of town. Jib Mill - who owns it? Doesn't know

✓ to see if his property

calbeaver@msn.com

Town of Basin 5 Year-Review Interview Questions

calbeaver@msn.com

Interviewee: Jim Calbert On water board, works w Commissioners

Date: 10/24/12 **Time:** 11:15 am **Location:** Basin - 42 Quartz

Interviewer: Kristine Edwards / Dick Sloan

Q1. Are you aware of the history and remedial efforts concerning the Town of Basin Superfund Site? Yes

Q2. Do you have any concerns or issues with the cleanup efforts that have been conducted to date? No

All the fill mat'l in Town came from the Crystal.

Q3. Do you need any information about the Town of Basin Superfund Site 5-year review process? No

Q4. Do you have any information that may be helpful for the 5-year review?

No, nothing negative.

Q5. Do you know how to contact the US Environmental Protection Agency with any questions that may arise? Yes

Q6. What do you think the community wants to know? Nothing really
No concerns

Q7. How do you prefer to get information about important issues? Hard copy, email/ letter Boulder Monitor Helena IR

Q8. Who else should we be talking to? ∅

Q9. Is there anything else you would like to add? ∅

Has a couple of spots w tailings - Jim covered it over & now cabin is built on one of them + stream bank removed.

Town of Basin 5 Year-Review Interview Questions

Interviewee: Tammy Ulrich shyshooter1@hotmail.com

Date: 10/24/12 **Time:** 12:00 noon **Location:** Basin School

Interviewer: Kristine Edwards / Dick Sloan

K-6 & preschool

Q1. Are you aware of the history and remedial efforts concerning the Town of Basin Superfund Site? yes - she was here during remedy. Removed part of playground.

Q2. Do you have any concerns or issues with the cleanup efforts that have been conducted to date? No.

Q3. Do you need any information about the Town of Basin Superfund Site 5-year review process? No

Q4. Do you have any information that may be helpful for the 5-year review? No

Q5. Do you know how to contact the US Environmental Protection Agency with any questions that may arise? yes

Q6. What do you think the community wants to know? No

Q7. How do you prefer to get information about important issues? any -

Q8. Who else should we be talking to? Ø

Q9. Is there anything else you would like to add? No concerns.

Appendix F
ARARs Evaluation

From: Haque-Hausrath, Katherine
Sent: Friday, November 30, 2012 4:24 PM
To: Sloan, Richard
Cc: Scusa, Larry
Subject: Basin OU1 ARARs Analysis for 2012 Five-Year Review

The State has reviewed the State of Montana applicable or relevant and appropriate requirements (ARARs) for the Basin Operable Unit 1 2001 Record of Decision. Since the 2008 Five-Year Review, various citations and references have changed. There have been updates to the general stormwater permits: the General Permit for Storm Water Associated with Construction Activity, MTR 10000, will be updated as of January 1, 2013; and the General Discharge Permit for Storm Water Associated with Mining and Oil and Gas Activities, MTR 300000, is updated as of January 1, 2008.

Also, the following substantive changes to the ARARs have occurred:

1) Surface water standards in the Circular DEQ-7 Montana Numeric Water Quality Standards (October 2012) (DEQ-7) have changed:
    a. The antimony DEQ-7 surface water standard is now 5.6 micrograms per liter (ug/L);
    b. As noted previously, the arsenic DEQ-7 surface water standard is 10 ug/L;
    c. The cadmium DEQ-7 surface water standard at 100 milligrams per liter (mg/L) hardness is .271 ug/L;
    d. The iron standard of 1,000 ug/L is now a binding DEQ-7 surface water standard; and
    e. The thallium surface water standard is now .24 ug/L;

However, the ROD states: "[surface water and sediment], along with instream tailings, will be evaluated during the RI for the Basin Watershed OU2 and will be addressed in the FS and the Proposed Plan for OU2…. Any recontamination of the streamside areas in OU1 which result from releases in OU2 will be remediated in the OU2 action." Therefore, the changes in the DEQ-7 standards for surface water will be addressed through the remedy for OU2.

The State therefore concludes that the changes to the DEQ-7 standards for surface water do not affect the protectiveness of the remedy.

Please let me know if you have any questions.

Regards,

Katherine Haque-Hausrath
Legal Counsel
Montana Department of Environmental Quality 1100 N. Last Chance Gulch P.O. Box 200901 Helena, MT 59620-0901
Phone: 406-841-5019
Fax: 406-841-5050
E-mail: khaquehausrath@mt.gov