ADMINISTRATIVE RECORD

1140014 - R8 SDMS

EXPLANATION OF SIGNIFICANT DIFFERENCES

BUTTE MINING FLOODING OPERABLE UNIT
SILVER BOW CREEK/BUTTE AREA NPL SITE

SILVER BOW COUNTY
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INTRODUCTION

This document presents an Explanation of Significant Differences (ESD) from the 1994 Record of Decision (1994 ROD) for the Butte Mine Flooding Operable Unit (BMFOU) of the Silver Bow Creek/Butte Area National Priorities List (NPL) Site. The 1994 ROD for this site was prepared by the U.S. Environmental Protection Agency (EPA) and the Montana Department of Health and Environmental Sciences (now Montana Department of Environmental Quality (DEQ)). EPA is the lead regulatory agency and MDEQ the support agency for this project. This is an enforcement Potentially Responsible Party (PRP) lead site with the major PRPs involved being Atlantic Richfield Company (ARCO) and the group of PRPs collectively called the MR Group, consisting of ASARCO, AR Montana Corporation, Montana Resources Incorporated, Montana Resources a partnership, and Dennis Washington.

EPA and DEQ have identified 10 significant differences from the remedy described in the 1994 ROD. These differences are primarily caused by new standards developed since the 1994 Record of Decision, changes to the 1994 Record of Decisions precipitated by changes to the MR mine permit, and administrative decisions by EPA to transfer of responsibilities between the Butte Priority Soils Operable Unit (BPSOU) and the Butte Mine Flooding Operable Unit (BMFOU). The significant differences discussed in this ESD are the following:

Stream and Discharge Standards Update:

1. The State of Montana adopted a stricter Cadmium (Cd) standard for water quality on January 8, 2002.

2. The Federal drinking water program adopted radionuclide standards for Uranium (Ur), Radium (Ra) 226/228, Gross Alpha Particles, and Beta/Photon Emitters on December 8, 2000 on December 8, 2003.

Mine Permit/Superfund Interaction

3. The Upgradient Bypass condition in the 1994 ROD has been modified to accommodate potential wet closure of Yankee Doodle Tailings Pond.

4. Authority for the management and reclamation of the sludge repository was transferred from the DEQ Mine Permit to Superfund through the Mine Flooding OU

5. Complete transfer of authority for Yankee Doodle Tailings Pond dam stability monitoring to the State Mine Permit process.

Butte Priority Soils Operable Unit (BPSOU)/Mine Flooding Operable Unit (BMFOU) Interaction

6. The storm water runoff from certain areas within the BPSOU boundaries has been routed under EPA Superfund orders and directions to the Berkeley Pit. The treatment of this storm water becomes a responsibility transferred to the BMFOU after it enters the Pit.

7. The West Camp water is undergoing treatability studies at the BPSOU Lower Area One (LAO) treatment lagoon system. The treatment of this water is a responsibility transferred to the BPSOU activities as long as the approved treatability study is ongoing, and BPSOU treatment is authorized in the upcoming BPSOU ROD. This responsibility will return to the BMFOU if the treatability study is discontinued or if the BPSOU Record of Decision does not address this water.

Other

8. Treatment of Continental Pit water in the Horseshoe Bend Water Treatment plant.

9. Allowance for HSB water treatment plant sludges to be placed in the Berkeley Pit without offsetting water withdrawals.

10. Modification of the 1994 ROD requirement for reevaluation of treatment technology when the water level in the Pit reaches the 5260 level.

These changes are effective immediately upon signature and modify the 1994 Record of Decision accordingly.

1. STATEMENT OF PURPOSE

The 1994 BMFOU ROD was signed on September 29, 1994 by EPA, and concurred on by DEQ on the same date. The 1994 ROD incorporated elements of a removal action selected and ordered by EPA for the Travona Shaft/West Camp operable unit in 1989, and collectively the two operable units are known as the Mine Flooding Site. Remedial Design and Remedial Action have been conducted by the potentially responsible parties for the Mine Flooding Site pursuant to a Unilateral Administrative Order issued by EPA on November 5, 1996.

