

GENERAL SITE INFORMATION, CHARACTERISTICS, AND STATUS

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|---|--|-------------------------|
| Project Name | <u>SILVER BOW CREEK</u> | ProjectID: 08-01 |
| Last Updated: | 02/07/04 | |
| City: | Butte | |
| County: | Silver Bow and Deer Lodge | |
| State: | MT | |
| Country: | USA | |
| Bodies of Water: | Silver Bow Creek; Clark Fork River | |
| US EPA Region: | VIII | |
| Status (Active, Complete, or Monitoring Only): | Active | |
| Date On NPL: | 1983 | |
| ROD/ESD Date: | 1995; 1998 (ESD) | |
| Operable Unit: | Streamside Tailings OU | |
| Areas of Concern (length or acres): | 24 miles of Silver Bow Creek and adjacent floodplains. | |
| Other Characteristics of Water Body: | Silver Bow Creek is the main drainage within the area covered by this operable unit (called the Streamside Tailings Operable Unit) and is the headwaters of the Clark Fork River. Average flow for Silver Bow Creek is 73 cfs. | |
| Contaminants of Concern: | Metals (arsenic, cadmium, copper, lead, mercury, zinc) | |
| Source of Contamination: | Tailings and other mining wastes have been disposed near or into Silver Bow Creek since the late 1800s, first from silver mills up until 1893, and subsequently from copper mining and smelting. Tailings are defined as "sand to silt-sized by-product of ore milling operations." The copper mines and smelters were mostly owned or controlled by Anaconda Copper Mining Company (AMC). In 1977, the assets of AMC were purchased by the Atlantic Richfield Company (ARCO). ARCO is the sole PRP. Active mining and smelting has ceased in the area. | |
| Contaminated Area Physical Characteristics: | <p>There are five primary sources of contamination to Silver Bow Creek, namely, 1) upstream sources, 2) tailings and metals-impacted soils, 3) contaminated groundwater, 4) instream contaminated sediments, and 5) railroad embankments (which were constructed with waste mining materials).</p> <p>The Silver Bow Creek Site is 24 stream miles in length, and is divided into four sub-areas consisting of 12 stream reaches. The stream drops 524 feet in elevation over the 24 miles. The four subareas are distinguished by different geographical and physical characteristics, e.g., Subarea 3 is a canyon setting with a narrow floodplain between railroad embankments and no improved roads while Subarea 4 has a wide floodplain with numerous overflow channels.</p> <p>Median streamside tailings/soil concentrations reported in the ROD for the most prominent metals are arsenic (215-563 ppm), copper (739-2,710 ppm), lead (316-1,510 ppm), and zinc (1,445-5,400 ppm). Mean instream sediment concentrations are arsenic (92 ppm in the sand fraction, 378 ppm in the clay/silt fraction); copper (694 ppm in the sand fraction, 10,460 ppm in the clay/silt fraction), and lead (225 ppm in the sand fraction, 6,700 ppm in the clay/silt fraction). Subsequently, data collected from Subarea 1 by the PRP in 1996 and by Montana DEQ in 1998 failed to corroborate the correlation of metals contamination with grain size. Further, the DEQ data suggested that metals concentrations in sediments decreased markedly below three feet. Metals concentrations from four instream borings in Subarea 1 were used to substantiate this finding, however, the results, presented in the ESD, exhibit only low levels of arsenic (< 36 ppm) throughout all four borings.</p> | |

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Type of Regulatory Action: Superfund. Final.

Overall Status Summary: The Silver Bow Creek Site in Montana was listed on the NPL in 1983 and is one of four Superfund sites known as the Clark Fork River Basin sites; the Basin is one of the largest geographic areas in the nation being addressed under Superfund. Contaminants of concern are arsenic, cadmium, copper, lead, mercury, and zinc. The 1995 ROD specified a large mass removal project requiring soil excavation and dry excavation for removal of 1,550,000 cy of metals-contaminated tailing/soils from the 100-year floodplain and removal of about 1,450,000 cy of in-stream sediment. Disposal would be in local repositories constructed outside the 100-year floodplain.

The 1995 ROD remedy "broke-down" once additional data collection and remedial design efforts were implemented by the PRP (ARCO). ARCO stopped work in April 1997 over conflicts regarding cleanup issues. The agency picked-up the work and used the new data and issues to justify and expand an already huge mass removal effort. This resulted in the agency issuing an ESD in 1998 to explain a 50% increase in targeted floodplain volumes, a doubling of the construction period (from 4 - 6 years to 12 years), a more than doubling of the estimated cost, a redefinition of the sediment target, and substantial changes to the approach for rehabilitating remediated stream and floodplain areas and for constructing secure waste disposal repositories (cells).