In the course of conducting and overseeing the remedial action implementation described in the 1994 ROD, EPA and DEQ reevaluated certain elements of the remedy as described in the 94 ROD. This reevaluation occurred because of changed circumstances, additional information gathered during initial design and action, and changed applicable or relevant and appropriate (ARAR) standards promulgated by the State and the federal government that are required to

ensure that the remedy is protective of human health and the environment. These modifications represent changes in the scope and cost of the Mine Flooding Site remedy, but they do not change the fundamental approach to remediation of the Mine Flooding Site.

The Comprehensive Environmental Response, Compensation, and Liability Act as amended (CERCLA) provides for the public disclosure of the reasons for significant differences through this document. The pertinent section of CERCLA, § 117(c), requires that the lead agency address post-ROD significant changes in the following instances:

> After adoption of a final remedial action plan (1) if any remedial action is taken [under section 104 or 120]; (2) if any enforcement action under section 106 is taken,; or (3) if any settlement or consent decree under section 106 or section 122 is entered into, and if such action, settlement or decree differs in any significant respects from the final plan [the ROD] the [lead agency] shall publish an explanation of significant differences and the reasons such changes were made.

Section 435(c)(2) of the National Contingency Plan, 40 CFR § 300.435(c)(2), states the same criteria and direction. EPA's remedy selection guidance entitled "A Guide to Preparing Superfund Proposed Plans, Record of Decisions, and Other Remedy Section Documents", OSWER Dir. No. 9200.1-23P (July, 1999), further explains the nature of significant differences, and states that this determination is a site-specific determination, considering the changes' scope, cost, and performance as it applies to the remedy, which generally involves a change to a component of a remedy that does not fundamentally alter the overall cleanup approach.

In this case, the changes identified below are significant differences. Some of these changes may be considered minor modifications, but EPA includes them in this document to ensure full public disclosure and consistency with the NCP.

This document has been placed in the administrative record for the Butte Mine Flooding Operable Unit as required by section 825(a)(2) of the NCP, 40 CFR § 300.825(c)(2), and in local information repositories in Butte, Montana. The full administrative record if housed at EPA Montana offices in Helena, Montana, 10 West 15th Street, 3d floor. Hours for access to the administrative record are 8:00 to 4:30, Monday through Friday except holidays. Information repositories containing microfilm copies of the administrative record are available in Butte and Anaconda, Montana, and can be accessed by contacting the EPA records center described above at 406 457-5046. Hard copies of this document will also be maintained at EPA Butte offices, 155 West Granite, Butte, Montana, and is available during office hours there. The availability of this document will be announced in a local newspaper, in accordance with the NCP.

2. SITE DESCRIPTION, HISTORY, CONTAMINATION SUMMARY, AND DESCRIPTION OF THE 1994 RECORD OF DECISION

A complete description of the site, its history, the contamination and its threats to human health and the environment, and the remedy selected in the 1994 Record of Decision can be found in the 1994 Record of Decision, Declaration and Decision Summary Section, parts 1 and 2. The Mine Flooding Site is located in and near the cities of Butte and Walkerville, Montana. It is part of the Silver Bow Creek/Butte Area (Butte Portion) Superfund Site. It consists of water within the Berkeley Pit, the underground mine workings hydraulically connected to the Berkeley Pit, the associated alluvial aquifer, the bedrock aquifer, and other contributing sources of inflow to the Berkeley Pit, East Camp System including surface runoff, leach pads, and tailings slurry circuit overflows, and the Travona/West Camp System. The Berkeley Pit is the major feature of this Site. The Horseshoe Bend (HSB) area, located in the east of Berkeley Pit is also a major source of contamination to the Site. The HSB area is a discharge point where several million gallons per day of contaminated alluvial groundwater surfaces before discharge to the Berkeley Pit. This discharge was captured and used in the mining operation, as approved by EPA, from April 15, 1996 to July 1, 2000 when the mining operation was suspended. Several million gallons of bedrock aquifer water per day is also directed to the Berkeley Pit through several thousand miles of underground shafts that are also part of the Site and contribute contamination to the Site.