The 1998 ESD defined remedy anticipates removal of 2,325,000 cy of metals-contaminated tailings/soils in the 100-year floodplain along 24 miles of Silver Bow Creek and disposal in new, local repositories (cells); in-situ lime-stabilization of an additional 1,425,000 cy of these materials; and removal or burial of an indeterminate volume of contaminated instream sediments along with re-routing or re-building stream channels and re-building impacted stream banks.

An Agreement-In-Principal was reached with ARCO in June 1998 and a Consent Decree was finalized with ARCO in April 1999. As part of these agreements, ARCO will not get re-involved in design and remediation efforts (i.e., a "buy-out" has been negotiated) – the State has assumed responsibility for these activities.

Litigation has continued for several years regarding natural resource damages (NRD) associated with the four Superfund sites in the Clark Fork River Basin. ARCO is PRP at all four. In 1993, the State of Montana, as the trustee, brought suit against ARCO, claiming NRD costs of \$800 million. The suit was divided into five phases and went to trial in March 1997 for three of the phases: (1) liability for injuries to fish and surface water; (2) groundwater; and (3) wildlife, vegetation, and soil. The remaining two phases, monetary compensation for restoration costs and for lost use of resources, were not tried because they were covered by the trial settlement. The trial settlement, \$215 million, was reached with ARCO following about a year of litigation and resolved most outstanding NRD issues. The settlement required ARCO: (1) to pay \$118 million for the NRD portion of the settlement for the restoration of lost or damaged resources in the Clark Fork Basin; (2) to pay \$80 million for the clean up portion of the settlement in the Silver Bow area south of Butte; (3) to pay \$15 million to reimburse the State for its damage assessment and litigation costs through January 1, 1998; and (4) to transfer property owned by ARCO and valued at \$2 million in the Consent Decree to the State of Montana.

After the agencies finalized the design and permitting requirements for remediation of Subarea 1, field work for the first one and one-quarter mile segment (Reach A) was targeted to begin in 1999. Concurrently, remedial design for the remaining 4.2 miles of Subarea 1 was ongoing. Subarea 1 Reach A was to be completed first, followed by Reach B (targeted for Summer-Fall 2000), and then Reaches C, D, and E (targeted for 2001)

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Preparation activities for implementation of the Subarea 1 Reach A remedy began in Fall 1999 with construction of roadways and access points. The Reach A remedy required that the first 800 ft. of streambed be diverted by building a sump area and pumping the water to a rock-lined ditch located outside the floodplain area; diversion of the remaining streambed would be directly to the diversion ditch. Streambed and floodplain excavation depths were to range between two and seven feet, with over-excavation of six inches to meet the targeted order-of-magnitude reductions in contamination levels.

Prior to excavation, floodplain soil would be dewatered in-situ using a series of trenches dug in the floodplain material and the collected water would be pumped from the trenches to the diversion ditch. Materials excavated from Reach A would be deposited in an area known as the Mine Waste Relocation Repository located adjacent to the Reach A floodplain. Following excavation, the streambed channel and floodplain would be restored and revegetated. The diversion of stream flow was anticipated to continue one or more years following restoration to allow full establishment of vegetative cover.

The following summarizes remediation performed in 1999, 2000, and 2001, and part of 2002:

Years 1999 and 2000:

- The creek flow in Reach A was diverted to a temporary channel outside the floodplain; the diversion will be maintained at least through 2001 (and possibly longer) to allow reestablishment of vegetation in the areas remediated. In Reach A, the creek is 13-15 feet wide with a nominal 30 cfs flow rate.
- Removal in Reach A plus two areas extending into Reach B (Mile 2) started and was completed in Year 2000 and resulted in removal of about 167,000 cy of creek bed sediment and floodplain soils from approximately 36.6 acres. Cost was \$3.254 million.
- Removed material was deposited in an adjacent, prepared repository known as the Mine Waste Relocation Repository where it was mixed with powdered lime for stabilization.
- No breakdown is available of volumes of sediment vs. floodplain soils removed, but a large majority of the removal is being performed in the floodplain.
- Verification sampling of surface soils (0-4 inch grabs) was performed on a 150-foot grid to verify meeting an Order-of-Magnitude reduction acceptance criteria. The criteria for acceptance specifies that 90% of the area remediated must result in an order-of-magnitude reduction for four to six of the six targeted elements (arsenic, cadmium, copper, lead, mercury, and zinc) at a 95% or greater confidence interval. Reportedly, of the 92 verification samples collected within Reach A, 60 of the samples, or 65.2%, met the acceptance criteria. This was greater than the expected rate of acceptance of 62.9%. For Year 2001, the overcut was increased from six inches to nine inches to reduce the likelihood of not meeting the criteria. (Per the ESD, this will result in the removal of an additional 60,000 cy of material.)
- The contractor was local – Jordan Contracting. (Construction work is re-bid each year.)
- In addition to sediment removal, the contractor built a new bridge due to undermining of existing bridge supports during the remediation. The bridge was completed in late December 2000.