Underground mining of silver and copper began in Butte in the late 1800s. By 1950, over 400 underground mines consisting of several thousand miles of interconnected mine workings, had operated or were operating in Butte. Most of the early mining companies were merged into or purchased by the Anaconda Copper Mining Company or its predecessors. In July 1955, the Anaconda Copper Mining Company began open pit mining in the Berkeley Pit. In 1963, the Weed Concentrator (now known as the MR Concentrator) became operational. Ore from the Berkeley Pit was processed at this facility, and concentrates were transported to Anaconda, Montana for smelting and refining. The Atlantic Richfield Company (ARCO) merged with the Anaconda Copper Mining Company is 1977 and continued to own and operate the pit and underground mine workings, and the nearby active mine area. Mining in the Berkeley Pit was discontinued in 1983. In 1985, the Pit and nearby mining property was sold to Montana Resources Incorporated (MRI), and in 1986 open pit mining and concentration resumed in the active area. In 1989, a partnership known as Montana Resources (MR) was formed between MRI and AR Montana Corporation, a wholly owned and controlled subsidiary of ASARCO. This entity continued ownership and operation of the Pit and nearby mine area until mining operations were shut down on July 1, 2001. MR is the current owner and operator of the active mine area south and east of the Pit and the Berkeley Pit.

To allow underground and later open pit mining in the Butte area, ground water was lowered by pumping throughout Butte's mining history. In latter years, the pumping system was located in the Kelley Mine shaft, just west of the Berkeley Pit. In 1982, pumping was discontinued by ARCO as it prepared to discontinue active mining of the Berkeley Pit. As a result, the artificially lowered groundwater level in the area began rising toward its pre-mining level in the

underground mines and the Berkeley Pit. At some point in the near future and if no remedial action is taken, this highly contaminated water will reach a level where it will be released into the surrounding alluvial aquifer and ultimately to Silver Bow Creek. The current projected date for reaching the critical water level is 2018.

After listing this area as part of the Silver Bow Creek/Butte Area in 1987, EPA began sampling and scoping activities. EPA conduced an Engineering Evaluation and Cost Analysis for the Travona/West Camp System in 1988 and 1989, and this formed the basis for a 1989 Action Memorandum that selected a temporary removal cleanup action for the West Camp System. EPA issued an Administrative Order on Consent and a Unilateral Administrative Order to potentially responsible parties for this action in 1989. EPA issued a second Administrative Order on Consent for conduct of the Remedial Investigation and Feasibility Study for the entire Mine Flooding Site in 1990, and the RI/FS was completed in 1994. EPA selected the remedial action for the Mine Flooding Site in 1994, with the concurrence of the State of Montana Department of Environmental Quality. EPA issued a Unilateral Administrative Order for conduct of the selected remedy in 1996.

In 1999, EPA reached agreement with ARCO, one of the potentially responsible parties for the Mine Flooding Site for resolution of claims and implementation of a remedy for a nearby operable unit known as the Streamside Tailings Operable Unit. In connection with that settlement, EPA and ARCO agreed to, and were ordered by the District Court of Montana, to conduct further settlement negotiations for all outstanding EPA CERCLA claims in the Upper Clark Fork Basin including the Mine Flooding Site. In March 2002, a Consent Decree was lodged with the District Court of Montana addressing CERCLA claims for the Mine Flooding Site, and requiring the continued implementation of the Mine Flooding remedial action, including changes to the 1994 ROD described below. The State of Montana is also a party to this Decree.

The Berkeley Pit is filling with water originating from the surrounding bedrock and alluvial aquifers and also from surface inflows. The water accumulating in the Berkeley Pit is contaminated with arsenic, cadmium, copper, lead, and zinc and other hazardous substances in high concentrations, and is highly acidic. This contaminated water in the bedrock aquifer presents a threat to human health and the environment should it be consumed or released, but it is technically infeasible to cleanup the bedrock contamination. Presently, because all bedrock groundwater flow in the area is toward the Berkeley Pit, and because the Travona/West Camp removal action controls releases from that system, contaminated mine water is being contained in the East and West Camps. However, if levels continue to rise uncontrolled, the hydraulic gradient could change and contaminated water could flow out of the East and West Camps into the surrounding alluvial groundwater and eventually to Silver Bow Creek. To prevent this from occurring, EPA and DEQ have determined that the water levels in the Mine Flooding Site must not rise above the critical water levels (CWLs) – 5,410 feet for the East Camp and 5,435 feet for the West Camp.