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- At peak periods, approximately 60 individuals were working in the field on the project.
- Revegetation of Reach A was completed in Spring 2001.
- A completion report is to be written for each creek segment as it is completed (anticipated to be annually). The completion report for Reach A is complete and available (Reference A-608).

Year 2001:

- Montana DEQ returned to Silver Bow Creek in April 2001 to remediate the remaining areas of Reach B (Mile 2) and all of Reach C (Mile 3).
- Montana DEQ required that creek diversion only need occur during active remediation and not for the entire period necessary for complete vegetation recovery as was required for Reach A. This method of stream diversion is to be evaluated following Year 2001 remediation to determine its applicability to other reaches.
- Removed creek sediment and floodplain soils were disposed of in Opportunity Ponds (which cover 5 sq. miles) located near Opportunity, Montana at the farthest downstream location of the 24-mile target area. The removed material was shipped by rail to the ponds and did not require stabilization for either shipping or disposal purposes. Reportedly, a rail spur extends from the main rail line directly to one of the ponds. For Reaches B and C, three loading areas spaced intermittently along the length of the removal area were built and one unloading area near the ponds existed and was available for use by the contractor. The contractor determined the method of loading and unloading of the rail cars (long-reach excavators).
- By the end of the 2001 construction season, Reaches B and C were about 75% complete. About 300,000 cy of creek and floodplain soil were removed and deposited in Opportunity Ponds.

Year 2002 (as of June 11, 2002):

- Diversion of stream flow to the rock-lined ditch was abandoned and instead flow is being temporarily diverted by rechannelizing the streambed around areas of contamination. Following removal of contaminated material, stream flow is redirected back to the original channel.
- Reaches B and C are estimated to be about 85% complete (~350,000 cy of material having been removed)
- The contractor is able to load about 48 gondola railcars per day for transport of excavated material to Opportunity Ponds for disposal. The Silver Bow Creek project is the sole customer for the existing commercial rail line that runs along the creek.
- A field crew of approximately 25-30 individuals is working on the project at any given time. The contractor is working 10-hour days, 5-6 days per week.
- Heavy spring rains in 2002 have hampered progress to-date.

After 3.5 years of removal activities, approximately 517,000 cy of streambed sediments and floodplain soils along Miles 1, 2, and 3 had been removed and disposed locally.

As of the end of 2003, project status was as follows:

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- Volume removed and disposed in 2002 and 2003 was approximately 320,000 cy.
- From the start of remediation in Fall 1999 to the end of 2003, 5.25 miles of stream and floodplain have been remediated, plus an additional 70 acres of floodplain in Subarea 4 in the western extent of the operable unit.
- Removed material has been disposed in the former tailings impoundments of the Anaconda Copper Mining Co. at Opportunity, MT.
- Work in Subarea 1 is complete. Work in Subareas 2 and 4 will take place in 2004. Work in Subarea 3 will start after Subarea 2 is completed.

Remedial Action Planned: ☒

Risk Assessment: ☒

Remedial Action Implemented: ☐

Status of Dredging ☐

PRPs: ☒

Contacts: ☒

References: ☒

Modeling: ☐

Fishing Advisory: ☐

Key Conditions: capping, confined disposal facility, extended (> 1 mile) river, floodplains targeted, habitat/streambank restoration, pilot/demonstration test, post monitoring, property access issues, rail transport for disposal

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Target Sediment Cleanup Standards (TSCS):

No numerical cleanup levels. Refer to "How TSCS Established"

How TSCS Established:

In the ESD, the instream sediment removal criteria was changed, based on analysis of samples collected by ARCO in 1996 which exhibited no significant correlation between metals contamination and either the type of the depositional feature (e.g., channel bar, side bar, point bar) or the grain size distribution of the material. Further, the agency, using a limited data set of questionable specificity, concluded that metals contamination levels of concern were not present at depth in sediments. As a result, the agency revised the criteria for remediating instream sediments in the following opportunistic and unscientific fashion as follows:

1. " Due to the (newly-identified approach for) relocation of the stream channel in portions of the operable unit, much of the existing stream channel will be abandoned. In reaches where the old channel is to be abandoned, the existing contaminated sediments within the old channel will be treated as all other floodplain tailings/impacted soils. If these materials are identified as tailings/impacted soils under the order-of-magnitude removal criteria, then they will have to be excavated and placed into repositories. In general, in Subarea 1 these materials meet the requirements for being below the order-of magnitude decrease in contaminant concentrations and will not be removed as tailings/impacted soils, but will remain in place. As part of the reconstructed floodplain, they will no longer be in direct contact with Silver Bow Creek surface water and will not impact the aquatic environment."

2. "In areas where the existing stream channel will be reconstructed in the same location, the direct contact of the surface water and the aquatic receptors with the stream bed materials necessitates that the contaminated stream sediments be removed. Existing instream sediments will be excavated to a minimum depth of one foot and placed in a repository. The new channel bed will be constructed with clean fill material. If channel construction requires additional excavation to meet new channel grade requirements, excavated material from deeper depths that is determined to have metals concentrations below the order-of-magnitude removal criterion will not be placed in a repository, but rather will be used for floodplain backfill. In Subarea 1, all materials to be excavated at depth to meet channel grade requirements are below the order-of-magnitude criterion and will be used for general backfill."

"The agencies adopt this new criteria to replace the instream sediments removal criteria defined in the ROD. The new criteria provide an acceptable approach addressing contaminated instream sediments that is cost-effective and consistent with other elements of the OU remedial design. It particularly complements the stream gradient and alignment changes identified in this ESD. The agencies have determined that the revised criteria are more protective than the prior ROD criteria because (1) the new criteria address the entire Silver Bow Creek channel in the OU, rather than just depositional areas, (2) the original criteria were found not to define adequately those contaminated sediments requiring removal, and (3) the stream bed of the new Silver Bow Creek channel will be constructed of clean, imported materials and the stream will be more stable geomorphically, reducing potential reentrainment of and exposure to contaminated materials in the stream"

Target Bank and Floodplain Cleanup Levels (if applicable):

Refer to "Stated Remedial Action Objectives (and Source)"

Other Target:

Environmental Sample Data

References:

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| <ul style="list-style-type: none">• Sediment:• Water:• Fish: | | |
| Estimated Target Volume: | Removal volume of sediments undefined; 3,750,000 cy of tailings/soils targeted in floodplains; 2,325,000 cy to be removed, lime-stabilized, and placed in local repositories; 1,425,000 cy to be lime-stabilized in-situ. | |
| Planned Disposal Method: | New, local repositories (cells) with two-foot thick soil cover and arsenic attenuating material in the base. | |
| Estimated Calendar Time to Implement Remedy: | 1999 - 2010 | |
| Estimated Time to Implement Remedy: | 12 years | |
| Estimated Cost to Implement Remedy: | \$76 million (present worth); \$98 million capital. | |
| Stated Remedial Action Objectives (and Source): | <p>1995 ROD (pages 99, 104, and 105)</p> <p>The RAOs are lengthy and cover three different media. Most of the text is quoted since it's important in understanding the remedy and includes some interesting statements and approaches.</p> <p>"The final remedial action objective and final remediation standards for surface water are:</p> <p>a. Meet the more restrictive of the aquatic life or human health standards for surface water identified in Montana DEQ Circular WQB-7, through application of I-classification requirements."</p> <p>b. "Prevent exposure of humans and aquatic species to instream sediments having concentrations of inorganic contamination in excess of risk-based standards. A physical criterion is used to define those sediments posing the greatest risk to receptor species. A contingency is established to develop metal-specific concentrations which would be risk-based, and allow sediment cleanup standards if the physical criterion standard cannot be employed appropriately."</p> <p>c. "Provided that upstream sources of Silver Bow Creek contaminants are eliminated, meeting the two remediation standards identified above should attain the remedial action objective to improve the quality of Silver Bow Creek's surface water and instream sediments to the point that Silver Bow Creek could support the growth and propagation of fishes and associated aquatic life, one of the designated goals for an I-class stream, including a self-sustaining population of trout species."</p> <p>"Within a reasonable time frame after implementation of the selected remedy, and contingent upon adequate cleanup of upstream sources, ambient surface water quality standards, ultimately including the WQB-7 standards described above, must be attained at all points in Silver Bow Creek within the OU."</p> <p>"No metal concentration cleanup goal is established for instream sediments by this action. Cleanup performance standards are based on physical size criteria applied to all depositional</p> | |

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areas. Specific standards may be identified in any implementing order, and the specific locations requiring instream sediment excavation will be determined prior to or during remedial design, based on more precise sampling and mapping of instream sediment grain size and depositional areas."

"The specific performance standards for instream sediments will be removal of the sand sized fraction and less ($< \text{ or } = 1 \text{ mm}$) from all depositional stream locations, regardless of size, as delineated by Montana DEQ and the EPA. The objective of this standard is to remove the majority of tailings (which also range in size from $< \text{ or } = 1 \text{ mm}$ and less) from the stream, which constitute the bulk of the instream sediment contamination. The objectives for instream sediment remedial actions is two fold, (1) remove all tailings and the majority of the contaminant load from the streambed and (2) prevent exposure of aquatic species to instream sediments having concentrations of contaminants in excess of published (in peer reviewed journals) risk-based concentrations. The ultimate goal is to improve Silver Bow Creek over time to a condition that supports a self-reproducing fishery for trout species."

"The final remedial action objectives and final remediation standards for tailings/impacted soils are:

- a. Prevent human exposure to tailings/impacted soils from residential or occupational activity. This will be accomplished, in part, through institutional controls that will require the entire OU to be developed into a recreational corridor."
- b. "Prevent erosion or migration of inorganic contaminants of concern in tailings/impacted soils into Silver Bow Creek or into groundwater that would prevent attainment of groundwater, surface water, and sediment remediation levels."
- c. "Protect all solid waste within the OU from flood displacement, washout, or erosion in accordance with ARARs."
- d. "Prevent the saturation of tailings/impacted soils by groundwater during any period of the hydrologic year or by bank storage of high-flow stream discharge."
- e. "Prevent migration of contaminants of concern in tailings/impacted soils that would cause phytotoxicity in terrestrial vegetation."

"Because the remediation of tailings/impacted soils is based primarily upon the need to reduce risks to environmental receptors and because adopted soil cleanup levels to address the contaminants of concern are not available, no chemical action level is defined for tailings/impacted soils. Instead, an "order of magnitude definition" as defined in the Draft RI report (ARCO, 1994a) of contaminated tailings/impacted soils is utilized to identify those soils requiring remediation. (Note: This refers to the difficulty in determining the base or depth of the tailings, since no abrupt, step-like change in chemical or physical parameters could be identified. Instead, the target depth for remediation was identified as the depth at which the surface metal concentration decreased by a factor of ten, i.e., an order of magnitude.) This methodology is expected to provide for an easily defined performance standard for field implementation, while also yielding a degree of cleanup of tailings/impacted soils that will provide adequate protectiveness for receptor species without setting specific chemical action levels. Specific locations and depths of excavation or in-situ treatment of tailings/impacted soils to be required will be defined during remedial design."

"Numerous (possibly hundreds) additional borings will be required to ascertain the base of