The remedy is described fully in the 1994 Record of Decision. A brief summary of the 1994 ROD is as follows:

1. Control of inflow from Horseshoe Bend, with exceptions for short term flows to the Berkeley Pit.
2. Treatment of surface water and groundwater from the Horseshoe Bend through use of water in the mining process or a newly constructed treatment plant.
3. Prevention of migration or discharge of East Camp and West Camp systems water from the bedrock aquifer by maintaining the critical water levels and implementing treatment, after re-evaluation of the treatment system, of water from the Pit.
4. Extensive monitoring to track the water quality and elevation of the East, West, and Outer Camp systems.
5. Sludge disposal from the treatment plant in an on-site facility or in Berkeley Pit.
6. Ongoing maintenance of the West Camp system removal action or an alternative plan.
7. Institutional controls to prevent inappropriate ground water use, and other institutional controls as needed.
8. Public education regarding the ground water elevation and treatment system evaluations.

3. DESCRIPTION OF SIGNFICANT DIFFERENCES AND BASIS FOR THE DECISION

Since the 1994 ROD was issued in September 1994, several significant occurrences anticipated in the 1994 ROD have taken place at the site, the most important of which was the suspension of mining on July 1, 2000. The suspension had significant impacts on the mine flooding project because contaminated Horseshoe Bend (HSB) surface discharge was no longer treated in and integrated into the tailings circuit. Pursuant to a unilateral order issued in 1996 that required treatment of HSB water through integration into the mine process, the HSB flow was controlled from April 15, 1996 until July 1, 2000. After suspension of mining, discharge of this flow into the Berkeley Pit resumed and the final design process for the HSB water treatment plant was triggered. The final design of this plant was approved by EPA in March 2002. Construction should begin in July 2002 and plant operation should begin in late 2003. This plant will be a lime precipitation high density sludge (HDS) water treatment plant capable of treating average flows of 5 million gallons per day (mgd) and peak flows of 7 mgd. It will be capable of treating HSB water, Continental Pit and Berkeley Pit water when it becomes necessary.

Certain of the differences below represent changes requiring an ESD although none of them fundamentally changes the primary component of the selected remedy described in the 1994 ROD (maintenance of the critical water level below the 5410' elevation in the East Camp/ Berkeley Pit System and below the 5435' elevation in the West Camp System, and wastewater treatment of HSB and Berkeley Pit water through hydroxide precipitation). Some of the differences described below could be viewed as development of the design or coordination between operable units at the Silver Bow Creek/Butte Area NPL Site rather than changes to the

remedial decision. However, the agencies include the differences in this ESD to clarify the nature of the remedial action as designed and to explain the basis for these important design elements. In addition, new standards for water quality were promulgated after the date of the 1994 Record of Decision. Standards, or ARARs, are frozen at the time of the 1994 ROD, unless new standards are shown to be necessary to ensure the protectiveness of the remedy. The standards added here are deemed necessary for inclusion into the remedial action to ensure protectiveness of human health and the environment.

Increases or decreases in costs precipitated by the differences outlined in this ESD are relatively small in comparison to the Net Present Value (NPV) for the Horseshoe Bend water treatment plant capital and operation and maintenance costs ($71 million) except for the potential cost increase for cadmium reduction ($47 million) if the additional treatment is necessary to protect aquatic life in Silver Bow Creek. The impact on the project costs for the differences are discussed below. Work sheets summarizing the assumptions for calculating all NPVs are available from EPA on request.

To reiterate, EPA and DEQ have identified 10 significant differences from the remedy described in the 1994 ROD. These significant differences to the 1994 ROD are broken down into 4 categories (Stream and Discharge Standards Update, Mine Permit/Superfund Interaction, BPSOU/BMFOU Interaction, and Other) and are discussed below.

STREAM AND DISCHARGE STANDARDS UPDATE

Several standards have been promulgated since the September 1994 ROD and this ESD generally incorporates these standards as part of the Mine Flooding Site remedial action,based on EPA's determination that the new standards are necessary to ensure that the remedy is protective. These standards are incorporated into the Mine Flooding Site remedial action, as explained below.

In April 2001 EPA updated its aquatic life criteria for cadmium to reflect the latest scientific knowledge about the effects of cadmium to better protect aquatic life. In response to this EPA update, on January 8, 2002, the State of Montana adopted new total recoverable cadmium standards for use in setting stream standards and discharge limits to protect aquatic life.

These new hardness dependent standards are reflected in the following equations :

chronic standard - $.94(e^{(0.9917(\ln(\text{hardness}))-6.332)})$
acute standard - $.97(e^{(1.205(\ln(\text{hardness}))-3.949)})$

For the discharge from the HSB water treatment plant, these equations yield an end of the pipe monthly average discharge standard of about 0.8 ug/L total recoverable cadmium at an expected hardness of 400 mg/l (maximum allowed in calculation) to protect aquatic life from chronic impacts. Treatability studies to date have shown that the HSB treatment plant may not meet this

monthly standard. This will be determined during the shakedown period but will not be known definitively until after shakedown of the plant following construction.

Monitoring conducted in 2001 indicated that the HSB stream, the Continental Pit and the Berkeley Pit have uranium concentrations of about 280 ug/L, 430 ug/L and 850 ug/L respectively. The HSB water treatment plant will receive the HSB stream in late 2003 and will eventually receive both the Continental Pit and Berkeley Pit waters. The radionuclide primary drinking water standards were published on December 8, 2000 and will become effective December 8, 2003. The standards are as follows: uranium - 30 ug/L; combined radium 226/228 - 5 pCi/L; gross alpha particle - 15 pCi/L; and beta/photon emitters - 4 mrem/yr. It is expected that the plant will meet these standards with the present design and anticipated operation, however, this will be determined during the shakedown period but will not be known definitively until after shakedown. If the standards can be met, they will become final standards for both end-of-pipe requirements and in-stream requirements. If they cannot be met, the following process will apply.

If the plant is not able to meet these standards through process modifications and optimization of the existing design during the shakedown period then one of several approaches will be used to insure that aquatic life is protected in the stream. These approaches include: 1) performance of a protectiveness analysis including but not limited to development of site-specific criteria which substitute new standards for the standards described here; 2) flow augmentation of the treated discharge using an available water source which would involve substituting achievable end-of-pipe standards and keeping in-stream standards; 3) minor modification of the existing design not using additional unit processes to achieve these new standards; or 4) other options approved by EPA in consultation with MDEQ. In the event these actions are not approved of by EPA in consultation with the DEQ, and/or new or substituted standards still cannot be met, then additional modification of the existing design will be done so that the standards will be achieved. All such options are subject to specific EPA approval, in consultation with the DEQ.

If the standard for cadmium is not met by the previously discussed approaches, it is anticipated that the tertiary treatment (soda ash softening, sand filtration, nanofiltration) necessary to comply would have a capital cost of about $10 million and an operational cost increase of about $1.3 million per year for the HSB influent stream (2003) and $2.5 million per year for the Pit influent stream for a total net present value (2002 dollars) of $47 million..

Because the radionuclide standards are expected to be met, no increased cost other than monitoring is expected.

MINE PERMIT/SUPERFUND INTERACTION

The BMFOU is located at and near a site where active mining has occurred (mining operations were suspended in July 2000) and where active mining is expected to continue into the future under the regulatory authority of the State of Montana. It has been the intent of EPA

and the State to coordinate both the Superfund activities and the permitted mining activities at this site in the most efficient way possible. Recently, EPA issued a decision document (Response Decision Deferral Document, EPA and DEQ, 2001) with the concurrence of DEQ which adjusted boundaries between EPA's Mine Flooding operable unit and Butte Active Mine Area operable unit (BAMAOU), and announced EPA's intent to refrain from taking Superfund action at the BAMAOU and to defer to State mine permit actions for environmental cleanup of that area.

The 1994 ROD called for an upgradient bypass of Upper Silver Bow and Yankee Doodle Creeks after the termination of mining. The creeks presently discharge to the Yankee Doodle Tailings Pond (this water is necessary as makeup water for the mining operation). An unknown amount of the approximately 1 mgd of the flow from these streams entering the pond, seeps into the alluvial groundwater system and is discharged at Horse Shoe Bend. At the time of the 1994 ROD it was anticipated that one of the alternatives for bypassing this flow would be diversion of upgradient stream flow into a stream to the west identified as Bull Run Creek which drains into Browns Gulch. The technical practicality of this option has not been fully evaluated.

Currently the MDEQ has bonded the MR facility for surface reclamation of all of the Yankee Doodle Tailings Pond except the 123 acres of the north end of the pond which would be covered by water and serve as a wet closure for the pond which would reduce re-acidification of tailings and allow the upper end of the tailings pond serve as wetlands habitat. EPA agrees that this use is appropriate and this ESD now allows such a use while retaining its requirement for an upgradient bypass should wet closure not be implemented. It is not presently known what final area for wet closure ponding will be approved through the mine permit process. Any excess water not necessary for the wet closure will be addressed under the BMFOU.

The cost of this change to the Mine Flooding operable unit is not definitively known but assuming that 30% of the 700gpm flow will result in seepage discharging at Horseshoe Bend, the cost of this additional of this treatment at the HSB plant has an NPV of about $3.4 million. The NPV savings from not having to construct and maintain the Bull Run Diversion is estimated to be about $4.3 million. Assuming that only 50% of the flow is necessary for the wet closure the cost for bypassing the remaining flow through the existing return water line from the Pond is estimated to be about $1.7 million. The savings in reclamation costs based on the state bonding calculation for 123 acres is about $2.25 million but this is not considered a cost savings to the Mine Flooding project. There is, therefore, a net cost of $800,000 to the Mine Flooding project based upon the changes to the 1994 ROD.

The 1994 ROD allowed for the disposal of treatment plant sludges in the Berkeley Pit or in an onsite repository. However all onsite property was under the jurisdiction and bonding authority of MDEQ through the MR mine permit. Because of this potential need for a sludge repository at the facility, 195 acres in the northwest area of the permitted mine area was removed from the permitted area and authority over management and reclamation of this area has been transferred

from the mine permit to the BMFOU. See pages 2 through 4 of the Response Action Deferral Decision document (EPA and DEQ, 2001). This ESD formalizes and clarifies the primary authority for management and reclamation of this area is with EPA as part of the BMFOU.

As allowed in the 1994 ROD, present disposal plans for the high density sludge generated by the HSB water treatment plant is for the placement of this sludge in the Berkeley Pit. Based on treatability studies and geochemical modeling, no adverse effects to the treatability of the pit water because of the placement of these sludges in the Pit are expected. The determination of the ability of the Berkeley Pit to accept these sludges long-term will be reevaluated prior to bringing the Pit influent stream to the HSB treatment plant. This evaluation is expected to occur at about the year 2015. If, at that time, it is determined that the sludge stream can continue to be placed in the Pit, the repository area will be reclaimed under a plan for reclamation to be approved at that time by EPA. The plan shall include a detailed description of reclamation methods and schedule for implementation for EPA approval, in consultation with the State. If the sludge is required to be disposed of on land, a repository in compliance with ARAR standards identified in the 1994 ROD will be designed, constructed, and utilized under BMFOU Superfund authorization. The purpose of this ESD is to make clear that the repository area which was once part of the permitted area is no longer part of the permitted area and is under the Mine Flooding Site remedial action, and will be addressed as part of that action.

The 1994 ROD anticipated the need for an onsite sludge repository but also allowed for disposal of treatment sludges into the Pit, therefore, there is no anticipated change in the cost of the remedy due to the clarification of authorities for management and reclamation.

The 1994 ROD required an evaluation and monitoring of the Yankee Doodle Tailings Pond to assess the geotechnical stability of the dam. This was also a requirement of the state operating permit. The evaluation of the dam was completed and showed that the dam is stable and also recommended continued monitoring. While the mine was operating approximately 15% of the total flow entering the Pond was attributed to Superfund activities (HSB flow). The remaining 85% of the flow was generated in the mining process (tailings circuit flow). The current plan to control the HSB flow in the future is through the operation of the HSB Water Treatment Plant and to no longer discharge HSB water to the pond for treatment. The pond may, however, be used for the disposal of tailings in the future. Because the pond will no longer be needed for treatment of HSB water and to clarify the regulatory authority, future monitoring of the Pond will be conducted pursuant to the State Mine Permit as outlined in the Response Action Decision Deferral Document (EPA and DEQ, 2001). The costs for future monitoring at the Pond are relatively small. This clarification, therefore, does not impact the cost of the remedy.

BPSOU/BMFOU INTERACTION

EPA and DEQ believe that certain efficiencies can be achieved at the Silver Bow Creek/Butte Area NPL Site if remedial activities at the various operable units can be coordinated. In effort to gain these efficiencies this ESD addresses two such coordination issues involving the potential treatment of storm water and West Camp waters.

The BPSOU has significant amounts of storm water runoff which must be addressed or treated in order to protect the uses designated for Silver Bow Creek and meet ARARs. Because of the difficulty of equalizing flows for treatment from intense stormwater events, the cost for treatment of stormwater can be considerable. Under its removal authority, EPA has approved diversion of storm water runoff form the Upper Buffalo Gulch and Belmont/Parrot Shop Complex into the Berkeley Pit. Accordingly, EPA has determined that storm water which is diverted from the BPSOU under an EPA approved plan is and will be part of the BMFOU upon its entry into Berkeley Pit. By diverting the water to the Berkeley Pit, which acts as a very large equalization basin, potential water treatment costs for this stormwater runoff can be greatly reduced. It is anticipated that a 435 acre area will produce approximately 58 million gallons of storm water per year or an average of about 160,000 gallons per day reporting to the Berkeley Pit.. This amounts to about 5% of the total daily flow to the Pit system. This input accelerates the need for plant expansion for Berkeley Pit treatment by about 10 months. The cost of treatment at the HSB treatment plant for this increased flow is estimated to be about $115,000 (2002 dollars) starting in 2018. The total net present value increase for the mine flooding project attributed to the accelerated expansion and increased flow is about $1.9 million. The exact savings to the BPSOU is not exactly known but the net present value (NPV) for the capital, and operation and maintenance costs for equalization basins and a treatment facility necessary to capture and treat storm water events of a 25 year, 24 hour magnitude with this level of contamination would greatly exceed this NPV cost.

The West Camp water is presently being treated at the Butte Metro Wastewater Treatment Plant through Butte Silver Bow's pretreatment program. Because this removal decision was a short term decision which required evaluation as more permanent remediation is selected, and changes in the arsenic drinking water standard to 10 ug/L, the need to evaluate other treatment options for the West Camp water are being evaluated. One of the options being evaluated is treatment in a lagoon system in Lower Area One which is part of the BPSOU. As part of the BPSOU feasibility study (FS), the ability of this lagoon system to treat contaminated groundwater from LAO is also being evaluated. If, at the conclusion of the BPSOU remedy selection process, a treatment system for the West Camp water is chosen as the remedy for the BPSOU, then the treatment of West Camp water will come under authorities associated with the BPSOU. If it is decided that a BPSOU treatment system is not the appropriate remedy for the treatment of West Camp water, the treatment of West Camp water remains under authorities associated with the BMFOU.

It is estimated that the NPV associated with the treatment of West Camp in the LAO lagoon system, if successful, would be about $960,000. The present cost of treatment in the Metro treatment plant is about $275,000 per year (NPV - $5.3 million). The NPV of conveyance and treatment of West Camp in the HSB water treatment plant is estimated to be about $3.9 million.

OTHER

The original operable unit description for the BMFOU included the Continental Pit as part of the

Operable Unit. However, the 1994 ROD did not designate the Continental Pit as a water level compliance point or mandate treatment of water which may enter or accumulate in the Continental Pit. This was not included because in 1994 water was not allowed to accumulate in the Continental Pit and was integrated into the mining operation. This ESD clarifies that, although not explicitly stated, the intent of the 1994 ROD was to include all waters accumulating in either the Berkeley Pit or the Continental Pit and is subject to the same standards for maintenance of water levels and discharge standards.

It is estimated that the total response costs for maintaining the water level in the Continental Pit below the 5410' level and for treatment will have a NPV of about $1.7 million. EPA and the State believe that this is a clarification of costs and not a project cost increase because it is within the original scope and intent of the 1994 ROD.

The 1994 ROD specified that any inputs of sludge into the Berkeley Pit should be offset by the pumping and treatment of an equivalent amount of water from the East Camp system. This decision was based on the assumption that the hydroxide precipitation treatment technology evaluated in the FS and designated in the 1994 ROD allowed and might employ a low density sludge process which would generate about 1.5 million gallons of sludge per day. It was decided in the remedial design process, however, to employ a high density sludge (HDS) process that will generate about 150,000 gallons of sludge per day. The placement of 1.5 million gallons of sludge in the Pit without offset was deemed unacceptable because the accelerated Pit rise rate. With the approval of the HDS design and a reduction of sludge input in the Pit by an order of magnitude, EPA and DEQ believe that the increased rise rate is acceptable. It is estimated that this input will accelerate the pit flooding by about 4.5% which will reduce the time until expansion of the HSB treatment plant is necessary by about 9 months. The increased cost for this reduction in time has a NPV of about $866,000. The reduced pumping and treatment costs precipitated by this decision is estimated to have a NPV of about $1.523 million. There is therefore a net NPV reduction in project costs is estimated to be about $657,000.

The 1994 ROD required a reevaluation of treatment technology when the water level in the Berkeley Pit reached the 5260' elevation which is predicted to occur in 2006. Because of the ongoing mining in 1994, the 1994 ROD anticipated that it would not be necessary to build a treatment plant until at least 2016 and that a feasibility study to evaluate innovative or new technology could be conducted in the interim. With the suspension of mining in 2000, however, the requirement to provide treatment for HSB water through the construction and operation of an independent treatment plant was triggered. With the HSB water treatment plant construction to be completed in 2003 and with the ability to treat Berkeley Pit water in this plant, the requirement for this feasibility study has been modified. It is now required that an evaluation of the ability of the HSB water treatment plant to treat the additional water from the Berkeley Pit be conducted 4 years prior to the water level in the East Camp System reaches the 5410'elevation which is anticipated in 2018. This change to the 1994 ROD requirement is not intended to restrict the potential for metals recovery of metals from the Berkeley Pit of Horseshoe Bend before water is treated. This change to the 1994 ROD does not cause a significant change in the cost of the remedy.

4. SUPPORT AGENCY COMMENTS

DEQ concurs in and adopts the changes and decisions identified in this document for the reasons explained above.

5. PUBLIC PARTICIPATION ACTIVITIES

This document will be placed in the Mine Flooding operable unit administrative record and the local information repositories and the Butte EPA office. A notice of availability of this document will be placed in a local newspaper in compliance with the NCP. EPA will continue to provide information to the public about the decisions described here and other aspects of the Mine Flooding remedy implementation through the Pit Watch publication and committee.

6. AFFIRMATION OF THE STATUTORY DETERMINATIONS

Considering the new information that has been developed and the changes that have been made to the selected remedy, DEQ and EPA believe that the selected remedy, as modified by this explanation of Significant Differences, remains protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to this remedial action or involves appropriate waivers of these requirements, and is cost effective. In addition, the revised remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this site.

APPROVAL

Max F. Dodson, Assistant Regional Administrator
Ecosystems Protection and Remediation
EPA Region 8

Date

Jan P. Sensibaugh, Director
Department of Environmental Quality
State of Montana

3/12/02
Date

6. AFFIRMATION OF THE STATUTORY DETERMINATIONS

Considering the new information that has been developed and the changes that have been made to the selected remedy, DEQ and EPA believe that the selected remedy, as modified by this explanation of Significant Differences, remains protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to this remedial action or involves appropriate waivers of these requirements, and is cost effective.

In addition, the revised remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this site.

APPROVAL

Max H. Dodson, Assistant Regional Administrator
Ecosystems Protection and Remediation
EPA Region 8

3-14-02
Date

Jan P. Sensibaugh, Director
Department of Environmental Quality
State of Montana

Date