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| | tailings for the purposes of: (1) determining the concentration with depth, (2) determining if the tailings/impacted soils are saturated by groundwater, and (3) how much and what tailings will be removed or treated in-situ." | |
| Measures of Success to be Used: | Refer to "Stated Remedial Action Objectives (and Source)" | |
| Planned Monitoring and Restoration: | Refer to "Stated Remedial Action Objectives (and Source)" and "Agency Position on Sediment Removal (and Source)" | |
| Agency Position on Sediment Removal (and Source): | <p>Several of the ESD changes provide insight into the approach and constraints for sediment removal. Specifically:</p> <ul style="list-style-type: none">• Stipulating in much greater detail the criteria for reconstructing the remediated stream bed and stream banks to provide a geomorphically (i.e., topographically) stable system. The 1995 ROD required that reconstructed stream beds be designed as a geomorphically stable, naturally meandering alluvial system to the degree possible. A 1998 consultant's report provided to the agencies criteria for stream channel design which included (1) changes in elevation to "eliminate the more severe aggradational and degradational reaches;" (2) changes in lateral position of the stream "in order to provide appropriate sediment transport capacity or to protect infrastructure;" and (3) decreases in the elevation of the channel bed with attendant decrease in floodplain elevation and reduced requirement for floodplain clean fill.• Utilizing temporary or permanent diversions of the stream channel during and after construction to allow for instream and near-stream excavation and backfill work in the dry. The temporary diversion channel or piping may remain for a period after completion of remediation and reconstruction of the stream bed and floodplain to allow durable, erosion resistant vegetation time to establish itself. (In Montana, more than one growing season can be required.) The ESD states: "Decisions on the use and design of diversions for each stream reach will be based on design and construction needs for that particular reach. Stream diversion will not be appropriate for all reaches. For example, in some reaches the floodplain is too narrow to accommodate a diversion. The need for the diversion to accommodate construction work or revegetation, the design flow rate for the diversions, the sizing of riprap or other erosion-resistant material, the location and configuration of the channel, the duration of the use of the diversion, and other key design elements will be decided on a reach-specific basis."• Addition of sedimentation basins outside the bounds of the 24-mile stretch, to intercept runoff from major source areas outside this operable unit. Locations for seven sedimentation basins have been identified for Subarea 1 alone.• Eliminating "treatment-type wetlands" as the end use for Subarea 1, due to uncertainties regarding design and need. No specific end use is defined in the ESD.• Increasing the construction time for the remedy from 4-6 years to 12 years, primarily to avoid the risk of having large reaches of reconstructed stream bank and floodplain exposed at any one time to potential erosion during high flow conditions. A maximum of two miles will be exposed with no vegetation in any one year. Additional reasons include:<ul style="list-style-type: none">- "to allow stream sediment and water treatment controls to be placed into service before implementing the remedy on Silver Bow Creek to minimize the risk of recontamination from upstream sources;" | |

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- "to evaluate the stability of the new stream banks in the upper reaches of Silver Bow Creek in response to high flow conditions and implement design modifications and improvements as appropriate in the lower reaches later in the project;"
- "to break the construction work into more easily managed units of two to three miles of stream at a time to improve quality control rather than attempt to have very large major construction projects over a short period; and"
- "to reduce the impact of construction on local communities by reducing the size of the construction operation at any one time."

RISK ASSESSMENT

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RA Type: Human Health and Ecological

RA Status: Complete

RA Objectives:

Company

Performing RA:

RA Reference Report:

RA Summary and Conclusions: The Human Health Risk Assessment evaluated exposure to three types of receptors: residents, workers, and recreationists. For future residents, the primary carcinogenic risk comes entirely from arsenic in soil and groundwater (combined 5.6×10^{-4}). An HI of 23 for non-carcinogenic risk is also calculated. For workers, both carcinogenic and non-carcinogenic risks are within the acceptable range. For recreationists, carcinogenic risks outside the acceptable range are calculated due to arsenic in railroad beds; also an HI ranging from 9-20 is calculated for "small children recreationists." No unacceptable human health risk is identified for instream sediments.

An Ecological Risk assessment was conducted, reportedly less quantitative than the human health risk assessment. The results, as stated in the ROD, are that "In Silver Bow Creek, which is devoid of fish and most other aquatic life forms, the presence of mine waste contamination is the primary factor limiting the health of the aquatic environment. These contaminants affect both the water quality and instream sediments in Silver Bow Creek and create a toxic environment for fish and most benthic macroinvertebrates. Other physical conditions which may adversely affect the health of Silver Bow Creek include siltation of the stream bottom, channelization and disturbance of adjacent land and streamside (riparian) habitat."

POTENTIALLY RESPONSIBLE PARTIES

Project Name **SILVER BOW CREEK**

ProjectID: 08-01

PRP Name: PRP INFORMATION NOT RELEASED

PRPID:

Street Address:

City:

State:

KEY CONTACTS

Project Name **SILVER BOW CREEK**

ProjectID: 08-01

Last Name: KEY CONTACT INFORMATION NOT RELEASED

Contact ID:

First Name:

Title:

Company:

Address:

City:

State:

Postal Code:

Work Phone # :

Other Phone #:

Fax # :

Email Address:

REFERENCES

Project Name SILVER BOW CREEK

ProjectID: 08-01

Reference Type: A

ReferenceID: 141

Title: *EPA Superfund Record of Decision: Silver Bow Creek, MT
(EPA/ROD/R08-90/030)*

Location: AEM

Category: ROD/Proposed Plan/Action Memo/Decision Document

Prepared by/Author: US EPA HQ

**Preparer/Author
Address:** 401 M Street, S.W.
Washington, DC 20460

Prepared For: General Public

Date Published: September 1990

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 360

Title: *Record of Decision: Silver Bow Creek/Butte Area - Streamside
Tailings Operable Unit (original portion)*

Location: AEM

Category: ROD/Proposed Plan/Action Memo/Decision Document

Prepared by/Author: (1) Montana Department of Environmental Quality (Lead Agency)
(2) US EPA Region VIII (Support Agency)

**Preparer/Author
Address:** (1) Environmental Remediation Division
2209 Phoenix Ave
Helena, MT 59602-0901
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Federal Building
301 South Park, Drawer 10096
Helena, MT 59626-0096

Prepared For: General Public

Date Published: November 1995

**Key Words and
Phrases:**

REFERENCES

Project Name SILVER BOW CREEK

ProjectID: 08-01

Reference Type: A

ReferenceID: 361

Title: *Explanation of Significant Differences: Streamside Tailings Operable Unit, Silver Bow Creek/Butte Area (original portion)*

Location: AEM

Category: ROD/Proposed Plan/Action Memo/Decision Document

Prepared by/Author: (1) Montana Department of Environmental Quality (Lead Agency)
(2) US EPA Region VIII (Support Agency)

Preparer/Author Address: (1) Environmental Remediation Division
2209 Phoenix Ave
Helena, MT 59602-0901
(2) Region VIII Montana Operations
301 South Park, Drawer 10096
Helena, MT 59626-0096

Prepared For: General Public

Date Published: August 1998

Key Words and Phrases:

Reference Type: A

ReferenceID: 558

Title: *Superfund Record of Decision: Silver Bow Creek/Butte Area, MT (EPA/ROD/R08-92/059)*

Location: AEM

Category: ROD/Proposed Plan/Action Memo/Decision Document

Prepared by/Author: US EPA HQ

Preparer/Author Address: Office of Emergency and Remedial Response

Prepared For: General Public

Date Published: June 1992

Key Words and Phrases:

REFERENCES

Project Name SILVER BOW CREEK

ProjectID: 08-01

Reference Type: A

ReferenceID: 559

Title: *EPA Superfund Explanation of Significant Difference for the Record of Decision: Silver Bow Creek/Butte Area, (Warm Springs Ponds O.U.), Silver Bow/Deer Lodge, MT 6/24/91 (EPA/ESD/R08-91/091)*

Location: AEM

Category: ROD/Proposed Plan/Action Memo/Decision Document

Prepared by/Author: US EPA HQ

Preparer/Author Address: Office of Emergency and Remedial Response

Prepared For: General Public

Date Published: March 1995

Key Words and Phrases:

Reference Type: A

ReferenceID: 608

Title: *Final Construction Report - - Streamside Tailings Operable Unit - - Silver Bow Creek/Butte Area NPL Site - - Subarea 1, Reach A Remedial Action*

Location: AEM

Category: Close-Out Report

Prepared by/Author: Maxim Technologies, Inc.

Preparer/Author Address: P.O. Box 4699
Helena, MT 59604

Prepared For: Montana DEQ (Mine Waste Cleanup Bureau) and US EPA Region VIII

Date Published: April 2001

Key Words and Phrases:

REFERENCES

Project Name SILVER BOW CREEK

ProjectID: 08-01

Reference Type: A

ReferenceID: 638

Title: *Streamside Tailings Operable Unit and Federal and Tribal
Natural Resource Damages Consent Decree
(No. CV-89-039-BU-PGH and No. CV-83-317-H-PGH)*

Location: AEM

Category: ROD/Proposed Plan/Action Memo/Decision Document

Prepared by/Author: United States District Court for the District of Montana

**Preparer/Author
Address:**

Prepared For: Atlantic Richfield Company

Date Published: April 19, 1999

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 639

Title: *Anaconda Smelter Site, the Milltown Reservoir Sediment Site, and
the Original Portion of Silver Bow Creek/Butte Area Site Consent
Decree
(No. CV-89-039-BU-PGH-002)*

Location: AEM

Category: ROD/Proposed Plan/Action Memo/Decision Document

Prepared by/Author: United States District Court for the District of Montana

**Preparer/Author
Address:**

Prepared For: Atlantic Richfield Company and Cleveland Wrecking Company, Inc.

Date Published: January 13, 1997

**Key Words and
Phrases:**

REFERENCES

Project Name **SILVER BOW CREEK**

ProjectID: 08-01

Reference Type: A

ReferenceID: 1042

Title: ***Remediation and Restoration of Silver Bow Creek: A Superfund Success Story***

Location: AEM

Category: Site Update

Prepared by/Author: Unknown

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: 2003 Spring

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 347

Title: ***Silver Bow Creek/Butte Area Fact Sheet***

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region VIII

**Preparer/Author
Address:** <http://www.epa.gov/unix0008/html/r80822.htm>

Prepared For: General Public

Date Published: April 1998

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 520

Title: ***Clark Fork Basin***

Location: AEM

Category: Site Update

Prepared by/Author: Susan Pastor

**Preparer/Author
Address:** US EPA Region V
77 West Jackson Blvd.
Chicago, IL 60604

Prepared For: Fox River Current

Date Published: May / June 2001

**Key Words and
Phrases:**

REFERENCES

Project Name **SILVER BOW CREEK**

ProjectID: 08-01

Reference Type: B
Title: *e-mail re: Silver Bow*
Location: AEM
Category: Site Update
Prepared by/Author: Joel Chavez
Preparer/Author Address: Montana DEQ
Prepared For: AEM, Inc.
Date Published: February 6, 2004
Key Words and Phrases:

ReferenceID: 1036

Reference Type: C
Title: *Silver Bow offers \$24M-\$46M in excavation*
Location: AEM
Category: Site Update
Prepared by/Author:
Preparer/Author Address:
Prepared For: Superfund Week
Date Published: November 21, 1997
Key Words and Phrases:

ReferenceID: 10

Reference Type: C
Title: *Silver Bow Creek gets pilot*
Location: AEM
Category: Site Update
Prepared by/Author:
Preparer/Author Address:
Prepared For: Superfund Week
Date Published: November 7, 1998
Key Words and Phrases:

ReferenceID: 12

REFERENCES

Project Name **SILVER BOW CREEK**

ProjectID: 08-01

Reference Type: C

ReferenceID: 104

Title: *Silver Bow Creek removal starts*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Superfund Week

Date Published: May 15, 1992

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 522

Title: *EPA, Montana Will Bid Part of \$80M Silver Bow Creek Mine
Tailings RA*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Superfund Week

Date Published: June 4, 1999

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 567

Title: *Silver Bow/Butte pilot tests near*

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Superfund Week

Date Published: September 1, 1995

**Key Words and
Phrases:**

REFERENCES

Project Name **SILVER BOW CREEK**

ProjectID: 08-01

Reference Type: C

ReferenceID: 691

Title: ***United States vs. Atlantic Richfield Co. (Civil No. 89-39-BU-PGH)***

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Superfund Week

Date Published: September 15, 2000

Key Words and Phrases: Rocker Operable Unit - Silver Bow Creek/Butte Area, Milltown Reservoir, Clark Fork River

Reference Type: C

ReferenceID: 1099

Title: ***Superfund Ruling Establishes Difference Between Restoration and Cleanup***

Location: AEM

Category: Legal

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Hazardous Waste/Superfund Week

Date Published: June 2, 2003

Key Words and Phrases:

Reference Type: L

ReferenceID: 51

Title: ***Memo re: Silver Bow Creek ROD (1995) and Explanation of Significant Differences (ESD, 1998) for the Streamside Tailings Operable Unit***

Location: AEM

Category: Site Update

Prepared by/Author: AEM, Inc.

Preparer/Author Malvern, PA 19355

Address:

Prepared For: Distribution

Date Published: October 26, 1998

Key Words and Phrases:

REFERENCES

Project Name SILVER BOW CREEK

ProjectID: 08-01

Reference Type: L

ReferenceID: 81

Title: *Memo re: Update of Year 2000 Remediation, Silver Bow Creek, Montana*

Location: AEM

Category: Site Update

Prepared by/Author: AEM, Inc.

Preparer/Author Address: Malvern, PA 19355

Prepared For: Internal file

Date Published: January 19, 2001

Key Words and Phrases:

Reference Type: L

ReferenceID: 170

Title: *Summary of Major Revisions to RODs and Proposed Plans - Sediment Sites*

Location: AEM

Category: ROD/Proposed Plan/Action Memo/Decision Document

Prepared by/Author: AEM, Inc.

Preparer/Author Address: Malvern, PA 19355

Prepared For: Internal Distribution

Date Published: April 13, 2001

Key Words and Phrases:
