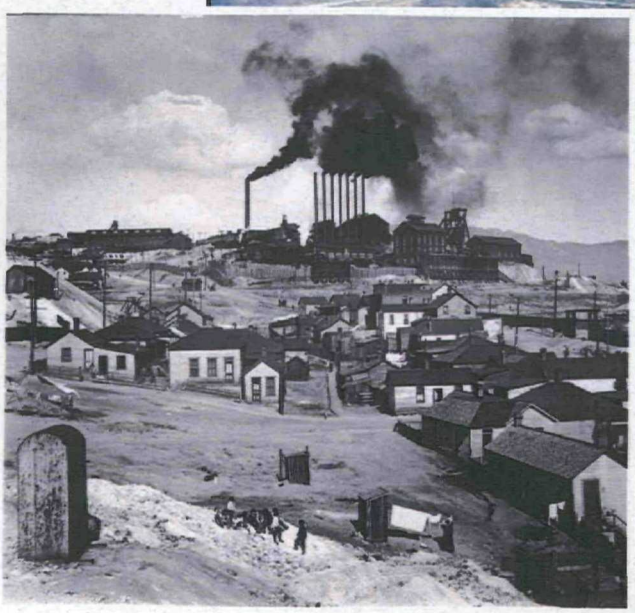
U.S. Environmental Protection Agency

Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

September 2006



Record of Decision

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Silver Bow Creek/Butte Area Superfund Site

Butte, Montana

September 2006

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Region 8, Montana Operations Office
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Record of Decision

Preface

Butte Priority Soils Operable Unit

Silver Bow Creek/Butte Area Superfund Site

Butte, Montana

The U.S. Environmental Protection Agency (EPA), in consultation with the Montana Department of Environmental Quality (DEQ), presents this Record of Decision (ROD) for the Butte Priority Soils Operable Unit (BPSOU) of the Silver Bow Creek/Butte Area Superfund Site in Butte, Montana. The ROD is based on the Administrative Record for the BPSOU, including the Remedial Investigation (RI), the Feasibility Study (FS), the Focused Feasibility Study (FFS), several human health risk assessments (HHRA), the ecological risk assessment, the Proposed Plan, the public comments received, and EPA responses to comments. The ROD presents a brief summary of the RI and FS, actual and potential risks to human health and the environment at the BPSOU, the major alternatives considered by EPA, and the Selected Remedy. The Selected Remedy was chosen by EPA in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended (42 United States Code [USC] § 9601 *et seq.*), and in accordance with the National Pollution Contingency Plan (NCP) [40 Code of Federal Regulations Part 300] to the extent practicable.

The ROD has three purposes:

- To describe the engineering components and remediation requirements of the Selected Remedy, including remedial action objectives, applicable, relevant and appropriate requirements (ARARs), and cleanup levels.

- To certify that the remedy selection process was carried out in accordance with the requirements of CERCLA, and, to the extent practicable, the NCP.

- To provide the public with a consolidated source of information about the history, characteristics, and risk posed by the conditions at the BPSOU, as well as a summary of the cleanup alternatives considered, their evaluation, the rationale behind the Selected Remedy, and the EPA's consideration of, and responses to, the comments received.

The ROD is organized into three distinct sections:

1. The Declaration section functions as an abstract and data certification sheet for the key information contained in the ROD. The signature page for the EPA Region 8 Assistant Regional Administrator and Director of the Montana Department of Environmental Quality is located in this section.

2. The Decision Summary section provides an overview of the BPSOU characteristics, the alternatives evaluated, and the analysis of those options. The Decision Summary also describes the Selected Remedy and explains how the remedy fulfills statutory and regulatory requirements.

3. The Responsiveness Summary section addresses stakeholder and public comments received on the Proposed Plan and other information contained in the Administrative Record.

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Acronyms and Abbreviations

ACMC	Anaconda Copper Mining Company
amsl	above mean sea level
AOC	Administrative Order on Consent
AR	Atlantic Richfield
ARAR	applicable, relevant and appropriate requirement
ARCO	Atlantic Richfield Company
ARM	Administrative Rules of Montana
ATSDR	Agency for Toxic Substances and Disease Registry
BERA	baseline ecological risk assessment
BMFOU	Butte Mine Flooding Operable Unit
BMP	best management practice
BPSOU	Butte Priority Soils Operable Unit
BRA	baseline risk assessment
BRES	Butte Reclamation Evaluation System
BSB	Butte Silver Bow County
CDM	CDM Federal Programs Corporation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
CDC	Center for Disease Control
CFRSSI	Clark Fork River Superfund Site Investigations
cfs	cubic feet per second
COC	contaminant of concern
CTEC	Citizen's Technical Environmental Committee
cy	cubic yard
DEQ	Montana Department of Environmental Quality
DEQ-7	DEQ Circular No. 7
EPA	U. S. Environmental Protection Agency
ERA	expedited response action
ETAG	Ecological Technical Assistance Group
FS	feasibility study
FFS	focused feasibility study
GMMA	Granite Mountain Memorial Area
gpm	gallons per minute
HHRA	human health risk assessment
HQ	hazard quotient
IC	institutional control
IEUBK	Integrated Exposure Uptake Biokinetic
LAO	Lower Area One
MCA	Montana Code Annotated
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
mcy	million cubic yards

mg/kg	milligrams per kilograms
mg/L	milligrams per liter
MR	Montana Resources
MSD	Metro Storm Drain
NCP	National Contingency Plan
NOAA	National Oceanic and Atmospheric Administration
NPL	National Priorities List
N-TCRA	non-time critical removal action
O&M	operations and maintenance
OMB	Office of Management and Budget
OU	operable unit
PBRA	preliminary baseline risk assessment
PRG	preliminary remediation goal
PRP	potentially responsible party
RAO	remedial action objective
RCRA	Resource Conservations and Recovery Act
RG	remedial goal
RHPP	Regional Historic Preservation Plan
RI	remedial investigation
RI/FS	remedial investigation/feasibility study
ROD	Record of Decision
RP	responsible party
SBC	Silver Bow Creek
SOP	standard operating procedure
SOW	statement of work
TAG	Technical Assistance Group
TCLP	toxicity characteristic leaching procedure
TCRA	time critical removal action
TI	technical impracticability
UAO	Unilateral Administrative Order
USGS	U.S. Geological Survey
UOS	URS Operating Systems, Inc.
URS	URS Greiner Woodward
USACE	U.S. Army Corps of Engineers
μg/L	micrograms per liter
μg/dL	micrograms per deciliter
$\mu g/m^3$	micrograms per cubic meter

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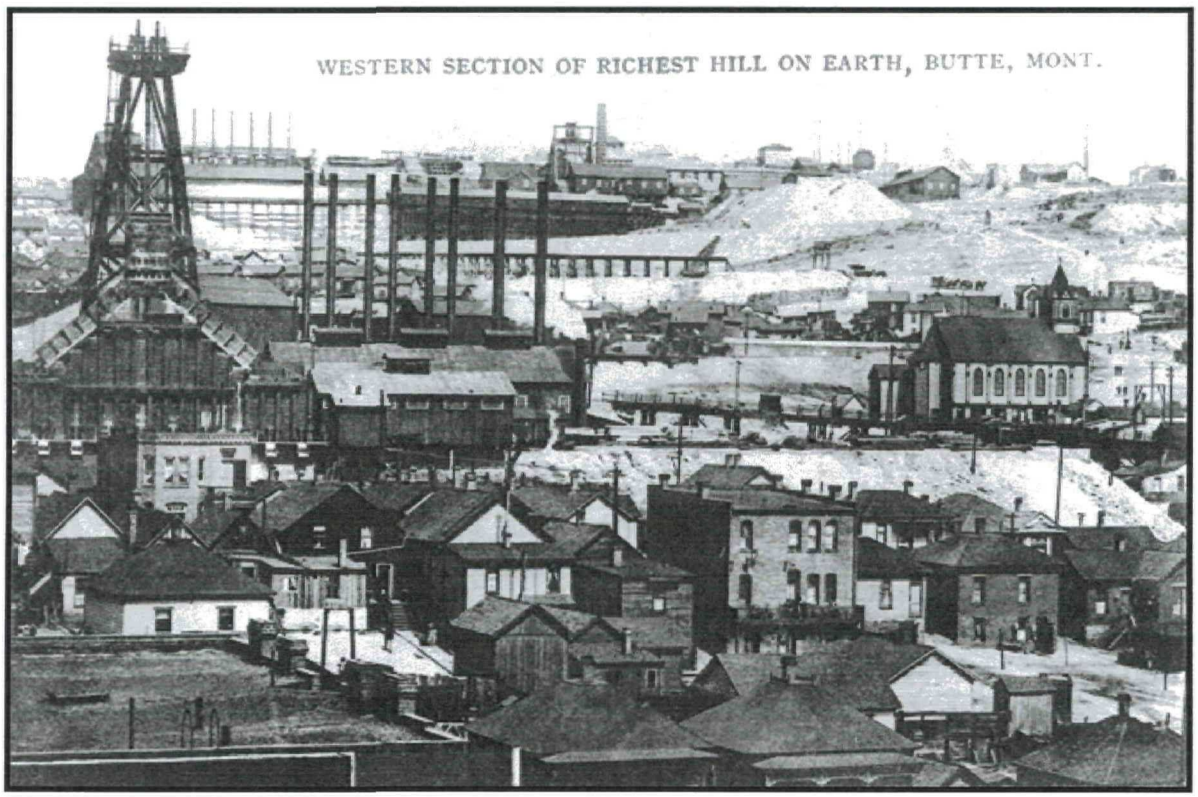
Declaration

Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

U.S. Environmental Protection Agency, September 2006

Part 1: Declaration



Declaration

Declaration

This part of the ROD summarizes key information and contains the formal authorizing signature page for the ROD.

Site Name and Location

This decision document has been prepared for the Butte Priority Soils Operable Unit (BPSOU) of the Silver Bow Creek/Butte Area Superfund Site, in Silver Bow County, in southwest Montana. The national Superfund database (i.e., CERCLIS) identification number for the site is MTD980502777. The BPSOU is one of eight remedial operable units (OUs) within the Silver Bow Creek/Butte Area Site. It consists of an approximately 5 square mile area encompassing the town of Walkerville and a large portion of the city of Butte.

Statement of Basis and Purpose

This decision document presents the Selected Remedy for the BPSOU (or "BPSOU site") within the Silver Bow Creek/Butte Area Superfund Site in Butte. EPA, the lead agency for site activities, with the partial concurrence of DEQ, the support agency, selected the remedy in accordance with Comprehensive Environmental Response, Compensation, and Liability Act, 42 USC §9601 *et seq.*, as amended (CERCLA), and to the extent practicable, the NCP [40 CFR Part 300]. The State of Montana, as represented by DEQ, partially concurs with the Selected Remedy.

This decision is based on the Administrative Record for BPSOU within the Site. The Administrative Record (on microfilm) and copies of key documents are available for review at the following locations: Montana Tech Library, 1300 West Park in Butte, Montana; the Butte EPA Office, 155 West Granite in Butte, Montana. The complete written Administrative Record is maintained at the EPA - Montana Office, 10 West 15th Street, Suite 3200, in Helena, Montana and can be viewed there.

Assessment of the Site

There are many pathways at the BPSOU site that create unacceptable risks to human health and the environment, as documented in the Administrative Record. The remedial action selected in this ROD is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment at the BPSOU site.

Description of the Selected Remedy

The BPSOU is one of four remedial OUs identified by EPA within the Butte Portion of the Silver Bow Creek/Butte Area National Priorities List (NPL) site. A brief description of each of the OUs is provided below:

- Butte Priority Soils OU - consists of historic mining areas within and near the municipalities of Butte and Walkerville, surface water, and alluvial groundwater associated with Silver Bow Creek.

- Mine Flooding OU - consists of the flooding Berkeley Pit and hydraulically connected underground mine workings and associated bedrock and alluvial aquifers in Butte. It addresses the bedrock groundwater system, which underlies beneath and influences the BPSOU. EPA completed a ROD for this OU in 1994. The ROD, including its state-of-the-art treatment plant to provide perpetual treatment of groundwater and extensive monitoring, is being implemented.

- West Side Soils OU - encompasses areas of Silver Bow County that have experienced mining activity but lie outside of other OU boundaries, generally north and west of the BPSOU. EPA is currently conducting preliminary RI/FS planning for this OU.

- Active Mining and Milling OU - consists of the permitted mine area currently operated by Montana Resources (MR) west and northwest of the BPSOU. In 2002, EPA deferred Superfund action at the OU to state authority under the State issued mine-operating permit and associated State mining laws.

Numerous response actions, including time-critical removal actions, expedited response actions, and other reclamation activities, have been implemented at the BPSOU. These previous response actions and the Selected Remedy are discussed below.

Previous Response Actions

The following is a summary of previously implemented response actions conducted within the BPSOU as Time-Critical Removal Actions (TCRAs) and Expedited Response Actions (ERAs, also known as Non-Time-Critical Removal Actions [N-TCRAs]). These actions were taken to address immediate and significant human health and environmental risks that EPA did not want to delay until the RI/FS and ROD process was completed. These response actions were subsequently evaluated as part of the RI/FS process.

The purpose of these early response actions was, in part, to address source areas that were found to have Contaminants of Concern (COCs) at concentrations that pose actual or potential human health and/or environmental risks. Approximately 422 acres of land within the BPSOU have been addressed through previous response actions. Previous response actions were completed using the expedited Superfund removal process. Although an expedited process was used, Superfund law requires these actions to be consistent with, and contribute to, the efficient performance of a final long-term remedial action, to the extent practicable. Therefore, EPA required that the early response actions be designed and constructed in a manner intended to be consistent with any final remedy.

Six TCRAs (Walkerville, 1988; Timber Butte, 1989; Butte Priority Soils, 1990-1991; Colorado Smelter, 1992; Anselmo/Late Acquisition/Silver Hill, 1992; and the Walkerville II, 1994) have been completed. Major construction for the on-going Storm Water TCRA and Railroad Beds TCRA was completed in 1999 and 2004, respectively. Two on-going expedited response actions include the Lower Area One (LAO) and the 1994 Residential/Source Areas (source areas and yards), which was amended to

include the 2000/2001 Walkerville TCRA. Other completed actions include the Lower Area One (LAO) Manganese Removal (1992), the Old Butte Landfill/Clark Mill Tailings (1998), and the construction of a groundwater interception system in the Metro Storm Drain (MSD) area. Treatability demonstration projects were conducted to evaluate the effectiveness of the LAO "treatment lagoons" for hydraulic control and treatment of contaminated groundwater, as well as to evaluate the effectiveness of storm water response actions on storm water runoff and the resulting water quality in receiving surface waters. Implementation of these response actions has resulted in the reclamation, removal, or stabilization of almost all major contaminant source areas and mine waste accumulations initially identified by the EPA at the BPSOU site. The response actions were in many cases undertaken to address the exceedances of arsenic or lead soil action levels at discrete locations within the BPSOU. Additionally, metals and arsenic contamination of surface water and groundwater and the resulting acute threat to the aquatic environment formed the basis for some of these actions.

Despite the past response actions completed at the site, site-wide remedial goals have yet to be achieved and significant risks still threaten human and environmental receptors. The potential exposure to lead and arsenic in residential soil and interior dust continue to pose a significant human health risk. Arsenic and metal contaminants in surface water and alluvial groundwater exceed applicable water quality standards and continue to affect aquatic life in Silver Bow Creek. The preferred remedy includes components to prevent or mitigate the remaining identified exposure pathways and to otherwise comply with applicable or relevant and appropriate cleanup standards (ARARs) and other remediation goals.

The following is a brief description of the TCRAs and the on-going ERAs undertaken within the BPSOU.

Time-Critical Removal Actions:

- Walkerville (1988) - Addressed certain mine waste dumps and residential soil areas contaminated with lead >2,000 milligrams per kilogram (mg/kg) or mercury >10 mg/kg in Walkerville.

- Timber Butte (1989) - Removed and consolidated about 40,000 cubic yards of contaminated soil.

- Butte Priority Soils (1990 and 1991) - Addressed risks from certain mine waste dumps, a concentrate spill, and seven residential yards in Butte and Walkerville.

- Colorado Smelter (1992) - Removed and consolidated on-site about 40,000 cubic yards of mine waste.

- Anselmo Mine Yard and Late Acquisition/Silver Hill (1992) - Addressed a mine yard and several mine dumps in Butte.

- Walkerville II (1994) - Addressed four additional dump areas with elevated soil lead levels.

- Railroad Beds (ongoing, 1999 - essentially completed in 2004) - Is addressing railroad beds and adjacent residential yards that contain elevated concentrations of metals and arsenic.

- Storm Water (ongoing - begun in 1997) - Partially addresses storm water problems in Butte. Includes reclamation of the Alice Dump and removal of about 50 cubic yards of mercury-contaminated soils in the Dexter Street area.

- Walkerville (2000/2001) - The residential properties in Walkerville that had not been previously sampled were sampled and reclamation was conducted at specific residences where clean-up levels were exceeded.

Expedited Response (Non-Time Critical Response) Actions:

- Lower Area One (ongoing) - Removed accessible mine tailings and contaminated soils from the Silver Bow Creek floodplain at the Colorado Tailings and Butte Reduction Works area and installed a groundwater interception and treatment system.

- Butte Priority Soils OU (Residential Soils/Source Areas (1994-Present) - Partially addresses certain residential areas with soil-lead concentrations above the residential lead action level of 1,200 ppm. Under this action, EPA, DEQ, Butte-Silver Bow and the Atlantic Richfield Company (ARCO) integrated the removal of residential lead contaminated soils associated with mine-related wastes with the removal or mitigation of lead contaminants from non-superfund sources at certain residences. This provided Butte Silver Bow County (BSB) with funding and the flexibility to implement a comprehensive cleanup program. The BSB Lead Intervention and Abatement Program goal is to reduce the level of lead exposure incurred by children under 6 years old, pregnant women, and nursing mothers in a manner that results in long-term health benefits. Butte-Silver Bow's program targets all sources of lead, including interior and exterior lead based paint, interior lead dust, water and residential soils. The non-residential source area portion of this action included the remediation of areas that were above the lead action level of 2,300 ppm

Other Actions:

- Lower Area One Manganese Removal (1992) - Removed manganese ore stockpiles in Lower Area One that were within the floodplain of Silver Bow Creek.

- Old Butte Landfill/ Clark Mill Tailings (1998) - Completed RCRA corrective action at the landfill in combination with Superfund removal actions. Removed about 800,000 cubic yards of the Colorado Tailings from Lower Area One and placed them in the repository constructed at this site

Principal threat wastes at the BPSOU site were addressed under these prior actions.

Selected Remedy

The ROD for the BPSOU is the second ROD prepared within the Butte Portion of the Silver Bow Creek/Butte Area Site. The first ROD was for the Mine Flooding OU and addressed bedrock aquifer contamination and the Berkeley Pit area.

The Selected Remedy for the BPSOU addresses potential or actual threats to human health or welfare or the environment resulting from heavy metals and arsenic in soils, indoor dust, surface water and groundwater. The Selected Remedy incorporates many prior response actions done under removal or other authority. The Selected Remedy achieves the remedial action objectives established for the operable unit, is fully protective of human health and the environment, and meets or appropriately waives ARARs established for the BPSOU.

The Selected Remedy is a combination of comprehensive Alternative 4 from the FS and Alternative 2 of the Focused Feasibility Study for Metro Storm Drain, with modification. The Selected Remedy expands and modifies these alternatives in certain respects. The Selected Remedy expands the existing residential cleanup program to include lead, arsenic, and mercury contamination in the general population, not just in sensitive populations.

A technical impracticability evaluation has been prepared for the alluvial groundwater aquifer. It supports the waiver of ARARs for the alluvial groundwater aquifer and, if appropriate, for certain solid waste and floodplain ARARs for waste left in place in the Silver Bow Creek floodplain.

This cleanup will address potential and actual threats to human health or welfare or the environment from heavy metals and arsenic in high-volume, low-toxicity mine waste and contaminated soils in Butte. The Selected Remedy addresses contamination of surface water, groundwater, sediment, and storm water runoff caused by heavy metals and arsenic. The highlights of the Selected Remedy are presented for solid media, groundwater, and surface water below. A more detailed description and discussion of the Selected Remedy is presented in Section 12.

Solid Media

Residential Soils and Dust

EPA's action levels for residential soils and dust are:

Table D-1
Soil, Dust, and Vapor Action Levels
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

Contaminant of Concern	Exposure Scenario	Concentration
Lead	Residential	1,200 mg/kg
	Non-Residential	2,300 mg/kg
Arsenic	Residential	250 mg/kg
	Commercial	500 mg/kg
	Recreational	1,000 mg/kg
Mercury	Residential	147 mg/kg
	Residential (vapor)	0.43 $\mu g/m^3$

Some residential areas above these levels have been addressed under prior removal actions, but many homes and residences have not. The BSB Lead Intervention and Abatement Program, described in Section 12.3.1.1, has been addressing certain residential areas (those homes or residences with children or pregnant women) in the manner described.

The Selected Remedy calls for the continuation and expansion of the BSB Lead Intervention and Abatement Program. The expansion of this program in the Selected Remedy requires that all residential properties within the BPSOU must be sampled and assessed and abated if action levels are exceeded, within a reasonable time frame, for arsenic, lead, and mercury. Abatement includes cleaning up yard soils, indoor dust, and attic dust as addressed below. Abatement can be done through the existing program, and can be integrated with the comprehensive abatement components of the program, which are already established.

If the Superfund remedial requirements are incorporated into the existing and expanded comprehensive program, a complete indoor and outdoor assessment (i.e., residential yard soil, indoor and outdoor dust, non-living space dust, lead-based paint, drinking water, and mercury vapor) of all residential properties that are known to be occupied or expected to be occupied must be completed within 8 years of the initiation of the expanded program. During this 8-year period, the clean-up of residential properties that exceed the actions levels will occur in concert with the assessment program. For those residential properties identified in the 8 year assessment program, the Selected Remedy requires the abatement activities be

completed as quickly as practicable, but no later than 15 years. The attic dust portion of the abatement program will continue thereafter.

Additionally, the program will ensure that all interior living spaces, including rentals, will be inspected to determine that attic dust is not entering living spaces. The regulatory agencies will evaluate the residential abatement program in 18 months, 36 months, and 5 years after the initiation of the expanded program. If these reviews show that the program is not protective of human health, the Agencies will modify the criteria that trigger the abatement of sources of attic dust contamination.

As noted, EPA's preference is for this program to be done in conjunction with the remediation of other lead and metal sources such as indoor plumbing, indoor lead based paint, and exterior lead based house paint, as is currently being done under the BSB Lead Intervention Program. This portion of the program, however, is outside of Superfund's statutory jurisdiction and must rely on voluntary cooperation from the potentially responsible parties, BSB, and the agencies to fund and implement this comprehensive approach. Under remedial design, EPA will work with these parties to develop a comprehensive program within the parameters described above. If an agreement can be reached between the responsible party (RP) Group and the EPA to address all pathways of exposure to lead, including lead-based paint, the Selected Remedy will include a Residential Metals Abatement Program to address lead, mercury and arsenic contamination in residential settings as described above and below.

A Residential Metals Abatement Program will expand the current BSB Lead Intervention and Abatement Program to include arsenic and mercury. The current Lead Intervention and Abatement Program focuses on properties with sensitive populations such as nursing mothers and children under age 6. The Residential Metals Abatement Program will also provide for a prioritized approach but is not limited to addressing only properties occupied by sensitive populations. The Residential Metals Abatement Program requires a multi-pathway approach to address lead, mercury, and arsenic contamination at all residential properties within the BPSOU. The program addresses all sources of arsenic, lead, and mercury in yards, household indoor dust, including dust in non-living space such as attics when an exposure pathway has been identified, interior and/or exterior lead paint, and lead solder in household drinking water pipes. It also includes sampling all residential properties within the BPSOU. Properties above the action levels for lead, arsenic and/or mercury will be remediated. Residential properties with sensitive populations as defined in the current Lead Intervention and Abatement Program will be addressed before those not occupied by sensitive populations.

Contaminated dust located in portions of homes that are seldom visited (non-living space areas) such as attics or crawl spaces will be remediated if an exposure pathway exists. Homes in Butte that are in areas adjacent to the BPSOU may have contaminated dust in the attics. Homes in these adjacent areas that have lead, arsenic, or mercury in attic dust will be addressed in the same manner as homes within the operable unit.

The Residential Metals Abatement Program will also require developing and implementing community awareness and educational programs in conjunction with a medical monitoring program.

If the comprehensive program cannot be achieved, the Selected Remedy requires a more rapid Superfund assessment and abatement program of all residential areas within the BPSOU Site. This program must address mercury, arsenic, and lead sampling for yards and indoor dust attributable in whole or in part to mine waste sources or yard contamination. Residential properties that have sensitive populations may be prioritized for remediation before properties that are occupied by non-sensitive populations, but all known or potential residences must be addressed within 3 years of the initiation of the expanded program. Community awareness and educational programs will be implemented. Homes in areas adjacent to the BPSOU that have lead, arsenic, or mercury in attic dust will be addressed in the same manner as homes within the operable unit.

Non-Residential Source Areas

Contaminated solid media located in non-residential areas at the BPSOU include waste rock piles, milling wastes, smelter wastes, and contaminated soils.

Reclaimed areas, including cover soil caps, must achieve the proposed performance standards described by EPA in the Butte Reclamation Evaluation System, which is attached to the ROD as Appendix E. This system is a site-specific tool to evaluate the stability, integrity, and degree of human and environmental protectiveness afforded by EPA-sanctioned response actions, or other past reclamation action initiated on lands impacted by mining within the OU.

The Butte Reclamation Evaluation System establishes a system for evaluating reclaimed and revegetated land, relying on routine inspections to assess the:

- Condition and diversity of vegetative cover;
- Presence of erosion;
- Condition of site edges;
- Presence of exposed waste material;
- Presence of bulk soil failure or mass instability; and
- Presence of barren areas or gullies.

It also sets corrective action triggers for each parameter. Vegetated cover soil caps addressed under this ROD must support a diverse plant community including native species to the extent that the constituents of the vegetation cover are not incompatible with land use or sound engineering practices.

Sites with contaminated soil are grouped into different categories for remedial action:

1. Conditional, limited no further action sites
2. Unreclaimed source areas exceeding arsenic and/or lead action level(s)
3. Unreclaimed source areas not exceeding arsenic or lead action levels, but that impact surface water quality
4. Previously reclaimed sites that were not addressed under EPA orders or actions
5. Sites within the Granite Mountain Memorial Area
6. Syndicate Pit
7. Butte Mine Waste Repository
8. Sites that were not granted a "conditional, limited no further action" status in the Response Action Summary Document
9. Buried and/or saturated solid media in Lower Area One and Metro Storm Drain

1. **Conditional, Limited No-Further Action Sites:** Areas of the OU that were reclaimed during previous cleanups and that were determined to have met standards and cleanup objectives in the Response Action Summary Document will require periodic assessments of reclamation conditions. Corrective actions will be taken as dictated by the Butte Reclamation Evaluation System. Separately, if the Surface Water Management Program determines additional remediation is needed, that work must also be done.

2. **Unreclaimed Source Areas Exceeding Action Levels:** Very few unreclaimed source areas remain with arsenic or lead concentrations greater than human health risk action levels. Areas that do remain will be capped similar to prior actions - some removal may be necessary for contouring reasons. Remaining source areas at the OU that exceed the lead or arsenic action levels include:

   - Goldsmith Dumps Site 161
   - Arctic Site 1530
   - Wake Up Jim Site 1615 [1]

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[1] This site will be addressed pursuant to the final design for the Granite Mountain Memorial Interpretive Area

- Small waste areas surrounding Clark Mill Tailings repository
- Caledonia Street
- Moose Dump Site 12

Also, any new source areas identified that exceed the risk-based action levels for lead and/or arsenic will be remediated.

3. **Unreclaimed Source Areas Not Exceeding Action Levels:** If an unreclaimed, disturbed site does not exceed lead or arsenic action levels, it may still be reclaimed because of contributions to storm water contamination. EPA, in consultation with the State, has determined that, at a minimum, the following list of sites will be addressed as an initial BMP effort under the Selected Remedy:

- Back Fill 007 Site 65
- Unnamed Dump Site 148
- New and Mahoney Street
- 413 Boardman Street
- Jenny Dell Site 33
- Kelley Mine Yard Entrance
- North Wyoming Street
- 800 North Main
- North Corner of Granite and Arizona
- Green Mountain Shaft[2]
- Streambanks, sediment and over bank deposits from and including the Blacktail Creek/Metro Storm Drain confluence area to Lower Area One
- 424 North Washington Street
- 131 West Copper Street

If it is demonstrated by the surface water monitoring and Surface Water Management Program that contaminants of concern (i.e., copper and zinc) from other areas are migrating and impacting surface water quality in Silver Bow

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[2] This site will be addressed pursuant to the final design for the Granite Mountain Memorial Interpretive Area

Creek, Blacktail Creek, or Grove Gulch Creek, to the extent that applicable water quality standards are exceeded, remedial actions for these areas will be implemented. The action to be implemented will be determined during remedial design, but will likely be capping with limited removal and reclamation.

4. **Previously Reclaimed Sites (Not Addressed Under EPA Order):** Sites where reclamation took place outside of removal actions mandated or performed by EPA will require sampling/inspection and possible further reclamation, as necessary. Specific actions to be implemented will be determined during remedial design, but will likely be capping with limited removal. These sites shall also be evaluated and maintained over the long-term under the Butte Reclamation Evaluation System.

5. **Granite Mountain Memorial Area:** Various reclamation and other enhancements to the historic Granite Mountain Memorial Area shall be implemented. These include: reclaiming source areas in publicly used areas, restricting access to certain areas of the historic mining landscape, installing picnic areas and walking trails, enhancing existing vegetation, and diverting storm water runoff to the Berkeley Pit. These actions shall be consistent with historical preservation requirements and other standards and the county's historical park plan.

6. **Syndicate Pit:** The Syndicate Pit shall be reclaimed, to the extent practicable, for use as a mine training center. Shallow to moderate slopes will be reclaimed using soil caps, rock caps, and gravel parking areas. Steep slopes will not be reclaimed. The pit base will continue to be used as a sediment catch basin.

7. **Butte Mine Waste Repository:** When full, the existing Butte Mine Waste Repository will be closed in compliance with ARARs. A new repository will be sited next to the existing repository if that capacity is needed. It, too, would be closed using the same standards.

8. **Sites Not Granted "Conditional, Limited No Further Action" Status:** The following three sites were reclaimed during previous TCRAs or N-TCRAs and were determined NOT to meet ARARs and preliminary remedial action objectives (RAOs) in the Response Action Summary Document:

   - Colorado Smelter
   - Lower Railroad Yard Site 1
   - Lower Area One

   The Colorado Smelter site and Lower Railroad Yard Site 1 were not granted a conditional, limited no further action status in the Response Action Summary Document. EPA believes that the seasonal high water table may be less than 10 feet below ground surface at the Colorado Smelter. Therefore, capped wastes may violate solid waste requirements. However, this has not yet been clearly determined. For this reason, additional data must be collected to determine the

separation of the seasonal high water table from wastes at the Colorado Smelter. If it is determined that the separation between the base of wastes and the seasonal high water table is less than 10 feet, wastes will be removed to a designated repository. Wastes at the Lower Railroad Yard Site 1 will be removed to a designated repository.

The Selected Remedy for the Lower Area One site is described below in Groundwater Components.

9. **Buried and/or saturated solid media in Lower Area One and Metro Storm Drain:** The Selected Remedy for LAO and MSD is described in the Groundwater portion of the text.

Groundwater

The Selected Remedy for groundwater will prevent ingestion of and direct contact with contaminated groundwater that would result in unacceptable risk to human health; prevent groundwater discharge that would lead to violations of surface water ARARs; and prevent degradation of groundwater that exceeds current standards. A Technical Impracticability evaluation was completed for the alluvial aquifer and determined that groundwater specific ARAR requirements cannot be met for the alluvial aquifer in a reasonable time frame. The Selected Remedy waives these ARARs in accordance with CERCLA.[3] The Selected Remedy for groundwater includes six components:

1. Existing contaminated saturated soils and mining waste will be left in place in Lower Area One and Metro Storm Drain.

2. Contaminated alluvial groundwater in the MSD shall be captured with the subdrain under the MSD channel, and/or another appropriate groundwater collection system. The captured groundwater shall continue to be pumped from the terminal vault in the MSD to the treatment facility at LAO. The captured and pumped water will be treated by lime precipitation technology as described below in subparagraph 4 before being discharged to Silver Bow Creek. However, because issues regarding long-term performance of the subdrain have not been fully addressed, the Selected Remedy also includes a 5-year shakedown period to evaluate the reliability of the MSD subdrain collection system. During this shakedown period, the system shall be evaluated and improved if needed, and an approved operation and maintenance plan shall be developed for the collection system. If the subdrain collection system shows significant performance issues, a

[3] The Technical Impracticability ARAR waiver would also apply to the prohibition on the disposal or storage of tailings/mine wastes/toxic or hazardous materials in the floodplain to the extent that any part of the remedial action for wastes left in place in the floodplain would constitute the active management or storage of those wastes.

new or modified groundwater collection system will be designed and implemented.

3. Contaminated alluvial groundwater at LAO and base flow from Missoula Gulch will be intercepted in a hydraulic control channel, which runs parallel to Silver Bow Creek, and routed to the treatment lagoon facility described below. If groundwater inflow between the MSD and LAO capture systems is found to adversely affect surface water quality, additional groundwater capture and hydraulic control shall be implemented. In addition, water from the Mine Flooding OU West Camp System will be routed to the hydraulic control channel at Lower Area One for treatment in the treatment facility described below.

4. As part of the RI/FS, AR has constructed a lagoon treatment system at Lower Area One as a demonstration project. Treatment discharge data from this system suggest that it has been meeting state water quality standards for copper, cadmium, and zinc at the point of discharge. Arsenic standards have been met on all but a few occasions. These data are especially encouraging for cadmium discharges - conventional treatment systems have had problems meeting the cadmium standard because of reduced holding times in such facilities. The lagoon treatment system's longer holding times appear to be effective in the treatment of cadmium. Accordingly, the Selected Remedy includes retention and continued operation of the lagoon system, after evaluation and improvements determined during remedial design, for treating captured and routed groundwater prior to discharge to Silver Bow Creek. However, because issues regarding long-term performance and sludge removal and disposal for the treatment lagoon system have not been fully addressed to date, the Selected Remedy also includes the following:

    a. A 5-year shakedown period will be in place for the lagoon treatment system. The captured groundwater will be treated to DEQ-7 standards (Table 8-2) prior to discharge. The lagoon treatment system must demonstrate successful water treatment and full compliance with the standards, when operating at designed capacity, and when operating under a wide range of conditions. Also, it must be demonstrated that sludge removal and sludge management can be performed effectively without causing system upsets. AR made modifications to expand the capacity of the treatment lagoons that did not go through the formal EPA design, review, and approval process. Therefore, those modifications and any additional design of the expanded treatment lagoon system will need to go through the formal EPA review and approval process. The lagoon treatment system shall be designed to prevent the release of untreated contaminated waters into Silver Bow Creek, as a result of upset periods due to flooding, equipment malfunction or failure, or extended periods of cold, etc. ARAR compliant sludge removal, management, and disposal plans must be developed and approved.

b. Using the Butte Reduction Works area near the lagoon treatment system for sludge drying and sludge management is not allowed, since it is a dedicated open space area more suitable for public use.

c. If at any time during the shakedown period, or thereafter, the system fails to meet discharge standards and cannot be adjusted or modified to meet standards, or if sludge removal, management, and disposal cannot be done in compliance with ARARs and in a protective manner, a conventional lime treatment system shall be designed and built at LAO. The conventional system shall use lime treatment technology to treat the captured contaminated water and meet all discharge standards.

d. The design will be required to include contingencies for how to manage and store collected groundwater during extended periods of upset.

5. A comprehensive groundwater monitoring plan shall be prepared and implemented for the entire alluvial aquifer to ensure that groundwater capture systems are effective; to determine that contaminated groundwater is not leaving the TI Zone or discharging to surface water; to provide additional information as necessary on the movement, quality, and quantity of groundwater; and to provide data for review of the groundwater remedy. This monitoring system shall include expanded wells and measurements from the existing system, and shall provide for the careful and thorough monitoring that includes, but is not limited to, groundwater near Blacktail Creek, the groundwater between the MSD and LAO groundwater capture systems, groundwater adjacent to the lagoon treatment system, and groundwater downgradient (west) of the BPSOU. An initial outline of groundwater monitoring requirements is included in Section 12.

6. A controlled groundwater area shall be established for the alluvial aquifer to prevent domestic use of this water and to prevent any well development that would exacerbate or spread existing contamination. Other institutional controls, such as county laws or regulations regarding domestic use of groundwater in the area, may also be required.

The Selected Remedy for groundwater will be implemented primarily in the Metro Storm Drain and Lower Area One areas. Under the Selected Remedy, buried and partially saturated wastes in these areas will be left in place with appropriate groundwater monitoring and institutional controls (ICs). This will provide a continued understanding of the extent of groundwater contamination and long-term protection of human health and surface water resources.

Contaminated alluvial groundwater in the MSD will be captured and routed to a lime treatment facility for treatment and discharge to Silver Bow Creek, per the conditions described above. The groundwater collection system at MSD and LAO has and will significantly reduce the loading of metals to Silver Bow Creek. The groundwater remedy will provide the level of protection of Silver Bow Creek needed to achieve remedial action objectives during non-wet weather (base flow) conditions.

Although previous response actions have removed a substantial quantity of waste material from LAO, wastes remain beneath the Municipal Sewage Treatment Plant, structures such as the aqueduct and slag walls being retained for their historic value, and below the vertical excavation limits established during the design of the LAO Expedited Response Action (ERA). Existing hydraulic controls constructed during the LAO cleanup to capture, control, and extract contaminated alluvial groundwater and to prevent groundwater discharge to Silver Bow Creek are incorporated into the Selected Remedy. This system has operated since 1998 and, based on improvements in water quality in Silver Bow Creek, appears to be effectively capturing contaminated alluvial groundwater.

Under the Selected Remedy, groundwater captured in the interception and collection systems at LAO and MSD will be combined with contaminated base flow from Missoula Gulch and the groundwater from the West Camp bedrock system of the Mine Flooding OU for combined treatment in the treatment lagoon facility, to be evaluated and possibly re-designed or modified during remedial design (per the conditions described above). If monitoring data demonstrate that the current subdrain is not capturing the contaminated groundwater, or contaminated groundwater is leaving the site, or the system is not otherwise effective, additional groundwater capture systems and/or extraction wells will be implemented to ensure full effectiveness of the system. The treated water shall be subsequently discharged to Silver Bow Creek or used for other beneficial purposes. Treatment capacity for the lagoon treatment system will be evaluated and finalized during remedial design.

Surface Water

The Selected Remedy for surface water is directed at achieving the primary objectives of returning Silver Bow Creek to its beneficial uses and protecting downstream receptors from releases of contamination from BPSOU. The Selected Remedy will protect human health and the environment, achieve water quality standards for COCs in Grove Gulch, Blacktail Creek and Silver Bow Creek, and meet all ARARs that are not waived. The Selected Remedy for surface water consists of the following components:

1. The Surface Water Management Program, which uses Best Management Practices (BMPs) to address contaminated storm water runoff and improve storm water quality.

2. Excavation and removal to a repository of contaminated sediments from the stream bed, banks, and adjacent floodplain along Blacktail Creek and Silver Bow Creek, from just above the confluence of Blacktail Creek and MSD to the beginning of the reconstructed Silver Bow Creek floodplain at LAO. The stream and floodplain will be reconstructed according to an EPA-approved design. Following removal of the in-stream sediments, further evaluation of surface water quality in this area will be conducted. If groundwater inflow is found to adversely affect surface water quality, additional hydraulic controls and groundwater capture shall be implemented.

3. Capturing and treating storm water runoff up to a specified maximum storm event, if BMPs implemented under the Surface Water Management Program do not achieve the goal of meeting surface water standards in Silver Bow Creek during storm water events.

4. Hydraulic control, capture, and treatment of contaminated groundwater to prevent its discharge to Silver Bow Creek surface water (as described in Section 12.3.2).

5. In-stream flow augmentation as appropriate. Flow augmentation will not be considered until the major remedial components described in this ROD are designed and implemented.

Hydraulic control, capture, and treatment of contaminated groundwater have largely addressed surface water contamination during base flow conditions. Storm water BMPs will be used to control storm water runoff from the OU and reduce the level of contamination of Silver Bow Creek, Blacktail Creek, and Grove Gulch from heavy metals and arsenic to below state water quality standards. The BMPs that will be implemented include, but are not limited to, actions such as source controls on mine wastes, engineered sediment controls, curb and gutters, detention/retention basins, routing storm flows away from receiving waters, or removal of waste materials to a repository. If BMPs are not effective in achieving surface water quality standards in Silver Bow Creek, lime treatment of storm water runoff may be required. Under this contingency, storm flows up to a specific design criterion would be collected and treated by lime treatment or redirected to the Berkeley Pit. If treatment is required, a conventional lime treatment plant dedicated for that purpose would be constructed.

The Selected Remedy permits augmenting stream flows by adding other water sources if necessary to increase flows and improve water quality. The objective of augmentation is to enhance the performance of other components of the surface water remedy and increase the probability of meeting surface water standards on a consistent basis within Silver Bow Creek. In-stream flow augmentation is subject to the conditions outlined above.

Elevated levels of arsenic and heavy metals occur in streambed sediments, the stream banks, and nearby floodplain materials from the confluence Metro Storm Drain and Blacktail Creek to the reconstructed Silver Bow Creek channel at LAO. To prevent these materials from being a source of contaminants to Silver Bow Creek, these materials shall be excavated and removed to an appropriate mine waste repository. The stream channel and floodplain shall then be reconstructed according to an EPA-approved design.

Institutional Controls

The Selected Remedy includes the following minimum ICs:

1. A controlled groundwater area will be established in the Alluvial Aquifer TI Zone to prevent domestic use of contaminated water, exacerbation or spreading of

existing contamination, or release of highly contaminated groundwater to surface water resources through irrigation. The controlled groundwater area will prevent new well development, except for CERCLA monitoring wells, well systems that treat contaminated water prior to use, and the use of existing domestic and commercial wells. To the extent a controlled groundwater area will not prevent the use of existing wells, an education and well abandonment program will be implemented to persuade owners not to use contaminated water and to voluntarily take existing wells out of service in exchange, for example, for being hooked up to public water. An administrative entity will be identified to monitor and enforce these restrictions.

2. County zoning and permit requirements will be implemented to ensure that capped waste areas, discrete areas of waste left in place, and other control measures such as storm water controls are not disturbed, mismanaged, or inappropriately developed and that waste taken from these areas is disposed of at the Butte Mine Waste Repository, or if identified as a hazardous waste disposed of at a RCRA C facility. These controls and permits are best implemented with adequate funding for appropriate redevelopment and re-use of affected sites.

3. Deed notices will be required for all areas where wastes were capped and left in place or where engineered controls were constructed or other discrete wastes were left in place. The deed notices will notify current and subsequent landowners of the presence of these wastes or engineered controls and ensure that these wastes are not disturbed. In addition, fencing and signs may be required to ensure the integrity of caps and engineered controls.

4. Where private landowners require fencing or use posting for legitimate reasons relating to the prevention of remedy disruption, the Selected Remedy requires the installation of these fences or signs.

Operations and Maintenance

There are several short-term Operation and Maintenance (O&M) plans in existence for various actions within the BPSOU site. The Selected Remedy requires the development of long-term and integrated comprehensive monitoring and O&M plans for all aspects of the Selected Remedy.

Statutory Determinations

The Selected Remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action, or appropriately waives ARAR requirements, is cost-effective, and utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on site above health-based levels that allow for unlimited use, a statutory review will be conducted within five years after initiation of remedial actions to ensure that the remedy is, or will be, protective of human health and the environment.

The Selected Remedy does not satisfy the statutory preference for treatment as a principal element of the remedy because feasible treatment options for solid media are not available for the waste and site conditions at the BPSOU. However, the remaining source materials in the BPSOU were determined to constitute a relatively low, long-term, non-principal threat, thus eliminating the need or expectation for treatment of solid media. Groundwater treatment, and an option to treat surface (storm) water if necessary, has been included in the Selected Remedy.

The Selected Remedy achieves substantial risk reduction and is feasible, implementable, and cost-effective. Residual risks are effectively managed under the Selected Remedy, as demonstrated by several years of experience at the OU with groundwater and cap management.

ROD Data Certification Checklist

The following information is included in the Decision Summary section of this Record of Decision. Additional information can be found in the Administrative Record for this site.

- COCs and their respective concentrations.
- Baseline risk presented by the COCs.
- Cleanup levels established for COCs and the basis for these levels.
- How source materials are addressed and a classification of remaining source areas as non-principal threat wastes.
- Current and reasonably anticipated future land use assumptions, and potential future beneficial uses of groundwater used in the baseline risk assessments and ROD.
- Potential land and groundwater use that will be available at the site as a result of the Selected Remedy.
- Estimated capital costs, annual operation and maintenance costs, and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected.
- Key factors that led to selecting the remedy.

Authorizing Signatures

The U.S. Environmental Protection Agency (EPA), as the Lead Agency for the BPSOU of the Silver Bow Creek/Butte Area Superfund Site (MTD980502777), formally authorizes this *Record of Decision*.

Max H. Dodson
Assistant Regional Administrator
Ecosystems Protection and Remediation
U.S. Environmental Protection Agency, Region 8

9/21/06
Date

The State of Montana Department of Environmental Quality (DEQ), as the Supporting Agency for the BPSOU of the Silver Bow Creek/Butte Area Superfund Site (MTD980502777), partially concurs with this *Record of Decision*. DEQ's Concurrence Letter is attached to this ROD as Appendix C.

Richard H. Opper, Director
State of Montana
Department of Environmental Quality

Date

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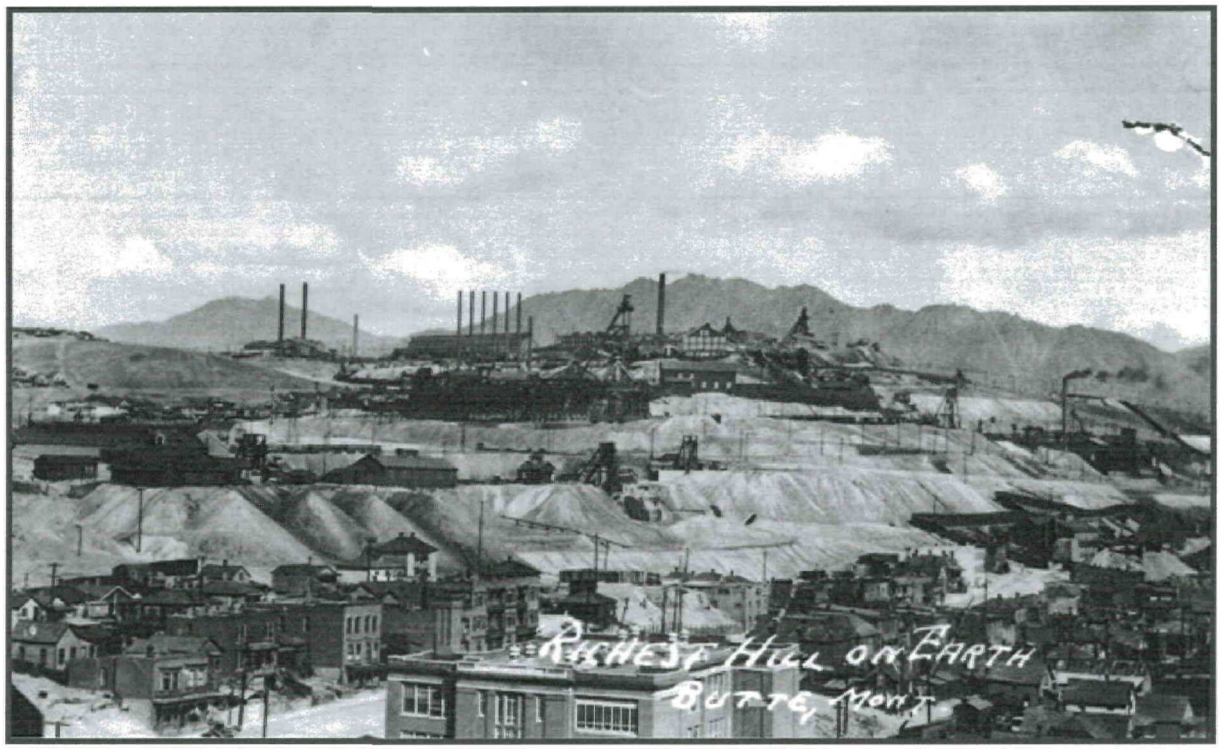
Richard H. Opper, Director
State of Montana
Department of Environmental Quality

9/22/06
Date

Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

U.S. Environmental Protection Agency, September 2006

Part 2: Decision Summary



Decision Summary

Section 1 Site Name, Location, and Description

Butte Priority Soils Operable Unit (BPSOU)
Silver Bow Creek/Butte Area Superfund Site
Butte, Montana
CERCLIS # MTD980502777

The Silver Bow Creek/Butte Area National Priorities List (NPL) Site, which includes the BPSOU, represents one of four contiguous Superfund Sites in the upper Clark Fork River Basin that extend 140 miles from the headwaters of Silver Bow Creek north of Butte to the Milltown Reservoir near Missoula, Montana (Figure 1-1). The Silver Bow Creek/Butte Area NPL Site lies immediately west of the continental divide in southwestern Montana, at the easternmost extent of the upper Clark Fork River drainage. The site encompasses approximately 85 square miles, including the entire length of Silver Bow Creek and associated land contamination from Butte westward approximately 25 miles to the Warm Springs Ponds near Anaconda. The site incorporates several square miles of land area within the city of Butte, Montana. The BPSOU lies within the Butte portion of the Silver Bow Creek/Butte Area site, encompassing the town of Walkerville, the part of Butte north of Silver Bow Creek and west of the Berkeley Pit, and a section of land that extends south from Silver Bow Creek to Timber Butte (Figure 1-2). The U.S. Environmental Protection Agency (EPA) is the lead agency and the Montana Department of Environmental Quality (DEQ) is the support agency for the BPSOU.

The BPSOU covers an area of approximately five square miles and is located a few miles west of the continental divide at an elevation range of approximately 5,400 to 6,400 feet above mean sea level (amsl). The BPSOU encompasses the northwestern portion of the Summit Valley, which is characterized by gently sloping terrain, generally sloping toward the north in the southern portion of the valley and toward the west in the northern portion of the valley. Mountains bound the valley on the east, south, and north with highest elevations reaching over 10,000 feet in the Highland Mountains south of Butte. The two primary streams in the valley are Blacktail Creek, which begins in the Highland Mountains to the south, and Silver Bow Creek, which begins where Blacktail Creek and the Metro Storm Drain (MSD) converge. Silver Bow Creek flows west along the base of the Butte Hill and, prior to mining, originated in the mountains northeast of the BPSOU. With the advent of mining, Silver Bow Creek was rerouted and the original channel and floodplain has been completely obliterated by the Berkeley Pit and the Yankee Doodle Tailings Pond. The MSD was constructed by realigning and filling the original Silver Bow Creek channel, a low-lying swampy area, with numerous mine waste impoundments. The Metro Storm Drain is generally dry, except during storm runoff or snowmelt episodes, and the primary source of flow in Silver Bow Creek is inflow from Blacktail Creek.

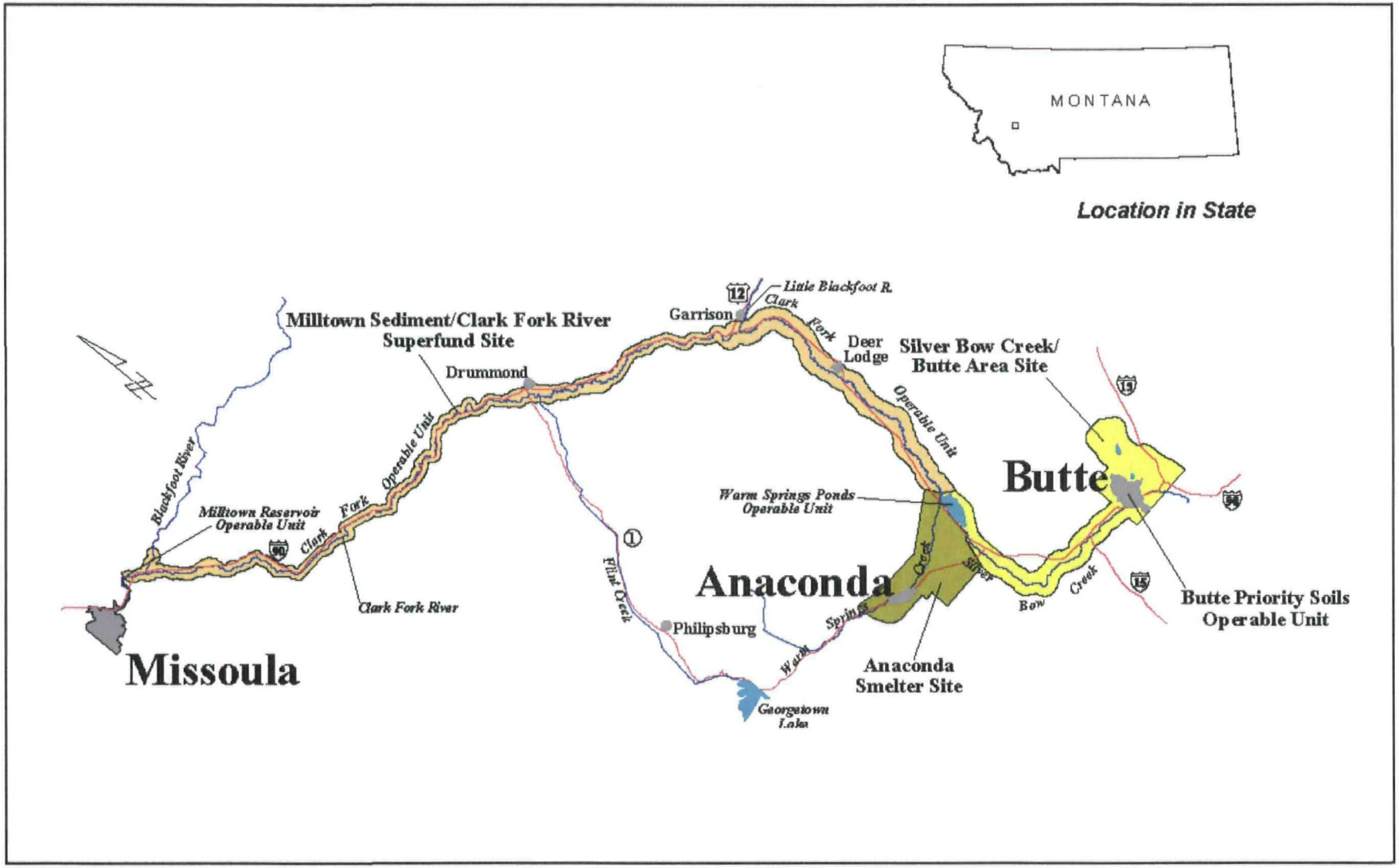


Figure 1-1
Site Location
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

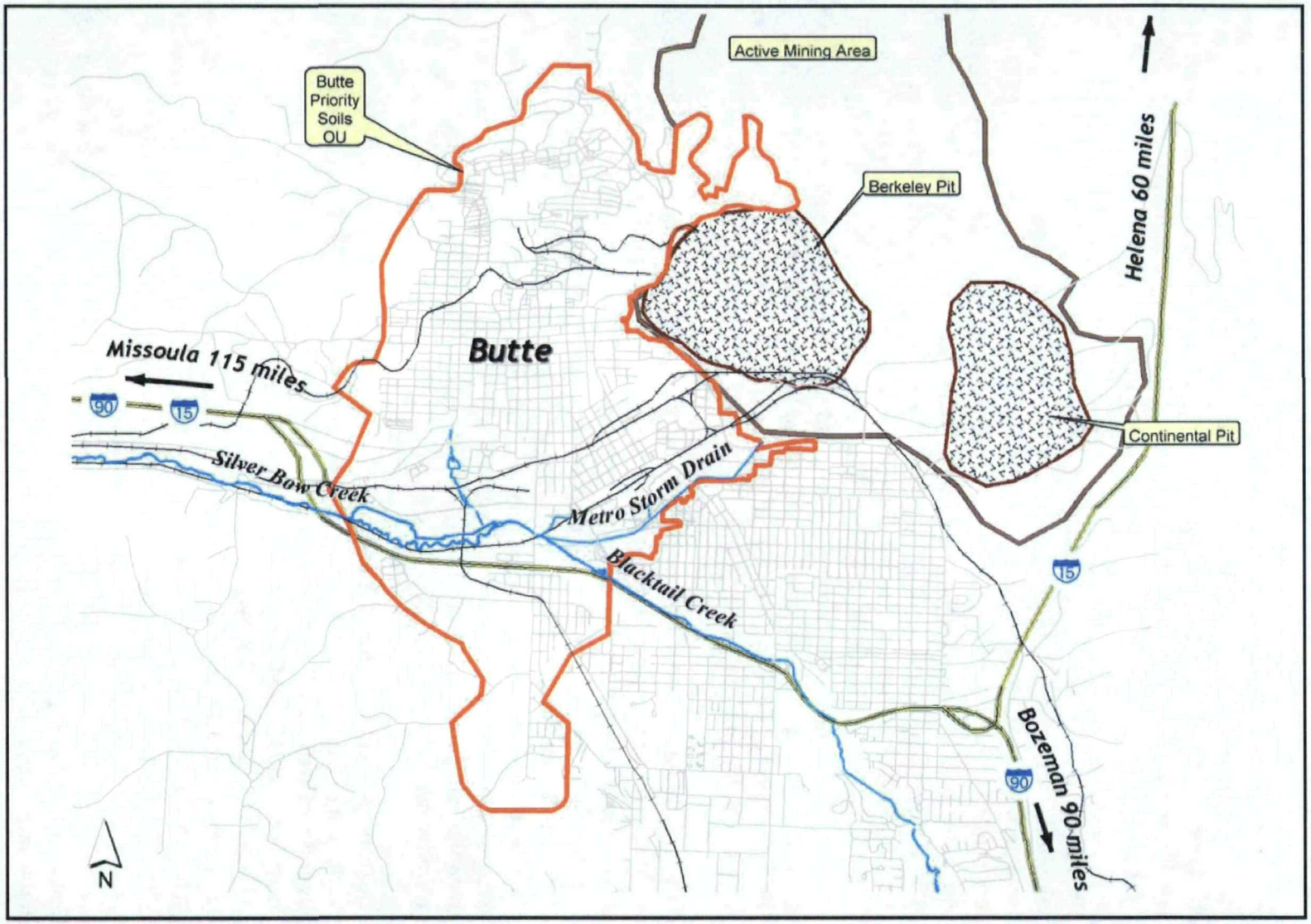


Figure 1-2
Butte Priority Soils OU Site Map
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

The BPSOU is centered on "Butte Hill", which is the location of the historic Butte Mining District. Contaminants at the site, including arsenic and heavy metals such as copper, lead, mercury, and zinc, are the result of 120 years of hard rock mining, smelting, milling, and other processing activities. Mining and ore-processing wastes in Butte represent the primary source materials. These wastes come in several different forms, including mill tailings, waste rock, slag, smelter fallout, and mixed combinations of each. Arsenic and metals contained in, or released from these wastes to soil, surface water, and groundwater pose significant risks to human and ecological receptors.

The BPSOU is situated in a predominantly urban setting, and includes residential neighborhoods, schools, and parks, as well as commercial and industrial areas. Land use within the BPSOU is subject to regulation by the Butte-Silver Bow (BSB) County government through local ordinances. Figure 1-3 is a map showing the major land uses in the BPSOU based on the BSB County Master Plan. The northern portion of the BPSOU is typified by residential and commercial development and inactive mining operations. Light industrial activity, scattered residences, and the Silver Bow Creek floodplain characterize the central portion of the BPSOU. The southern portion is characterized by residential areas, inactive mining operations, cemeteries, and undeveloped land. The estimated population of the city of Butte was 34,128 in 1994. The population of Butte peaked in 1920 at 60,313 people. The 2000 U.S. Census reports Butte's population to be 33,892.

Butte's continental climate is characterized by short, cool, dry summers and long, cold winters. The annual precipitation in Butte generally varies from 6 to 20 inches, with an average of nearly 13 inches. The greatest amount of precipitation, approximately one third of the annual amount, typically occurs during the months of May and June. With an estimated annual free water evaporation of 30 inches (NOAA 1988), annual evaporation significantly exceeds annual precipitation in the Butte area. However, precipitation amounts may exceed evaporation during certain portions of each year, given the cold climate in Butte. As a result, precipitation provides some recharge to groundwater systems in the BPSOU area.

The principal geologic units within the BPSOU are quartz monzonite bedrock overlain in places by alluvial deposits. Alluvium within the BPSOU is associated with Silver Bow Creek, Blacktail Creek, the MSD (i.e., the historic Silver Bow Creek floodplain), and Grove Gulch. The thickness of the alluvium is generally greater than 200 feet in the upper MSD area and decreases toward the west to less than 20 feet near the western BPSOU boundary. A water table depression associated with the Berkeley Pit has resulted in the formation of a groundwater divide in the alluvial groundwater system. The alluvial groundwater divide is located in the vicinity of the upper MSD and consists of an area with a relatively flat water table several hundred feet wide. Within the boundaries of the BPSOU, groundwater to the north and east of the divide flows toward the Berkeley Pit. Groundwater south and west of the divide generally flows parallel to the major drainages in the BPSOU.

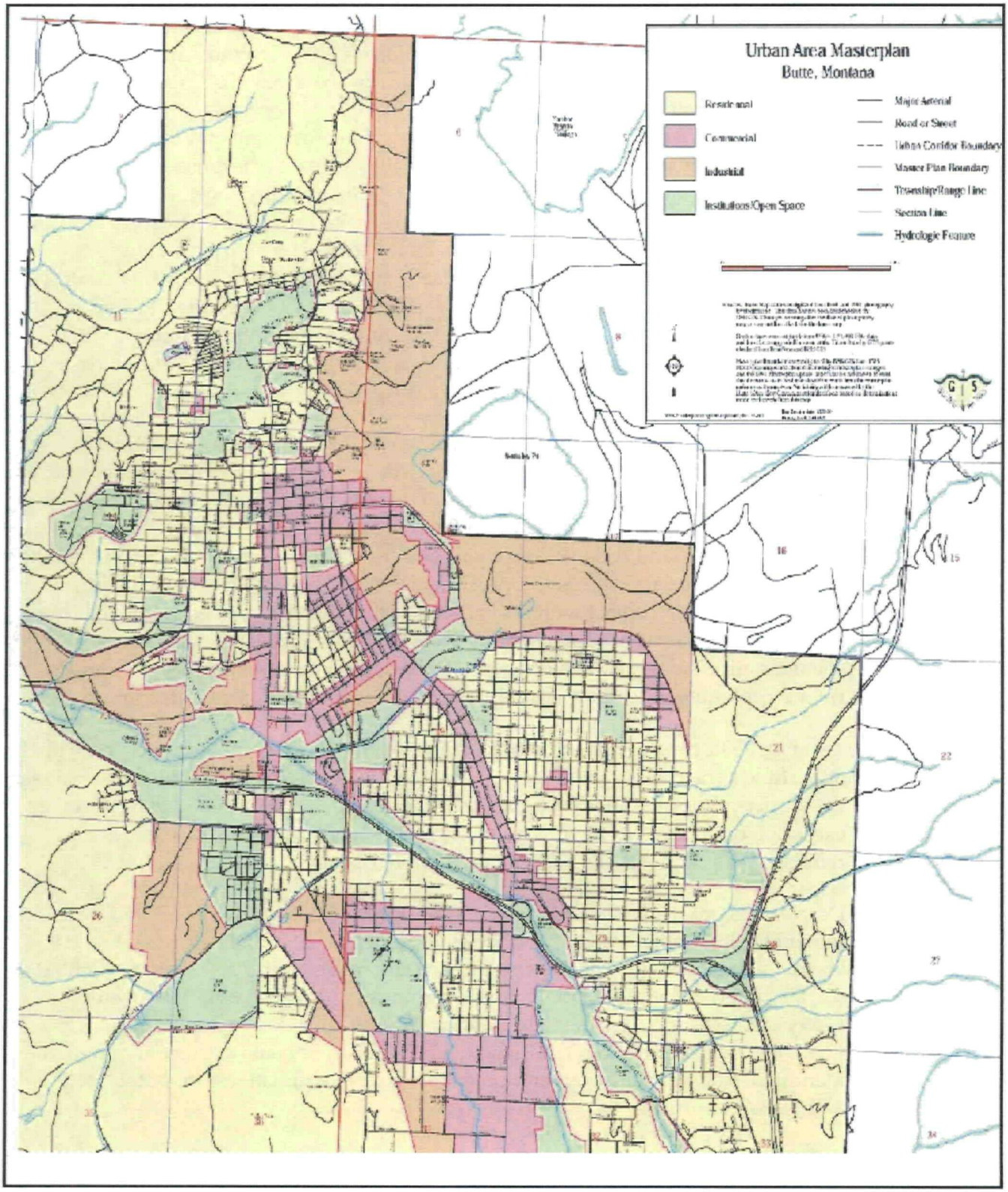


Figure 1-3
Land Use within the BPSOU
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

Groundwater flow from the entire drainage converges in the west-central portion of the BPSOU in the area known as Lower Area One (LAO). Groundwater exits the west side of the BPSOU (and LAO) in a relatively narrow region of the flood plain alluvium associated with Silver Bow Creek. The alluvial deposits in this narrow region are less than 20 feet thick. The reduction in lateral extent and thickness of the alluvium near the west end of the BPSOU greatly decreases the cross-sectional flow area of the alluvial system, resulting in a "neck" through which only a very small portion of the alluvial groundwater can exit the basin. As a result, nearly all alluvial groundwater within the Summit Valley is forced to discharge to surface water in Blacktail Creek, the lower portion of the MSD, and to various groundwater control ponds and channels in LAO constructed as part of the LAO Expedited Response Action (ERA). This hydrogeological setting within LAO and the hydrologic modifications made as part of the LAO ERA has made it possible to control, collect and treat approximately 95 percent of the alluvial groundwater within the BPSOU.

EPA has implemented many response actions during the course of the RI/FS to address high priority human health and environmental risks, and these actions have reduced the severity of contaminant loading to Silver Bow Creek. Response actions completed to date have addressed over 8 million cubic yards of waste using removal, capping, and/or land reclamation. Over 400 acres of mine-impacted land on the Butte Hill have been reclaimed. Also, approximately 1.2 million cubic yards of tailings that were previously in contact with ground and surface water have been removed from the Silver Bow Creek floodplain. Storm water controls, including conveyance channels, diversions, and detention basins, have been constructed to significantly reduce contaminant loading carried from the Butte Hill via storm water runoff.

Through 2005, the PRP Group has spent approximately $60 million associated with Superfund construction activities within the Butte Priority Soils OU. EPA has assessed the work completed under past response actions and has determined that, with the exception of three sites, the removal work is consistent with BPSOU site-specific remedial goals and ARARs and will not require further action.

Despite this progress, site-wide remedial goals have not been achieved, and threats to human health, public welfare, and the environment exist from heavy metals and arsenic. The actual or potential exposure to lead, mercury and arsenic in residential soil and interior household dust poses a significant human health risk. Arsenic and heavy metals in surface water and alluvial groundwater exceed applicable water quality standards. The Selected Remedy includes components to prevent or mitigate identified exposure pathways and potential threats to human health, public welfare and the environment.

Section 2 Site History and Enforcement Activities

The Silver Bow Creek/Butte Area NPL Site is located in the upper Clark Fork River watershed and includes portions of Butte and Walkerville, Montana. EPA designated the original Silver Bow Creek Site as a Superfund site in September 1983, under the authority of the CERCLA. EPA expanded the Silver Bow Creek Site to include the Butte Area in 1987. In addition to the BPSOU, this NPL site also includes the following remedial OUs: Butte Mine Flooding Operable Unit ([BMFOU] - Berkeley Pit and flooded underground mine workings); Rocker Timber Framing and Treatment Plant; Streamside Tailings; Warm Springs Ponds Active Area; Warm Springs Pond Inactive Area; Active Mine Area; and West Side Soils (formerly Non-Priority Soils). Other Superfund sites within the Clark Fork River drainage include the Anaconda Smelter NPL Site, the Montana Pole and Treating Plant NPL Site, and the Milltown Reservoir/Clark Fork River NPL Site.

Site History

In 1864, the first placer gold claims in the Butte area were staked and worked. These low-grade ores proved difficult to recover, and Butte remained a small mining camp compared to others in the region. Early activities focused on placer mining. However, silver and copper ore also attracted the attention of early miners.

By the 1870s, dozens of silver and copper claims had been located and successful treatment processes developed, prompting the construction of mills and smelters capable of refining arsenic-laden copper ores. A world-class copper industry began to develop. In 1881, the purchase of mining claims by future copper baron, Marcus Daly, marked a significant turning point for Butte. Daly and his financial partners organized various companies, which became the Anaconda Copper Mining Company (ACMC) and rapidly accumulated surrounding mining properties on the Butte Hill. At about this time, there were over 300 operating copper mines, at least 10 silver mines, five smelters, and over 4,000 posted claims. Many mining companies operated in the Butte area from the 1860s through the 1920s.

Butte's air quality was poor for many years because of heap roasting – a process in which copper ore was roasted in large, open air fires – and smelting that took place within the city limits. In response to the poor air quality, on December 17, 1890 the city passed Ordinance 186, which made it illegal to roast ore within the city limits.

In 1883, Daly developed his own smelting facility 25 miles away and established the town of Anaconda. In the early 1890s, Daly and the ACMC built their own railroad, the Butte, Anaconda & Pacific, thus monopolizing the mining, transportation, and smelting of the copper ore. Spurs of the mainline tied all of the ACMC mines on the Butte Hill to the smelter works in Anaconda.

By 1910, the Butte district had produced over 284 million pounds of copper, making it the largest producer of copper in North America. All of the mines produced waste piles of various compositions, and the mills and smelters produced large quantities of tailings and related waste that were disposed of in ponds or dumped in Silver Bow Creek. Between 1910 and 1927, ACMC completed consolidation, with few exceptions, of all of the major mines, smelters, and mills in Butte. Milling and smelting continued in Butte until the 1920s but, as the copper smelting capacity at Anaconda grew, Butte became primarily a mining center. Butte's smelters and mills produced air emissions that contaminated yards and attics throughout the BPSOU, as well as large quantities of waste such as tailings and slag. Butte's mines also produced waste and overburden piles throughout Walkerville and Butte.

Mining in Butte was entirely underground until 1955, when ACMC began surface mining at the Berkeley Pit. Figure 2-1 shows the mining landscape in Butte at the beginning of the open pit mining era.

For 80 years, immense quantities of low-grade ore were moved from the Berkeley Pit to Anaconda. But in the 1960s and early 1970s, significant changes were made in the mining and processing procedures. The completion of the Weed Concentrator in Butte in 1964 reduced the amount of ore sent to Anaconda from 12 to just one trainload per day. The Weed Concentrator (now known as the Montana Resources Concentrator) was an ore concentrating facility that produced large quantities of waste in the active mine area and discharged large volumes of contaminated water to the Metro Storm Drain.

In 1977, ACMC merged with ARCO. Open pit mining operations were conducted in the Berkeley Pit until 1982 and in the Continental Pit until 1983 when all mining operations were suspended by ARCO, the successor to ACMC. In 1985, certain properties were sold to Dennis Washington, owner of the Montana Resources (MR) Company. MR is the current operator of surface mining operations in the Continental Pit, which is located east of the Berkeley Pit, and the MR Concentrator (formerly known as the Weed Concentrator). ARCO closed the Anaconda Smelter in 1984. ARCO is now known as Atlantic Richfield, and is a wholly owned subsidiary of British Petroleum.

More than 120 years of mining has created numerous waste rock dumps that are scattered throughout the Butte area. Operation of mills, concentrators, and smelters generated tailings and a variety of other materials. The City of Butte and the Town of Walkerville were established with the advent of mining in the area and grew in size and population as the mining and milling industries flourished. The communities were established close to the mining and milling centers as a matter of convenience. Urbanization of Butte Hill and paving of large areas increased storm water runoff relative to pre-urbanization levels. Railroads were used to transport the ore and ore concentrate. Some railroad grades were built using mine waste rock, fill, and other readily available materials.

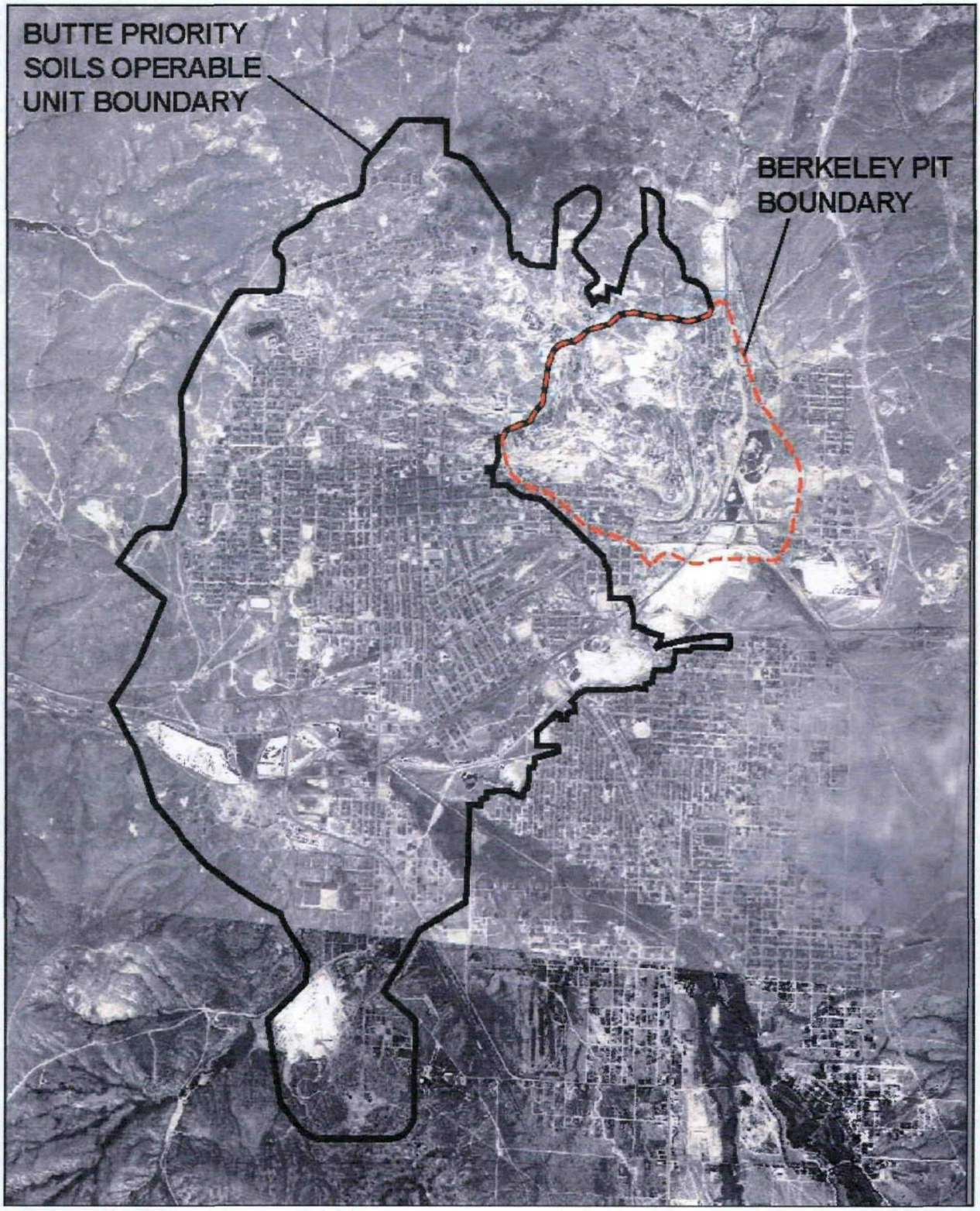


Figure 2-1
Beginning of Butte Open Pit Mining Era
(1954-1956)
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

Beginning in 1881, several railroads have served Butte, including the Union Pacific Railroad; Northern Pacific Railway and the Great Northern Railway (now The Burlington Northern and Santa Fe Railway Company); the Butte, Anaconda and Pacific Railroad; the Milwaukee Road (also known as the Chicago, Milwaukee, St. Paul and Pacific Railroad); the Montana Western Railway; and the Rarus Railway (Rarus). Remaining rail lines in the BPSOU area are shown on Figure 2-2.

Enforcement Activities

EPA designated the original Silver Bow Creek Site as a Superfund site in September 1983. A fund lead RI for Silver Bow Creek was started in 1984. During the course of this initial RI, the importance of Butte as a source of contamination to Silver Bow Creek was formally recognized. Preliminary results from the Silver Bow Creek RI indicated that upstream sources (i.e., ubiquitous mining-related wastes throughout Butte) were partly responsible for the contamination observed in the creek. After a thorough analysis of the relationship between the two sites (Butte and Silver Bow Creek), EPA concluded that they should be treated as one site under CERCLA. EPA subsequently modified the existing Silver Bow Creek Site to include the Butte area and the formal name was changed to the "Silver Bow Creek/Butte Area NPL Site" in 1987. The BPSOU was one of four remedial OUs formed in the Butte Area.

A list of PRPs is provided in Appendix D. Following issuance of this ROD, EPA will reexamine and update this list. Many of the original PRPs are no longer in existence. The new Anaconda Company has purchased Ferry Lane, one of the PRPs. EPA settled with Montana Power Company in October 2000 for its liability share within the Butte Priority Soils OU. EPA will consider settlement discussions with other small parties, separate from the main Remedial Design/Remedial Action Consent Decree. The main RPs who are likely to participate in the final Consent Decree are ARCO, Butte-Silver Bow County, Burlington Northern Santa Fe Railroad, Union Pacific Railroad Company, and Montana Resources, Inc. and its related entities.

In 1987, the Butte Soils Screening Study (CDM 1988) was conducted to provide EPA with site characterization data for the purpose of prioritizing future Remedial Investigation/Feasibility Studies (RI/FS) and removal activities. In 1989, EPA separated the BPSOU into Phase I and Phase II activities to be implemented concurrently. Phase I activities focused on high-priority human health risks and resulted in the implementation of numerous TCRAs and ERAs (discussed in additional detail previously and below). These activities have included physical removal and/or capping of the majority of potential arsenic and lead source areas within, or close to, residential neighborhoods (e.g., waste rock dumps, railroad beds, residential yards, and play areas) and cleanup of many yards. Phase II activities included conducting the full RI/FS for the entire OU. The emphasis of Phase II was an evaluation of arsenic and metal concentrations and pathways relating to Silver Bow Creek and alluvial groundwater, and both present and future arsenic and metals concentrations and pathways relating to source materials located outside of residential areas.

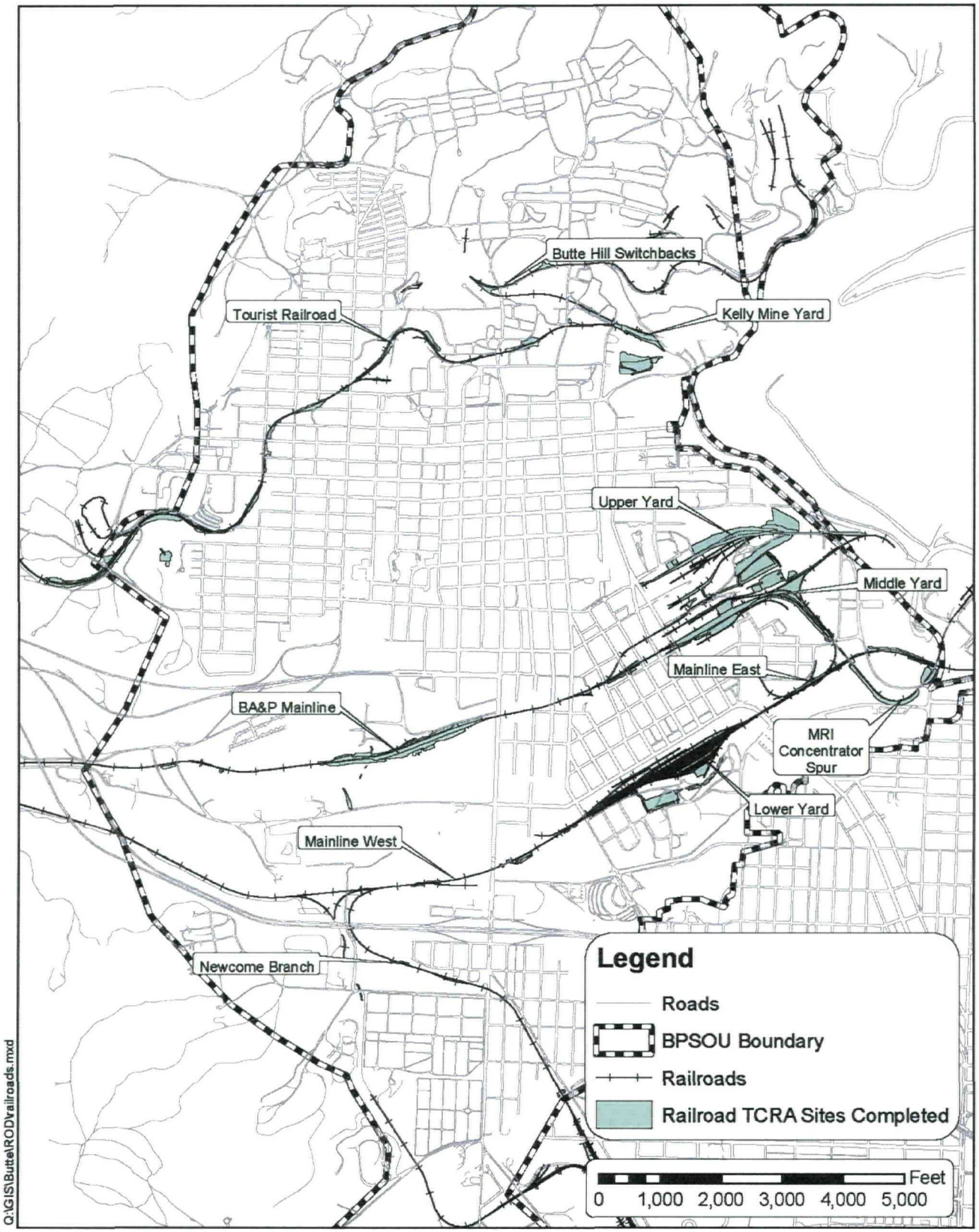


Figure 2-2: Butte Railroads and Sites Addressed in the Railroad TCRA
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

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In 1991, following initial data collection activities, EPA developed the Statement of Work (SOW) for the Phase II RI/FS (EPA 1991). The SOW served as the substantive basis for the Phase II RI/FS Work Plan (PRP Group 1996). A consent order to conduct a RI/FS at the BPSOU was executed by EPA and signed by ARCO and other BPSOU PRPs in June 1992.

Site Characterization Background

The soil/mine waste, air, surface water, and groundwater media of the BPSOU have been the subjects of studies since the late 1960s. The pace of study picked up considerably after the area became listed on the NPL in 1983. Tables 2-1, 2-2, and 2-3 summarize the soil, surface water, sediment, and groundwater investigations used to prepare the BPSOU RI and FS reports. As shown in Table 2-1, numerous investigations concerning surface soil and surface mine waste were conducted to examine the chemical characteristics of soil within residential and commercial areas, mine waste rock dumps, tailings accumulations, and railroad grades within the BPSOU. The surface water system within and adjacent to the BPSOU has been characterized by the investigations shown in Table 2-2. Both alluvial and bedrock water-bearing units are present within the Silver Bow Creek/Butte Area NPL Site. The BPSOU RI Report and subsequent documents primarily characterized the alluvial aquifer, since the bedrock aquifer was addressed in the Mine Flooding OU. Groundwater investigations are shown in Table 2-3.

Air quality within the BPSOU has been monitored with regard to total suspended particulates and metals concentrations. The majority of the data identified are linked to permitting requirements for the active mining/milling areas. As discussed in Section 3.1 of the RI report, the airborne transport of COC bearing particulates within the BPSOU does not pose a significant threat to human health and, therefore, additional efforts to characterize the air pathway were not undertaken in connection with the RI.

The PRP Group was responsible for developing the Phase II RI/FS work plan, the RI/FS reports and most of the associated sampling and analysis plans, laboratory analytical protocols, site health and safety plans, data reports, and technical memoranda supporting the RI/FS. All reports were reviewed and approved by EPA, in consultation with DEQ. EPA, in consultation with DEQ, prepared human health and ecological risk assessments, the community involvement plan, the Focused Feasibility Study of the Metro Storm Drain, and identified ARARs for the BPSOU site. In consultation with DEQ, EPA prepared the Proposed Plan and this ROD. Following issuance of the ROD, EPA and ARCO, along with other parties, are subject to a court order for mandatory Consent Decree negotiations.

Summary of BPSOU Response Actions

As noted previously, EPA undertook several removal actions (TCRAs and ERAs) within the Butte Priority Soils OU. Virtually all of this work was done by the PRPs under unilateral or administrative consent orders. Prior to the final FS and remedial decision process, 422 acres of land within the Butte Priority Soils OU have undergone

Table 2-1
Summary of Previous Soils Investigations
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

Reference	Surface Soil/Mine Waste Summary	Types of Soil/Mine Waste Information Collected	Number of Samples within the BPSOU Surface Soils Database	Analytes
Ecology and Environment, 1987. Data Results for Walkerville, Silver Bow County, Montana, letter report to Michael Holmes of EPA from Kenton Alexander of Ecology and Environment, Inc, March 11, 1987.	Surface soil sampling in Walkerville at waste dumps, drainages, residential yards, etc. Data from this investigation was not included in the soil database (Appendix A) due to incomplete sample location information.	Surface soil sampling with 611 samples	NA	542 samples - As, Cd, Cn, Cr, Cu, Hg, Pb, Mn, Zn & pH 69 samples - Ag, Al, As, Ba, Be, Ca, Cd, Cn, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Na, Ni, Pb, Sb, Se, Sn, Tl, V, & Zn
AMC, 1987. Butte/Centerville Soil Sampling Project Report, Prepared by Tetra Tech, Inc, April 1987. BUTS087C	Sampled bare surface soil in public areas where children are likely to play: parks, schools, ball fields, ice rinks, motocross racing areas, day care centers and rodeo grounds. One composite sample from each area was collected and generally consisted of several subsamples.	Surface soil sampling of bare soil in public areas	50 plus 2 duplicates	As, Cd, Cu, Hg, Pb, Zn, pH,& percent moisture
CDM, 1988. Final Report, Butte Soils Screening Study (BSSS) for the Butte Addition to the Silver Bow Creek NPL Site, Butte, Montana, Prepared for EPA. BUTS087 A	A comprehensive soils screening study to provide analytical data for prioritizing future RI/FS activities. Measured soil concentrations at historic mining and processing sites as well as residential and public areas.	Surface soil sampling, soil profile sampling	367 plus 19 duplicates	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Na, Ni, Pb, Sb, Se, Sn, Tl, V, & Zn
Ecology and Environment, 1988. Data Validation Results from the Walkerville Removal Action, letter report to Mike Holmes of EPA from Karen Abbenhaus of Ecology and Environment, Inc, October 25,1988.	Surface soil sampling in Walkerville at residences, ball fields, waste rock piles, etc. Data from this investigation was not included in the soil database (Appendix A) due to incomplete sample location information.	Surface soil sampling with 225 samples	NA	Hg, Pb, pH, & porosity
CH2M Hill and Chen-Northern, 1990a. Draft Final Silver Bow Creek CERCLA Phase II Remedial Investigation Summary, Area 1 Operable Unit. BUTSD89A BUTGW89A	Filled in data gaps of Phase I RI (MultiTech, 1987). Conducted soils mapping, sampling of soils and dispersed tailings and sampling of impounded tailings deposits in the Area One Operable Unit.	Surface soil sampling, lithology, metals by grain size and mapping; subsurface soil sampling	105 plus 9 duplicates 73 additional XRF	Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Na, Ni, Pb, Sb, Se, Tl, V, & Zn
Ecology and Environment Inc., 1990b. Report of Sampling Activities, Butte Priority Soils, Butte, Montana, March 1, 1990. BUTS090B	Determined if elevated metals existed in waste rock piles included in the Butte Priority Soils Removal Action.	Surface soil sampling	35	As, Cd, Cu, Pb, Zn & pH
ARCO, 1991a. Butte Priority Soils Investigation, Prepared by PTI Environmental Services, February 1991. BUTS091D	Helped fill data gaps from CDM (1988) (BSSS). Collected soil samples from 560 residential yards and analyzed for metals.	Surface soil sampling of residential yards	45 CLP data only	As, Cu, Pb & Zn
BSB Department of Health and Univ. of Cincinnati, 1991. The Butte-Silver Bow Environmental Health Lead Study. BUTS091E	650 soil samples were taken in residential yards, gardens, and play areas to help identify and quantify accessible metals in the environment. Performed a blood lead study for children under six years of age.	Surface soil sampling	532	As, Cd, & Pb
CDM, 1991. Priority Soils Railroad Data, Letter to Sara Weinstock of EPA from Robert Rennick of CDM Federal, June 17,1991. BUTS091A	Characterized metals and arsenic concentrations in designated railroad grades within the BPSOU.	Railroad grade sampling	51 plus 3 duplicates	Al, As, Cd, Cu, Cr, Fe, Pb, Mg, Ni, Zn, pH, & EC

Table 2-1
Summary of Previous Soils Investigations
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

Reference	Surface Soil/Mine Waste Summary	Types of Soil/Mine Waste Information Collected	Number of Samples within the BPSOU Surface Soils Database	Analytes
ARCO, 1992h. Anaconda Long Term Vegetation Monitoring Project, 1988-1990, Smelter and Butte Hill Sites. Prepared by W. Keammerer, D. Arthur, and A. Kuenstling. CFUS088A	Evaluated revegetation success at reclaimed areas in Butte and Smelter Hill near Anaconda. Characterized existing vegetation and metals concentrations in upper soil layers and plant tissues to help evaluate long term stability of vegetation. Data from this investigation was not included in the soil database because samples of remedial cover soils, not mine waste.	Surface soil sampling, vegetation structure and composition	NA	Al, As, B, Ba, Cd, Cr, Cu, Fe, K, Mg, Mn, Mo, Na, Ni, P, Pb, Si, Sr, Ti, V, Zn, pH, SAR, TOC, & CEC
CDM, 1992a. Buffalo Gulch Drainage/Residential Yards Sampling Photographs, Letter to Sara Weinstock of EPA from Gregg R. Monger of CDM Federal, July 14, 1992.	Characterized metals and arsenic concentrations in sub-surface soil samples within source areas within the Buffalo Gulch Drainage and surface soil samples from five selected residential properties within BPSOU.	Surface and sub-surface soil sampling	5 Residential yard data only	As, Cd, Cu, Pb, Zn, pH, & EC
Ecology and Environment Inc., 1992. Report of Sampling Activities Anselmo/Late Acquisition Removal Areas, Butte, MT. BUTS092C	Collected surface soil samples at the Anselmo Mine Yard Removal Area and the Late Acquisition Removal Area. Results used to fill data gaps in determining boundaries of materials to be removed by PRPs.	Surface soil sampling	8	As, Pb, & pH
MSE, Inc., 1992. Final Field Sampling Report, ARCO Priority Soils Investigation. BUTS092B	Sampled 37 residential yards for metal analyses. One composite sample from each yard was collected and consisted of 2 to 16 subsamples.	Surface soil sampling of residential yards	46 plus 3 duplicates	As, Cd, Cu, Pb & Zn
ARCO, 1993c. 1991 DS/DV/DU Report, Colorado Tailings and Butte Reduction Works Soils Investigation, Lower Area One Expedited Response Action, Supplemental Investigations, Sliver Bow Creek/Butte Area NPL Site. BUTS091B	Determined areal extent of mine tailings and metals-impacted soils and mapped surface debris within Lower Area One.	Mapped surface debris and performed surface soil sampling with LAO.	5	As, Cu, Pb, Zn, & Organics
CDM, 1993. July 1993 TCRA Sampling Results, Letter to Sara Weinstock of EPA from Darrel Stordahl of CDM, August 12,1993. BUTS093A	Collected soil samples from the Alice Dump, Anselmo Mine Yard area, and fill material stockpiled at Lower Area One.	Soil and fill material sampling	27 plus 1 duplicate	As, Cu, Pb, Zn, and pH
AGI, 1994. Railbed Assessment, BPSOU. BUTS093B	Evaluated metals concentrations in railroads owned or leased by BNRR, UPRR, and MWRC within the BPSOU.	Surface and sub-surface samples of railbed materials. SPLP leach tests.	154 plus 6 duplicates	As, Cu, Pb, & Zn A few samples had: Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Na, Ni, Pb, Sb, Se, 11, V, & *Zn*
CDM, 1994a. BPSOU January 1994 Soil Sampling Results, Missoula Gulch-Emma Dump, Letter to Sara Weinstock of EPA from Darrel Stordahl of CDM, February 14, 1994. BUTS094B	Collected surface soil samples from the North Emma Dump and the vacant area to the north of this dump.	Surface soil sampling	13 plus 1 duplicate	As, Cd, Cu, Pb, Zn, & pH
CDM, 1994b. BPSOU April 1994 Soil Sampling, Source Areas Sampling Results, Letter to Sara Weinstock of EPA from Darrel Stordahl of CDM, May 26,1994. BUTS094C	Sampled waste rock dumps and other mining-related areas to determine if they would be added to the BPSOU ERA Source Areas SOW for removal.	Surface soil sampling	27 plus 2 duplicates	As, Cd, Cu, Pb, Zn, & pH

Table 2-1
Summary of Previous Soils Investigations
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

Reference	Surface Soil/Mine Waste Summary	Types of Soil/Mine Waste Information Collected	Number of Samples within the BPSOU Surface Soils Database	Analytes
AGI, 1995. October 1994 Supplemental Soil Sampling, Railbed Assessment, BPSOU. BUTS094D	Collected soil samples to confirm metals concentrations in railbed at the westerr extremity of BPSOU and the rail bed on the Newcome Branch. Data from this investigation was not included in the soil database (Appendix A) because samples taken from material which was removed as part of the Montana Pole Site remediation.	Surface and sub-surface sampling	NA	As, Pb
CDM, 1995. BPSOU November 1994 Soil Sampling Results, Letter to Sara Weinstock of EPA from Darrel Stordahl of CDM, January 26, 1995. BUTS094A	Collected surface soil samples from waste rock dumps and other mining-related areas to determine metals and arsenic concentrations as part of BPSOU ERA activities.	Surface soil sampling	30 plus 2 duplicates	As, Cd, Cu, Pb, Zn, & pH
URS Operating Services, Inc., 1997. Trip Report for Removal Support, Alice Dump, Butte/Walkerville, Montana.	Collected surface soil samples from the Alice Dump to determine metals and arsenic concentrations.	Surface soil sampling	96 plus 9 XRF results for samples with CLP results	As, Co, Cu, Pb, Hg, & Zn
CDM, 1998. Data Summary Report for Stream-Sediment and Soil Sampling in Grove Gulch, Blacktail Creek, and Silver Bow Creek Diversion Channel, BPSOU. BUTS097A	Collected surface soil samples adjacent to Grove Gulch. Sampled materials that resembled mine wastes or had little to no vegetation cover.	Surface soil sampling	10 plus 1 duplicate	As, Cd, Cu, Pb, Zn, & pH
ARCO, 2000a. Data Summary Report, Railroad Bed Time Critical Removal Action, Supplemental Railroad Bed Sampling Program. RRTCRA	Performed sampling of railroad bed material and adjacent residential yards to further define the extent of railroad beds and yards to be addressed by the Railroad Bed TCRA.	Surface soil sampling of railroad bed materials and adjacent residential yards.	64 plus 2 duplicates	Railroad Beds: As, Cd, Cu, Pb, Zn, & pH Residential Yards: As, Pb
MBMG 2001. Soil Borings, Tailings and Overburden Thicknesses and Volumes, Lower Area One and Metro Storm Drain.	Conducted soil borings in 19 locations in the Upper Metro Storm Drain Areas to confirm the presence and thickness of buried tailings and mine waste deposits.	Lithologic descriptions, waste volume estimates, Simulated Acid-Rain Leach testing and XRF analyses performed on cores and discrete waste samples.	22 acid-rain leach tests. XRF analyses performed on 4 samples.	Acid-rain leach tests: pH, SC, As, Cd, Cu, Zn XRF: As, Cd, Cu, Pb, Zn
MBMG 2004. Summary of Investigation Upper Silver Bow Creek, Butte, Montana. Montana Bureau of Mines and Geology Open File Report 507.	Lithologic and groundwater quality information from installation of six monitoring wells in the Metro Storm Drain. Also, column leach tests performed on alluvial materials obtained from two separate locations in the Metro Storm Drain.	Lithology, groundwater quality and leachate analyses for column leach tests	NA	Groundwater Quality Data: Dissolved Metals, water quality parameters, major ions, nutrients, tritium and helium isotopes. Column test leachate: Cd, Cu, Fe, Zn
MBMG 2006. Soil Borings at Butte-Silver Bow Metro Sewage Treatment Plant and Butte Reduction Works, Butte, Montana.	Soil core drilling program to expand knowledge of tailings thicknesses at MSTP and BRW, and refine the tailings volume estimates for LAO.	Soil Borings to visually confirm presence or absence of tailings	NA	NA

NA - Not Applicable, because not included in BPSOU surface soils database.
Reasons datasets were omitted listed in Section 3.2 of Final RI Soil/Mine Waste Characterization
SAR - Sodium Absorption Ratio; TOC - Total Organic Carbon; CEC - Cation Exchange Capacity; EC - Electrical Conductivity

Table 2-2
Summary of Previous Surface Water and Sediment Investigations
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

Reference	Surface Water/Sediment Summary	Types of Surface Water/Sediment Information Collected	Number of Locations Sampled	Number of Sample Analyses	Analytes
MultiTech, 1987. Silver Bow Creek Remedial Investigation Final Report Phase I RI).	Characterized surface water flow and quality associated with the Silver Bow Creek CERCLA Site.	Surface water flow and quality monitoring, storm water sampling, installation of permanent stream gaging stations	22 [1]	159 [1]	Varied, generally: As, Cd, Cu, Fe, Pb, Zn, N03, S04, TDS, TSS, Hardness, Alkalinity, pH, SC, Temperature, Flow
CH2M Hill, 1987a. Data Summary Report Supplemental Remedial Investigation, Silver Bow Creek Site	Collected surface water and stream sediment data from Silver Bow Creek, upper Clark Fork River, and their tributaries to help characterize the Silver Bow Creek Site.	Surface water flow and quality monitoring, stream bed sediment sampling	31 Surface Water [1] 6 Sediment [1]	95 Surface Water [1] 12 Sediment [1]	Surface Water: Al, As, Cd, Cr, Cu, Fe, Mn, Pb, Zn, S04, TSS, Eh, General Chemistry & Flow Sediment: Al, As, Cd, Cr, Cu, Fe, Mn, Pb,Zn, DO, Eh & General Chemistry
Ingman, G.L., 1987. Completion Report and Final Data Summary, Clark Fork River Basin Water Quality Monitoring Project RIT-86-8503.	Performed water quality monitoring for the entire Clark Fork River at 31 fixed stations with 16 samples each. Two of the stations are located within the BPSOU.	Surface water flow and quality monitoring, macroinvertebrate and periphyton sampling	2	38	As, Cu, N, P, Zn, O-P04, NH3-N, N03+N02, TSS, General Chemistry & Flow
CH2M Hill and Chen-Northern, 1990a. Draft Final Silver Bow Creek CERCLA Phase II Remedial Investigation Summary, Area 1 Operable Unit.	Filled in data gaps of Phase I RI (MultiTech, 1987). Focused on characterizing surface water quality during a snowmelt runoff event and a baseflow sampling event in the Area One Operable Unit.	Surface water flow and quality monitoring, storm water sampling, baseflow sampling	11	14	Varied, generally: Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Sb, Se, Tl, V, Zn, N03, S04, TSS, CLP RAS Organics, General Chemistry & Flow
Ingman, G.L. and M.A. Kerr, 1990. Water Quality in the Clark Fork River Basin, Montana, State Fiscal Years 1988-1989	Continuation of study documented in (Ingman, 1987). Monitoring stations increased to 32 total with 3 stations located within the BPSOU.	Surface water flow and quality monitoring, macroinvertebrate and periphyton sampling	3	93	As, Cd, Cu, N, P, Pb, Zn ,P04, NH3-N, N03+N02, TSS, General Chemistry & Flow
ARCO, 1992a. Draft Remedial Investigation Report, Montana Pole & Treating Plant Site, Prepared by Keystone, Inc.	Performed surface water and stream sediment sampling to help assess the effect of the Montana Pole and Treating Plant Site on Silver Bow Creek.	Surface water flow and quality monitoring, stream bed sediment sampling	7 Surface Water 4 Sediment	11 Surface Water 4 Sediment	Surface Water: As, Cd, Cr, Cu, Pb, Zn, Organic Compounds (Phenols, PAHs, VOCs, TPHs, TOG) TDS, TSS, pH, SC, Temperature & Flow Sediment: As, Cd, Cr, Cu, Pb, Zn & Organic Compounds (Phenols, PAHs, VOCs, TPHs, PCBs, dioxins)
PRP Group, 1994. DS/DV/DU Report, BPSOU, 1993 Storm Water Investigations	Characterize hydrology of the BPSOU and determine the nature, extent, and potential sources of metals loading to surface waters	Surface/storm water flow and quality monitoring, precipitation monitoring	14	115	Ag, Al, As, Cd, Cu, Fe, Hg, Mo, N, P, Pb, Sb, Zn NH3-NH4, N02, N03, S04, TDS, TSS, DO, COD, General Chemistry & Flow
PRP Group, 1995a. DS/DV/DU Report, BPSOU, 1994 Storm Water Investigations	A continuation of PRP Group (1994) to characterize hydrology of the BPSOU and determine the nature, extent, and potential sources of metals loading to surface waters	Surface/storm water flow and quality monitoring, precipitation monitoring	11	32	Ag, Al, As, Cd, Cu, Fe, Hg, Mn, N, P, Pb, Sb, Zn, NH3-NH4, NO2, N03, S04, TDS, TSS, DO, COD, General Chemistry & Flow
PRP Group, 1996b. DS/DV/DU Report, BPSOU, 1995 Storm Water Investigations	A continuation of PRP Group (1994, 1995a) to characterize hydrology of the BPSOU and determine the nature, extent, and potential sources of metals loading to surface waters	Storm water flow and quality monitoring, precipitation monitoring	11	115	Ag, Al, As, Ba, Be, Cd, Cr, Cu, Fe, Hg, Mn, Mo, Pb, Sb, Se, Zn, N03, S04, TDS, TSS, General Chemistry & Flow
CDM Federal, 1997. Final 1996 Storm Water Monitoring Data Summary Report, BPSOU, Prepared for EPA	Collected data to allow correlation between the amount of precipitation and the volume of storm water runoff in the upper Missoula Gulch watershed.	Storm water flow monitoring in upper Missoula Gulch, precipitation monitoring	0	0	Flow
PRP Group, 1997. DS/DV/DU Report, BPSOU, 1996 Storm Water Investigations	A continuation of PRP Group (1994, 1995a, 1996b) to characterize hydrology of the BPSOU	Storm water flow monitoring, precipitation monitoring	0	0	Flow
CDM Federal, 1998. Data Summary Report for Stream-Sediment and Soil Sampling in Grove Gulch, Blacktail Creek, and the Silver Bow Creek Diversion Channel.	Collected stream sediment samples to assess potential for Grove Gulch to contribute impacted stream sediments to Blacktail Creek and Silver Bow Creek. Appendix A of CDM (1998) includes 2 stream sediment samples from Missoula Gulch collected by MBMG, but unpublished.	Streambed sediment sampling and adjacent soils (Soil samples discussed in Table 1-1 and Section 1.5.1)	12 Sediment 1 Sediment Appendix A unpublished MBMG data	12 Sediment 2 Sediment Appendix A unpublished MBMG data	Sediment: As, Cd, Cu, Pb, Zn MBMG Sediment: Al, As, B, Ba, Cd, Cr, Cu, Fe, Li, Mn, Mo, Ni, P, Pb, Si, Sr, Ti, V, Zn, Zr,

Table 2-2
Summary of Previous Surface Water and Sediment Investigations
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

Reference	Surface Water/Sediment Summary	Types of Surface Water/Sediment Information Collected	Number of Locations Sampled	Number of Sample Analyses	Analytes
PRP Group, 1998. Final DS/DV/DU Report BPSOU Surface Water Investigation	Presents the results of field and laboratory analysis of surface water samples collected during the Final Phase II RI/FS for the BPSOU.				
CDM Federal, 1999. Task Specific Sampling Memorandum for Stream-Sediment Sampling in Upper Silver Bow Creek, the Metro Storm Drain, and the Lower Portions of Blacktail Creek, Buffalo Gulch, and Missoula Gulch.	Collected stream sediment samples to assess metals associated with stream sediments in Silver Bow Creek and its tributaries within the BPSOU.	Streambed sediment sampling	19 Sediment	19 Sediment	Sediment: As, Cd, Cu, Pb, Hg, Zn, TOC
United States Geological Survey, Long-Term Clark Fork River Monitoring Program	Collect surface water flow and quality data at two locations within the BPSOU on Blacktail Creek and Silver Bow Creek. Water quality sampling began in March 1993 and has continued through the present, except for 1996. Sample frequency is eight times per year.	Surface water flow and quality monitoring	2	Approximately 90 through 1999, ongoing (16/year)	As, Cd, Cu, Fe, Mn, Pb, Zn, TSS, General Chemistry & Flow
BMFOU Remedial Design / Remedial Action Monitoring Program	Monitoring water quality monthly to determine I-Class standard for future treated water discharge requirements.	Surface water flow and quality monitoring	3	Approximately 300 through 1999 (ongoing) 50/year	Ag, Al, As, Cd, Cu, F, Fe, Mn, Pb, Se, Tl, Zn, N03, S04, & General Chemistry
ARCO 2000. Draft LAO Expedited Response Action Final Phase II Monitoring Report for May 1998 through June 30, 2000 and Quarterly Report for April 1, 2000 through June 30, 2000	Summarizes the monitoring activities conducted from April 1998 through June 2000.	Presents surface water and groundwater elevations, water chemistry, and surface water flow data for the period of April 1998 to June 2000.	Varies, over 150 GW and SW monitoring locations	Quarterly from May 1998 through June 2000	Varies, some stations were water levels only, others included general chemistry and total and dissolved metals.
CDM Federal, 2000. Draft Technical Memorandum Regulatory Considerations for Storm Water Management at the Silver Bow Creek/Butte Area NPL Site	Considers site-specific storm water runoff characteristics in conjunction with federal, state and local storm water regulations in recommending a basis for storm water management and compliance the BPSOU.	NA	NA	NA	NA
ARCO 2005. Draft Data Summary and Interpretation Report, Base Flow and Wet Weather Data, October 2002 – September 2003	Summarizes and evaluates the surface water data collected during base flow and runoff events monitored from Oct. 2002 through Sept. 2003.	Base and wet weather flow and quality monitoring	64	Quarterly base flow measurements and 7 wet weather events from Oct. 2002 to Sept. 2003	Ag, Al, As, Cd, Cr, Cu, Fe, Hg, Mn, Pb, Zn, S04, TDS, TSS, DO, Alk, pH, General Chemistry & Flow
ARCO 2005. Draft Data Summary and Interpretation Report, Base Flow and Wet Weather Data, October 2003 – September 2004	Summarizes and evaluates the surface water data collected during base flow and runoff events monitored from Oct. 2003 through Sept. 2004.	Base and wet weather flow and quality monitoring	63	Quarterly base flow measurements and 11 wet weather events from Oct. 2003 to Sept. 2004	Ag, Al, As, Cd, Cr, Cu, Fe, Hg, Mn, Pb, Zn, S04, TDS, TSS, DO, Alk, pH, General Chemistry & Flow
ARCO 2003. Draft Data Summary and Interpretation Report, Base Flow and Wet Weather Data, October 2001 – September 2001	Summarizes and evaluates the surface water data collected during base flow and runoff events monitored from Oct. 2001 through Sept. 2002.	Base and wet weather flow and quality monitoring	59	Quarterly base flow measurements and 13 wet weather events from Oct. 2001 to Sept. 2002	Ag, Al, As, Cd, Cr, Cu, Fe, Hg, Mn, Pb, Zn, S04, TDS, TSS, DO, Alk, pH, General Chemistry & Flow
ARCO, 2005. Butte Treatment Lagoons Draft Quarterly Data Summary Report, 3rd Quarter 2005 (Quarterly Report No.14)	Summarizes and evaluates water quality and flow data collected from July 2005 to Sept. 2005 at the Lower Area One treatment lagoons.	Water quality and flows monitored	25	Flows monitored daily; water quality sampled 9 times per month.	Ag, Al, As, Cd, Cr, Cu, Fe, Hg, Mn, Pb, Si, U, Zn, Hard

TDS - Total Dissolved Solids; TSS - Total Suspended Solids; SC - Specific Conductance; DO - Dissolved Oxygen; COD - Chemical Oxygen Demand;
CLP RAS Organics - Contract Laboratory Program Routine Analytical Services organic analyses;
DS/DV/DU - Data Summary Data Validation/Data Usability
1 Includes sample locations outside of the BPSOU boundary.
2 General Chemistry Parameters usually include Ca, Mg, K, Na, Cl, Alkalinity, pH, temperature, specific conductance.

Table 2-3
Summary of Previous Groundwater Investigations
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

Reference	Groundwater Summary	Types of Groundwater Data Collected	Number of Groundwater Locations Sampled	Number of Groundwater Sample Analyses	Analytes [2]
Botz, 1969. Hydrogeology of the Upper Silver Bow Creek Drainage Area, Montana.	Described occurrence, quality, and movement of groundwater in Upper Silver Bow Creek drainage area.	Aquifer testing, groundwater quality and water level monitoring	56	56	S04, General Chemistry
CH2M Hill, 1987a. Data Summary Report Supplemental Remedial Investigation, Silver Bow Creek Site	Vadose Zone Characterization Study to assess flux of metals from unsaturated stream side tailings into underlying groundwater.	Vadose zone hydraulic characterization	9	80	Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Fe, Mn, Ni, Pb, Sb, Se, Sn, Tl, V, Zn, & General Chemistry
CH2M Hill, 1987b. Final Data Summary Report Addendum, Supplemental Remedial Investigation, Silver Bow Creek Site	Data report containing pore water samples from the Vadose Zone Characterization study. Data were not available at the time of CH2M Hill 1987.	Vadose zone water quality monitoring	5	10	Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Fe, Mn, Ni, Pb, Sb, Se, Sn, Tl, V, Zn, & General Chemistry
MultiTech, 1987. Silver Bow Creek Remedial Investigation Final Report (Phase I RI).	Evaluated extent of groundwater impacted by COCs and significance of tailings as COC sources in Silver Bow Creek CERCLA Site.	Well installations, groundwater quality and water level monitoring, aquifer testing, soil water measurements	98	209	As, Cd, Cu, Fe, Pb, Zn, S04, General Chemistry, & Eh.
EPA, 1989. Supplemental Data Package, Enclosure 1 - Attachment 3 of Notice Letter, Mine Flooding Operable Unit of the Silver Bow Creek/Butte Area NPL Site.	Supplemental data package associated with the Special Notice Letter and Draft Administrative Order for the Mine Flooding Operable Unit of the Silver Bow Creek Butte Area NPL Site. Package is Enclosure 1 - Attachment 3 in the Notice Letter.	Groundwater quality and water level monitoring	22	195	Varies, generally: Ag, Al, As, Ba, Cd, Cr, Cu, Fe, Hg, Mn, Pb, Se, Si, Zn, S04, & General Chemistry.
ARCO, 1990a. Colorado Tailings and Butte Reduction Works Project, Prepared by Hydrometrics, Inc.	Gathered groundwater data to support remediation actions within the LAO.	Well installations, groundwater quality and water level monitoring, aquifer testing	26	30	As,Cd,Cu,Fe,Pb,Zn,S04 & General Chemistry
ARCO, 1990b. Data Report, Lower Area One Groundwater, Bedrock, and Geotechnical Site Investigations, Silver Bow Creek CERCLA Site, Expedited Response Action, Prepared by Dames & Moore, Inc.	Further assessed groundwater conditions in LAO for COCs.	Well installations, groundwater quality and water level monitoring	5	5	Ag, Al, As, Ba, Cd, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Si, Sr, Zn, S04 & General Chemistry
CH2M Hill and Chen-Northern, 1990a. Draft Final Silver Bow Creek CERCLA Phase II Remedial Investigation Summary, Area 1 Operable Unit.	Filled in data gaps of Phase I RI (MultiTech, 1987). Further defined nature, extent, and transport of groundwater impacted by COCs in the Area One Operable Unit.	Well installations, groundwater quality and water level monitoring, aquifer testing, surface geophysical investigation	71	126	Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Sb, Se, Tl, V, Zn, N03, S04, General Chemistry & Eh.
CH2M Hill and Chen-Northern, 1990b. Draft Final Silver Bow Creek CERCLA Phase II RI Data Addendum, Area 1 Operable Unit	Addendum of groundwater analytical data to the Phase II RI (CH2M Hill and Chen-Northern, 1990a).	Groundwater quality data	72	72	Ag, As, As, Ba, Be, Cd, Co, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Sb, Se, Tl, V, Zn, N03, S04, & General Chemistry.
ARCO, 1992a. Draft Remedial Investigation Report, Montana Pole & Treating Plant Site, Prepared by Keystone, Inc.	Identified nature and extent of COCs in groundwater associated with the wood treating facility. COCs different than BPSOU.	Well installations, groundwater quality and water level monitoring, aquifer testing	53	76	As, Cd, Cr, Cu, Pb, Zn, Organic Compounds (PCP, PAHs, TPH, BTEX, dioxinlfurans, etc.) & General Chemistry
ARCO, 1992. Lower Area One/West Camp Ground Water Treatability Study Quarterly Data Summary Report 1st Quarter 2002 (Quarterly Report No. 1)	Field scale treatability study of combined LAO and West Camp ground water. Evaluates treating both LAO and West Camp flows in the LAO Colorado Tailings Treatment Lagoons.	Ground water quality, mixing of ground water flows, and treatment evaluation. Water level monitoring	13	61	Ag, Al, As, Cd, Cr, Cu, Fi, Hg, Mn, Pb, Si, Zn & General Chemistry
Groundwater Technology, 1992. Final Screening Site Inspection Report for the Montana Power Company's Montana Street Operation Center, Butte, MT.	Collected data to determine nature and extent of COCs at the Montana Power Company's Montana Street Operating Center.	Well installations, groundwater quality and water level monitoring	9	19	Al, As, Ba, Be, B, Cd, Cr, Cu, Hg, Li, Mo, Ni, Pb, Sb, Se, Sr, Tl, Ti, V, Zn, Zr & General Chemistry

Table 2-3
Summary of Previous Groundwater Investigations
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

Reference	Groundwater Summary	Types of Groundwater Data Collected	Number of Groundwater Locations Sampled	Number of Groundwater Sample Analyses	Analytes [2]
ARCO, 1994a. Draft Remedial Investigation Report for the Butte Mine Flooding Operable Unit RI/FS, Prepared by Canonie Environmental Services, Inc.	Identified nature and extent of COCs in groundwater within the BMFOU. Some BMFOU monitoring wells are located within the BPSOU. Established a critical maximum level for water in the Berkeley Pit and performed a Private Well inventory.	Well installations, groundwater quality and water level monitoring, aquifer testing, private well inventory, groundwater modeling	77	144	Ag, Al, As, Ba, Cd, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Si, Zn, N03, S04, General Chemistry & Eh.
ARCO, 1994b. Data package submittal for the Supplemental Hydrologic Investigations (no report).	Implemented to provide a groundwater supplement to the Storm Water Investigations. Objectives included developing preliminary estimates of the quality, quantity, and distribution of surface water/groundwater exchanges as related to potential COC loading to Silver Bow Creek.	Well installations, groundwater quality and water level monitoring, aquifer testing	43	43	Ag, Al, As, Cd, Cu, Fe, Hg, Mn, Pb, Sb, Zn, S04 & General Chemistry
PRP Group, 1998. Final DS/DV/DU Report BPSOU Groundwater Investigation February 1997 – January 1998.	Presents the groundwater data collected and analyses completed during the Final Phase II RI/FS for the BPSOU.	Groundwater quality tested and water level measured	Water level measured in 49 wells; samples taken from 38 wells	217	Ag, Al, As, Cd, Cu, Fe, Hg, Mg, Mn, K, Na, Alk, Cl, Fl, Pb, Ti, Zn, TDS, S04, Sb & General Chemistry
ARCO, 2002. LAO/West Camp Groundwater Treatability Study, Quarterly Data Summary Reports, Numbers 1 through 14, ongoing	Presents sampling and analyses results for the Field-Treatability Study of combined LAO and West Camp groundwater at the LAO Colorado Tailings Treatment Lagoons at BPSOU.	Groundwater flow rate, pH and the rate lime was added were measured, as was water quality	6 stations	68	Ag, Al, As, CD, Cr, Cu, Fe, Hg, Mn, Pb, Si, Zn, and general chemistry
ARCO 2000. Draft LAO Expedited Response Action Final Phase II Monitoring Report for May 1998 through June 30, 2000 and Quarterly report for April 1, 2000 through June 30, 2000	Monitoring of surface water and groundwater re-equilibration after the LAO ERA to determine effectiveness of surface water and groundwater separation and effectiveness of groundwater capture and management	Groundwater Elevations and Groundwater chemistry, precipitation	Varies, over 150 GW and SW monitoring locations	Quarterly from May 1998 through June 2000	Varies, some stations were water levels only, others included general chemistry and total and dissolved metals.
CDM 2003. Data Summary Report, May 2003 Metro Storm Drain Supplemental Base Flow Sampling	Mass loading study along the MSD channel from Harrison Avenue to station SS-03	Measured discharge and water chemistry at intervals along the MSD channel. Sampling was of groundwater discharging to surface water in the MSD channel	18 sample points (16 mainstem, 2 tributaries)	18 (for parameters shown)	Discharge, Total and Dissolved Al, Sb, As, Cd, Cu, Cr, Ca, Co, Fe, Pb, Mn, Mg, Hg, Ni, K. Ag, Na, Zn, sulfate, chloride, bicarbonate, carbonate, acidity, hardness, TDS, temperature, turbidity, oxidation-reduction potential (ORP), pH, specific conductance (SC), and dissolved oxygen (DO).
CDM 2004. Focused Feasibility Study of the Metro Storm Drain	Evaluated 7 alternatives for remedial action in the Metro Storm Drain	Used necessary data from previous studies (water levels, chemistry, seepage run, well logs, leaching tests, etc.)	NA	NA	NA
MBMG 2004. Summary of Investigation Upper Silver Bow Creek, Butte, Montana. Montana bureau of Mines and Geology Open File Report 507.	Lithologic and groundwater quality information from installation of six monitoring wells in the Metro Storm Drain. Also, column leach tests performed on alluvial materials obtained from two separate locations in the Metro Storm Drain.	Lithology, groundwater quality and leachate analyses for column leach tests	6	6	Groundwater Quality Data: Dissolved Metals, water quality parameters, major ions, nutrients, tritium and helium isotopes. Column test leachate: Cadmium, copper, iron, and zinc.
ARCO 2004. MSD Post Construction Groundwater Monitoring	Monitoring plan to evaluate the change in the potentiometric surface after installation of the MSD subdrain	Water levels from wells and surface water bodies, flow and chemistry at subdrain cleanouts	Approximately 110 water levels measured	10 cleanouts, vault, and mouth of MSD	Water levels, metals As, Cd, Cu, Fe, PB, Si, Zn, Mn, K , Ca, Na, and general chemistry
BMFOU Remedial Design / Remedial Action Monitoring Program	Monitoring changes in water levels and water quality. Water levels of the system will trigger components of remedial action program.	Well installations, groundwater quality and water level monitoring	49	Approximately 600 through 1999 (ongoing) 98/year	Varies, generally: Al, As, Cd, Cu, F, Fe, Li, Mo, Mn, Ni, Pb, Se, Zn, N03, S04, Eh, & General Chemistry

1 Includes sample locations outside of the BPSOU boundary.
2 General Chemistry Parameters usually include Ca, Mg, K, Na, Cl, Alkalinity, pH, temperature, specific conductance

extensive response actions. The work was completed from the late 1980s through 2004. The final actions for two ongoing ERAs (Lower Area One and one for residential soils/source areas) are determined in this ROD. These response actions were undertaken to address the immediate human health and environmental problems at Butte Priority Soils OU.

Although an expedited process was used to conduct these response actions, Superfund law requires that removal actions be implemented in ways that contribute to the efficient performance of a final long-term remedial action, to the extent practicable. Therefore, EPA required that the response actions be designed and constructed in a manner intended to be consistent with any final remedy. Response actions conducted at the BPSOU are summarized below.

Walkerville TCRA (1988). Addressed mine waste dumps (e.g., Lexington Mine Yard) and residential soil areas contaminated with lead above 2,000 milligrams per kilogram (mg/kg) or mercury above 10 mg/kg in Walkerville. Nearly 300,000 cubic yards of material were removed from 10 sites. One mile of rock-lined ditch was also constructed to control surface water runoff from the recontoured waste piles. EPA also removed contaminated soil from six earthen basements and 33 residential yards.

Timber Butte TCRA (1989). Approximately 40,000 cubic yards of contaminated soil were removed and consolidated in an on-site repository that was recontoured, covered with fill soil, and revegetated. Drainage was improved with recontouring and the installation of drainage ditches. Contaminated soil was removed from two residential yards and the yards were recontoured, covered with soil, and revegetated.

Butte Priority Soils TCRA (1990 and 1991). Mitigated risks from a number of mine waste dumps, a concentrate spill, and seven residential yards located in Butte and Walkerville. Response actions were taken at 30 waste dumps (100,000 cubic yards) that were either capped or removed. In addition, a railroad bed and seven residential yards were reclaimed. These actions included removing waste, adding lime rock, capping with soil, application of fertilizer, and seeding each site.

Colorado Smelter TCRA (1992). Addressed wastes associated with the Colorado Smelter. Approximately 40,000 cubic yards of mine waste were removed and consolidated in an on-site repository. The site was reclaimed and drainage channels were installed.

Anselmo Mine Yard and Late Acquisition/Silver Hill TCRA (1992). Addressed a mine yard and several mine dumps in Butte. The work involved excavation of mine waste, recontouring, capping, and revegetation. Terracing, rock-lined ditches, and other drainage control measures were used for storm water management purposes.

Walkerville II TCRA (1994). EPA conducted further removal activities in Walkerville to address four additional dump areas with elevated soil lead levels. In 1994 and 1995, 12 more waste dumps were removed or capped in place.

Railroad Beds TCRA (1999 - 2004). Addressed railroad beds and adjacent residential yards at the OU that contain elevated concentrations of metals and arsenic (see Figure 2-2) The railroad beds were constructed using mining-related waste or contaminated by spillage during transport of ore or ore concentrates. The TCRA included significant storm water drainage improvements.

Storm Water TCRA (1997 - present). Begun in 1997 to address storm water problems in Butte. To control storm water flow and minimize soil erosion and transport of contaminated sediment to Silver Bow Creek, storm water conveyance structures were built and large areas of barren land and contaminated soil were reclaimed with cover soil and revegetation. Storm water channels and detention ponds were placed in critical areas to minimize erosion and reduce the release and transport of contaminants from historic mining areas.

This response action also included reclamation of the Alice Dump and the removal of about 50 cubic yards of soils contaminated with elemental mercury in the Dexter Street area. The Alice Dump is a large waste rock dump located in upper Missoula Gulch that contained about 2 million cubic yards of contaminated soil and waste rock. At Dexter Street, a limited quantity of the mercury-contaminated soils failed Toxicity Characteristic Leaching Procedure (TCLP) and required disposal at an EPA-approved Resource Conservation and Recovery Act (RCRA) hazardous waste disposal facility. The remaining soils were disposed of at an on-site waste repository.

Walkerville TCRA (2000). Residential properties in Walkerville that had not been previously sampled were sampled and cleanups implemented at those residences with elevated arsenic, lead, and/or mercury above action levels. Approximately 40 properties were addressed.

Lower Area One (LAO) ERA (1992 - present). The LAO ERA focused on the removal of accessible mine waste and contaminated soils along Silver Bow Creek and across the floodplains associated with Silver Bow Creek in the area of the historic Colorado Tailings and Butte Reduction Works facilities. In May 1992, ARCO signed a Consent Order with EPA to implement EPA's selected response action alternative for the LAO ERA. Per the work plan, the response action was to be accomplished in three phases. Phase I, which was divided into Segments I and II, included the excavation, transportation, and disposal of tailings and other contaminated materials from LAO, partial backfilling of the site with clean materials, and construction of a new Silver Bow Creek channel. Phase II was an equilibration and monitoring period that involved the collection of ground and surface water data needed to determine the appropriate final response action at LAO. Phase III consists of the design and implementation of the final response actions relating to LAO, as described in this ROD.

The first step in the removal was Phase I, Segment I activities consisting of the excavation and transport via railroad of the "dry" contaminated material above the water table to the Opportunity Ponds near Anaconda. A total of 270,600 cubic yards of materials were excavated from 1993 to 1994 during Phase I, Segment I. During

1995, EPA and ARCO initiated Phase I, Segment II pilot-scale excavation activities consisting of the removal of wet contaminated materials below the water table. The pilot-scale operation demonstrated that dewatering could be achieved by trenches to intercept groundwater and, in 1996, full-scale dewatering and excavation of saturated materials began. To expedite the cleanup, a proposal was made in the summer of 1996 to haul the contaminated materials by truck to the nearby Clark Tailings site rather than continue to transport to the Opportunity Ponds by rail. Following public comment and subsequent approval of the proposed Clark Tailings repository and future use plan in spring 1997, excavated waste materials were transported to the Clark Tailings area throughout the summer and fall of 1997. By the end of 1997, Phase I activities had removed a total of 1.2 million cubic yards of mine waste and contaminated soils from Silver Bow Creek and the associated floodplains in the area of the Colorado Tailings and Butte Reduction Works. The area was then backfilled with imported material and grasses, forbs, and trees were planted to establish a diverse and nature vegetative cover. The stream channel was reconstructed in accordance with rigid engineering standards to maintain an elevated stream channel to insure a losing stream. Waste removal during the Lower Area One ERA was completed to a predetermined excavation limit established on the basis of the natural pre-existing land contours. Although the excavation limit ensured that the majority of the waste and contaminated soil was removed, waste was left in some areas that were below the excavation limit. In addition, in-situ waste and contaminated soils remain under the Metro Sewage Treatment Plant facility, and the historic aqueduct and slag walls. A hydraulic control channel was constructed parallel to the floodplain to collect groundwater. The captured groundwater is treated in the Treatment Lagoon Demonstration Project before discharge back to Silver Bow Creek.

Phase II of the Lower Area One ERA has been completed during which the hydrologic equilibration and monitoring of ground and surface water occurred and water treatability studies were performed. Phase III, which includes final reclamation and land use planning for this area, will be decided and performed as a component of this ROD. For example, the selection of a collection and treatment requirement for groundwater for this area is included in this ROD.

Butte Priority Soils OU ERA Residential Soils/Source Areas(1994-Present). EPA implemented a program to remediate residential metals and arsenic that focused on certain residential areas with soil-lead concentrations above the residential lead action level (1,200 mg/kg) and the arsenic level of 250 mg/kg. Under this action, EPA, MDEQ, Butte-Silver Bow, and ARCO integrated the removal of residential lead contaminated soils associated with mine-related wastes and the removal or mitigation of lead contaminants from non-superfund sources. This provided BSB with funding and the flexibility to implement a comprehensive public health program while meeting EPA's initial removal action requirement. The BSB Lead Intervention and Abatement Program goal is to reduce the level of lead exposure incurred by children 0-6 years, pregnant women and nursing mothers in a manner that results in long-term health benefits. Butte-Silver Bow's program targets all sources of lead, including interior and exterior lead based paint, interior lead dust, water and residential soils for certain residential areas.

The source area portion of this action included the remediation of areas that were above the lead action level of 2,300 mg/kg.

Other Actions

Lower Area One Manganese Removal (1992). This removal action was used to remove manganese ore stockpiles in Lower Area One within the floodplain of Silver Bow Creek. The piles were located east of the Metro Sewage Plant and west of Montana Street in Lower Area One. The Defense Logistics Agency and EPA conducted the manganese removal. The stockpiles included ore and process tailings remaining after efforts by the Department of Defense to process manganese ore at the Butte Reductions Works Plant during World War II.

A total of 261,000 cubic yards were moved to a private repository in Whiskey Gulch, west of the Butte Priority Soils OU (Bureau of Reclamation 1992). The action was a critical ancillary action to the Lower Area One ERA.

Old Butte Landfill/ Clark Mill Tailings (1998). A RCRA corrective action and permitting process was completed at this site southwest of Butte, in combination with EPA mandated Superfund action. The site consisted of a 60-acre impoundment with approximately 1 million cubic yards of mill tailings immediately adjacent to, and partially mixed with, the old Butte Municipal Landfill. The mixed nature of the wastes necessitated a combined Superfund and RCRA response action be performed under RCRA jurisdiction.

At the Clark Mill Tailings, approximately 800,000 cubic yards of the Colorado Tailings removed from Lower Area One were placed in the repository constructed at this site. The final RCRA repository cover was designed in 1997 and constructed in 1997 and 1998. The overall design included the subsequent construction of a recreational complex on top of the repository that included several irrigated ball fields, play areas, and park buildings. The recreational complex was opened in 2001. This area is permitted by DEQ under its solid waste authorities.

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Section 3 Highlights of Community Participation

CERCLA Sections 113 and 117 and NCP Section 300.430(f)(3) require public participation in the remedy selection process. The statute and regulation require that before adoption of any plan for remedial action to be undertaken by EPA, the State, or individual (e.g., potentially responsible party), the lead agency must:

- Publish a notice and make the proposed plan available to the public.
- Include in the proposed plan sufficient information to provide a reasonable explanation of the preferred remedy and alternative proposals considered.
- Provide reasonable opportunity for submission of written or oral comments and an opportunity for a public meeting at or near the site regarding the proposed plan and any proposed findings relating to cleanup standards.
- Keep a transcript of the meeting and make such transcript available to the public.

Additionally, notice of the final remedial action plan set forth in the ROD must be published and the plan must be made available to the public before commencing any remedial action. Such a final plan must be accompanied by a discussion of any significant changes to the preferred remedy presented in the proposed plan along with the reasons for the changes. A response (responsiveness summary) to each of the significant comments, criticisms, and new data submitted in written or oral presentations during the public comment period must be included with the ROD.

EPA has conducted the required community participation activities and additional community involvement activities through an extensive program of community involvement, the components of which are outlined below.

3.1 Release of a Proposed Plan

The BPSOU Proposed Plan was released to the public on December 20, 2004. The plan presented an overview of the site and presented EPA's preferred alternative for remediation. It also discussed the comment period, how to provide comment, and notice of the time and place of public meetings regarding the Proposed Plan.

The Proposed Plan was sent by mail to approximately 100 people on December 20, 2004 and was hand-delivered to high priority parties and individuals in Butte. Copies were also made available at the Citizens Technical Environmental Committee office on December 20, 2004.

Copies of the Remedial Investigation, Risk Assessments, Feasibility Study, and Proposed Plan were made available to the public for review at the following locations:

- Montana Tech Library, located at West Park in Butte, Montana
- Butte EPA Office, located at 155 West Granite in Butte, Montana
- EPA - Montana Office, located at 10 West 15th Street, Suite 3200, in Helena, Montana

3.2 Monthly "Superfund and You" Newspaper Column

On December 12, 2004, 12 days prior to the release of the Proposed Plan, the upcoming release was announced in the monthly column placed by EPA in The Butte Standard. The upcoming public meeting was also announced. The title of the column was "Superfund and You - EPA's Proposed Plan for the Butte Cleanup." This was the 13th in a series of monthly columns that were initiated to raise public awareness of the upcoming Proposed Plan and ROD. The columns covered issues of special interest to the public, especially where there was an event or an opportunity for public involvement.

3.3 EPA Press Release

On December 20, 2004, EPA issued a press release announcing the release of the Proposed Plan, how and where the plan could be obtained, and the date of the public meeting. The press release was sent to the following media outlets:

- The Montana Standard - the local daily paper
- Butte Weekly - a free weekly paper
- The 'Roun'Town Review - a free monthly paper
- Technocrat - Montana Tech newspaper
- The Missoulian - a daily newspaper in a nearby community
- The Helena Independent Record - a daily newspaper in a nearby community
- The Great Falls Tribune - a daily newspaper in a Montana community
- The Bozeman Daily Chronicle - a daily newspaper in a nearby community
- The Billings Gazette - a daily newspaper in a Montana community
- The Lee Newspapers State Bureau
- The Associated Press
- KBOW-AM/KOPR-FM - a local radio station
- KMSM-FM- the local university radio station
- KXTL-AM/ KMBR-KAAR - FM - a local radio station

- KUFM Missoula - the nearest public radio station

3.4 Display Advertisements

A total of four individual display advertisements were prepared and placed in one or more of the local newspapers after the release of the proposed plan. The display ads consisted of:

- Announcement of the release of the proposed plan and planned public meeting
  - The Montana Standard (local daily newspaper) on December 22, 2004
  - The Butte Weekly (the free weekly newspaper) on December 23, 2004
  - The 'Roun'Town Review (free monthly newspaper) on January 3, 2005
- Announcement of details of the first public meeting
  - The Butte Weekly on January 19, 2005
  - The Montana Standard on January 22, 23 and 24, 2005
- Announcement of extension of the comment period
  - The Butte Weekly on January 19, 2005
  - The Montana Standard on January 22, 23 and 24, 2005
- Announcement of details of the second public meeting
  - The Montana Standard on March 11, 13, and 14, 2005

3.5 Public Comment Period

The public comment period for the proposed plan was initially set at 60 days. This period was subsequently extended to 90 days (December 20, 2004 to March 20, 2005) based on feedback from the public.

3.6 Summary Fact Sheet

A four-page fact sheet devoted entirely to the Proposed Plan, entitled "Summary of the Proposed Plan", was sent to EPA's Butte mailing list on December 20, 2004. The fact sheet was also distributed to the general public as an insert in the Montana Standard on December 22, 2004. It was included as an insert in the Butte Weekly on December 23, 2004. A total of 25,000 fact sheets were printed for insertion into the two newspapers.

3.7 Public Hearings

Two public hearings were held in Butte after the release of the Proposed Plan. The first was on January 25, 2005 at the Montana Tech campus. Approximately 150 people

attended that meeting. The second meeting was held on March 15, 2005 at the Elks Lodge in uptown Butte (206 W. Galena Street) and had approximately 30 attendees.

These meetings were focused on accepting formal oral comments from the public. Thirty-two people provided oral comment at the first meeting and 10 did so at the second meeting. A court reporter transcribed the comments and EPA made the meeting transcripts available to the public by placing them in the Administrative Record.

3.8 EPA Web Site

The Proposed Plan and the meeting date were published on the web page below on Jan. 3, 2005. The web address is www.epa.gov/region8/superfund/sites/mt.

3.9 Butte Citizen's Working Group

EPA funded the "Butte Citizens' Working Group" to provide another opportunity for interested residents to discuss issues related to Superfund activities and to provide input to the remedy selection process. The group provided comments on the Proposed Plan during the formal comment period.

3.10 Available Supporting Documents

The Administrative Record, including the Remedial Investigation and Feasibility Study, was available for public review and comment during the Proposed Plan public comment period. The documents available included the following:

- Phase II Remedial Investigation Report, Butte Priority Soils Operable Unit, Silver Bow Creek/Butte Area Superfund Site, prepared by ARCO dated April 2002. Report is two volumes - Volume I: Text and Appendices, Volume II: Tables, Figures, & Plates.
- Addendum - Final Phase II Remedial Investigation (RI) Report, Butte Priority Soils Operable Unit (BPSOU), prepared for the PRP Group by MFG, Inc , dated May 14, 2003.
- Response Action Summary Document, prepared by ARCO dated October 2, 2003.
- Phase II Feasibility Study Report, Butte Priority Soils Operable Unit, Silver Bow Creek/Butte Area Superfund Site, prepared by ARCO dated April 2004.
- Final Preliminary Baseline Risk Assessment, Priority Soils Operable Unit, Silver Bow Creek/Butte Area NPL Site, Butte, Montana, prepared for EPA by CDM dated April 26, 1991.
- Final Preliminary Baseline Risk Assessment, Lower Area One, Silver Bow Creek/Butte Area NPL Site, Butte, Montana, prepared for EPA by CDM dated August 25, 1991.

- Draft Baseline Risk Assessment for Lead, Expedited Response Action, Priority Soils Operable Unit, Silver Bow Creek/Butte Area NPL Site, prepared for EPA by CDM dated February 11, 1994.

- Final Risk Assessment, Butte Priority Soils Operable Unit, Baseline Human Health Risk Assessment For Arsenic, Silver Bow Creek/Butte Area NPL Site, Butte, Montana, prepared for EPA by CDM dated April 29, 1997.

- Technical Memorandum, Addendum to the Baseline Human Health Risk Assessment, Evaluation of Human Health Risks Associated With Exposure to Alluvial Ground Water, Silver Bow Creek/Butte Area NPL Site, Butte-Silver Bow County, Montana, Butte Priority Soils Operable Unit, prepared for EPA by CDM dated July 26, 2000.

- Final Baseline Ecological Risk Assessment, Silver Bow Creek/Butte Area NPL Site, Butte Priority Soils Operable Unit, Butte, Montana, prepared for EPA by CDM dated September 21, 2001.

3.11 Responsiveness Summary

A responsiveness summary that summarizes significant public comments received during the comment period and EPA responses is included as Part 3 of this ROD.

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Section 4 Scope and Role of Operable Unit

The Silver Bow Creek/Butte Area Site is one of four Superfund Sites in the Clark Fork Basin. The four sites are:

- Anaconda Smelter Site
- Milltown Reservoir/Clark Fork River Site
- Montana Pole and Treating Plant Site
- Silver Bow Creek/Butte Area Site

Together with the Anaconda Smelter and Milltown Reservoir/Clark Fork River sites, the Silver Bow Creek/Butte Area Site is included in what is referred to as the Clark Fork Basin Superfund Sites (Figure 4-1). These sites were listed on the NPL to address the release or threat of release of contaminants related to the mining and ore-processing facilities in Butte and Anaconda and other mining related facilities in and along Silver Bow Creek and the upper Clark Fork River.

The Butte Priority Soils OU addressed by this ROD is one of many OUs in the Silver Bow Creek/Butte Area Site. This OU focuses on historic mining areas within the urban areas of Butte and Walkerville, as well as surface water and alluvial groundwater in the Silver Bow Creek floodplain through Butte, and is described more thoroughly in Part 2, Section 1.

The four Superfund sites in the Clark Fork Basin extend from the headwaters of Silver Bow Creek north of Butte to the Milltown Dam on the Clark Fork River near Missoula. Although the sites are interrelated, cleanup schedules and time frames are based on site-specific and OU-specific risk conditions. In some instances, these OUs are physically commingled. For example, the BMFOU addresses the bedrock groundwater system under a portion of the BPSOU. The West Side Soils OU includes other metals-impacted areas within the Silver Bow Creek/Butte Area Site not addressed under the BPSOU, the BMFOU, or the Active Mining OU. In addition, the Montana Pole and Treating Plant NPL Site is located entirely within the BPSOU boundary. There is some overlap, including the mobilization and transport of COCs to and from adjacent areas, among these sites. Generally, however, these sites are studied and remediated separately and distinctly.

The Montana Pole and Treating Plant Site is an organic waste site not related to mine wastes. It is a smaller, 40-acre state-lead site located entirely within the Butte Priority Soils OU. This former wood treating facility, located along the south side of Silver Bow Creek opposite of Lower Area One, is contaminated with pentachlorophenol and other organic compounds used as wood preservatives. A multiple-phase cleanup started in 1996 with final completion expected before 2010. DEQ will continue to

operate a Montana Pole water treatment plant and in-situ treatment facilities for decades at this site.

Silver Bow Creek/Butte Area NPL Site

The Silver Bow Creek/Butte Area NPL Site is divided into two portions for administrative purposes - the Butte portion and the original portion. The Butte Priority Soils OU (as described extensively in this ROD) is one of four remedial OUs within Butte portion (Figure 4-1). The other three OUs in the Butte portion include:

Butte Mine Flooding OU. This area consists of flooding of the Berkeley Pit and hydraulically connected underground mine workings and associated bedrock and alluvial aquifers in response to the cessation of dewatering practices. It also addresses the bedrock groundwater system under a large portion of the Butte Priority Soils OU.

EPA completed a ROD for this OU in 1994. A state-of-the-art treatment plant was recently completed to treat inflow from the active mine area. This treated water is currently being used by the active mining operations. Berkeley Pit water will be treated at this treatment plant when rising water levels in the Berkeley Pit reach the determined critical water level. Treated water will be discharged to Silver Bow Creek or reused within the active mine.

West Side Soils OU. This OU encompasses areas of Silver Bow County that have experienced mining activity but lie outside of other OUs. This is generally north and west of the Butte Hill. EPA has conducted initial scoping activities for this OU.

Active Mining and Milling OU. This area is located east and northeast of the Butte Priority Soils OU and consists of the permitted mine area currently operated by Montana Resources. In 2002, EPA deferred Superfund action at the site to state authority under the operating hard rock mining permit.

The original portion of the Silver Bow Creek/Butte Area NPL site includes four remedial OUs:

Streamside Tailings OU. The Streamside Tailings OU covers an area along Silver Bow Creek and its associated floodplain, and runs from the western end of the Butte Priority Soils OU to the point where Silver Bow Creek enters the Warm Springs Ponds. The OU extends for approximately 25 creek miles between Butte and Warm Springs.

The OU focuses on the fluvially deposited tailings along Silver Bow Creek and the adjacent railroad beds that are contaminated with mine waste. DEQ and EPA completed a ROD for this OU in 1995.

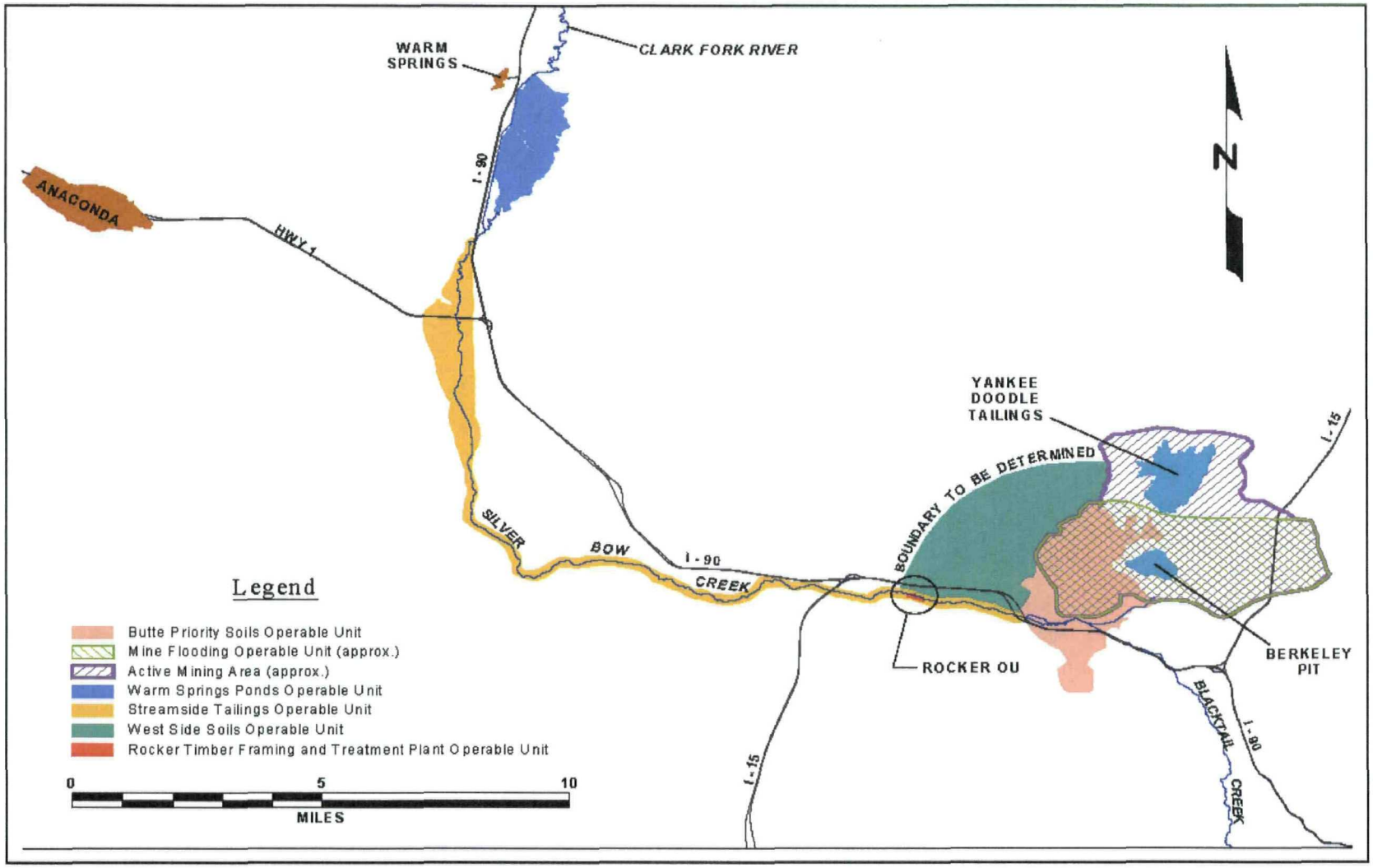

Figure 4-1
Operable Units within the Silver Bow Creek/ Butte Area NPL Site (approximate boundaries)
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

The remedial action being implemented at this OU includes the in-situ treatment, excavation, and removal of floodplain materials containing high concentrations of heavy metals and arsenic. The stream channel is being reconstructed and grass, forbs, trees, and shrubs are being planted to reestablish a diverse and permanent vegetative cover along the reconstructed stream and throughout the floodplain. Construction work to implement the remedial plan was initiated in 1999. Restoration activities are being concurrently implemented with remedial activities. An effective and timely remedial action upstream at the Butte Priority Soils OU will help protect and compliment the remedial and restoration accomplishments at the Streamside Tailings OU remedy.

Warm Springs Ponds Active and Inactive Area OUs. The Warm Springs Ponds are located at the western border of the Silver Bow Creek/Butte Area site and consist of three man-made ponds covering 2,400 acres around the confluence of Silver Bow, Mill, Willow, and Warm Springs Creeks. The ponds were constructed by ACMC between 1911 and 1959 to control the amount of mine and mill tailings and contaminated sediment carried into the Clark Fork River from Silver Bow Creek.

All mining-related contamination in these ponds is the result of migration from upstream sources (e.g., from Butte and Streamside Tailings) or from Anaconda site sources. Two RODs for this OU have been signed, one in 1990 and one in 1992. These two RODs are interim RODs and final remedial decisions for the Warm Springs Ponds area will be made at a later date. Remedial action has included removal of tailings, modification of channels to route flood flow, modification of berms, establishment of monitoring systems, upgrading of treatment systems, construction of wet-closure berms, chemical fixation of contaminated tailings and soils, long-term monitoring, and institutional controls. Currently, the active ponds function as settling/retention ponds to remove contaminants carried downstream by Silver Bow Creek to certain permitted levels, prior to discharge to the upper Clark Fork River. To facilitate removal of contaminants, lime is added to the inflow from Silver Bow Creek, which is then routed into the ponds. Construction was completed in 1995, and EPA's latest five-year review of the remedy found that it continues to protect human health and the environment. The long-term need for the Warm Springs Ponds as a treatment facility depends on the effectiveness of upstream cleanup activities.

Rocker Timber Framing and Treating Plant OU. This OU is located about seven miles west of Butte and was the location of a wood treatment plant that operated for 48 years until it closed in 1957. The plant produced treated wood for use in the underground mines in the Butte area. Spilled process materials (arsenic trioxide powder), treated wood chip residues, and dripped or leaked process solutions (creosote and caustic heated arsenic brines) resulted in contamination of soils and groundwater.

In 1989, an initial response action removed approximately 1,000 cubic yards of contaminated material. EPA and DEQ signed a ROD in 1995 to address the remaining contamination in soils and groundwater. The Rocker site remedy involved an

innovative treatment technology to immobilize arsenic in soils and precipitate arsenic from groundwater.

An interim monitoring phase started in 1998. In 2001, a supplemental groundwater treatment action was initiated in support of remedial work being conducted at the adjacent Streamside Tailings OU. To date, EPA has determined that the remedy is protective of human health and the environment, although further actions at the site may be necessary.

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Section 5 Summary of Site Characteristics

5.1 Site Overview

The BPSOU site is centered on the "Butte Hill", which is the location of the historic Butte Mining District. Contaminants at the site, including arsenic and heavy metals such as cadmium, copper, lead, mercury, and zinc, are the result of 120 years of hard rock mining, smelting, milling, and other processing activities. Mining and ore-processing wastes in Butte are the primary source materials for COCs. These wastes come in several different forms, including mill tailings, waste rock, slag, aerial emissions, and mixed combinations of each. Arsenic and metals contained in, or released from these wastes to soil, surface water, and groundwater pose significant threats to human and ecological receptors.

The BPSOU is situated in a predominantly urban setting, and includes residential neighborhoods, schools and parks, as well as commercial and industrial areas. Land use within the BPSOU is subject to regulation by the Butte-Silver Bow (BSB) County government through local ordinances. In Section 1, Figure 1-3 is a map showing the major land uses in the BPSOU based on the BSB County Master Plan. The northern portion of the BPSOU is characterized by residential and commercial development and inactive mining operations. Light industrial activity, scattered residences, and the Silver Bow Creek floodplain characterize the central portion of the BPSOU. The southern portion is characterized by residential areas, inactive mining operations, cemeteries, and undeveloped land. The estimated population of the city of Butte was 34,128 in 1994. The 2000 U.S. Census reports Butte's population to be 33,892.

The BPSOU covers an area of approximately five square miles and is located west of the continental divide at an elevation range of approximately 5,400 to 6,400 feet above mean sea level (amsl). The BPSOU encompasses the northwestern portion of the Summit Valley, which is characterized by gently sloping terrain, generally sloping toward the north in the southern portion of the valley and toward the west in the northern portion of the valley. Mountains bound the valley on the east, south, and north with highest elevations reaching over 10,000 feet in the Highland Mountains south of Butte.

Granitic rocks of the Boulder Batholith underlie the Butte area. They are primarily quartz monzonite intersected by porphyritic dikes and plugs. The rocks are fractured and faulted and extensively mineralized. This mineralization was the target of local mining. The communities of Butte and Walkerville were established close to the mining and milling centers as a matter of convenience. Operation of mills, concentrators, and smelters generated tailings, related wastes, and a variety of other materials that were deposited on-location, in the midst of residential areas.

The two primary streams in the valley are Blacktail Creek, which begins in the Highland Mountains to the south, and Silver Bow Creek, which is now considered to begin at the confluence of Blacktail Creek and the MSD Prior to mining, Silver Bow

Creek originated in the mountains northeast of the BPSOU. As mining production increased, mills and smelters were located along the creek. To accommodate mineral processing activities, Silver Bow Creek was rerouted as needed and was used for waste disposal. Tailings impoundments were constructed in the floodplain and wastes were discharged directly into the creek. With the advent of open pit mining, most of the original channel and floodplain were completely obliterated by the Berkeley Pit and the Yankee Doodle Tailings Pond.

The MSD was constructed in the 1930s by realigning and filling the original Silver Bow Creek channel, a low-lying swampy area, with numerous mine waste impoundments. Until 2004 when the groundwater subdrain was constructed, the MSD discharged a small amount of base flow. Thus the primary source of flow in Silver Bow Creek is Blacktail Creek. Below the confluence of MSD and Blacktail Creek, Silver Bow Creek flows west along the base of the Butte Hill, through the reconstructed stream channel at Lower Area One, and exits the OU.

The following sections provide a characterization of site media, specifically, solid media, groundwater, surface water, and air quality. Following the characterization of site media, the site conceptual model is presented. Historical and cultural resources are discussed at the end of the section.

5.2 Solid Media Characterization

Since the listing of the site on the NPL in the early 1980s, numerous investigations have been conducted to characterize the soils and mine wastes in residential, commercial, and industrial areas of the OU. Nearly 3,000 soil/waste samples were collected and analyzed. The results were used to prepare the BPSOU Remedial Investigation Report and to delineate areas with elevated metal content.

Residential solid media characterization is presented first, followed by subsections concerning non-residential solid media characterization. These subsections include: upland mine waste/soils, Granite Mountain Memorial Area, railroad beds, and floodplain wastes. Floodplain wastes (including Lower Area One and Metro Storm Drain) are presented last to serve as a transition to groundwater and surface water characterization.

5.2.1 Residential Soil, Indoor Dust, and Attic Dust Characterization

Many residences in Butte were built in close proximity to former mines and mineral processing facilities. In some instances, homes were built directly on top of mine wastes. Thus, many early investigations included the collection of residential soil samples.

In the late 1980s and early 1990s, several TCRAs were implemented based on EPA's lead-related human health risk assessment (CDM 1991 and CDM 1994) and data indicating the presence of lead contamination in many residential yards within the BPSOU site.

In the mid 1990s, a programmatic approach was adopted to address certain residential areas with lead concentrations greater than 1,200 mg/kg. The Butte-Silver Bow Lead Intervention and Abatement Program established a multi-pathway protocol for identifying candidate properties for lead abatement, typically properties inhabited by sensitive populations (children less than 6 years old, pregnant women, nursing mothers). The protocol not only takes into account lead-contaminated soils, but also considers the presence of other sources of lead associated with residential properties. Leaded paint was used on the interior and exterior of a substantial number of homes in Butte and Walkerville and is a source of a substantial amount of the residential indoor lead.

In 2001, EPA completed an additional evaluation of the potential human health risks to children and adults living in Walkerville from exposure to arsenic, lead, and mercury in outdoor soil, indoor dust, mercury vapor, and attic dust. In general, concentrations of these metals were highest in attic dust or basement soil, lower in outdoor soil, and lowest in indoor living area dust. Approximately 20 percent of the residential yards sampled exceeded the lead action level and the affected homes are being addressed in on-going response actions. EPA determined in a risk assessment process done in coordination with ATSDR, that, in most homes, there is not a complete attic dust exposure pathway because attics are not living spaces and are infrequently accessed by Butte and Walkerville residents.

There are approximately 4,000 residential properties within the BPSOU boundaries. Approximately 800 yards have been sampled under the Butte Lead Intervention and Abatement Program. This indicates that there are approximately 3,200, residential properties remaining in the BPSOU to be sampled. Information presented in Appendix F-3 of the FS Report (PRP Group 2004) indicates that on average, 44 percent of the properties sampled in the past have exceeded one or more of the solid media action levels. This number of properties is expected to be higher than will actually be required, because recent activities have focused on Walkerville and portions of Butte where historical mining activities were more intensive and where lead, arsenic, and mercury levels in soils would be expected to be higher than in other residential portions of the BPSOU, such as the area closer to Interstate 90, which will likely have lower contaminant concentrations. Also, if data indicate residential properties in areas adjacent to the BPSOU exceed action levels, these properties will be remediated under the BPSOU ROD.

Residential soil abatements typically consist of excavating yards with elevated lead concentrations to a depth of 18 inches. A geo-textile liner is placed over the excavated area to provide a barrier against contaminated soil that may be present beneath the excavated area. The excavated area is backfilled with 18 inches of clean soil and either sod is laid down or an appropriate cap such as asphalt is placed over the clean soil.

If the residential yards are cleaned up in this manner, the buildings associated with the yards are tested for exterior lead based paint. If lead based paint is present on these buildings, the lead based paint is addressed to prevent recontamination of the residential yards.

Earthen basements with elevated levels of lead, arsenic and/or mercury are addressed by removing excess contaminated soil from the walls and floor. The walls are covered with a geo-textile liner and plywood is applied over the liner to prevent direct contact with contaminated soil. Cement is placed over earthen basement floors.

If contaminated interior household dust is detected in residential properties, the source of interior dust will be determined. The source (i.e. lead based paint or attic dust) is addressed and the interior dust is removed from the residence.

If lead is detected in tap water, an investigation is completed to determine if lead pipes and/or lead solder is present in the residence. If the lead source is found, it is removed.

If contaminated dust is detected in the attic and interior living space, the attic dust is removed using a high-powered vacuum cleaner in the attic. The interior living space is cleaned to remove all contaminated dust.

5.2.2 Non-Residential Soil/Waste Characterization

Non-residential soils and mine wastes can generally be divided into 1) upland soils and mine wastes, 2) contaminated railroad beds, and 3) floodplain wastes. These are discussed in further detail below. Volumes of these categories of wastes are summarized in Table 5-1.

5.2.2.1 Upland Soils/Mine Waste Characterization

The upland soils and mine waste areas generally refer to mining wastes from mining operations on the Butte Hill that are not immediately part of a residential property These are also referred to as "source areas".

Among the largest and most comprehensive of the data collection efforts related to soil/mine waste were the Butte Soils Screening Study (CDM 1988) and the Field Survey of Unreclaimed Areas (CDM 1997a). The soils screening study provided EPA with analytical data to prioritize RI/FS studies and removal activities. The primary goal of the survey of unreclaimed areas was to conduct a final systematic inventory to identify any previously unidentified contaminated soil or mine waste. Numerous additional soil/mine waste source areas were identified during the survey. The data generated from the Butte Soil Screening Study and the Field Survey of Unreclaimed Areas were compiled with other solid media investigations (42 data sets) into a database for use in preparing the RI report.

More than 1,000 surface samples were collected in non-residential areas of the OU (Figure 5-1), of which approximately 20 percent exceeded an arsenic or lead action level Except for the Railroad Beds TCRA, which was arsenic-driven, removal actions

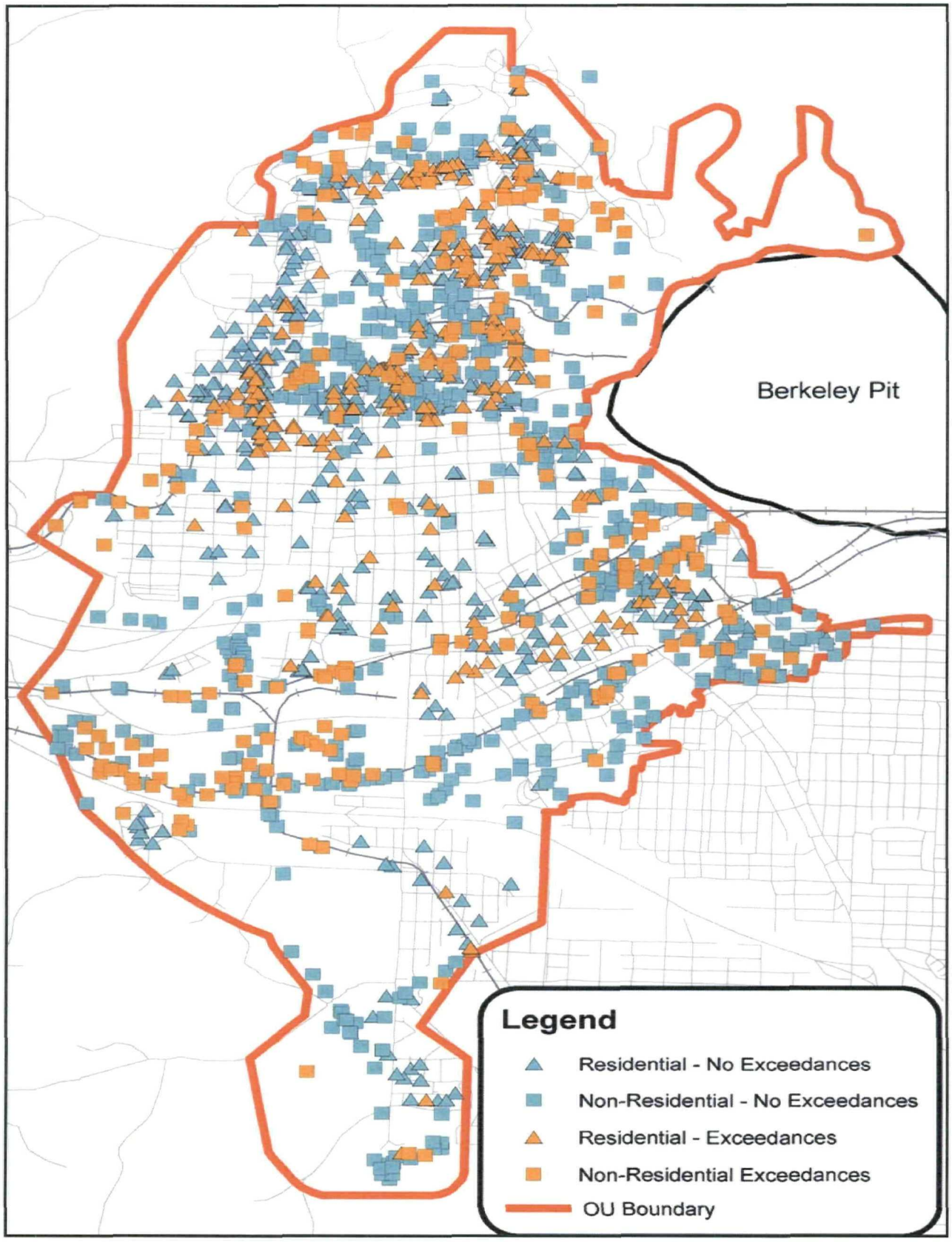


Figure 5-1
Soil Sample Locations
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

involving source areas were implemented primarily to address exceedances of the lead action level (2,300 mg/kg).

To date, 422 acres of source areas have been reclaimed. The initial quantity of mining-related wastes in upland areas was approximately 7.8 million cubic yards. Approximately 6.9 million cubic yards of mine waste have been removed or reclaimed as a result of completed response actions, leaving roughly 0.9 million cubic yards of wastes that are being considered for future remedial action at the site (Table 5-1). It is estimated that 0.1 million cubic yards of this remaining amount may exceed arsenic and lead action levels and require reclamation. It is estimated that the remaining 0.8 million cubic yards do not exceed arsenic and lead action levels. These source areas may be reclaimed in the future to address storm water concerns.

With the exception of a relatively small number of known source areas identified in the FS, all of the sample locations of source areas where lead and/or arsenic exceedances were detected (Figure 5-2) have been reclaimed or otherwise addressed by previous response actions. Known or unknown source areas exceeding action levels will be addressed in accordance with the ROD.

5.2.2.2 Granite Mountain Memorial Area

The Granite Mountain Memorial Area (GMMA) is a recent addition to the BPSOU and is located in the northeastern part of the OU (Figure 5-3). The memorial is dedicated to the 168 miners who perished in the disastrous Granite Mountain-Speculator fire in 1917.

Unlike other portions of the OU, it comprises a relatively large area of unreclaimed waste dumps that are not located in residential areas or in the Silver Bow Creek drainage. Portions of the GMMA will be reclaimed. Other portions of the site will remain unreclaimed and these areas will be fenced to prevent people from coming into direct contact with these mine wastes. Significant work will be completed on the memorial including a picnic area, landscaping with native shrubs and trees, and paving the main access road to the GMMA. Surface soils and mine waste materials in this area have been sampled and analyzed during three separate sampling programs. Of the 65 samples collected, only one exceeded the open space/recreation action level for arsenic. Seven (11 percent) exceeded the source area action level for lead. Air monitoring was conducted at the GMMA for a one-year period. The results indicated there were no elevated levels of or exceedances of heavy metals during the air sampling.

5.2.2.3 Railroad Beds

A railroad network to service, support, and supply the mining activity was essential to mining in Butte. Ore from Butte was transported via rail to smelters in Anaconda for nearly 100 years. As Butte's population grew, the rail lines transected many of the neighborhoods. Today, approximately 55,000 linear feet of railroad beds exist within the OU (Figure 5-3).

Figure 5-2
Lexington Head Frame and Mine Yard after Walkerville TCRA (Before and After)
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

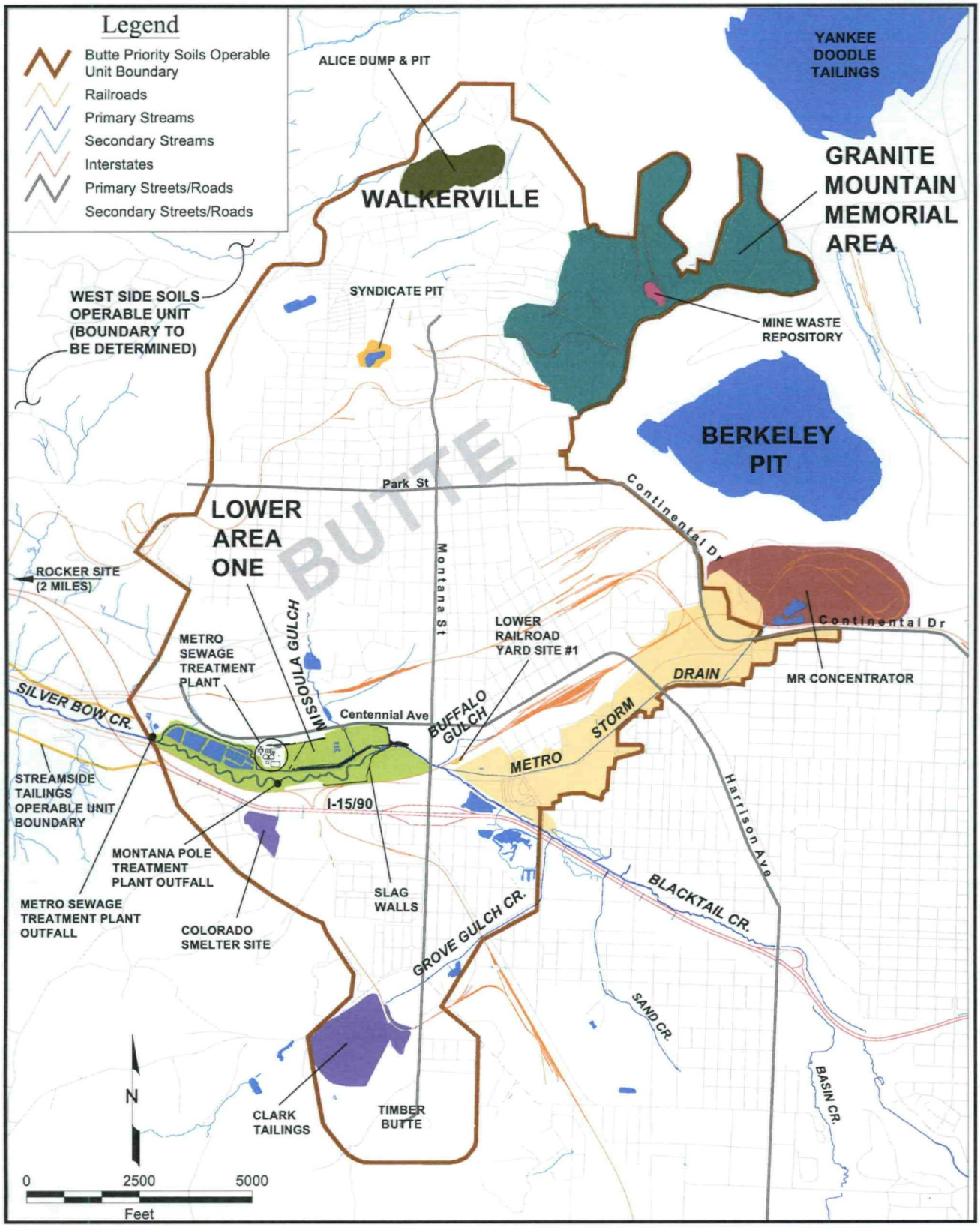


Figure 5-3
BPSOU Site Layout Map
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

Preliminary work related to characterization and cleanup of contamination associated with railroad lines was conducted in the late-1980s and mid-1990s. With the completion of the Baseline Human Health Risk Assessment for Arsenic in 1997 (CDM 1997b) and the resultant action level for arsenic, EPA initiated the Railroad Beds TCRA.

Elevated concentrations of arsenic and lead in railroad beds are due to the use of mining-related waste materials for subgrade soil or ballast and/or from spillage from rail cars during transport of ore or ore concentrates. Unlike other BPSOU TCRAs, the Railroad Beds TCRA primarily addressed exceedances of the arsenic (rather than lead) action level.

In late 1999, a supplemental sampling effort was conducted to further refine the extent of the railroad bed contamination to be addressed as part of the response action. Of the 300 surficial railroad bed samples collected, about 75 percent exceeded the arsenic non-residential action level. The volume of rail bed material that exceeded the arsenic action level was estimated to be 300,000 cy. Construction was initiated in 2001 and was completed by the end of 2004 (Table 5-1).

The Railroad Beds TCRA reduced human health risk in Butte and environmental risks to Silver Bow Creek from railroad beds. Standard construction techniques were employed, focusing on removal or constructing barriers to waste materials to reduce erosion along rail embankments, and implementing significant improvements to the storm water drainage system.

Barriers include the use of soil covers, rock covers, and geotextile materials. Storm water improvements include emplacement of a new 60-inch storm water main and other water-routing improvements to the Butte storm water drainage system, including properly sized ditches, culverts, and retention ponds. In addition, soil removal and other improvements have been made to residential properties along active and inactive rail lines. Waste rock and other contaminated materials located within the 100-year floodplain were removed. The project is highlighted by construction of a historic preservation trail on about 4.5 miles of former rail line.

5.2.2.4 Floodplain Wastes

Silver Bow Creek is the primary stream drainage in the Butte area. Historically, the creek flowed from its origin on the continental divide in the mountains north of the BPSOU, through the area that is now the Berkeley Pit and through the Metro Storm Drain area. Prior to the onset of mining in Butte, the Silver Bow Creek floodplain (in what is now the Metro Storm Drain), was a low-lying wetland area that probably received recharge from shallow alluvial groundwater. Because it was the source of water closest to the mines on Butte Hill, numerous milling and smelting plants were constructed along Silver Bow Creek, generating an estimated total of 10 million tons of waste from 1878-1925. Although a significant portion of the smelter, milling, and concentrator wastes released to surface water were transported downstream out of the Butte area by Silver Bow Creek, a sizeable volume of wastes remained within and

adjacent to the historic stream channel and in large impoundments constructed within the floodplain and low-lying wetlands.

Table 5-1
Quantities of Contaminated Soil and Mine Waste in the OU
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

Location or Category	Volume (million cubic yards))	Comments
Before EPA Involvement		
Mining wastes in upland areas	7.8	Includes waste rock dumps and other wastes at historic mines, mills, and smelter sites.
Floodplain wastes	4.3	Tailings deposits and other buried wastes in Lower Area One and Metro Storm Drain
Contaminated Railbeds	0.3	
Total	***12.4***	
Wastes Addressed by EPA Response Actions		
Reclaimed upland source areas	6.9	Source areas above As or Pb action levels addressed under TCRAs, ERAs, or other actions.
Removed floodplain wastes	1.2	
Reclaimed Railbeds	0.3	Reclaimed under Railroad Beds TCRA.
Total	***8.4***	
Wastes Being Considered For Future Remedial Action		
Floodplain wastes	3.1	Approximately 1.2 million cy of waste removed from Lower Area One.
Unreclaimed Wastes	0.8	Below As or Pb action levels. May be reclaimed in the future to address storm water concerns. Includes wastes in the Granite Mountain Memorial.
Unreclaimed Source Areas*	0.1	Remaining source areas above As or Pb action levels to be addressed in the ROD.
Total	***4.0***	

*Estimated in Appendix E-1 of the final FS. Pre-reclamation sampling in the OU found that 40 percent of samples collected in waste areas had lead or arsenic concentrations above action levels.

Metro Storm Drain

The Metro Storm Drain is the geographic area within the east-central portion of the BPSOU that generally encompasses the historic (though not the current) Silver Bow Creek floodplain between Continental Drive and Blacktail Creek (Figure 5-3). The

Metro Storm Drain structure is a man-made surface water conveyance constructed during the 1930s to provide a means of transporting mine water, sewage, and storm water out of Butte. It generally follows the historic Silver Bow Creek channel. It was used by ARCO's predecessors to discharge waste and wastewater from the Berkeley Pit operation. Metro Storm Drain merges with Blacktail Creek to form Silver Bow Creek.

The Parrott Tailings impoundment in the upper portion of the Metro Storm Drain is the largest of waste deposit in the area, and is not in the current floodplain. The Parrott Tailings and other wastes have been covered by fill-dirt, including overburden, and much of the waste deposits are now under city infrastructure. Sizable deposits of waste and contaminated soils are present in the middle and lower portions of the Metro Storm Drain (Diggings East, North Side Tailings, and Lower Metro Storm Drain Tailings). Some of these deposits are within the current floodplain and some are not.

Mining wastes and contaminated soils in the Metro Storm Drain area are largely buried below the surface. For example, the Parrott Tailings are under as much as 30 feet of mining overburden in some areas. An estimated 2 million cubic yards of mining-related waste and intermixed fill material are present within Metro Storm Drain. In some places, tailings/fill material extends to depths of over 25 feet below ground surface (Parrott Tailings). A portion of these wastes is in direct contact with groundwater and serves as a primary source of contaminants to alluvial groundwater. Tailings deposits in the middle and lower reaches of the Metro Storm Drain have also been found to be significant sources of contaminants to groundwater. These sources can reliably be contained. These materials and their impacts on groundwater are discussed in more detail in Section 5.3.

A significant assortment of municipal infrastructure and private businesses now exist over the area where the mining wastes were deposited. The infrastructure and businesses include streets, railroads, city utilities, homes, Silver Lake Pipeline, parking lots, large and small private businesses such as dry cleaning, retail, restaurant, shopping center, and the City-County Shop Complex, etc. Due to the large volume of waste, the overlying infrastructure, and the lack of detailed analysis of the area, the Metro Storm Drain area and the underlying alluvial aquifer were the subject of a focused FS prepared in 2004 by EPA as a supplement to the site wide FS to evaluate various remedial options for the Metro Storm Drain.

Lower Area One

Lower Area One is located at the western portion of the BPSOU Silver Bow Creek floodplain and includes the area where the historic Colorado Tailings and Butte Reduction Works were located (Figure 5-4). This area was the site of at least four very large milling and smelting facilities, all of which contributed to the deposition of ore processing wastes and tailings. In late 1991, EPA initiated the Lower Area One ERA to address acute threats to human health and the environment from heavy metals and arsenic in surface water and groundwater.

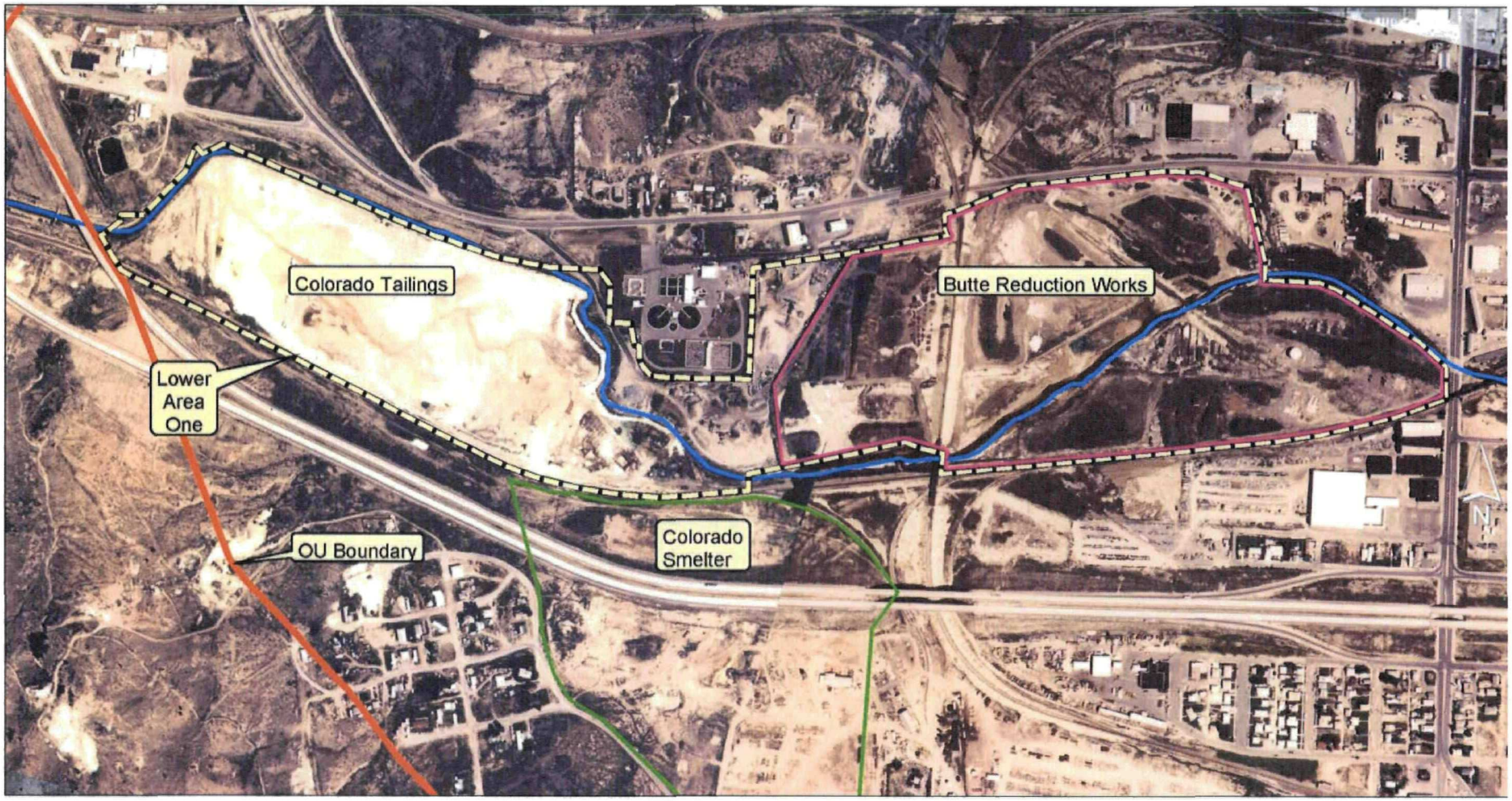


Figure 5-4
Historic Photo of Lower Area One
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

The removal and floodplain re-construction work (Phase I) was completed in 1998 and included the excavation of approximately 1 2 million cubic yards of tailings and contaminated soil from the floodplain. However, a significant volume of tailings and contaminated soils still remains at LAO, including tailings and wastes underneath the Metro Sewage Treatment Plant and the historic slag walls and aqueduct. There are also tailings and contaminated soils below the established excavation limits that were set to correspond to the bottom of the tailings and waste deposits.

Following the removal, the Silver Bow Creek channel and floodplain were reconstructed. The stream channel was reconstructed at a higher elevation to prevent contaminated groundwater from discharging to the surface water in Silver Bow Creek. The floodplain area was backfilled with clean barrow material and a diverse assortment of carefully selected plants including woody species was planted in the floodplain. A hydraulic control channel was constructed to capture contaminated groundwater. Also, four large open areas were excluded from the backfill operation in the northern portion of the site and are employed to facilitate hydraulic control and capture of groundwater. One of the four open areas was re-contoured and subdivided into six separate lagoons that are being used by the PRP Group to conduct a treatability study to test the "Treatment Lagoons in a Wetland Setting" technology. The treatability study is briefly described in Section 5.3 (Groundwater Characterization).

Phase II of the Lower Area One ERA included an extended period of groundwater and surface water equilibration during which an interim monitoring plan was implemented and completed in late 2000. Post removal groundwater monitoring indicates that groundwater COCs in the alluvial aquifer within Lower Area One remain at concentrations exceeding groundwater quality standards. For example, in the former Colorado Tailings area, the wells monitored before and after the removal showed a decrease in contaminant concentrations ranging from 10.6 percent (cadmium in GS-25) to 90.2 percent (arsenic in BMW98-4A). However, these post-removal concentrations were generally well in excess of the human health standards - in one case, 145 times greater (arsenic in BMW-2A). Many concentrations remained greater than 20 times the human heath standard. None of the original concentrations exceeding standards have decreased to the extent that drinking water standards were met in the 2000 dataset.

Phase III of the Lower Area One ERA was deferred to the final remedial action that is described in this ROD. These activities include the implementation of the treatment technology for treatment of groundwater, and the final reclamation and land use planning for the entire Lower Area One site.

5.3 Groundwater Characterization

Alluvial groundwater and its interaction with mine wastes, contaminated soil, and surface water was the focus of the groundwater investigation for the BPSOU. Unconsolidated deposits that comprise the alluvial aquifer within the upper Silver Bow Creek drainage are found along all the larger streams and throughout the central

portion of the basin (Figure 5-5). Alluvium is composed of unconsolidated Tertiary and Quaternary aged deposits that overlie bedrock and include valley fill, landslide debris, talus, and fan gravels derived from the surrounding mountains. Within the OU, the alluvial aquifer encompasses the Metro Storm Drain area and the floodplain areas of lower Blacktail Creek, Grove Gulch Creek, and a portion of Silver Bow Creek. The thickness of the alluvium is generally greater than 200 feet in the upper Metro Storm Drain area and decreases toward the south and west to less than 30 feet within and west of Lower Area One.

The alluvial aquifer in the upper Silver Bow Creek valley is about 3.5 miles wide and 7 miles long and occupies an area of approximately 23 square miles. The lower portion of this alluvial drainage (south of Berkeley Pit) is now referred to as the Metro Storm Drain area. A significant portion of the groundwater recharge to the Silver Bow Creek watershed in BPSOU is intercepted by the Berkeley Pit and the Continental Pit (Figure 5-6). The hydrologic boundaries are shown from a different vantage point in Figure 5-7, which illustrates how the upper portion of the watershed is cut off from the Metro Storm Drain.

Alluvium pinches out towards the north, as the Butte Hill rises away from Silver Bow Creek and the Metro Storm Drain. South of Silver Bow Creek, the alluvial aquifer extends up a portion of Grove Gulch Creek in the southern portion of the OU.

Site data (differences in hydraulic heads, water chemistry, and aquifer test data) show that the alluvial and bedrock aquifers beneath the Butte area are hydraulically distinct. Groundwater that occurs in the non-weathered granitic bedrock is associated with the underground mine workings and the Berkeley Pit system and is a component of the Butte Mine Flooding OU ROD. For these reasons, groundwater in the bedrock aquifer was not evaluated under the Butte Priority Soils RI/FS, except where it occurs within the upper weathered portion of the bedrock system and interacts directly with alluvial groundwater.

Groundwater movement in the Silver Bow Creek Valley mimics surface water movement and flows from higher elevation to lower elevation. South of Butte, groundwater flows northward away from the Highland Mountains. Flow in the historic Silver Bow Creek watershed moves from the Continental Divide toward the south-southwest. At the confluence of Blacktail Creek and the Metro Storm Drain, groundwater flow is diverted toward the west beneath Silver Bow Creek and exits the valley just west of the operable unit boundary and Lower Area One.

Near the confluence of Blacktail Creek and the Metro Storm Drain, the alluvial aquifer thins to approximately 30 feet. It continues to thin in a westward direction as the valley narrows. Immediately west of Lower Area One, at the outlet of the Silver Bow Creek valley, the width of the alluvium narrows to about 900 feet (see Figure 5-6). The alluvial deposits in this narrow region are less than 20 feet thick.

The reduction in lateral extent and thickness of the alluvium near the west end of the OU greatly decreases the cross-sectional flow area of the alluvial system, resulting in a

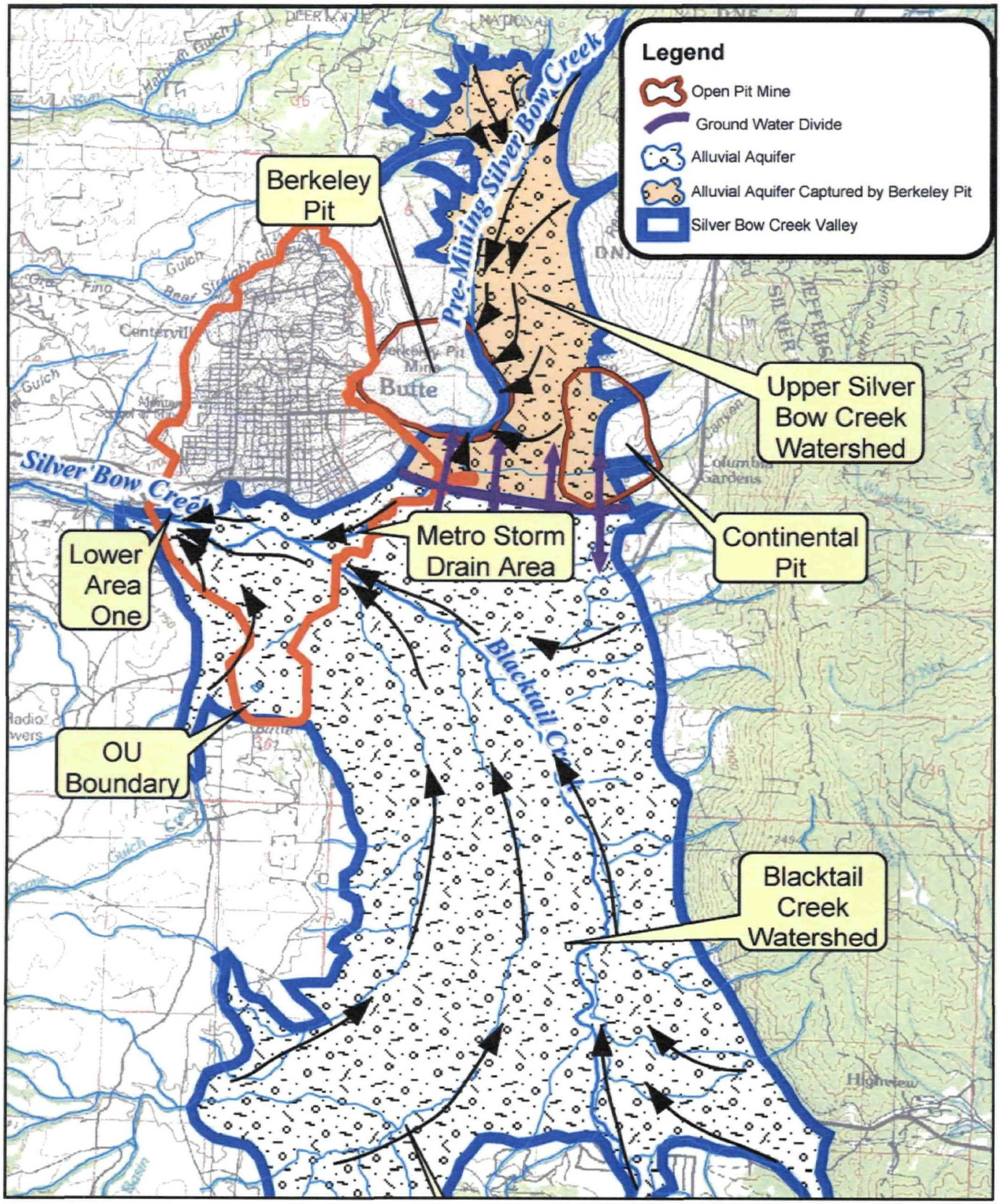


Figure 5-5
Upper Silver Bow Creek Valley Alluvial Aquifer
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

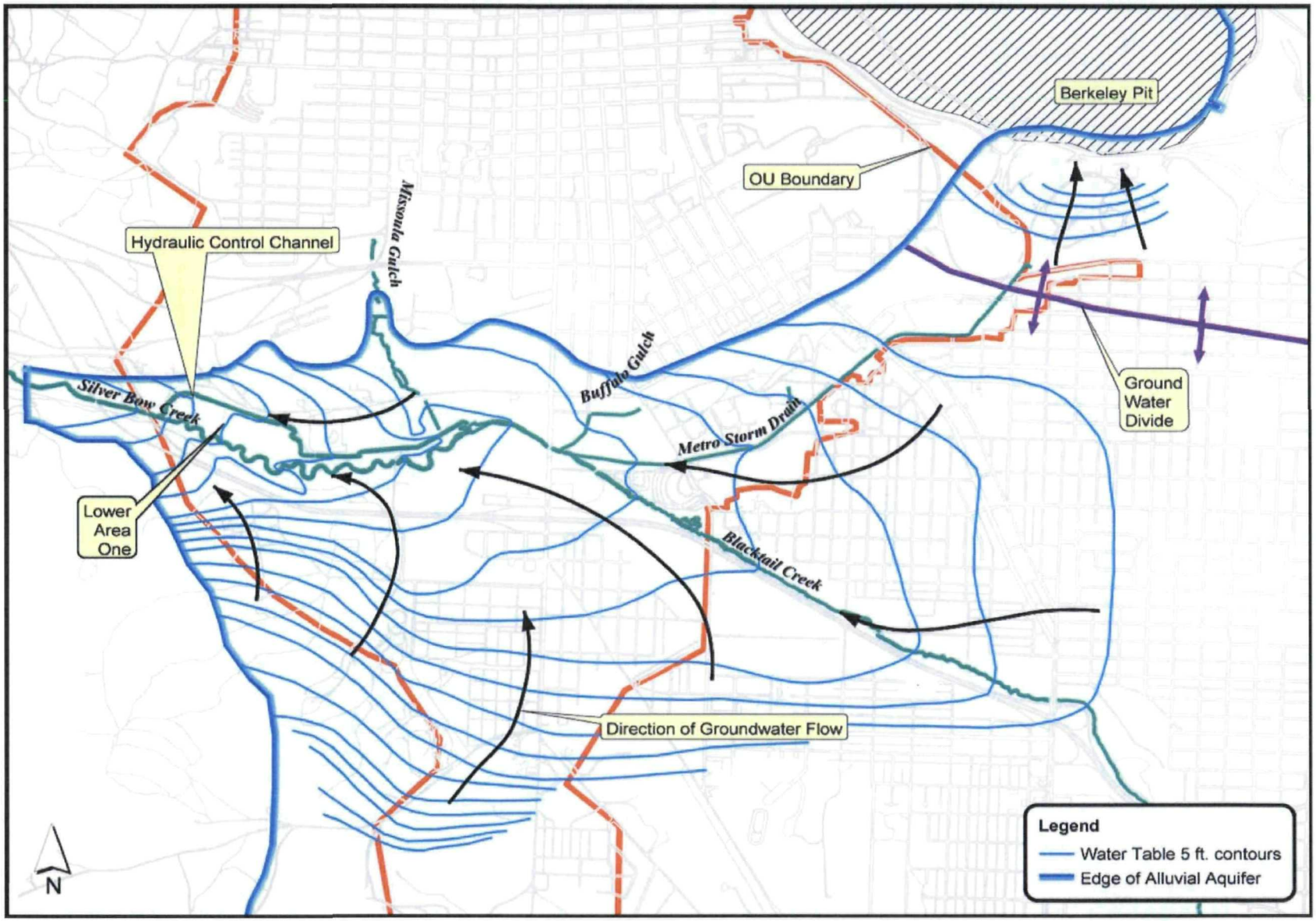


Figure 5-6
Potentiometric Surface Map of the Alluvial Aquifer
Record of Decision
Butte Priority Soils Operable Unit
S r Bow Creek/Butte Area NPL Site

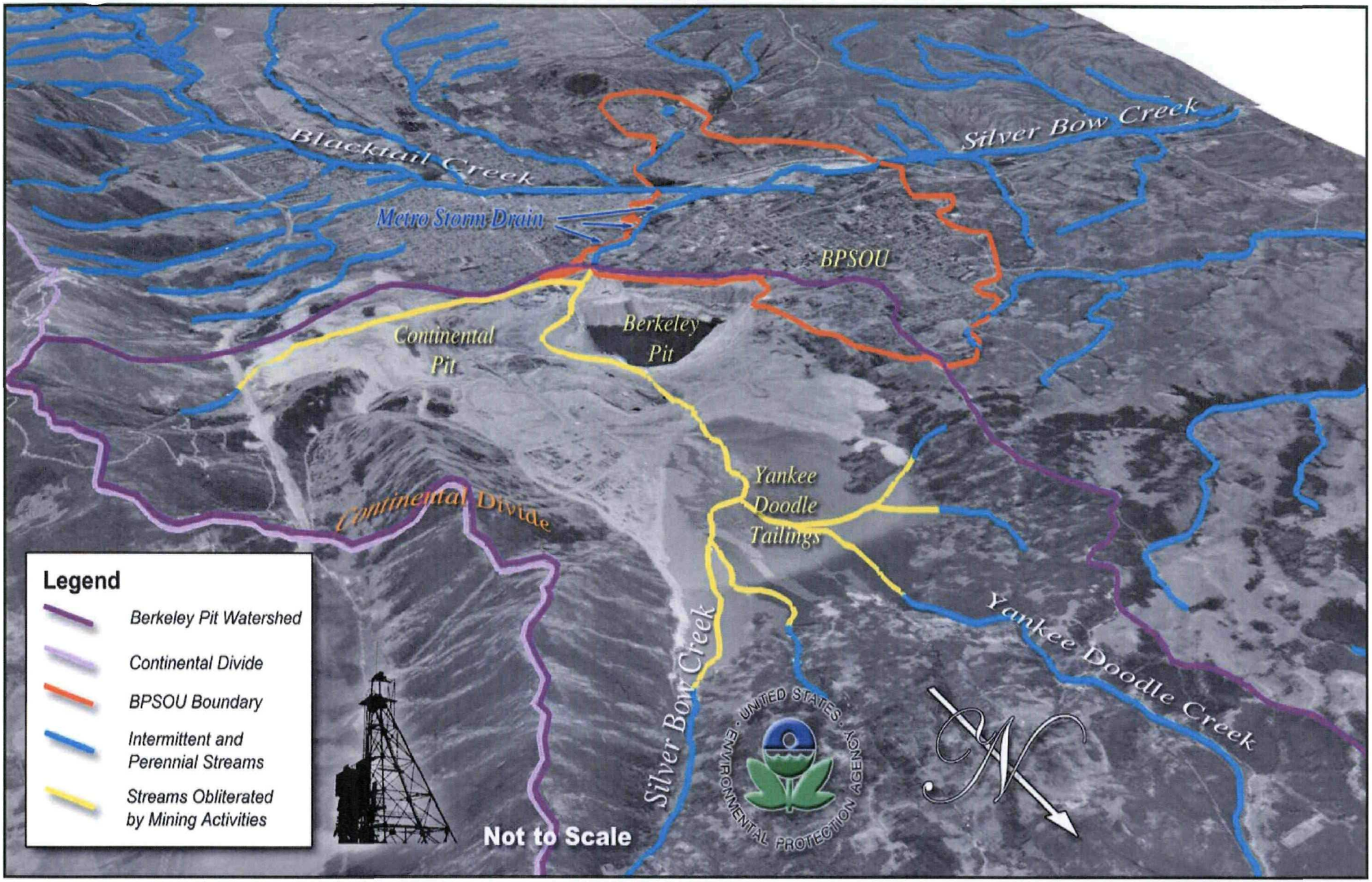


Figure 5-7
Hydrologic Boundaries and Surface Water Features
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

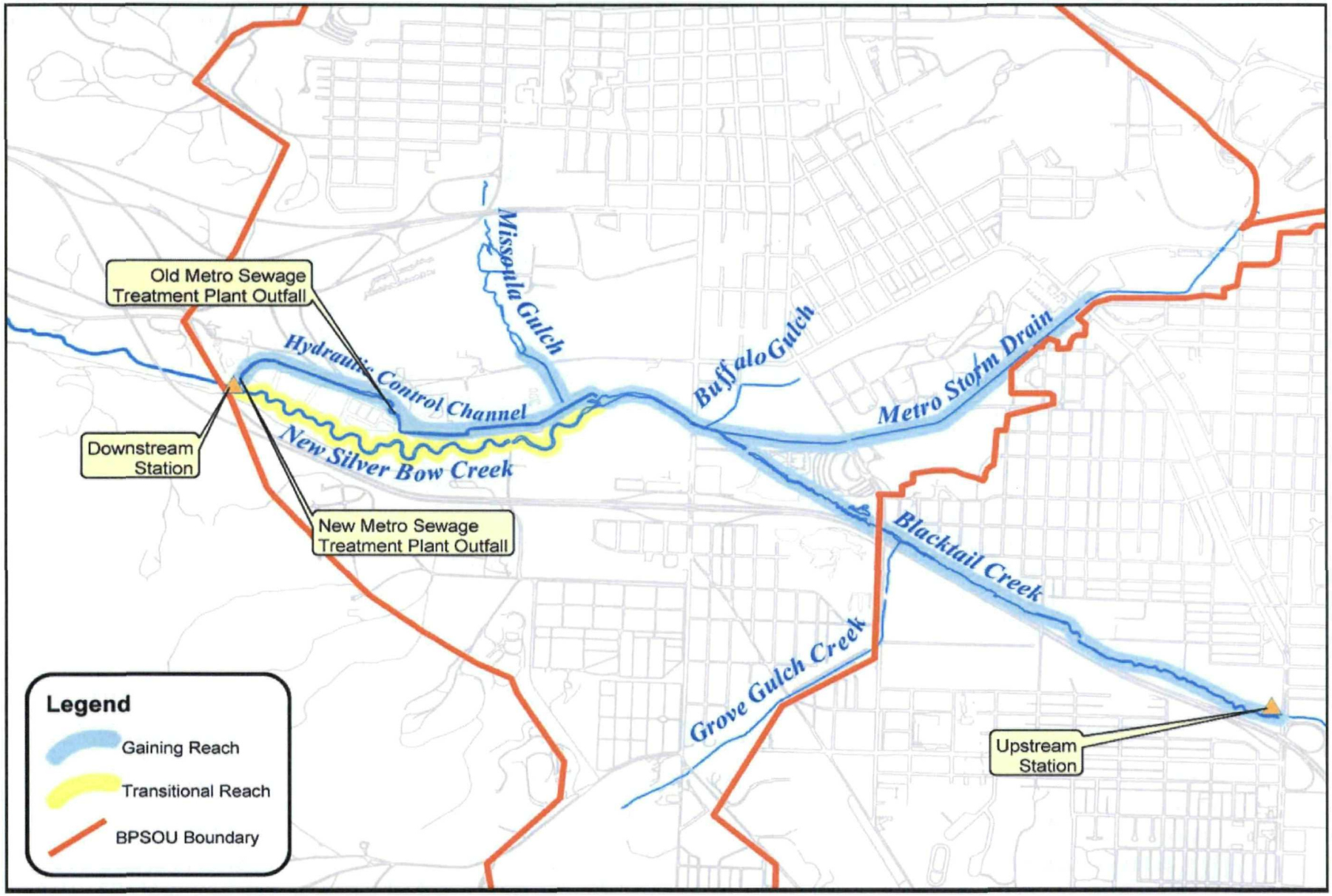


Figure 5-8
Key Surface Water Sampling Locations
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

"neck" through which only a very small flux of alluvial groundwater can exit the basin. The reduction in cross-sectional flow area causes much of the alluvial groundwater to discharge to the lower reaches of Blacktail Creek, the Metro Storm Drain, and Silver Bow Creek. Measured gains and losses over these surface water reaches (key surface water monitoring stations are shown in Figure 5-8) support the conclusion that most of alluvial groundwater in the portion of the Silver Bow Creek basin located within the BPSOU boundary discharges to surface water and leaves the basin as surface water flow in Silver Bow Creek.

This decrease in cross sectional area of the alluvium at the west end of Lower Area One enhances the effectiveness of the groundwater capture system. Prior to installation of the groundwater capture system at Lower Area One, underflow beneath Silver Bow Creek at the valley outlet was estimated at less than 150 gallons per minute (gpm) (Hydrometrics 1990). Since the groundwater collection system began operation in 1998, the flux of groundwater that exits the upper Silver Bow Creek Valley is less than 6 gpm (PRP Group 2002).

5.3.1 Hydrogeologic Data

Within the OU, the alluvial aquifer has been extensively characterized. Approximately 200 wells and soil borings have been completed in the alluvial aquifer. Data collected from these wells and geophysical investigations were used to evaluate the lithologic and hydraulic character of the alluvial aquifer. A subset of 65 wells was included in the monitoring well network (Figure 5-9) and these wells have provided a large quantity of hydrogeologic data on the alluvial groundwater system. This includes long-term water level measurements and information on aquifer characteristics obtained from pumping and slug testing.

Potentiometric data indicate that groundwater flow from the Blacktail Creek floodplain (upper Silver Bow Creek valley), the Metro Storm Drain, and the Silver Bow Creek floodplain converges in the vicinity of Lower Area One (Figure 5-6). Small quantities of groundwater flow enter the floodplain system from subdrainages on the Butte Hill (e.g., Missoula Gulch, Buffalo Gulch).

A drainage divide in the alluvial groundwater system is present south of the Berkeley Pit and is attributable to the "cone of depression" caused by dewatering operations in the pit area. Groundwater north of this divide flows toward the pit. South of the divide, groundwater flows southward toward lower Metro Storm Drain and Silver Bow Creek. This groundwater divide will be maintained as a condition of the Butte Mine Flooding OU ROD to control migration of contaminated water in the Berkeley Pit and underground mine workings.

Groundwater quality in the alluvial corridor south of the divide is severely degraded. Elevated levels of groundwater COCs are concentrated in this corridor of the alluvial aquifer. Contaminant concentrations are highest in the upper Metro Storm Drain and in Lower Area One.

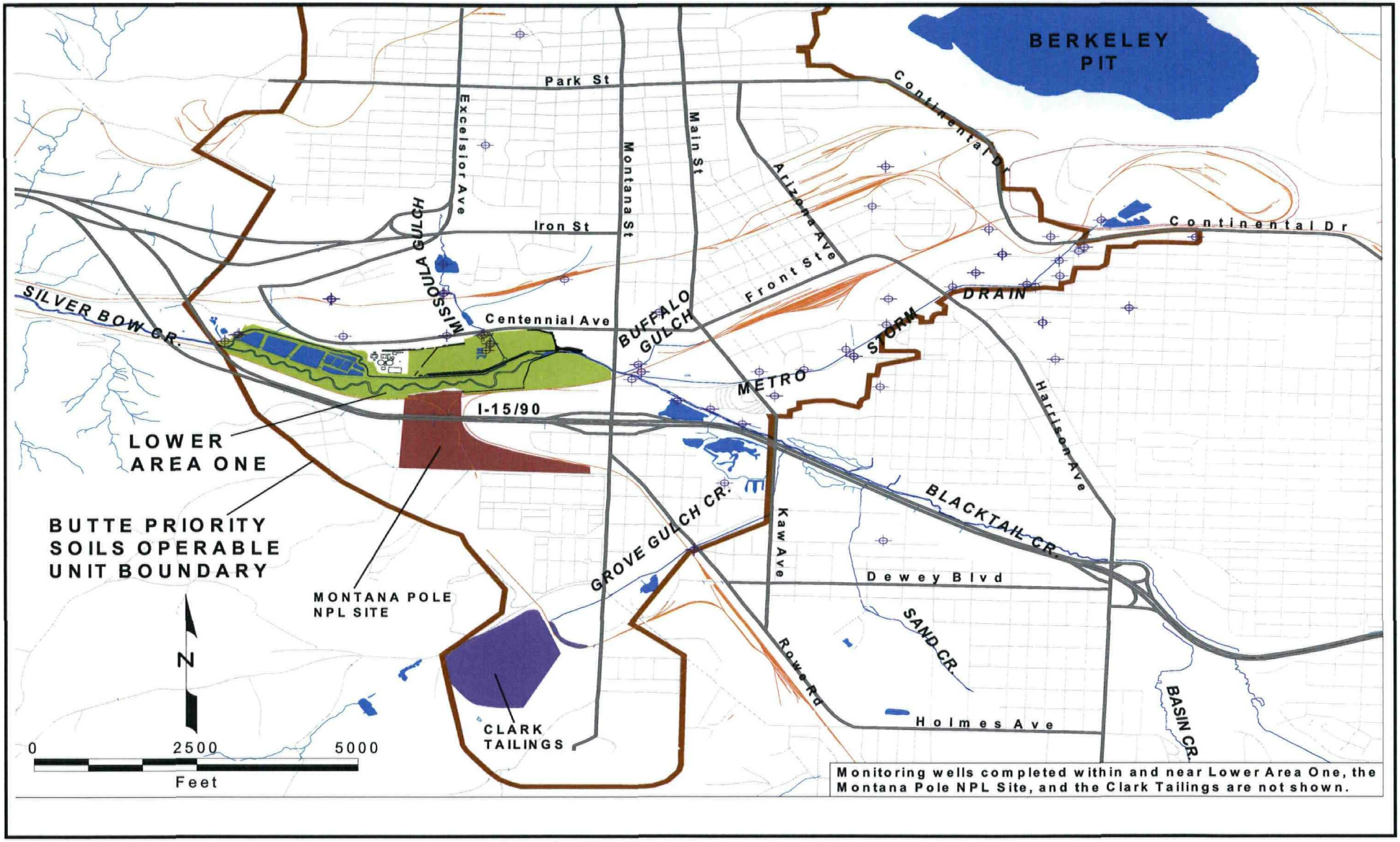


Figure 5-9
Butte Priority Soils OU Monitoring Wells
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

5.3.2 Lower Area One

Prior to the implementation of Phase I of the LAO ERA, this area was characterized by mining, smelting, and milling waste deposits, stockpiles of manganese ore and manganese slag walls used to segregate waste accumulations from the channel of Silver Bow Creek, and several tailings impoundments (Figure 5-4). The largest of these impoundments was the Colorado Tailings. These impoundments held an estimated 2.2 million cubic yards of mining related wastes (Table 5-1).

Initial characterization of groundwater quality in Lower Area One was performed in the late 1980s and early 1990s and indicated that alluvial groundwater was severely degraded and had a significant impact on surface water quality in Silver Bow Creek. The Colorado Tailings and other waste materials in Lower Area One were partially saturated with groundwater (Figure 5-10) and this resulted in significant contaminant loading to Silver Bow Creek.

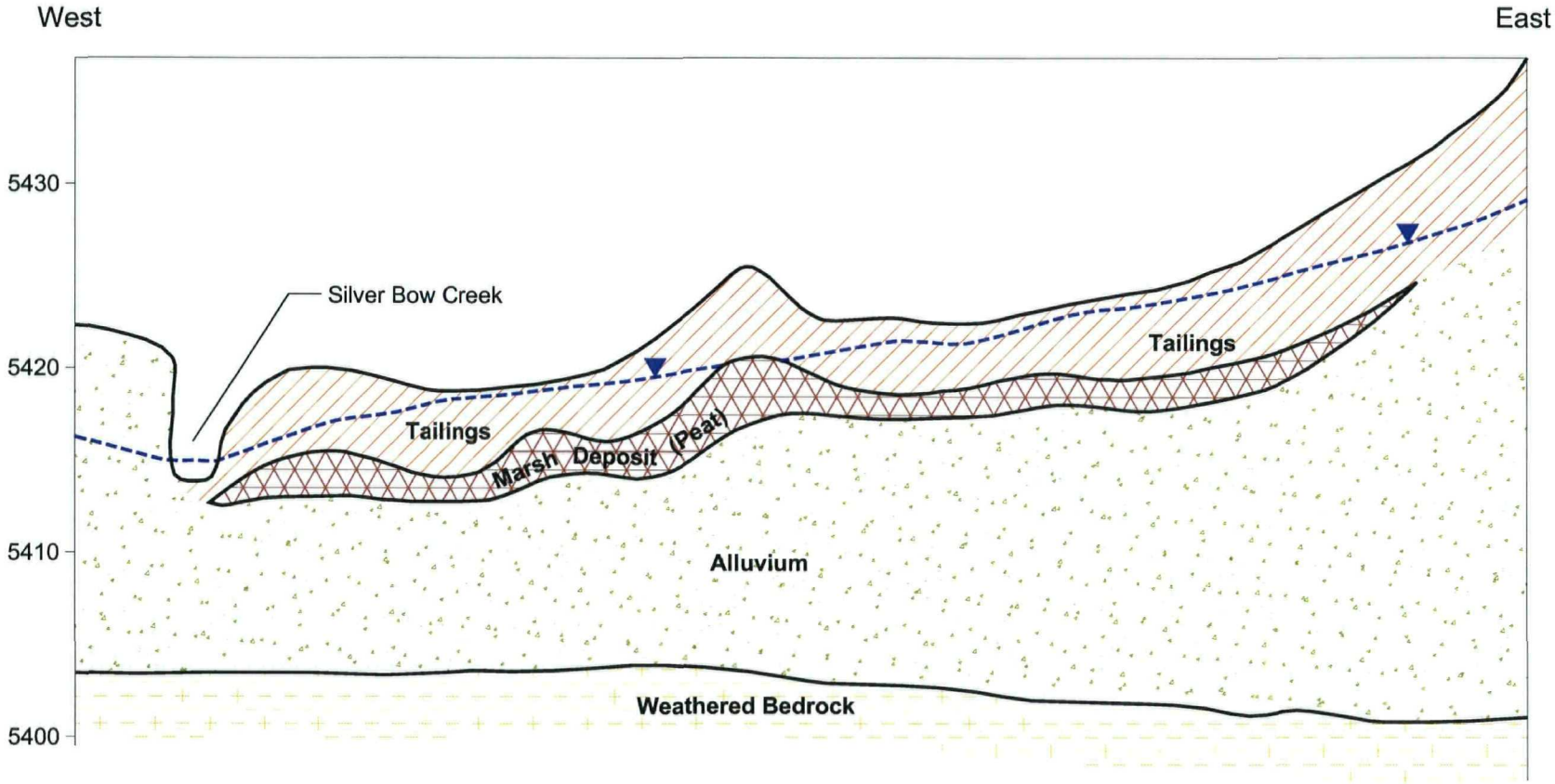
The magnitude of groundwater contamination at Lower Area One before the implementation of Phase I of the ERA is illustrated on Figure 5-11. As discussed earlier in this section, Phase I entailed excavating and removing significant quantities of tailings and contaminated soils, backfilling with clean fill, restoring the Silver Bow Creek channel, and constructing a hydraulic control channel.

Contemporary site features at Lower Area One are shown on Figure 5-12. Groundwater remains contaminated in Lower Area One due to leaching of metals from inaccessible tailings and other wastes that remain in the area (Figures 5-13 a, b and c show cadmium, copper, and zinc as examples). However, current hydraulic controls prevent contaminant loading to Silver Bow Creek and allow for the capture and eventual treatment of groundwater (Figure 5-14).

5.3.2.1 Treatability Study at Lower Area One

Since completing Phase I of the ERA (waste removal and reconstruction of Silver Bow Creek floodplain) in 1998, the PRP Group has performed a treatability study in Lower Area One to assist in the selection of groundwater treatment methods for the BPSOU. A detailed description of the treatability study is presented in Appendix D of the Final Feasibility Study Report (PRP Group 2004).

The study was conducted in a series of three unlined lagoons that were constructed within one of the larger open areas that remained un-backfilled following the removal of the Colorado Tailings (see Figure 5-12). An additional parallel set of three lagoons was constructed in 2001 to increase capacity, supplement treatment in the original lagoons, and for independent use when maintenance is required on the original lagoons. The treatment system is designed to treat contaminated groundwater captured by the Lower Area One hydraulic control channel and open water areas, as well as water diverted from the West Camp system of the Mine Flooding OU. The treatment system uses lime addition to modify the pH and chemistry of influent water to reduce metal solubility. Treatment within the lagoon system is accomplished primarily by lime precipitation. Additional biological or "wetland-type" treatment



Reproduced from Montana Bureau of Mines and Geology Open-File Report No. 227 (May 1990)

Figure 5-10
Pre-removal Profile of the Colorado Tailings
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

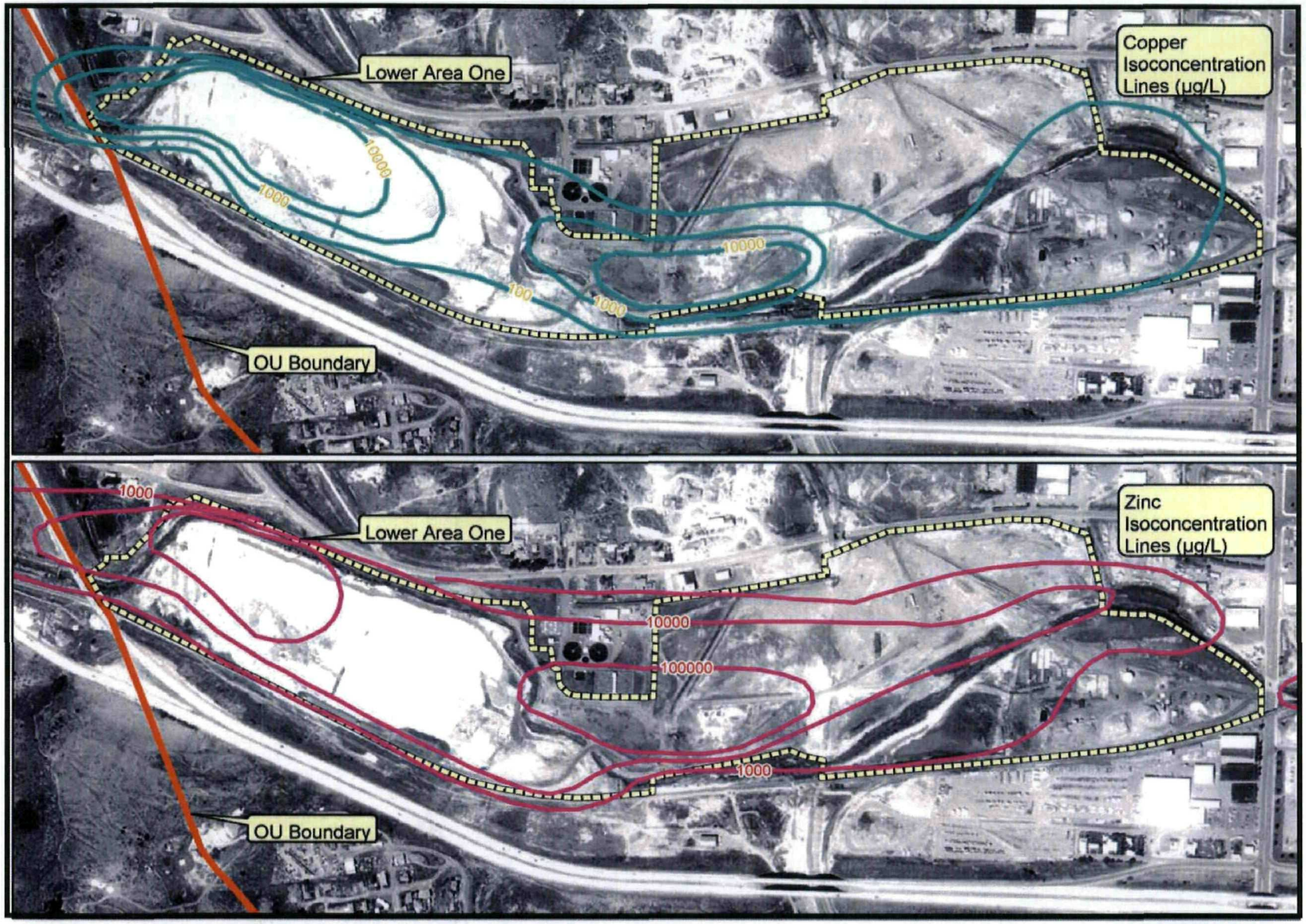


Figure 5-11
Pre-removal Copper and Zinc Distribution in Lower Area One Groundwater
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

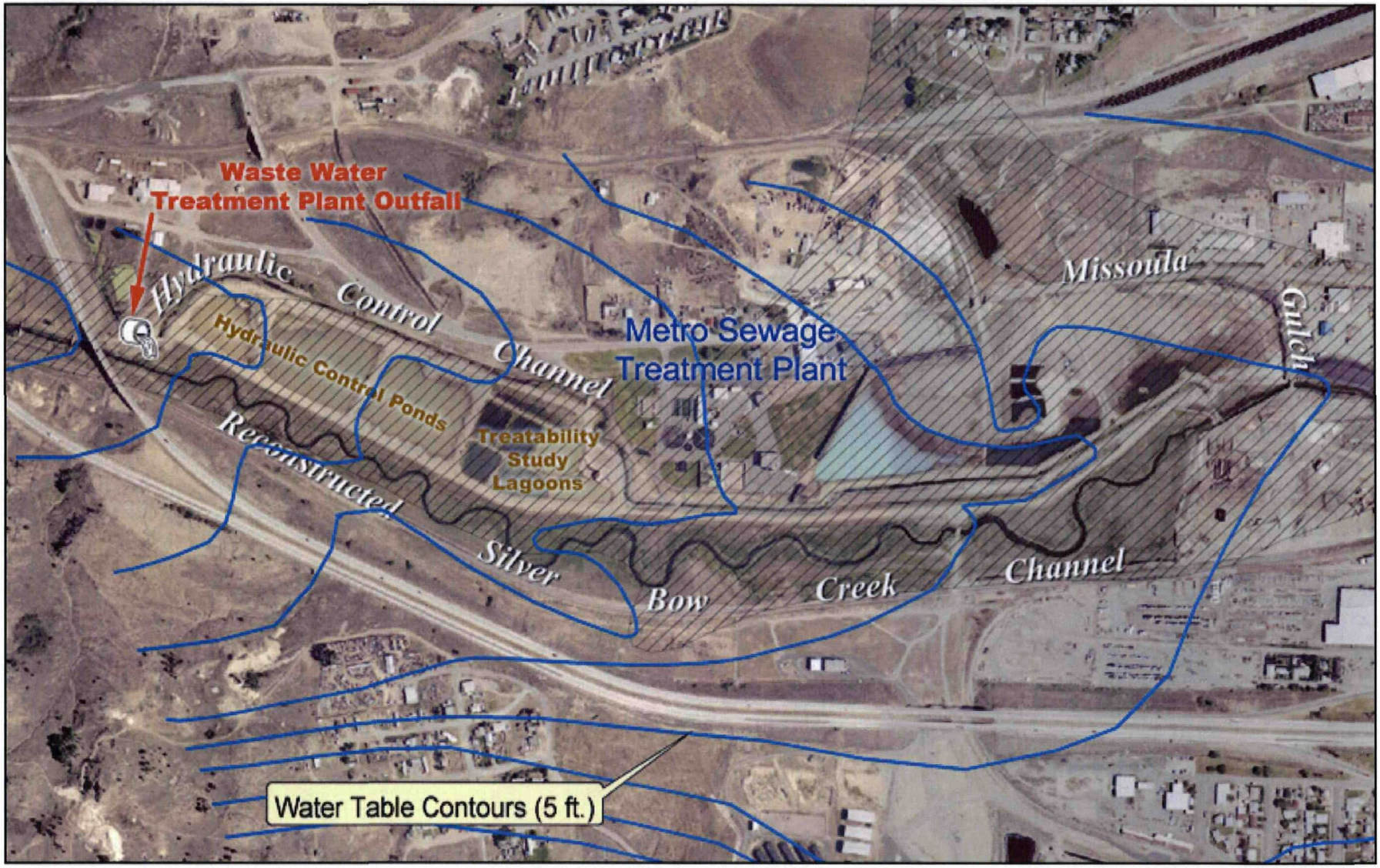


Figure 5-12
Lower Area One Post-Removal Features (2002 photo)
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

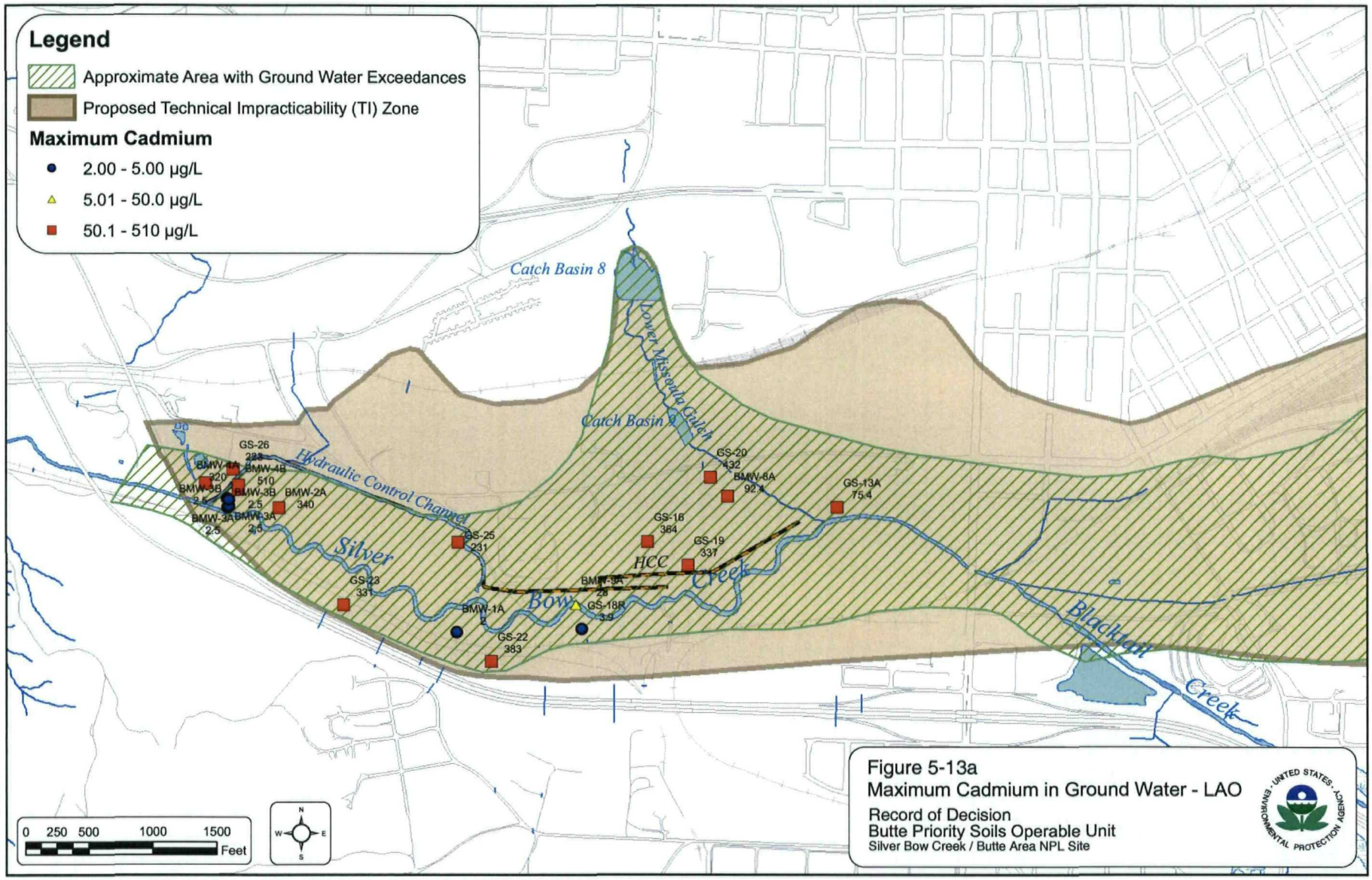


Figure 5-13a
Maximum Cadmium in Ground Water - LAO

Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek / Butte Area NPL Site

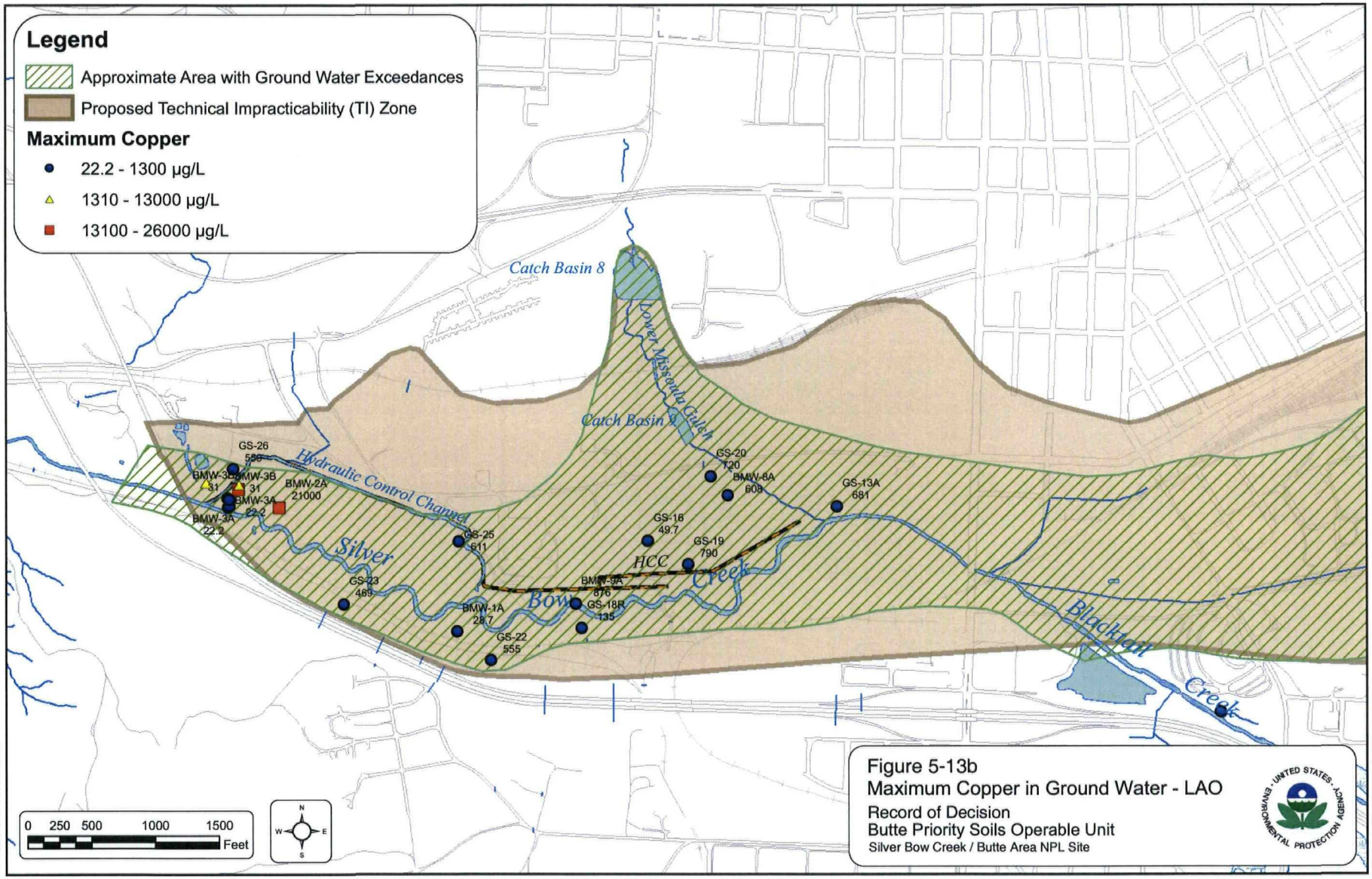


Figure 5-13b
Maximum Copper in Ground Water - LAO
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek / Butte Area NPL Site

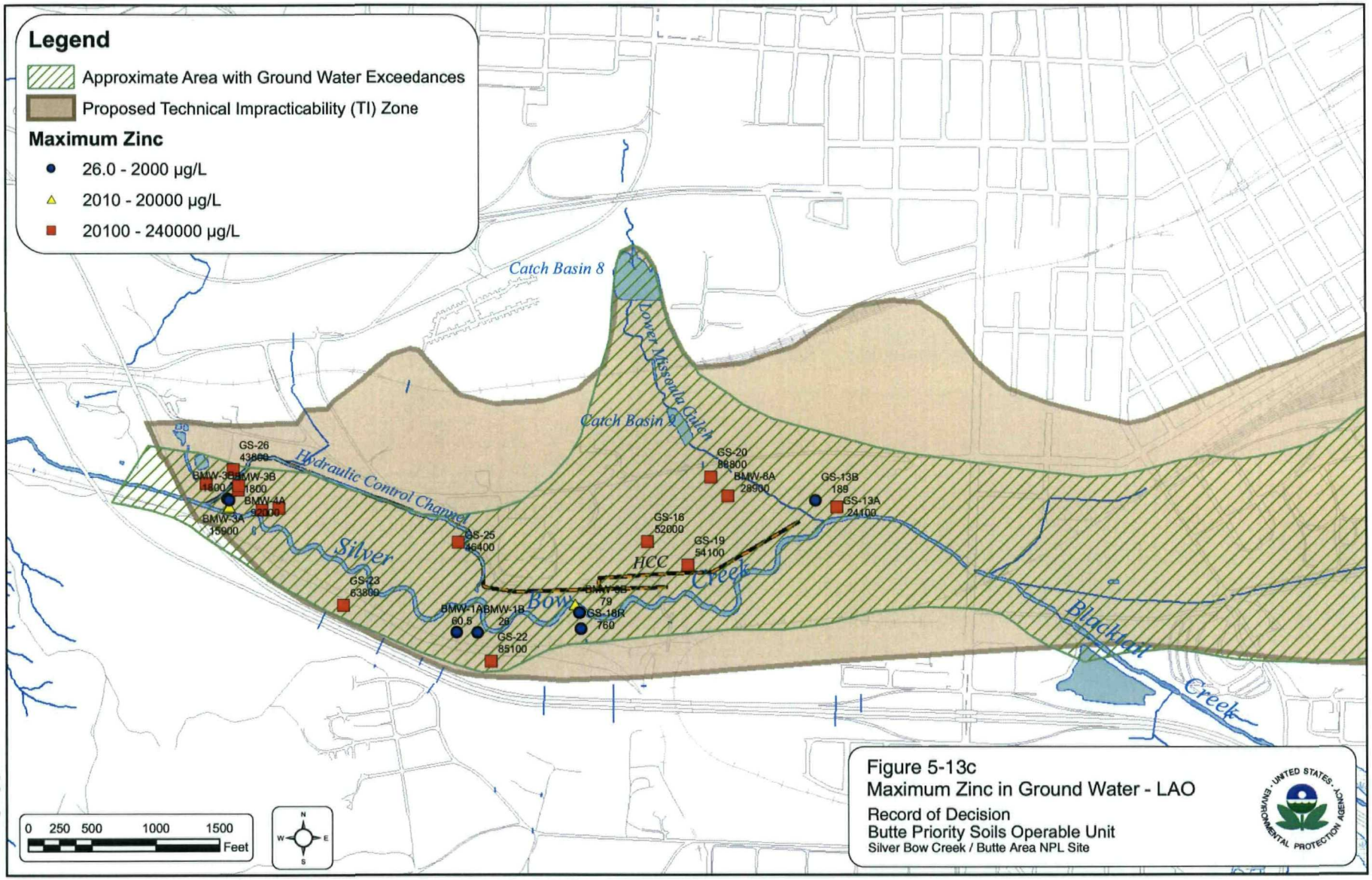


Figure 5-13c
Maximum Zinc in Ground Water - LAO
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek / Butte Area NPL Site

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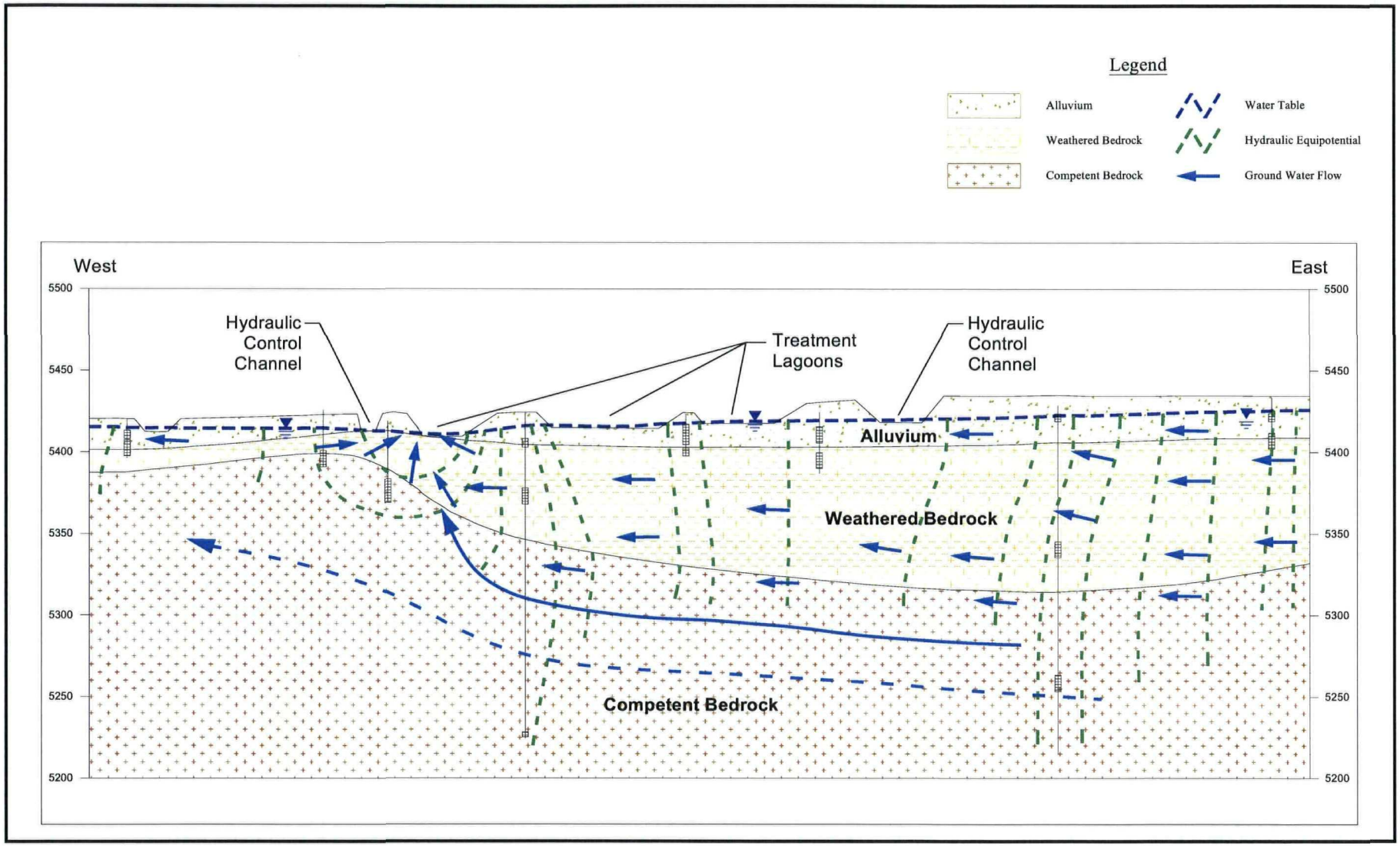


Figure 5-14
Lower Area One Groundwater Capture Profile
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

effects were demonstrated to be minimal, particularly during the winter months. The study showed that the lagoon system was generally capable of effectively treating influent waters to achieve discharge standards (Montana DEQ-7 standards) during periods of normal operation.

5.3.3 Metro Storm Drain

The thickness of the alluvial aquifer is greater than 250 feet beneath the upper Metro Storm Drain and thins to approximately 25 feet near the confluence of Metro Storm Drain and Blacktail Creek (Figure 5-15). Alluvium within the Metro Storm Drain is comprised of poorly sorted sand, gravel, silt, and clay of low to moderate permeability. Generally, the aquifer is coarser and more permeable in the shallow portion of the aquifer (above 70 to 80 feet) than it is at depth.

Near land surface, the Metro Storm Drain area is predominantly reworked fluvial sediments and fill material (including waste rock, slag, tailings, demolition debris, and old dump material) ranging in thickness from a few feet to over 25 feet. Buried tailings in the upper Metro Storm Drain area are the remnants of tailing impoundments constructed for wastes generated predominantly by the historic Parrott Smelter. The most notable waste deposits in the lower Metro Storm Drain are referred to as the North Side and the Diggings East Tailings (Figure 5-16).

The alluvial aquifer in the Metro Storm Drain area receives recharge primarily from precipitation, snowmelt, and runoff from the Butte Hill. The groundwater cone of depression created by the Berkeley Pit intercepts and contains groundwater in the alluvial and bedrock aquifers north of the Metro Storm Drain area (Figures 5-6 and 5-7).

Minor recharge may be received from the east in the upper Metro Storm Drain; however, most of the flow from the east is diverted southward toward Blacktail Creek prior to entering the Metro Storm Drain area. The groundwater divide is a broad area with a nearly flat water table surface that extends over much of the upper Metro Storm Drain area. In lower Metro Storm Drain, the water table slopes toward the southwest at an average horizontal hydraulic gradient of approximately 0.4 percent.

In the middle reaches of the Metro Storm Drain, shallow groundwater flow generally parallels the channel and discharges to the channel in the lower Metro Storm Drain area. A water balance evaluation performed during the RI (PRP Group 2002) demonstrated that the calculated flux through the alluvial aquifer in the Metro Storm Drain is essentially accounted for by the average base flow (0.3 cfs). This suggests that nearly all groundwater within the upper and middle Metro Storm Drain is expressed as surface water in the lower reaches of the Metro Storm Drain channel.

Groundwater in the Metro Storm Drain area is severely impacted by buried and fluvially deposited mining wastes throughout the Metro Storm Drain, including the historic Silver Bow Creek floodplain. Impacts are most apparent beneath and down gradient of the Parrott Tailings, North Side Tailings, and Diggings East Tailings (Figures 5-17 a, b, and c show cadmium, copper, and zinc concentrations as

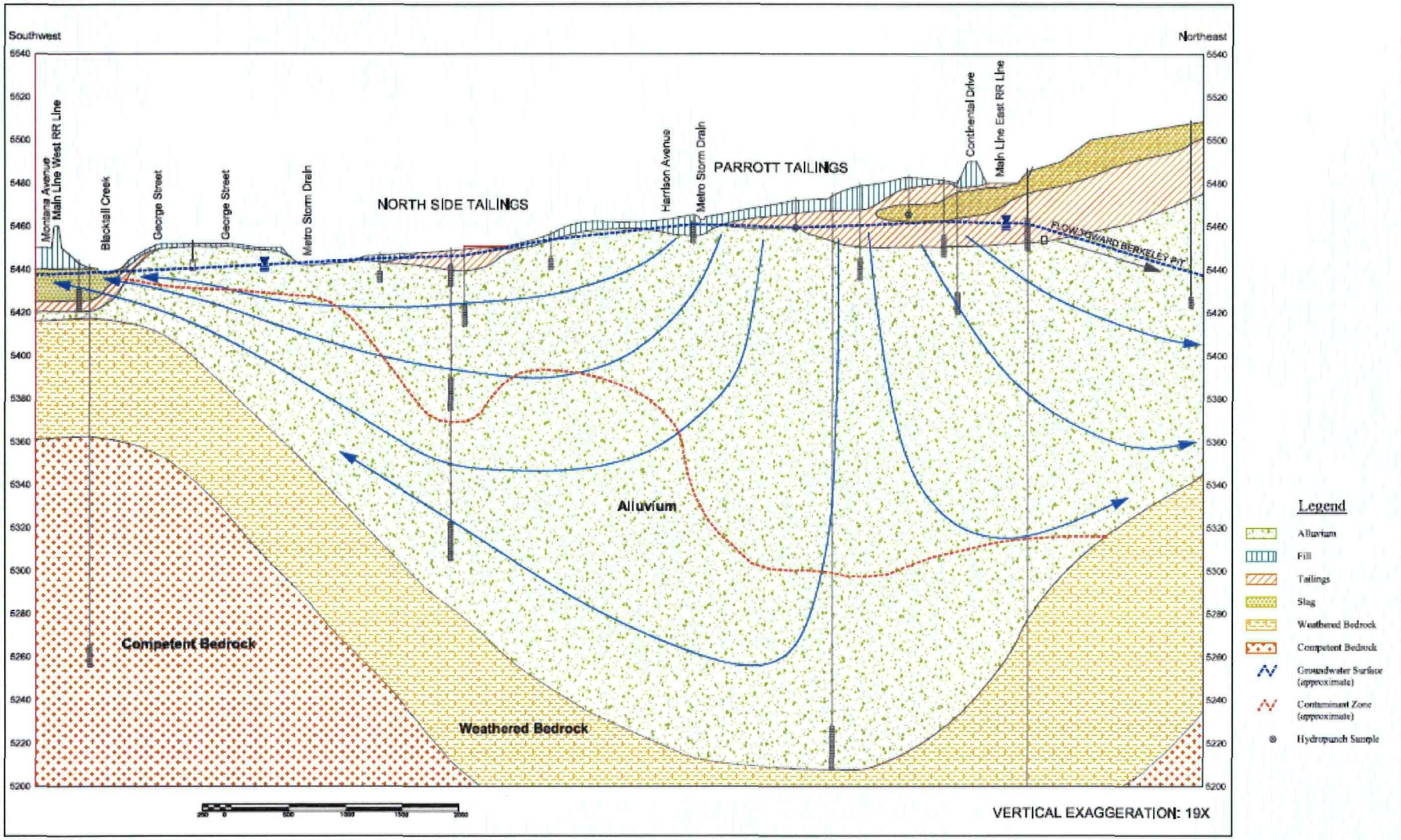
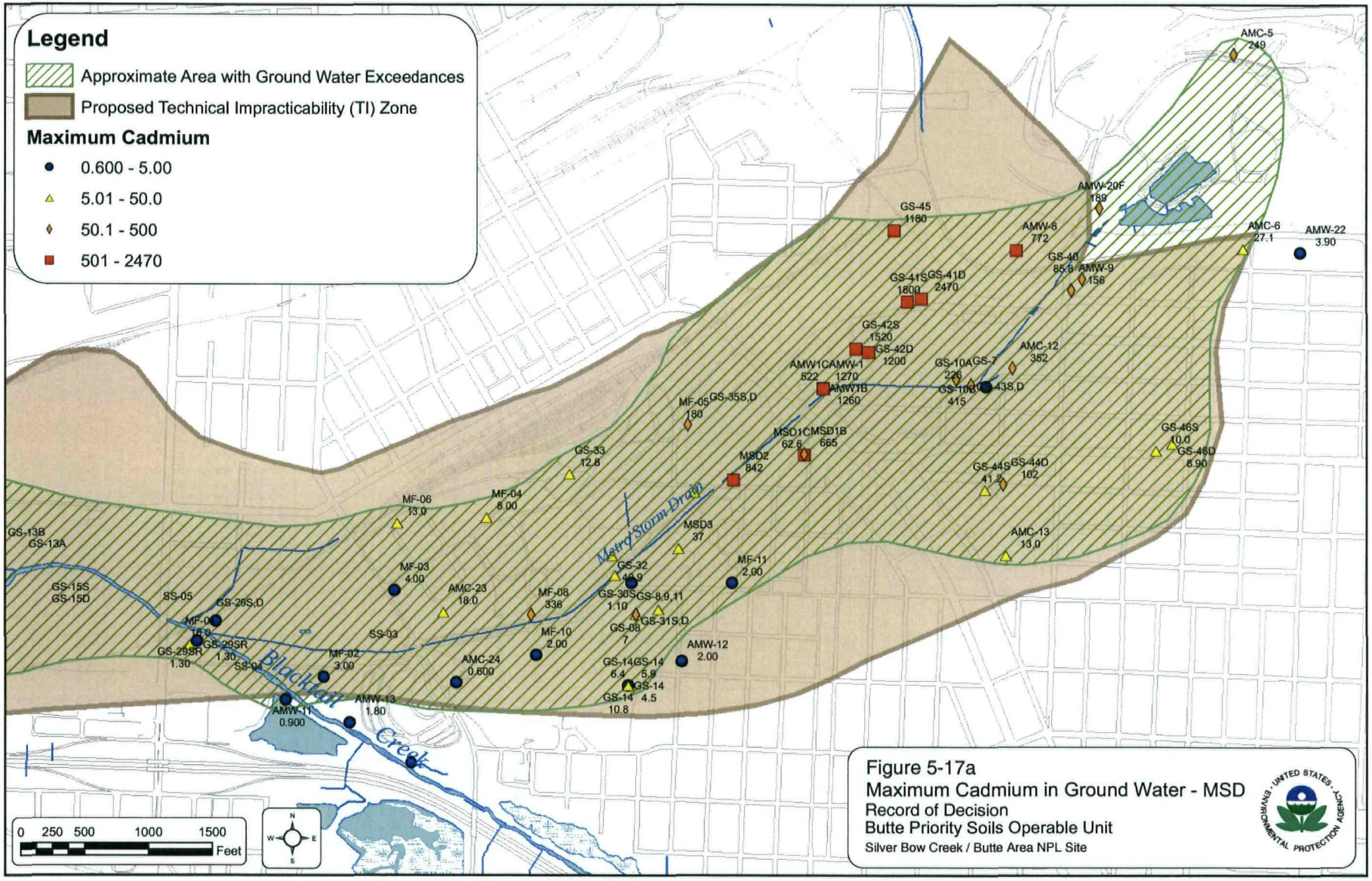


Figure 5-15
Profile of Alluvial Aquifer in Metro Storm Drain
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

Figure 5-16
Waste Materials in Metro Storm Drain
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site


Legend
Approximate Area with Ground Water Exceedances
Proposed Technical Impracticability (TI) Zone
Maximum Cadmium
0.600 - 5.00
5.01 - 50.0
50.1 - 500
501 - 2470
AMC-5 249
AMW-20F 189
GS-45 1180
AMW-8 772
AMC-6 27.1
AMW-22 3.90
GS-40 85.8
AMW-9 156
GS-41S 1800
GS-41D 2470
GS-42S 1520
GS-42D 1200
AMC-12 352
AMW1C
AMW-1 1270
522
GS-10A
GS-7
AMW1B 1260
GS-10B 415
GS-43S,D
MF-05 180
GS-35S,D
MSD1C
MSD1B 665
62.6
MSD2 842
GS-33 12.8
GS-46S 10.0
GS-46D 8.90
GS-44S 41.2
GS-44D 102
AMC-13 13.0
MF-06 13.0
MF-04 8.00
Metro Storm Drain
MSD3 37
GS-13B
GS-13A
MF-03 4.00
GS-32 46.9
MF-11 2.00
GS-15S
GS-15D
SS-05
GS-29S,D
AMC-23 18.0
MF-08 336
GS-30S 1.10
GS-8,9,11
GS-31S,D
MF-01 16.9
GS-29SR 1.30
SS-03
MF-10 2.00
GS-08 7
AMW-12 2.00
GS-29SR 1.30
SS-04
MF-02 3.00
AMC-24 0.600
GS-14 6.4
GS-14 5.9
GS-14 4.5
GS-14 10.8
AMW-13 1.80
AMW-11 0.900
Blackfoot Creek
0 250 500 1000 1500 Feet
N
W
E
S
Figure 5-17a
Maximum Cadmium in Ground Water - MSD
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek / Butte Area NPL Site
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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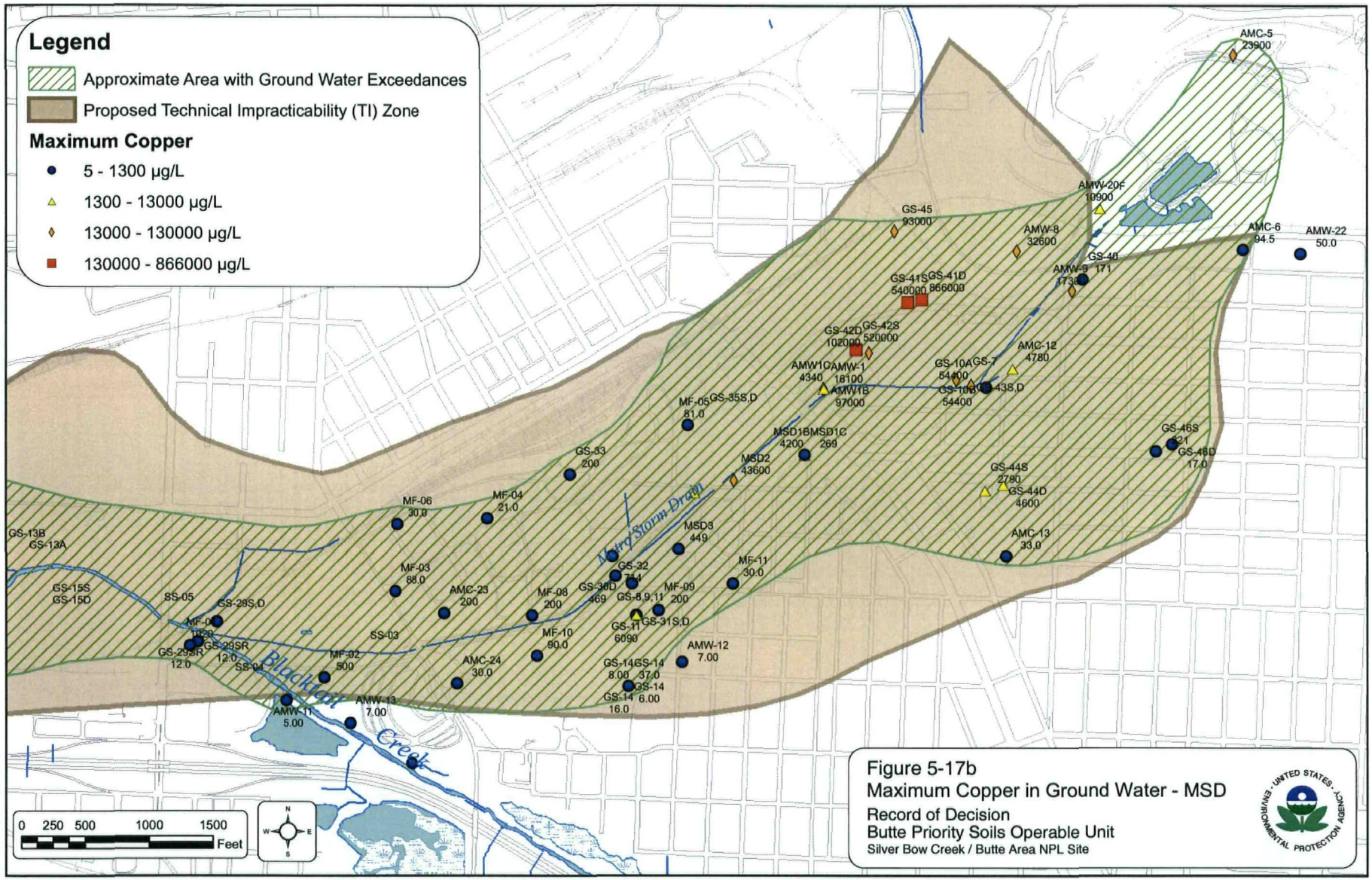

Figure 5-17b
Maximum Copper in Ground Water - MSD
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek / Butte Area NPL Site

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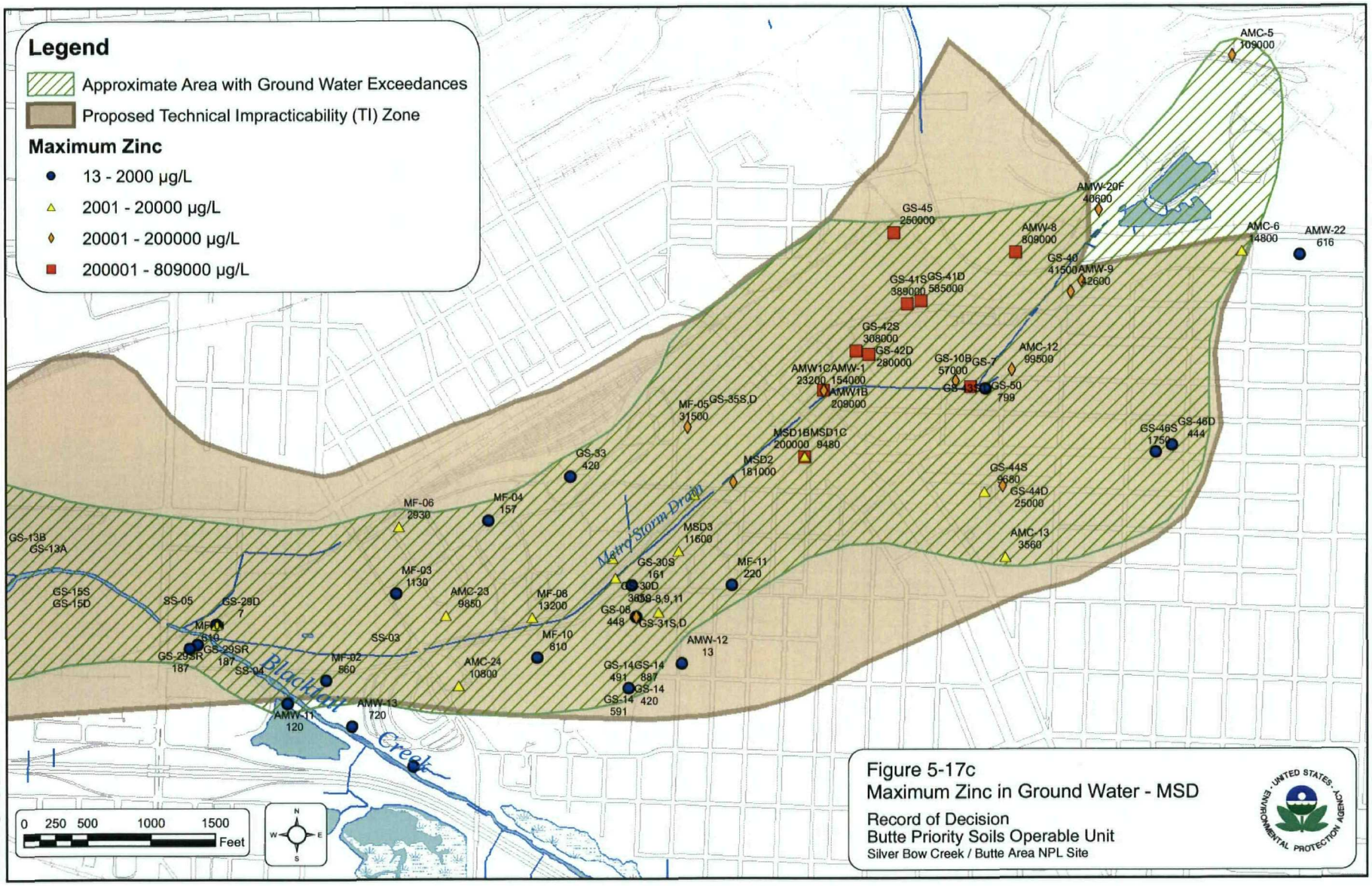
Legend
Approximate Area with Ground Water Exceedances
Proposed Technical Impracticability (TI) Zone
Maximum Zinc
13 - 2000 µg/L
2001 - 20000 µg/L
20001 - 200000 µg/L
200001 - 809000 µg/L
AMC-5 109000
AMW-20F 40600
GS-45 250000
AMW-8 809000
AMC-6 14800
AMW-22 616
GS-40 41500
AMW-9 42600
GS-41S 389000
GS-41D 585000
GS-42S 308000
GS-42D 280000
AMC-12 99500
GS-10B 57000
GS-7
GS-50 799
AMW1C 23200
AMW-1 154000
AMW1B 209000
MF-05 31500
GS-35S,D
MSD1B 200000
MSD1C 9480
MSD2 181000
GS-46S 1750
GS-46D 444
GS-44S 9680
GS-44D 25000
AMC-13 3560
GS-33 420
MF-06 2930
MF-04 157
Metro Storm Drain
MSD3 11600
GS-30S 161
GS-30D 3659
GS-8,9,11
GS-08 448
GS-31S,D
MF-11 220
AMW-12 13
GS-13B
GS-13A
GS-15S
GS-15D
SS-05
GS-28D 7
MF-01 619
GS-29SR 187
GS-29SR 187
SS-04
SS-03
MF-03 1130
AMC-23 9850
MF-08 13200
MF-10 810
MF-02 560
AMC-24 10800
GS-14 491
GS-14 887
GS-14 420
GS-14 591
AMW-11 120
AMW-13 720
Blackfoot Creek
0 250 500 1000 1500 Feet
N
W
E
S
Figure 5-17c
Maximum Zinc in Ground Water - MSD
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek / Butte Area NPL Site
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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examples). Contaminant concentrations in these areas exceed applicable water quality standards, in some cases by several orders of magnitude. Impacts to groundwater quality are apparent in the lower Metro Storm Drain area, but they are not as widespread or concentrated as in the middle and upper reaches of the Metro Storm Drain.

Beneath the Parrott Tailings, groundwater quality is impacted to a depth of at least 150 feet. Beneath the Diggings East Tailings, contamination reaches to depths of at least 70 feet. Since the alluvial aquifer thins toward the west (only 25 feet), impacts to alluvial groundwater in lower Metro Storm Drain are relatively shallow.

Groundwater flow paths in the upper Metro Storm Drain area are typical of a groundwater divide. The water table is nearly flat over a broad area. As a result, lateral groundwater movement is very slow. The predominant direction of groundwater flow in the upper Metro Storm Drain is downward, and vertical gradients are downward at approximately 3 to 5 percent.

Beneath the groundwater divide, downward vertical flow diverges, with some flow directed toward the Berkeley Pit (north-northeast) and some flow directed toward lower Metro Storm Drain and Silver Bow Creek (south-southwest). Southwestward directed flow is forced back toward the ground surface in the lower Metro Storm Drain as a result of the thinning of the alluvial aquifer. Thus, deep circulating groundwater originating in upper Metro Storm Drain travels to depth before eventually rising back toward ground surface in the middle and lower reaches of the Metro Storm Drain (Figure 5-15).

Fate and transport calculations indicate that contaminant migration in the alluvial aquifer is also very slow in the Metro Storm Drain. Groundwater travel times along flow paths from the upper area beneath the Parrott Tailings to the middle and lower reaches are on the order of 100 years. Considering attenuation, the movement of contaminants is even slower.

Hydrogeochemical analyses demonstrate that contaminants observed in shallow groundwater discharging to the channel in lower Metro Storm Drain are a product of leaching from the North Side and Diggings East Tailings and not the Parrott Tailings. Eventually, contaminants from the Parrott Tailings area in upper Metro Storm Drain will reach lower Metro Storm Drain, but it is estimated that this would take a period of at least 200 years.

5.3.3.1 MSD Subdrain

In 2003, as directed by EPA, acting under the Consent Decree for the Butte Mine Flooding OU, ARCO conducted excavation along the Metro Storm Drain channel to install a pipeline to convey effluent from the Horseshoe Bend/Berkeley Pit Treatment Plant. To prevent having to re-excavate the area for the purposes of groundwater response actions, a subsurface groundwater collection system (subdrain) was installed along the path of the old Metro Storm Drain channel and the channel was reconstructed over the subdrain to convey wet weather flows (Figure 5-18). This

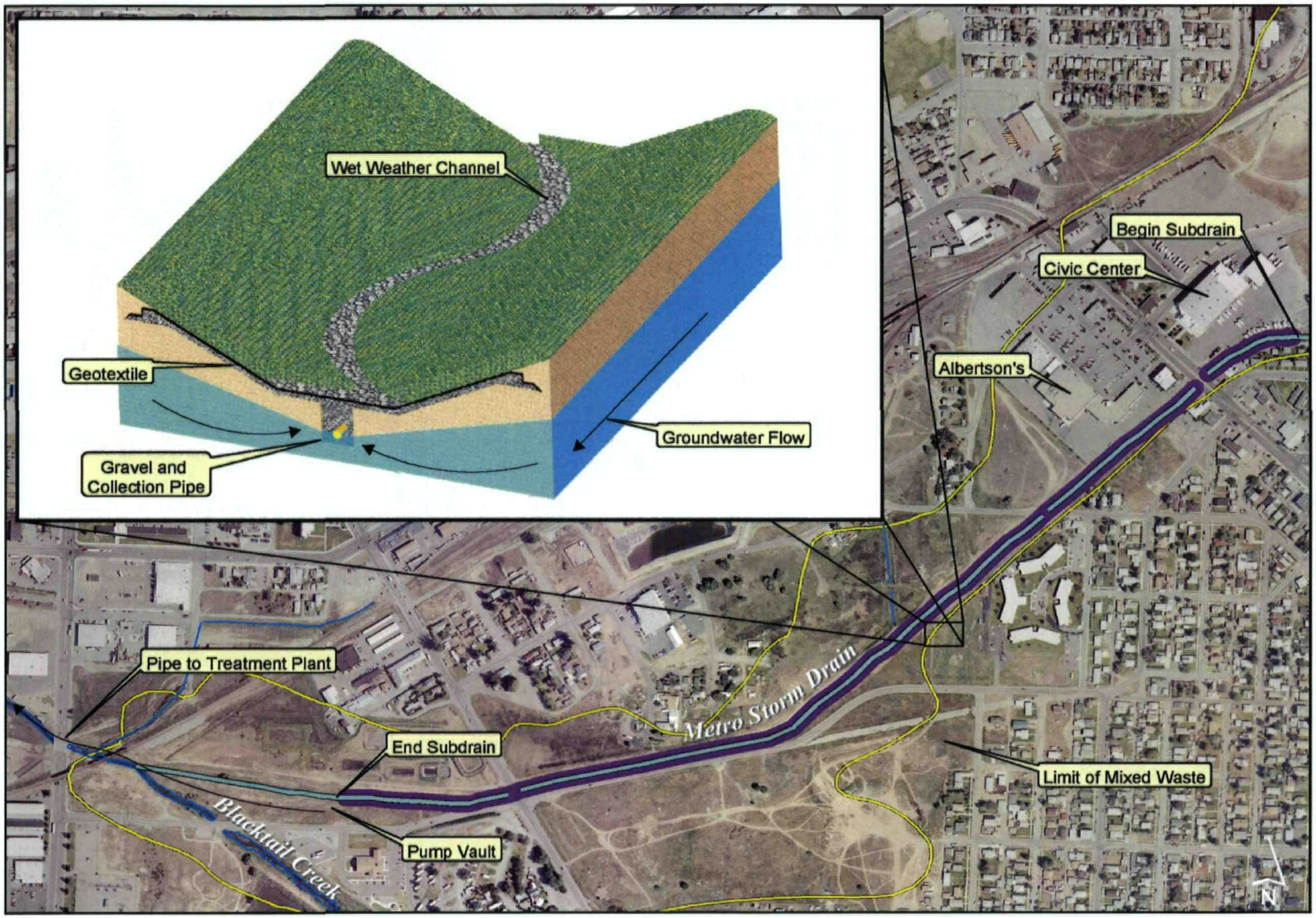


Figure 5-18
Metro Storm Drain Subdrain
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

subdrain captures groundwater that formerly discharged to the Metro Storm Drain channel (base flow) and conveys it to a pump vault where it has and will be conveyed to Lower Area One. The final design and construction of the BPSOU remedy will entail further evaluation and design of this system, including routing of the captured Metro Storm Drain base flow to a groundwater treatment system, designed for treating groundwater captured from both Metro Storm Drain and Lower Area One to DEQ standards in perpetuity (see Section 8, Table 8-2). The performance of the design will be evaluated during the required five-year reviews.

5.4 Surface Water Characterization

The Butte area was listed as a Superfund site largely due to water quality issues associated with Silver Bow Creek. Data collected in the 1980s and early 1990s demonstrated elevated metals concentrations in Silver Bow Creek during base flow and storm flow conditions. The water quality was poor and failed to meet state water quality standards.

Silver Bow Creek now begins at the confluence of the Metro Storm Drain and Blacktail Creek. The Metro Storm Drain was constructed by realigning and filling the original Silver Bow Creek channel, a low-lying swampy area with numerous mine waste impoundments. The upper portion of Metro Storm Drain is dry except during storm runoff or snowmelt episodes. The lower portion receives flow via groundwater discharge during normal flow conditions and, up until the construction of the subrain in 2004, the MSD contributed between 0.3 and 0.5 cubic feet per second (cfs) to Silver Bow Creek.

The primary source of flow in Silver Bow Creek is inflow from Blacktail Creek, which normally contributes 11 to 15 cfs. The Metro Storm Drain and current Silver Bow Creek floodplain also receive flow from sub-basins on the Butte Hill (Figure 5-19). Except for the lower Missoula Gulch sub-basin, discharge from the Butte Hill occurs only during storm runoff and snowmelt events. The Lower Missoula Gulch sub-basin intercepts shallow groundwater and maintains a base flow of 0.1 to 0.3 cfs.

Perennial stream flow also occurs in Grove Gulch south of Silver Bow Creek. Grove Gulch Creek discharges flow to Blacktail Creek upstream of its confluence with Metro Storm Drain. Normal base flow near the mouth of Grove Gulch is less than 0.2 cfs.

In addition to the perennial flow and storm water runoff, Silver Bow Creek receives regulated discharge from the Metro Sewage Treatment Plant (see Figure 5-12). Discharge from the plant is normally between 5 and 9 cfs, constituting roughly 30 percent of the total base flow in Silver Bow Creek.

Major contributors of metals to Silver Bow Creek, during periods of base flow, were:

- Surficial tailings in Lower Area One (through which Silver Bow Creek flowed prior to 1997). These were largely removed during the Lower Area One ERA.

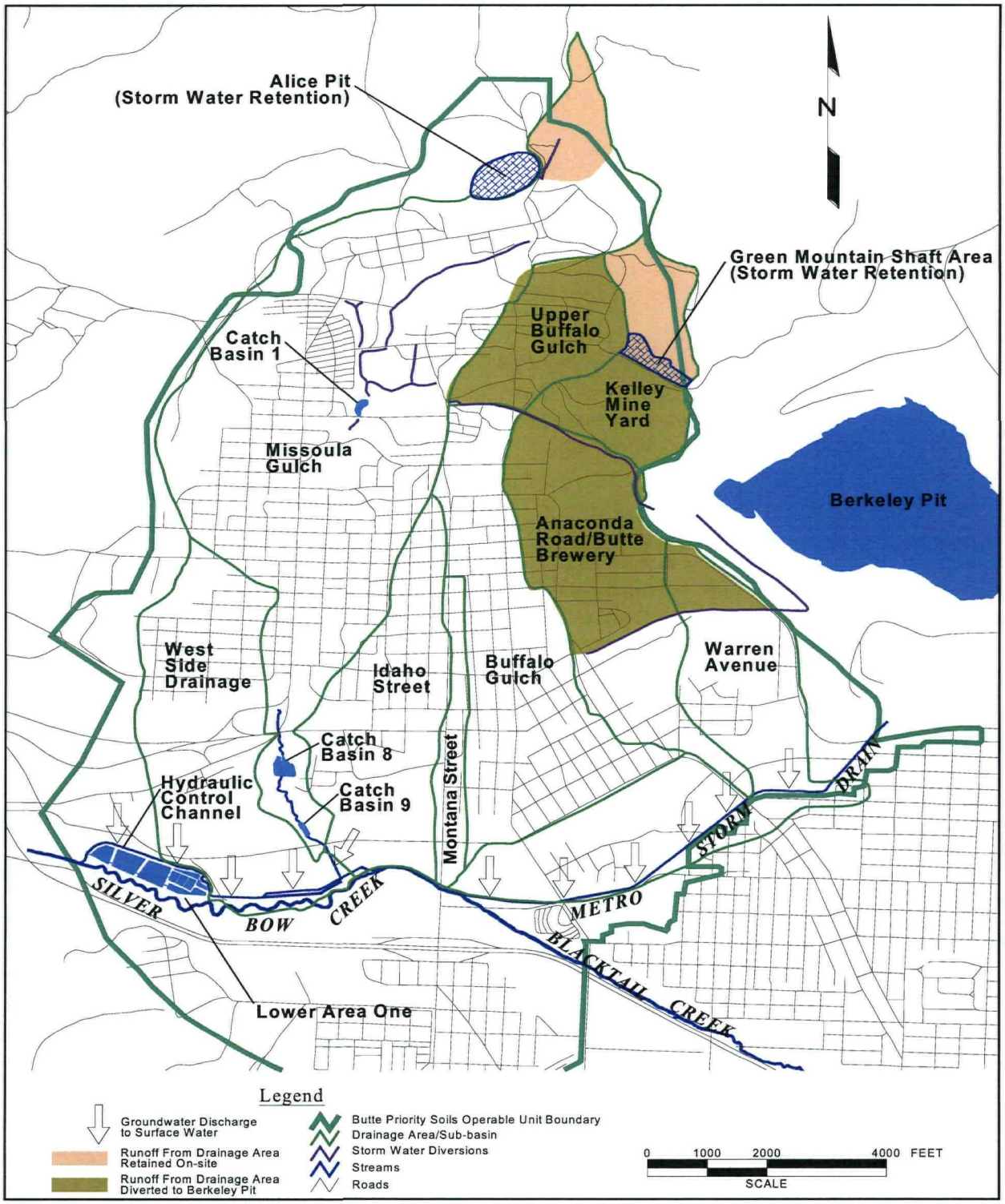


Figure 5-19
Butte Hill Storm Water Drainage Basins
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

- Groundwater contaminated by the Colorado tailings (at Lower Area One) expressed directly as surface water to Silver Bow Creek. Capture and treatment of this groundwater has been ongoing as part of the treatability study.
- Metals laden sediment deposits distributed along the Silver Bow Creek stream channel.
- Contaminated groundwater expressed as surface water in Metro Storm Drain. This water is now being collected by the MSD subdrain.
- Surficial tailings along Metro Storm Drain channel (through which surface water flowed prior to 2004).
- Contaminated groundwater in the Missoula Gulch drainage expressed as surface flow just north of Lower Area One. This base flow has been routed into the hydraulic control channel at Lower Area One for combined treatment with captured LAO groundwater.

The major contribution of metals to Silver Bow Creek during periods of storm water flow is run-off from the Butte Hill, which transports metals laden sediments from the waste sources to the Metro Storm Drain and Silver Bow Creek. Additionally, metal laden evaporative salts dissolve into solution and eventually discharge to Silver Bow Creek.

5.4.1 Base Flow Conditions

Two surface water sampling locations are key to the discussion of base flow water quality. One is a sampling station located on Blacktail Creek upstream of the Metro Storm Drain. The other is a station located on Silver Bow Creek at the western border of the OU (Figure 5-8), downstream of Lower Area One.

Both dissolved phase and total recoverable metals analyses were performed. Dissolved phase data are usually used for ecological risk assessment, but surface water quality standards for metals (except aluminum) are based on total recoverable data. For cadmium, copper, lead and zinc, comparisons are made between data collected at the two stations and the chronic aquatic life standard. Arsenic data are compared to the surface water human health standard (DEQ 2006).

The pre-1998 base flow water quality in Blacktail Creek was considered relatively good, with only minor exceedances in values reported for total recoverable copper and lead, and also a minor exceedance in dissolved phase copper (Table 5-2). The mean values for all five COCs were below their respective standards. In comparison, water quality in Silver Bow Creek was very poor prior to 1998. The mean values of total recoverable concentrations for all COCs were above their respective standards; at times orders of magnitude above the standards for cadmium, copper, lead, and zinc.

Because of the poor water quality in Silver Bow Creek, mitigation efforts were undertaken in the mid-1990s. In 1997, 1.2 million cubic yards of tailings and

Table 5-2
Surface Water Summary Statistics for Base Flow (Prior to 1998)
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

COC[3]		Station			
		Blacktail Creek (12323230)[1]		Silver Bow Creek (SS-07)[2]	
		Dissolved	Total[4]	Dissolved	Total
Arsenic	Count	36	36	52	59
	Min	1.0	2.0	4.0	1.4
	Max	13.0	18.0	18.0	151.0
	Mean	4.7	6.6	7.8	18.6
Standard[5]		18	18	18	18
Cadmium	Count	36	36	52	59
	Min	0.10[7]	1.00[7]	0.5	0.6
	Max	0.50	1.00[7]	8.0	31.0
	Mean	0.11	1.00[7]	2.8	4.0
Standard[6]		0.28	0.28	0.4	0.4
Copper	Count	36	36	66	59
	Min	1.0[7]	2.0	19.0	85.0
	Max	10.0	18.0	300.0	2880
	Mean	4.1	7.1	98.2	284.1
Standard[6]		9.6	9.6	12.7	12.7
Lead	Count	36	36	52	59
	Min	0.5	1.0	0.5	1.3
	Max	0.6	9.0	110.0	1360
	Mean	0.5	1.9	13.3	65.6
Standard[6]		3.3	3.3	5.0	5.0
Zinc	Count	36	36	66	59
	Min	3.0	10.0[7]	320.0	350.0
	Max	10.0	30.0	2520	4910
	Mean	4.7	12.2	977.2	1083.3
Standard[6]		122.6	122.6	162.1	162.1
Parameter					
Flow (cfs)	Count	36		59	
	Mean	15.3		30.6	
Hardness (mg/L as $CaCO_3$)	Count	36		59	
	Mean	102.8		142.9	

[1] 12323230 is located on Blacktail Creek upstream of the Butte Priority Soils Operable Unit (near Harrison Ave).
[2] SS-07 is located on Silver Bow Creek at the downstream edge of the BPSOU.
[3] Contaminant of Concern (concentrations reported in µg/L).
[4] State of Montana DEQ-7 standards only apply to total recoverable metals.
[5] 2004 State of Montana DEQ-7 human health standard for surface water.
[6] 2004 State of Montana DEQ-7 chronic aquatic life standard based on hardness.
[7] Value reported at the detection limit.

contaminated soils were removed from LAO and that portion of Silver Bow Creek was reconstructed. An interception trench and a system of treatment lagoons were constructed at LAO to capture and treat contaminated ground water (which formerly discharged directly to Silver Bow Creek).

Through completion of the Lower Area One ERA and through groundwater treatment, base flow water quality in Silver Bow Creek has improved significantly (Table 5-3). The mean and maximum values for the COCs (dissolved phase and total recoverable) are considerably lower than those seen previously. This improvement in water quality is shown visually in Figure 5-20 with a graph of total recoverable copper concentrations over time as measured at Station SS-07 downstream of Butte. Elevated concentrations in recent years coincide with the disturbance during installation of the MSD subdrain and reconstruction of the MSD channel.

With treatment of all groundwater captured in the vicinity of LAO, the remaining major sources of contaminants to Silver Bow Creek are the Metro Storm Drain and stream sediments along Silver Bow Creek upstream of the reconstructed channel. With collection and treatment of water from the Metro Storm Drain and removal of these sediments, as required by the ROD, ARARs for surface water during base flow conditions are achievable.

5.4.2 Wet Weather Conditions

Storm water runoff from the Butte Hill has been identified as a major contributor of both dissolved phase COCs and metals-laden sediments to Silver Bow Creek. Figure 5-21 and Figure 5-22 depict total recoverable copper and zinc concentrations from 1985 to the present during wet weather conditions. The vertical lines represent the maximum concentration of the COC measured on a particular high flow event. Also depicted are relevant high and low water quality standards.

Significant water quality exceedances (at times orders of magnitude above the standard) have been reported for both copper and zinc and are still occurring. As a result of the serious nature of these past exceedances, actions were taken in the mid to late 1990s and in the early part of this decade to reduce the impact of storm water discharge to Silver Bow Creek.

In 1996 the Storm Water TCRA was initiated to minimize the impacts of runoff on Silver Bow Creek for storm magnitudes up to the 24-hour, 25-year event. This was accomplished, in part, by routing storm water runoff from the upper portion of the Butte Hill in Buffalo Gulch, Missoula Gulch, and the Kelley Mine Yard to the Berkeley Pit, effectively removing storm water runoff from this portion of the Butte Hill (up to the design event). Runoff from Missoula Gulch (west-central portion of the Butte Hill) was captured and routed to a series of three sediment catch basins prior to discharge to Silver Bow Creek.

Other actions taken to improve water quality in Silver Bow Creek during storm water runoff events include capping of approximately 175 mine waste source areas on the Butte Hill during the late 1980s and 1990s. Although the source areas were capped for

Table 5-3
Surface Water Summary Statistics for Base Flow (1998 to 2002)
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

COC[3]		Station			
		Blacktail Creek (12323230)[1]		Silver Bow Creek (SS-07)[2]	
		Dissolved	Total[4]	Dissolved	Total
Arsenic	Count	35	35	48	48
	Min	1.1	2.0	4.0	3.6
	Max	6.0	7.0	12.0	19.0
	Mean	2.8	3.7	6.9	9.7
Standard[5]		18	18	18	18
Cadmium	Count	35	35	48	48
	Min	0.02[7]	0.02[7]	0.06	0.1
	Max	1.0[8]	1.0[8]	4.3	5.0
	Mean	0.2	0.4	1.0	1.3
Standard[6]		0.3	0.3	0.4	0.4
Copper	Count	35	35	48	48
	Min	0.8	1.5	2.5	13.5
	Max	9.3	10.0	77.0	110.0
	Mean	2.8	4.6	18.2	46.8
Standard[6]		10.1	10.1	13. 9	13.9
Lead	Count	33	34	46	48
	Min	0.05[8]	1.0[8]	0.1	1.0
	Max	1.0[8]	5.0	2.4	36.0
	Mean	0.7	1.2	0.9	7.1
Standard[6]		3.6	3.6	5.8	5.8
Zinc	Count	35	35	48	48
	Min	1.0	2.0	60.0	86.0
	Max	20.0	40.0	1050	1080
	Mean	6.7	10.6	309.2	362.6
Standard[6]		130.0	130.0	177.8	177.8
Parameter					
	Count	35		57	
Flow (cfs)	Mean	8.9		25.5	
Hardness	Count	35		48	
(mg/L as $CaCO_3$)	Mean	110.1		159.4	

[1] 12323230 is located on Blacktail Creek upstream of the Butte Priority Soils Operable Unit (near Harrison Ave).
[2] SS-07 is located on Silver Bow Creek at the downstream edge of the BPSOU.
[3] Contaminant of Concern (concentrations reported in µg/L).
[4] State of Montana DEQ-7 standards only apply to total recoverable metals.
[5] 2004 State of Montana DEQ-7 human health standard for surface water.
[6] 2004 State of Montana DEQ-7 chronic aquatic life standard based on hardness.
[7] Estimated value.
[8] Value reported at the detection limit.

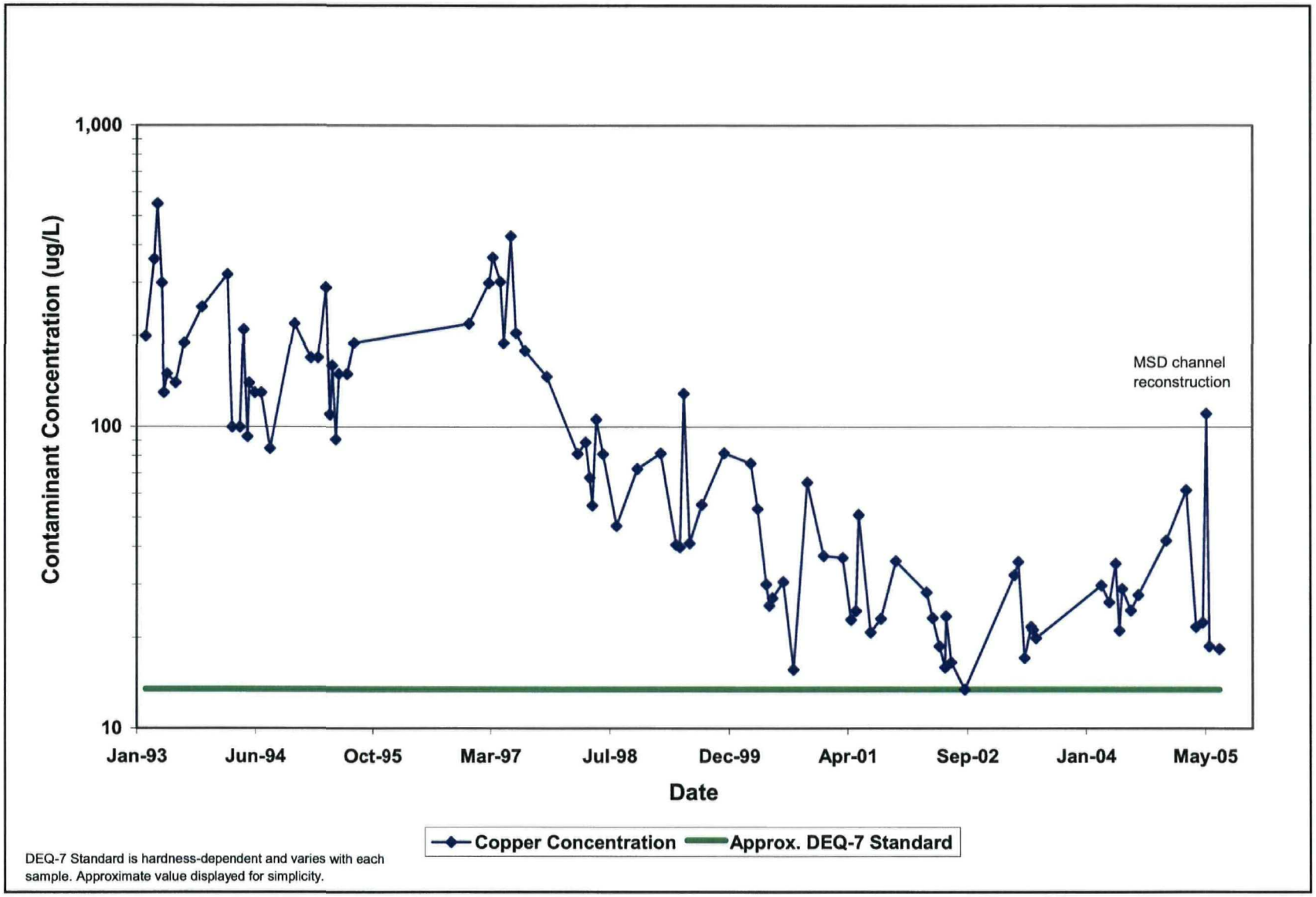


Figure 5-20
Total Recoverable Copper Concentration in Silver Bow Creek Directly Below Butte (Station SS-07)
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

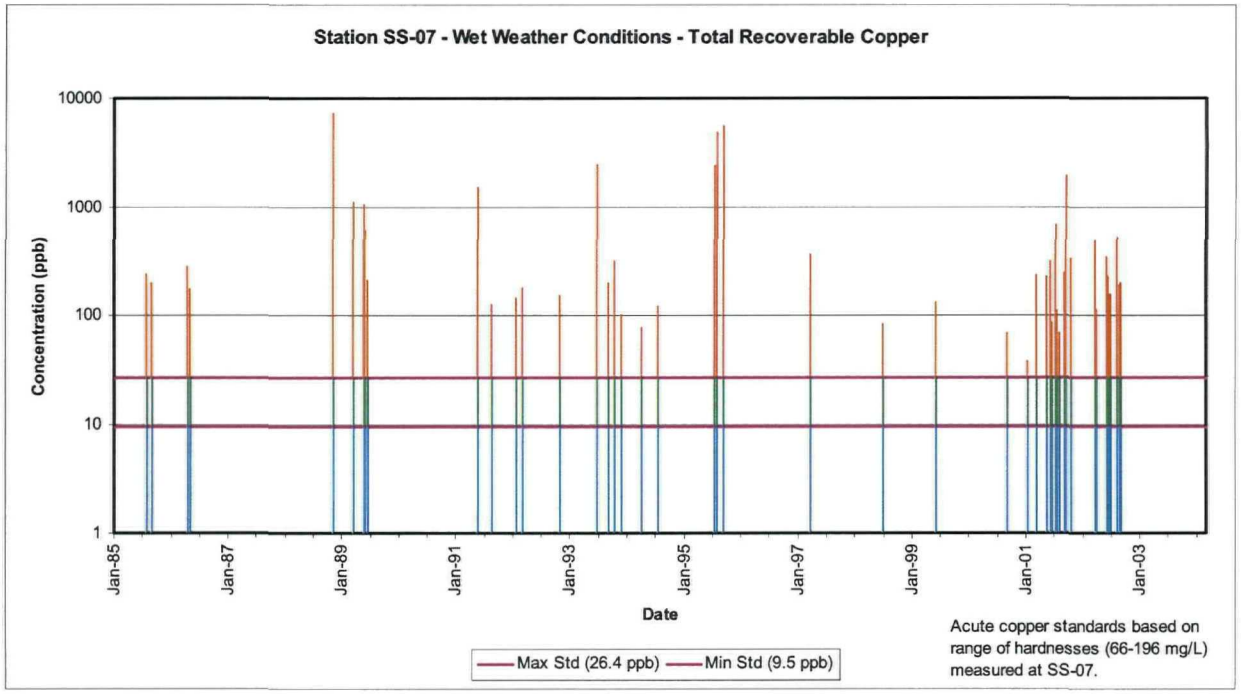


Figure 5-21 Copper Concentrations for Wet Weather Flow Conditions at Station SS-07

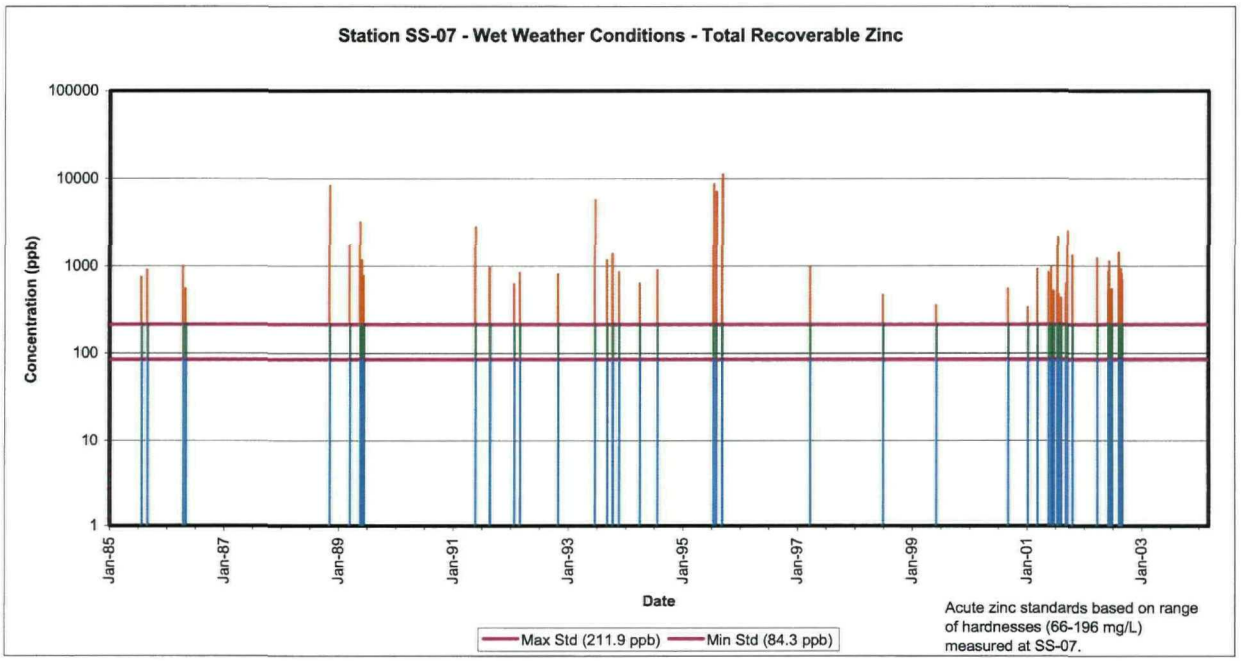


Figure 5-22 Zinc Concentrations for Wet Weather Flow Conditions at Station SS-07

human health issues related to lead and arsenic, the source areas also acted as significant contributors of metals-laden sediments to Silver Bow Creek during storm events. In addition to protecting human health, the vegetative caps on the source areas also prevent contact of waste materials with storm water, minimizing contaminant transport.

The previously discussed Railroad Beds TCRA was initiated to meet the human health goals by either removing or capping in-place contaminated railroad bed materials. The caps also aided in meeting the goal of controlling storm water runoff by providing a protective barrier that reduced sediment transport. To further meet the goal of controlling storm water runoff, numerous ditches, culverts and sediment basins were constructed. This included the diversion of a significant portion of run-off from the east side of the Butte Hill to the Berkeley Pit (in addition to that captured by the Kelley Mine Yard diversion described above).

As a result of the Storm Water and Railroad Beds TCRAs, a large portion of the storm water runoff from the Butte Hill is either diverted to the Berkeley Pit (thereby removing the potential to discharge to Silver Bow Creek) or is detained in catch basins for sediment reduction prior to discharge to Silver Bow Creek.

In 2003, as part of the construction of the Metro Storm Drain subdrain, ARCO removed about 45,000 cubic yards of contaminated sediment material from the Metro Storm Drain channel. The channel was then reconstructed to convey storm water flow. The subdrain generally prevents contaminated groundwater from discharging to the surface channel (improvements to this system are being considered currently and may be further considered during remedial design) and the reconstructed channel prevents storm water from contacting tailings and other waste material as it runs along Metro Storm Drain. The Metro Storm Drain reconstruction was completed in late 2004 and another marked improvement in Silver Bow Creek water quality is expected.

5.4.3 Surface Water Summary

As previously discussed in Section 5.4.1 and shown in Table 5-3 and Figure 5-20, actions taken to date have improved base flow water quality in Silver Bow Creek, although exceedances of standards continue to occur. However, significant exceedances of water quality standards still occur under wet weather flow. The in-stream contaminant concentrations for wet weather flow have not been reduced to the same magnitude as those for base flow. However, the total volume of contaminants reaching Silver Bow Creek from wet weather has been reduced by diverting much of the run-off to the Berkeley Pit and by removing metals laden sediments in catch basins.

5.5 Air Characterization

Air quality data collected since the late 1980s indicate that late fall, winter, and early spring are generally associated with the highest particulate levels in the Butte area. These typically occur during periods of temperature inversions. However, these high

particulate levels are primarily associated with smoke from wood burning, road dust, and vehicle exhaust and, to a lesser extent, dust emissions from active mining and milling operations. While air quality in Butte was poor due to the open heap roasting of ore and smelting operations during the earliest days of mining operations until well into the twentieth century, this is no longer the case.

The human health risk assessments concluded that the risks from inhalation of COCs were at least 10 times less than the risks associated with ingestion of COCs in soils and dust. Calculated inhalation risk was near the point of departure, and EPA concluded that inhalation of COCs does not present a significant human health risk.

Unreclaimed source areas were not a significant source of 10-micron particulate matter (PM-10) emissions, even prior to any of the reclamation actions in the OU. The PM-10 data from the various stations around Butte show that particulate concentrations in Butte are quite low, with no exceedances of the annual 50 microgram per cubic meter ($\mu g/m^3$) standard since 1987. Only one exceedance of the daily 150 $\mu g/m^3$ standard has been noted since 1989. Additionally, particulate levels have been decreasing over the past 10 to 15 years (Figure 5-23).

In 2001, EPA evaluated the existing data and concluded that airborne transport of COC-bearing particulates does not pose a significant threat to human health and that COC transport due to wind erosion of particulate matter is low and decreasing. This study found that the impact of COCs from source areas through the air pathway is expected to be minimal for the following reasons:

- Inhalation of COCs was determined to not be a human health risk
- PM-10 concentrations have decreased significantly over the last 15 years, and COC concentrations, comprising a fraction of PM-10, would show a concomitant decrease
- Fugitive dust emissions from mine waste source areas are being addressed through reclamation and revegetation

5.6 Site Conceptual Model

The primary sources of contaminants in the OU are mining and ore processing wastes, which include waste rock dumps, milling wastes (i.e., tailings), and smelting wastes. The primary release mechanisms for mine wastes, tailings, and waste on railroad beds are wind erosion, infiltration, percolation, and runoff. These pathways were individually evaluated. Those that were complete and presented a significant risk to human health or ecological receptors were evaluated quantitatively in the risk assessments.

Transport of contaminants can also occur from secondary sources. These include surface soils to surface water by runoff, acid, arsenic and heavy metals to groundwater through infiltration and percolation, and contaminated dust to other media through wind erosion.

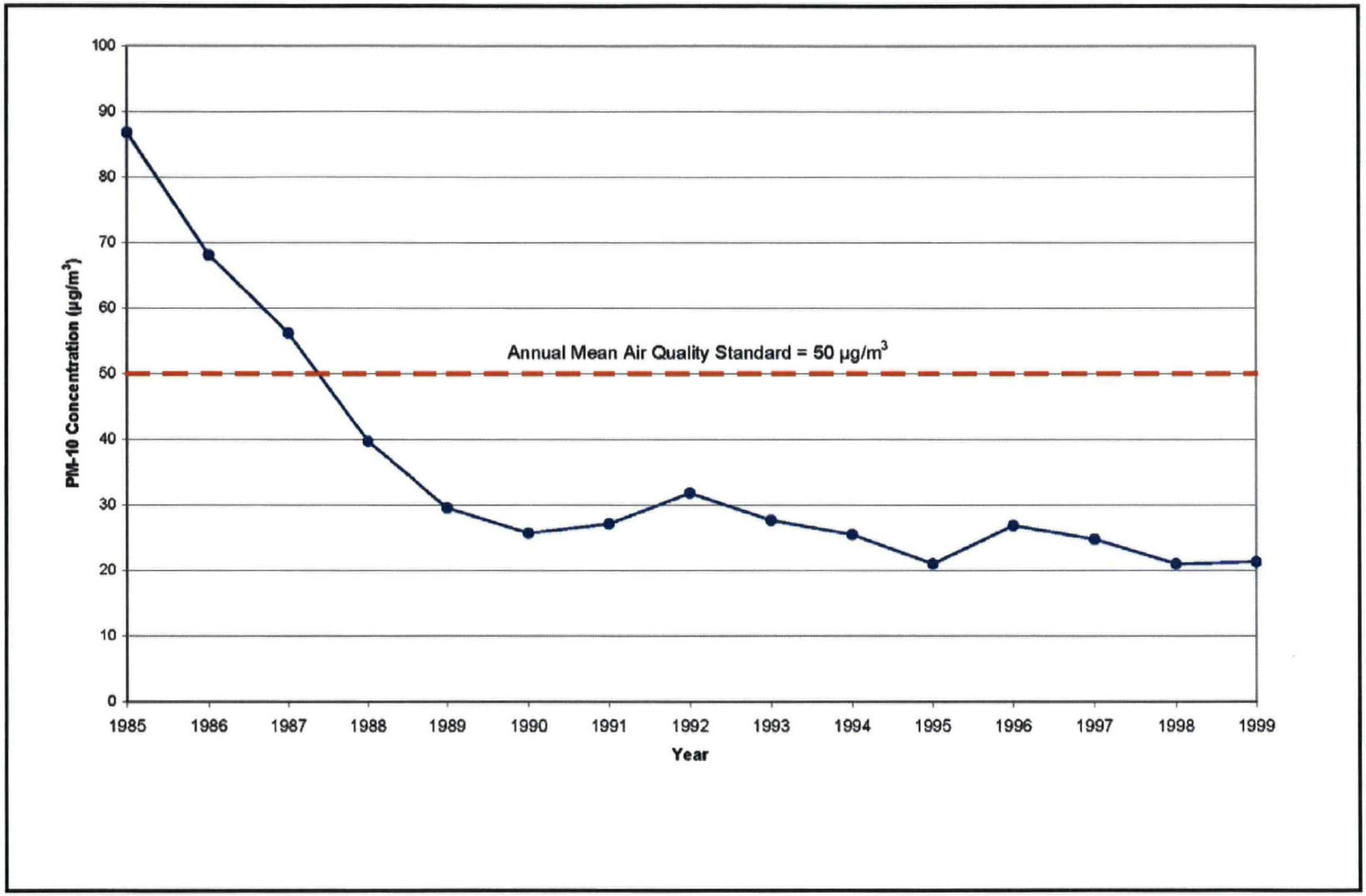


Figure 5-23
Average PM-10 Concentrations
Greeley School Location (30-093-0005)
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

5.6.1 Human Receptors

Figure 5-24 presents the Site Conceptual Model for human receptors. It is important to note that many of the site risks have been largely eliminated at the site through EPA Response Actions. The significant (+) and minimal (-) human health exposure pathways are:

Residents (Adults and Children Ages 0 - 6):

- +Ingestion of surface soils
- +Ingestion of interior dust
- -Inhalation of fugitive dust
- +Ingestion of contaminated groundwater (requires concerted effort to establish pathway)
- +Ingestion of attic dust (requires concerted effort to establish pathway)

Commercial Workers (Adults):

- +Ingestion of surface soils
- +Ingestion of interior dust
- -Inhalation of fugitive dust

Railroad Workers (Adults):

- +Ingestion of surface soils
- -Inhalation of dust

Recreational Visitors (Inner tubers):

- +Ingestion of surface water
- +Dermal exposure to surface water
- -Inhalation of fugitive dust

5.6.2 Ecological Receptors

Terrestrial habitat is limited due to the urban nature of the OU. Therefore, EPA focused the assessment of ecological risk on the aquatic habitat of Silver Bow Creek and surface water ponds that might represent habitat for waterfowl. The site conceptual model for ecological risks is shown in Figure 5-25. EPA identified two complete pathways by which fish and benthic macroinvertebrates may be exposed to toxic levels of arsenic and metal contaminants:

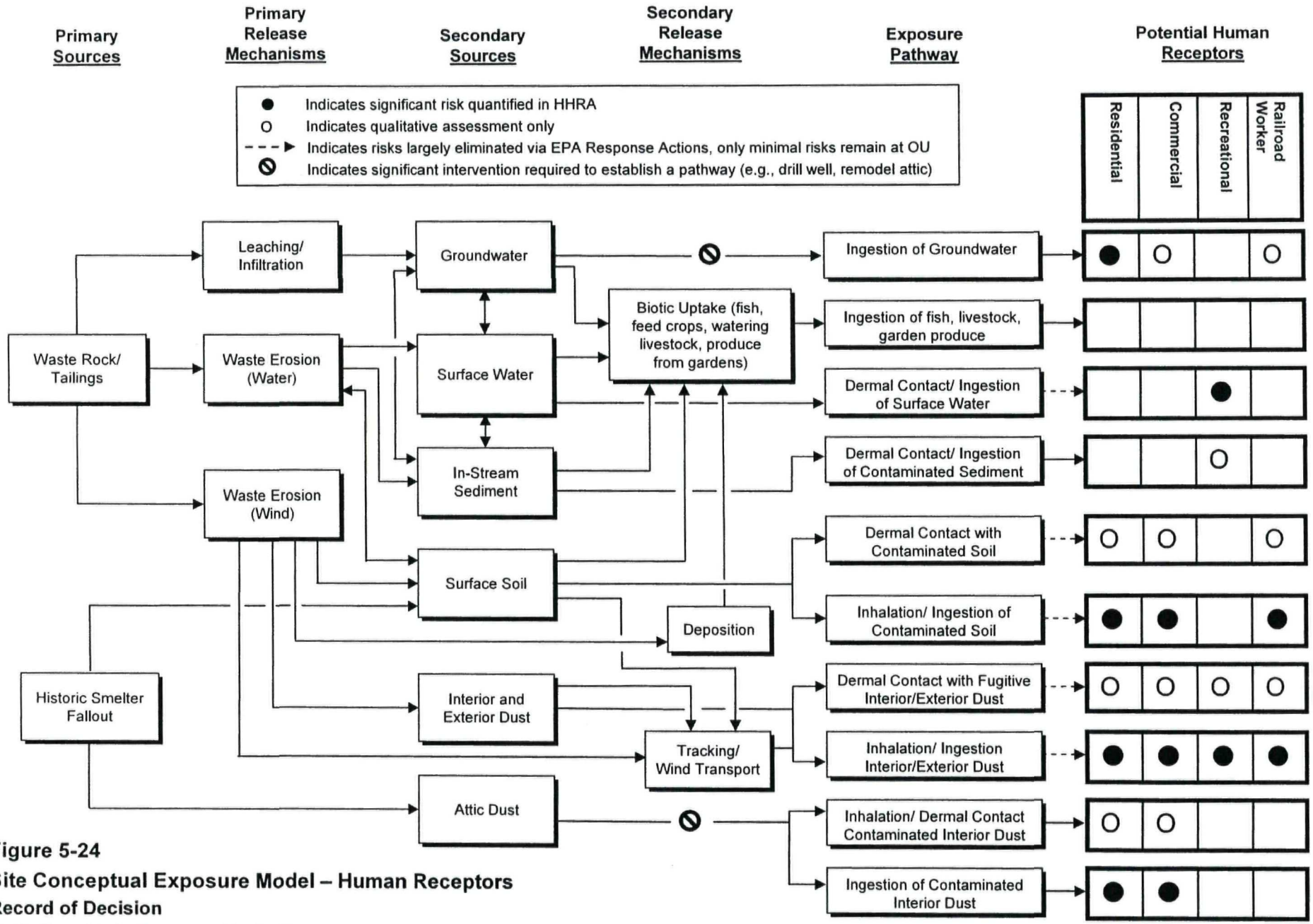


Figure 5-24
Site Conceptual Exposure Model – Human Receptors
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area Site

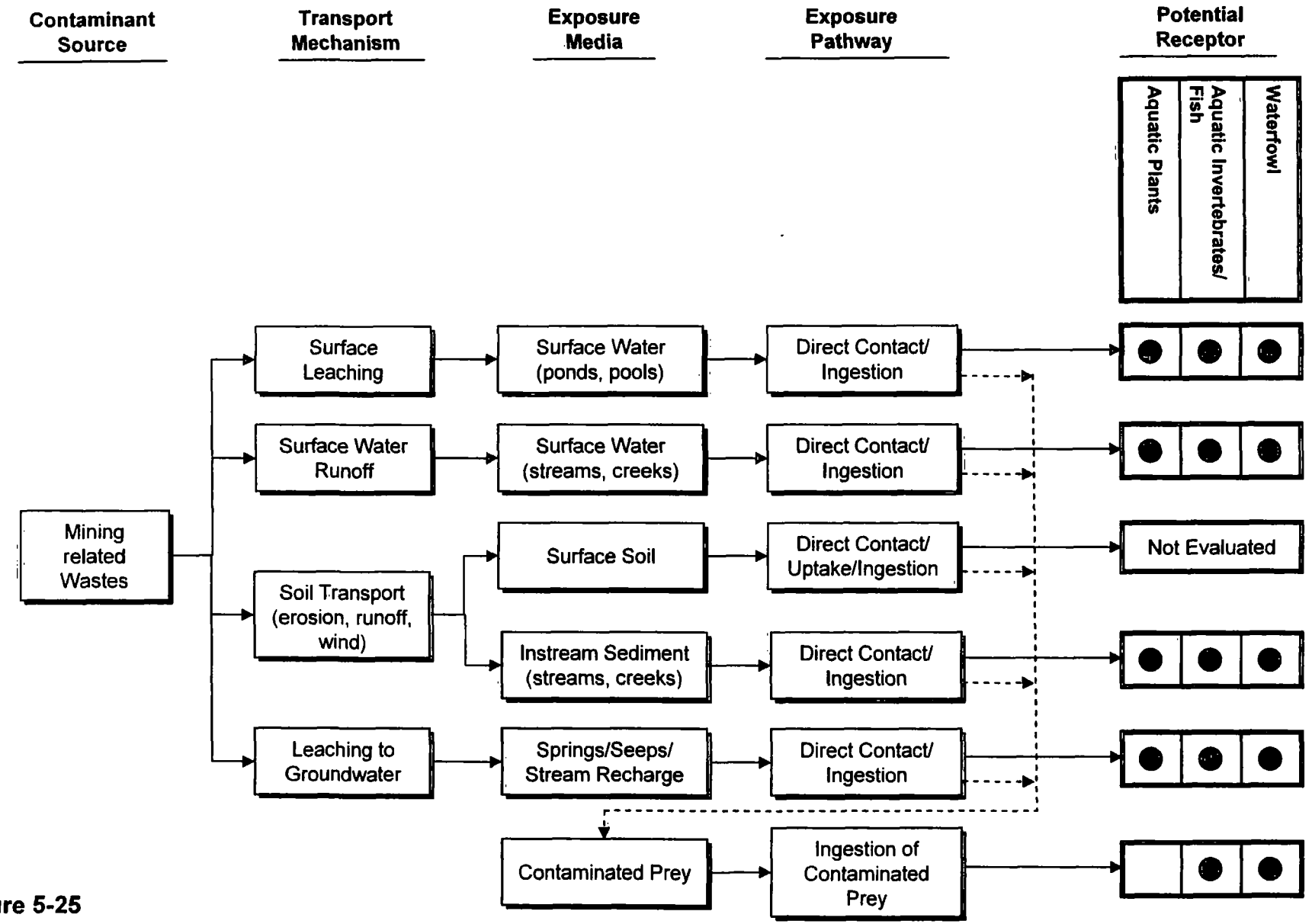


Figure 5-25
Site Conceptual Exposure Model – Ecological Receptors
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area Site

- Respiratory exposure to, and direct contact with, surface water and sediment by aquatic organisms
- Ingestion of prey and incidental ingestion of sediments

Waterfowl may be exposed to toxic levels of site contaminants in surface water and sediment via:

- Direct ingestion of surface water and sediments
- Ingestion of contaminated prey

Silver Bow Creek was once home to thriving trout populations, including bull trout. Bull trout is a listed threatened species under the Endangered Species Act. The State and the U.S. Fish and Wildlife Service maintain a strong interest in adequate protection of aquatic receptors, which are at risk under current conditions.

5.7 Historic and Cultural Resources

In 1962, the Butte mining district was designated as a National Historic Landmark District. The boundary of the Butte Historic District is defined by the city limits of Butte.

In 1992, EPA, DEQ, ARCO, the State Historic Preservation Office, the Advisory Council on Historic Preservation, and the local governments of Butte-Silver Bow County and Walkerville signed a Programmatic Agreement. The agreement calls for a programmatic approach to addressing historical resources affected by Superfund work. The parties worked together on development of the Regional Historic Preservation Plan (RHPP), which was completed in 1993.

A second Programmatic Agreement was subsequently prepared to establish required procedures and mitigation activities. The agreement has been effective in predicting the impacts to historic and cultural resources during Superfund activities, providing for the avoidance or, when necessary, mitigation of impacted resources. The requirements for this agreement will continue during implementation of this ROD since the National Historic Preservation Act is an ARAR.

The Visitor Center was constructed and developed by the PRP Group to partially mitigate the loss of historic resources. The Visitor Center was a joint cooperative effort by local and state government agencies, corporations, non-profit organizations, and private citizens. The center is home to and managed by the Butte-Silver Bow Chamber of Commerce.

Other historic and cultural resources include the Granite Mountain Memorial, the slag walls and aqueduct at the Butte Reduction Works, the Berkeley Pit, the Anselmo and other mine yards, and photographic documentation produced under the Walkerville TCRA.

As described in this ROD, additional historic mitigation at Lower Area One will be implemented as a component of the final remedial action. Avoiding the destruction of the historic resources has preserved many of the areas, and the historical community and agencies strongly encourage preservation and avoidance where possible and where consistent with the components of this ROD. The portion of the BPSOU remedy that addresses the Granite Mountain Memorial area was designed to preserve mining features by avoidance, and it was a request from the local city/county government and historical stakeholders. Interpretive signage is planned or in place for the walking trails constructed on the former Butte, Anaconda & Pacific/Tourist railroad line, on the Alice Dump, in Buffalo and Missoula Gulches, and at other historic locations.

The Butte and local area was part of the aboriginal lands of the Salish and Kootenai Indian Tribes. The Confederated Salish and Kootenai Tribes (the Tribes) maintain use rights of this area under a treaty with the United States. EPA has worked cooperatively with the Tribes to identify and avoid tribal religious or historical and cultural resources. This effort will continue during the design and remedial action phases. The Tribes have expressed a strong interest in the cleanup of Silver Bow Creek and Blacktail Creek, which were historic fishing areas for the Tribes. The bull trout and its habitat are especially important to the Tribes.

Section 6 Current and Potential Future Land and Resource Uses

6.1 Land Use

The boundary of the BPSOU encompasses a large area of both Walkerville and Butte. The OU is primarily an urban setting, which is characterized by older homes and historic mining features. The area covered by the OU has a range of land uses that are typical of urban areas: residential, industrial, commercial, and recreational (Figure 6-1). It includes a number of private and public schools, parks, and playing fields. Several rail lines also run through the OU. There is no agricultural land within the OU.

The majority of Butte's housing stock was built before 1959. Houses are typically built close together on lots that are 100 feet by 40 feet, or less. The Butte-Silver Bow County Planning Board enforces the land use regulations in the area, including several that are specific to the needs of a Superfund site.

Land outside of the OU becomes increasingly less residential with distance. Nearby notable land uses include the Berkeley Pit and the active mining operations at Montana Resources' Continental Pit and Yankee Doodle Tailings Pond. Beyond Butte and Walkerville, land use is primarily agricultural and recreational (U.S. Forest Service and Bureau of Land Management).

6.2 Economy of Butte

Over its colorful history, the economy of Butte has been based primarily on mining. During the economic boom periods, the population of Butte approached 100,000. Butte's current population is approximately 34,000. In the 1980s, economic conditions deteriorated significantly after ARCO ceased mining at the Berkeley Pit, which idled roughly one third of Butte's work force.

More recently, some of Butte's major employers – Touch America and NorthWestern Energy, formerly known as Montana Power Co. – have struggled, significantly affecting the Butte economy. The business misfortunes of these companies has affected the economy directly, through the loss of jobs, and indirectly through the loss of income generated via the purchase of goods and services, payment of taxes, payment of pensions, and loss of stock equity value. The economic hardship that Butte has suffered has raised the issue of whether the low-income population within the OU is affected by environmental justice issues.

Today, Butte celebrates its mining history and promotes economic growth by developing tourism, high technology research and manufacturing, engineering, health care, education, and cultural arts. The current economy, while not as vigorous as during the booming mining years, is improving

Figure 6-1
Relationship of the BPSOU to the Butte/Walkerville Urban Setting
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

and is broader based including tourism, technical services, government, mining, retailers, recreation, etc.

Butte's historic features contribute to its economic stabilization. Butte has one of the largest National Historic Landmark Districts in the country, with over 4,500 buildings listed as national historic sites or buildings. Groups, such as Main Street Uptown Butte and Imagine Butte, are working to find the funding necessary to encourage and allow maintenance and development of these structures.

6.3 Redevelopment in the Cleanup Process

EPA encourages redevelopment of Superfund sites wherever possible. At large mining sites, it is not always feasible to remove all contaminated waste, and the remedy described in this ROD uses a mix of waste removal and in-place capping of waste. Many areas of mine waste have been capped in place.

Past response actions are monitored and maintained to assure that the remedy is effective and permanent. It is also the objective of EPA to assure that the remedy does not restrict future redevelopment. This approach is consistent with EPA's current redevelopment guidance and initiative. A number of site work plans since 1990 have included redevelopment. The following illustrates how Superfund cleanup has been done in Butte over the past 18 years in a manner that has improved public health and the environment while allowing for many significant redevelopment projects.

EPA's redevelopment role is to work with residents on ideas, coordinate redevelopment with cleanup wherever possible, evaluate land use, address historic preservation issues, and comply with the Regional Historic Preservation Plan.

Current and future redevelopment work at the Silver Bow Creek/Butte Area Site includes:

- ***Montana's Copperway.*** A system of historic sites in Butte and Walkerville linked by recreational trails, including interpretive signs and stations.
- ***Butte Hill Trail.*** A walking trail developed from an abandoned railroad bed.
- ***Copper Mountain Recreation Complex.*** A new recreational complex (baseball fields, soccer fields, etc.) was built on top of the repository for the Clark Tailings and Colorado Tailings.
- ***Granite Mountain Memorial.*** A monument to the miners who died in the Granite Mountain/Speculator fire of 1917 was constructed. The area will be enhanced with picnic tables, walking trails, a new access road and the historic mining landscape will be preserved.
- ***Knob Hill.*** The Alice dump and pit in Walkerville were reclaimed and walking trails and picnic tables added.

EPA has also been involved in a variety of projects related to land use at the site, whether alone or in partnership with other state or local agencies. These include:

- ***Education.*** Maintenance of protective vegetative caps is important to the success of the Butte environmental cleanup. Unfortunately, each year some caps are damaged by motorized vehicle traffic. EPA provides funding to the Citizen's Environmental Technical Committee (CTEC) through a technical assistance grant. CTEC, local government officials, concerned citizens, representatives of law enforcement, and motor vehicle use group members make up the Butte Area Communication Advisory Committee. This group works to develop an educational program to deter people from activities that damage the caps.

- ***EPA Grants.*** Since 2001, EPA awarded grants specifically for efforts related to future development of the site. This has included a $100,000 grant awarded to Butte-Silver Bow County for geophysical work to determine structural integrity of vacant properties in Uptown Butte and Central Butte and a $30,000 grant to develop a film on the history of the Butte area and the role Superfund has played in its redevelopment.

- ***Property Transfer.*** Public and private cooperation is making it possible to transfer properties owned by the ARCO and mining companies to local government for potential redevelopment.

- ***Open Space.*** Open space is needed in management of storm water, and is also desirable for aesthetic reasons. Storm water is a primary concern in the Butte cleanup. It must be routed to appropriate locations to avoid damage to caps and to reduce COC loading to Silver Bow Creek. The Butte Hill Trail is an example of how cleanup can produce community benefits.

- ***Walkerville Baseball Field.*** EPA collaborated with the PRPs and local governments in the creation of a new baseball field for Walkerville in 1988.

- ***Geographic Information System (GIS).*** In the early 1990s, ARCO purchased a GIS system to be used for Superfund activities. The system also now allows for a variety of other tasks such as urban planning and redevelopment.

- ***State Assistance.*** Butte-Silver Bow has received Resource Indemnity Trust grant funds from the State of Montana to address other important issues on the Butte Hill, including underground subsidence and the restoration of historic head frames.

- ***Source Area Redevelopment.*** In some areas, a large volume of contaminated material served as the source for migration of contaminants via wind, water, or other types of transport. To date, more than 420 acres of source areas have been addressed to stop or slow this migration and make these areas safe. EPA worked with ARCO, other PRPs, and landowners to combine removal, capping, and redevelopment in ways that met both public and private community redevelopment needs.

- ***Mine Yard Redevelopment.*** Along with the previously mentioned source areas, there are several mine yards - areas where mining shafts were/are located - that are being redeveloped. Work at these areas has included:

  - Redevelopment of the Anselmo Mine Yard for public tours and other activities.

  - Redevelopment of the Kelley Mine Yard into offices for ARCO.

  - Cleanup of the Steward Mine Yard for future redevelopment by Butte-Silver Bow County.

  - Redevelopment of the Syndicate Pit (now used by Montana Tech as a training ground for students of underground mining).

Examples of these public and private redevelopment projects are shown in Figure 6-2.

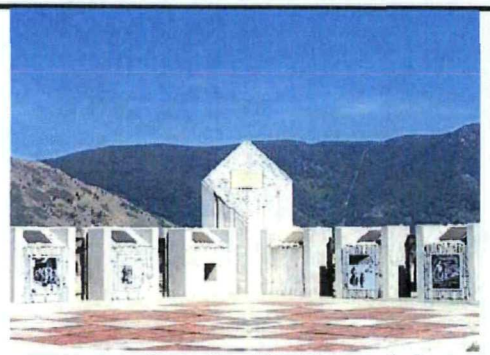
6.4 Surface Water Use

Silver Bow Creek, Blacktail Creek, and Grove Gulch Creek comprise the surface water bodies in the BPSOU. Beginning at the confluence of Blacktail Creek and Metro Storm Drain, Silver Bow Creek, flows from east to west through the BPSOU. Grove Gulch Creek is small tributary that joins Blacktail Creek above its confluence with Silver Bow Creek.

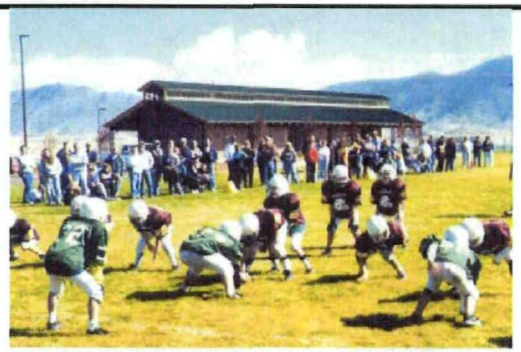
Blacktail Creek and Grove Gulch Creek are classified "B-1" for their water use. B-1 waters are suitable for drinking, culinary, and food processing purposes after conventional treatment. These waters are also suitable for bathing, swimming, recreation, the growth and propagation of salmonid fishes and associated aquatic life, waterfowl, furbearers, and as a water supply for agricultural and industrial use.

Silver Bow Creek from the confluence of Blacktail Creek to Warm Springs Creek (southeast of Anaconda) is classified "I" for water use. I-class streams are impaired and the State of Montana has a goal to improve these waters to fully support beneficial uses. These beneficial uses are considered supported when the concentration of toxic, carcinogenic, or harmful parameters in these waters do not exceed the applicable standards specified in the DEQ-7 Circular. Silver Bow Creek as it flows through the BPSOU is not used as a drinking water source or for agricultural or industrial use. There are reports of limited recreational use (inner tubing and swimming) on Silver Bow Creek.

One of the major remedial goals at the BPSOU is to restore Silver Bow Creek to its beneficial uses – particularly returning it to a stream that can support a fishery and other aquatic life and meets ARARs. The Selected Remedy is anticipated to meet or exceed that goal.

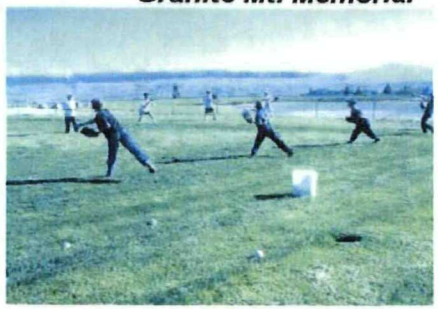


Granite Mt. Memorial

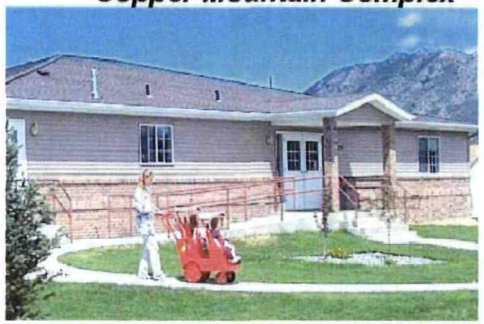


Copper Mountain Complex

Knob Hill Park and Trail

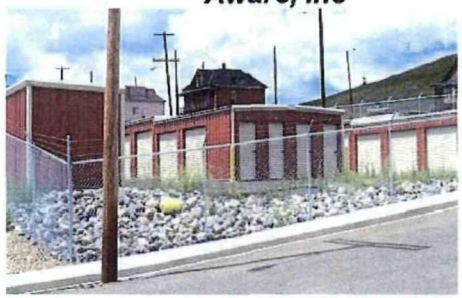


Missoula Street Complex

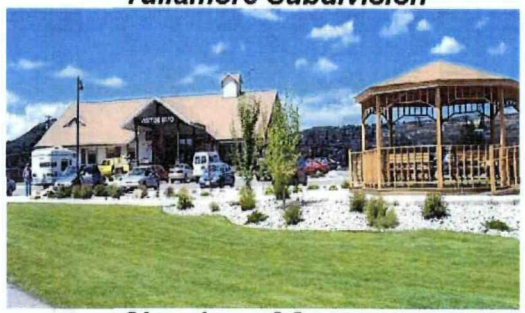


Aware, Inc

Tullamore Subdivision



Storage Unit Facility



Chamber of Commerce

Figure 6-2
Examples of Public and Private Redevelopment at the Silver Bow Creek/Butte Area Site
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

6.5 Groundwater Use

BPSOU site groundwater is not currently a source of drinking water, except for a few cases where groundwater is not contaminated. The City of Butte obtains drinking water from sources outside of the immediate area. Current drinking water sources for residents within the BPSOU are Moulton Reservoir, Basin Creek Reservoir, the Big Hole River, and two bottled water companies. These water sources are located outside of the BPSOU and are not impacted by site contamination.

There are groundwater wells located in the BPSOU, but they are not used as a drinking water source. Very low flow rates in the alluvial aquifer, along with the area's general industrial land use and extensive contamination, make domestic use of the aquifer questionable. With the exception of the Clark Tailings Area, which is under an approved Groundwater Control Area designation (a state-approved groundwater use ban), the drilling and use of groundwater is not currently prohibited. Preliminary work on more extensive state-approved bans has been ongoing. Local ordinance requires residents to be connected to the municipal domestic water supply system if they are within 300 feet of the supply system. Properties connected to the water system are prohibited from using groundwater for any purpose other than sprinkling or irrigation. Butte-Silver Bow County has an ordinance that states it "...is required at the owner's expense to install suitable water service facilities therein, and to connect such facilities directly to the water main within sixty days after date of official notice to do so, provided that a water main is located within a distance of three hundred feet from the owner's property line". The ordinance goes on to state that "... the occupants of property connected to the water system may not use water provided by wells for any purpose other than sprinkling or irrigation".

The alluvial aquifer throughout much of the BPSOU has elevated levels of COCs. COC concentrations are variable over several orders of magnitude, with numerous exceedances of DEQ-7 groundwater standards. Although a significant number of response actions have been conducted, including the removal of a large volume of source material in LAO, the removal or capping of source areas, and improved storm water routing and runoff from Butte Hill, substantial improvement of groundwater quality is anticipated to take decades to centuries. Therefore, a controlled groundwater area will be established for the alluvial aquifer as part of this ROD and contaminated groundwater will be captured and treated prior to discharge to Silver Bow Creek. The groundwater that is captured and treated may be used to meet public or industrial needs.

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Section 7 Summary of Site Risks

Risk assessments have been conducted in Butte since the early 1990s to quantify actual and potential human health and environmental risks from chemical contaminants in tailings, waste rock, soils, indoor dust, surface water and groundwater. The baseline risk assessment estimates what risks the site poses if no action were taken and identifies the contaminants and exposure pathways that need to be addressed by the remedial action.

Previous response actions have greatly reduced site risks. Nevertheless, contamination remaining on-site still presents unacceptable risks to human and ecological receptors. The Selected Remedy is necessary to protect public health or welfare or the environment from actual or threatened releases of these and other contaminants to the environment. The COCs at the BPSOU, by media, are shown in Table 7-1. The key COCs at the site are arsenic, cadmium, copper, lead, mercury, and zinc.

Table 7-1
Summary of Chemicals of Concern for the BPSOU
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

Chemical	Solid Media	Groundwater	Surface Water
Aluminum			X
Arsenic	X	X	X
Cadmium		X	X
Copper		X	X
Iron			X
Lead	X	X	X
Mercury	X	X	X
Silver			X
Zinc		X	X

7.1 Human Health Risks

The primary sources of BPSOU site contaminants are mining, milling, smelting and ore processing wastes, which include waste rock piles, milling and concentrator wastes, and smelting wastes. The primary routes of movement of these contaminants are runoff, infiltration, percolation, and wind erosion. Contaminant movement can also occur from secondary sources: surface soils to surface water by runoff; transport to groundwater through leaching, infiltration, and percolation; and contaminated dust to other media through wind erosion.

Regarding human health risks, the exposure pathways of concern for contaminants at the BPSOU are ingestion of soils and dust, direct contact with skin, and ingestion of water. Depending upon the characteristics of the contamination and the population, some pathways are more important than others. All primary and secondary transport

pathways were reviewed in accordance with the EPA risk assessment guidance and procedures, and those that were complete and presented a risk to human health were evaluated quantitatively. The Selected Remedy is intended to prevent or mitigate exposure pathways through appropriate excavation and removal (especially in yards and attics), capping, land reclamation, institutional controls, storm water controls, and groundwater control and treatment. Another major purpose of the Selected Remedy is to maintain and monitor the remedy to ensure that exposure pathways are prevented or mitigated.

For humans, the primary exposure pathways at the OU are:

- Ingestion of surface soils (for residents, commercial workers, and railroad workers);
- Ingestion of interior dust (for residents and commercial workers);
- Dermal exposure to surface water (for recreational visitors);
- Ingestion of surface water (for recreational visitors); and
- Ingestion of alluvial groundwater risks were calculated, although no current exposures occur.

Only one significant secondary exposure pathway for humans was identified: inhalation of fugitive dust (for residents, commercial workers, railroad workers, and recreational visitors).

The Preliminary Baseline Risk Assessment ([PBRA], Clement 1991) used data collected from the Butte Soil Screening Study (CDM 1988) to identify contaminants present in the BPSOU that posed significant human health risks. The PBRA concluded that arsenic and lead could pose a risk to human health at the BPSOU site. The PBRA ruled out further assessment of exposure to cadmium. Mercury was generally not evaluated because many mercury source areas discovered in Walkerville had been addressed, and the study assumed any future discovery of mercury would be similarly addressed. Therefore, EPA conducted subsequent human health risk assessments focused on arsenic and lead exposure scenarios within the BPSOU. These assessments were:

- The Preliminary Baseline Human Health Risk Assessment for Lower Area One (CDM, 1991);
- Baseline Human Health Risk Assessment for Lead (CDM 1994) and Enforcement/Action Memorandum - Butte Priority Soils Operable Unit (EPA 1994);
- Baseline Human Health Risk Assessment for Arsenic (CDM 1997) and Enforcement/Action Memorandum - Railroad Bed Time Critical Removal Action Attachment A: Arsenic Action Levels (EPA 1999a);

- Technical Memorandum: Addendum to the Baseline Human Health Risk Assessment; Evaluation of Human Health Risks Associated with Exposure to Alluvial Ground Water - Butte Priority Soils Operable Unit (CDM 2001a); and

- Human Health Risk Assessment, Walkerville Residential Site (UOS 2003).

Major findings of each of these assessments are discussed below.

7.1.1 Preliminary Baseline Human Health Risk Assessment for Lower Area One

The Final Preliminary BRA for LAO was completed in 1991. The risk assessment evaluated human health and ecological risks associated with inorganic contaminants in groundwater and surface water for the LAO portion of the BPSOU. The objective of the human health portion of the LAO risk assessment was to evaluate the potential effects of contaminated surface water and/or groundwater from LAO for human receptors. The final list of COCs based on concentrations, frequency of detection, and toxicity were arsenic, cadmium, chromium, lead, and zinc.

Based on current and future land-use at LAO, several human exposure scenarios for both surface water and groundwater were evaluated during the LAO risk assessment including occupational, recreational (swimming, inner-tubing), trespassing, and residential scenarios. The assessment quantitatively characterized the potential carcinogenic risk and noncarcinogenic health impacts from exposure to COCs in both groundwater and surface water within LAO. Risks to human receptors from exposure to COCs in surface water were determined to be low and negligible in comparison to the risks associated with exposure to COCs from daily ingestion of groundwater. Based on a future residential scenario, where groundwater in the alluvial aquifer beneath LAO would be consumed daily over a lifetime (70 years), unacceptable carcinogenic risk was determined from exposure to arsenic and unacceptable non-carcinogenic risk was determined from exposure to arsenic, cadmium, and zinc. Also, lead in groundwater presented a potential concern because it was determined that daily ingestion of lead concentrations in groundwater at LAO may result in blood lead levels above 10 micrograms per deciliter (µg/dL). Exposure to COCs in surface water and groundwater from non-residential exposure scenarios were determined not to pose a human health risk.

7.1.2 Baseline Human Health Risk Assessment for Lead

The BRA for lead, completed in 1994, was conducted to evaluate potential human health risks associated with exposure to lead within residential areas of the BPSOU (CDM 1994). Potential human health risks were predicted using EPA's Integrated Exposure Uptake Biokinetic (IEUBK) Model for Lead to predict blood lead levels from environmental exposure to lead.

The Preliminary RGs for lead were developed according to EPA's Risk Assessment Guidance for Superfund. Site-specific inputs were used for lead in soil, house dust, and the bioavailability of lead in soil. A bioavailability of 10 percent was used for soil

and indoor dust, respectively, based on bioavailability studies in both monkeys and swine. The remainder of the risk equation input variables were default values recommended by EPA guidance and the EPA toxicologist to define the reasonably maximum exposed individual. Based upon the IEUBK Lead Model developed for the BRA for Lead, EPA derived a preliminary remedial goal of 1,200 mg/kg for residential soils and a preliminary RG of 2,300 mg/kg for non-residential soils to maintain a blood-lead level of 10 µg/dL or less for at least 95 percent of the children between the ages of zero and 6 years, which is within EPA targeted risk range. The Preliminary RGs for the cleanup of lead contaminated soils in residential and non-residential areas within the BPSOU were mandated and published in the Priority Soils NTCRA action memorandum and Proposed Plan.

7.1.3 Baseline Human Health Risk Assessment for Arsenic

The BRA for arsenic was completed in 1997 to evaluate potential human health risks associated with exposure to arsenic in residential areas of the BPSOU. As a known carcinogen, arsenic may pose both cancer risks and non-cancer risks. The Preliminary RGs for arsenic were developed according to EPA's Risk Assessment Guidance for Superfund. Site-specific inputs were used for arsenic in soil and house dust, and the bioavailability of arsenic in soil. Bioavailability of 18 and 25 percent were used for soil and indoor dust, respectively, based on bioavailability studies in both monkeys and swine. The remainder of the risk equation input variables were default values recommended by EPA guidance and the EPA toxicologist to define the reasonably maximum exposed individual. Preliminary RGs were calculated representing cancer risks of 1 in 10,000, 1 in 100,000 and 1 in 1,000,000. Under the reasonable maximum exposure scenario, the selected Preliminary RG of 250 mg/kg represents a 1 in 19,040 cancer risk, which is within EPA targeted risk range.

7.1.4 Technical Memorandum: Addendum to the Baseline Human Health Risk Assessment; Evaluation of Human Health Risks Associated with Exposure to Alluvial Ground Water

Neither the BRA for Lead nor the BRA for Arsenic evaluated human health risks from exposure to contaminated groundwater at the BPSOU. This was because groundwater data representative of current site conditions were not available at the time these risk assessments were conducted. The LAO risk assessment did present conclusions regarding risks associated with ingestion of alluvial groundwater beneath LAO. However, this evaluation was limited to the LAO area and, more importantly, was conducted with data collected before the LAO removal and other removal actions at the BPSOU were complete. Therefore, when groundwater data more indicative of the current site conditions were collected, EPA determined that the potential human health risks associated with exposure to alluvial groundwater at the BPSOU should be assessed.

Based on hydrogeologic considerations, including the spatial extent of the alluvial aquifer, potential sources of contaminants, groundwater flow characteristics (flow direction and flow boundaries), and groundwater quality, the BPSOU was divided

into nine separate groundwater exposure units. Risk calculations were performed for each groundwater exposure unit independently.

Non-cancer risks (systemic risks) from ingestion of alluvial groundwater were found to be location and element specific. Blood lead levels in children would be unacceptable if groundwater in Lower Area One and Metro Storm Drain was ingested.

The risk assessment of the alluvial groundwater throughout the OU shows that cancer risks are driven by arsenic concentrations in groundwater and are unacceptable in major portions of Butte (Buffalo Gulch, West Side, Railroad Yards, Lower Area One, and the Metro Storm Drain exposure units), if actual exposure should occur.

7.1.5 Human Health Risk Assessment, Walkerville Residential Site

In 2001, EPA performed a supplemental risk assessment to determine whether arsenic, lead, and mercury in outdoor soil and indoor dust presented an unacceptable health risk to children and adults living in Walkerville (UOS 2003). The Walkerville risk assessment was implemented to address concerns raised by the public regarding mercury contamination in Walkerville. Prior EPA risk assessments addressed arsenic and lead risks, which are the primary drivers of the residential cleanups.

The soils in residential yards, soil in earthen basements, and dust in living areas and attics of Walkerville were found to be sources of arsenic, lead, and mercury. In general, concentrations of these metals were highest in attic dust or basement soil, lower in outdoor soil, and lowest in indoor living area dust.

The risk assessment showed that lead in outdoor soil and indoor dust at Walkerville residences pose an unacceptable health risk to young children. Non-cancer risks for arsenic and (generally) mercury in outdoor soil and indoor dust are at acceptable levels.

The attic-use survey conducted by EPA in consultation with the Agency for Toxic Substances Disease Registry (ATSDR) concluded that, under normal conditions, people using their attics have a complete exposure pathway. The surveys and risk assessment show the frequency of attic use is very low and the risks are within EPA's acceptable risk range. The study found that home occupants suffer limited exposure to attic dust because they access attics on a limited basis and are exposed for a short duration. Using the survey finding, the risk assessment concluded that contaminants in attic dust do not generally pose unacceptable risk to occupants because a complete exposure pathway does not exist. In the event that a complete exposure pathway is created by activities such as remodeling or when an avenue of exposure is created by ceiling or wall deterioration, an unacceptable risk may occur.

Based on the results of the Walkerville risk assessment, EPA established an indoor residential action level for mercury vapor of 0.43 $\mu g/m^3$ and an action level of 147 mg/kg for mercury in residential soil. The previously established residential action

levels for arsenic (250 mg/kg) and lead (1,200 mg/kg) in soils were determined to be protective.

7.2 Ecological Risk

BPSOU is in an urban setting with limited natural terrestrial habitat. Due to the limited terrestrial habitat, risks to terrestrial ecological receptors were not determined. Aquatic habitat occurs along Silver Bow Creek, in adjacent wetland areas, and in surface water ponds used to control sediments. These aquatic environments are habitat for invertebrates, fish, waterfowl and other biota. Therefore, assessments of ecological risk in the BPSOU focused on aquatic environments.

Two ecological risk assessments have been conducted at the BPSOU:

- Preliminary Baseline Risk Assessment (PBRA) for the Lower Area One (LAO) Non-Time Critical Removal Action (N-TCRA) (CDM 1991); and
- Final Baseline Ecological Risk Assessment (BERA), Silver Bow Creek/Butte Area NPL Site, Butte Priority Soils Operable Unit (CDM 2001b).

The ecological portion of the PBRA focused of risks to ecological receptors inhabiting the portion of Silver Bow Creek within the BPSOU. This area is consistent with the area of primary ecological concern at the OU. The PBRA included:

- Identification of ecological site COCs
- Discussion of fate and transport mechanisms, site receptors, and exposure pathways
- Preliminary identification of assessment and measurement endpoints
- Evaluation of ecotoxicological effects and potential risks to aquatic receptors, using conservative toxicity values

Since the PBRA was conducted in 1991, numerous response action activities have been conducted at the BPSOU, including:

- Removal of tailings and other contaminated solid media from the Silver Bow Creek floodplain in LAO
- Reconstruction of the Silver Bow Creek channel through LAO
- Removal of arsenic and lead contaminated mine waste on the Butte Hill
- Construction of engineered caps over contaminated mine waste on the Butte Hill
- Residential yard replacement

- Land reclamation
- Construction of storm water controls

These response actions resulted in the removal or control of some sources of environmental contamination to Silver Bow Creek and have reduced the level of contaminants in the creek. Because the response actions altered the environmental conditions in Silver Bow Creek, ecological risks characterized in the PBRA were no longer representative of site conditions. As a result, EPA determined that further risk characterization was needed to determine the level of ecological risks (actual or potential) to aquatic receptors that continue to exist under current site conditions. The Ecological Technical Assistance Group (ETAG) for the BPSOU determined that the PBRA satisfied the requirements of the Screening-Level Ecological Risk Assessment (SERA) and, therefore, represented the initial two steps of the eight-step ecological risk assessment process for Superfund. The PBRA documents the presence of environmental risks associated with exposure to specific contaminants in wastes in the Silver Bow Creek floodplain and was a key factor in EPA's decision to take a response action at LAO.

Due to the urban setting at the BPSOU, terrestrial habitat is limited to non-existent. For this reason, EPA determined that terrestrial receptors would not be evaluated and focused the risk characterization on the aquatic environment. Animals in the aquatic environment may be exposed to toxic levels of contamination in the following ways:

- Fish and benthic macroinvertebrates may be exposed by breathing or touching surface water and sediment and by ingestion of prey or sediment.
- Waterfowl may be exposed by direct ingestion of surface water and sediments or by ingestion of contaminated prey.

To determine the level of current ecological risks in Silver Bow Creek, EPA initiated the BERA to evaluate risks to aquatic receptors in the creek from its origin at the confluence of Metro Storm Drain and Blacktail Creek to the Butte Metro Sewer discharge at the downstream (western) extent of the BPSOU. Also, the BERA evaluated risks to waterfowl in on-site ponds that were created during the removal of waste material in LAO. The BERA constituted the remaining six steps of the eight-step ecological risk assessment process for Superfund recommended by current EPA guidance.

The BERA was designed to quantify risks to ecological receptors under the current site conditions to determine the need for further remedial action. It included:

- Documentation of any risks to aquatic receptors from exposure to arsenic or metals that may continue in Silver Bow Creek (within the BPSOU) after the implementation of source area removals, assuming continued input of site contaminants to Silver Bow Creek from groundwater and surface water discharge.

- Identification of site contaminants that continue to pose ecological risks to aquatic receptors.

- Generation of information for making risk management decisions and evaluating remedial alternatives.

One of the RGs for the BPSOU site is to return the reach of Silver Bow Creek within the BPSOU to its beneficial uses, which include supporting a self-sustaining trout fishery. This implies that arsenic and metals concentrations and other chemical components in surface water and sediments cannot pose adverse effects to any life stage of fish, including the more sensitive larval and early fry stages, and the important prey species consumed by trout, such as benthic macroinvertebrates. To ensure that this remedial goal can be achieved, EPA identified additional management goals, beyond the main goal of assessing current ecological risk, for the BERA:

- Determine levels of contaminants that will allow a self-sustaining salmonid fishery in Silver Bow Creek, specifically, the establishment of brook trout and other fish species currently present in Blacktail Creek; and

- Determine levels of contaminants that will allow survival of salmonid species.

Primary contributors to ecological risk, based on the BERA evaluations, are identified as "major COCs". They are:

- Surface water - cadmium, copper, manganese, and zinc

- Sediment - arsenic, cadmium, copper, lead, and zinc

- Waterfowl exposures - copper and zinc

Despite the response actions taken at LAO to remove wastes from the Silver Bow Creek floodplain and to minimize the impacts from contaminated groundwater, the risk characterization determined that hazard quotients (HQ) greater than 1 are still evident for both surface water and sediment within Silver Bow Creek. HQs greater than 1 indicate unacceptable environmental risks under EPA's ecological risk assessment guidance. The risk characterization showed that the most hazardous ecological conditions at the BPSOU are in the tributary drainages to Silver Bow Creek (e.g., Missoula Gulch and Metro Storm Drain), which suggests that ecological conditions could still be improved with further remedial action.

Risk questions defined in the BERA are repeated below, along with responses, to summarize the results of the risk assessment.

- *Are levels of mining-related contaminants in surface water and sediment sufficiently elevated to adversely affect survival, growth, or reproduction of salmonid fish in Silver Bow Creek?* Yes. Salmonid fish are at risk from metals-contaminated surface water and sediment. Survival, growth, and reproduction are likely to be impaired at the most contaminated

locations. Although not quantitatively assessed, metals-contaminated sediments and prey are also expected to contribute to the overall risks to salmonid fish.

- *Are levels of mining-related contaminants in surface water and sediment sufficiently elevated to adversely affect the survival, growth, and reproduction of aquatic plants and aquatic invertebrates in Silver Bow Creek?* Yes. Sensitive aquatic invertebrates and some forms of aquatic plants are at risk from contamination of surface water and sediments.

- *Are the levels of mining-related contaminants in surface water, sediments, aquatic vegetation, and aquatic invertebrates sufficiently elevated to adversely affect the survival, growth, and reproduction of waterfowl frequenting Missoula Gulch Ponds and LAO Ponds?* Waterfowl may be at significant risk due to cadmium, copper, and zinc via ingestion of metals-contaminated sediments and food. Elevated risk estimates are directly related to assumptions on diet, foraging frequency, and COC concentrations. Risks are probably over-estimated because of conservative assumptions used where site-specific data are lacking. Contaminated pond surface water may also be of concern, mostly due to bioaccumulation potential rather than direct ingestion.

7.3 Remaining Risk

Although the previous response actions and the residential lead abatement program have reduced human health risks, metal-laden mine waste within the BPSOU continues to threaten human health and the environment, and continues to adversely impact local groundwater and surface water resources. As a result, the Selected Remedy builds upon the accomplishments of previous response actions to eliminate or mitigate remaining human and ecological risks.

The Selected Remedy includes, but is not limited to, the following major critical elements to address remaining risks:

- A site-wide operations and maintenance program for reclaimed sites to ensure permanence of the caps over mine waste.

- Alluvial groundwater collection and treatment along with appropriate institutional controls, ARAR waivers, and monitoring.

- Additional source removal, capping of mine waste and land reclamation for contaminated solid media.

- Plans for a Residential Metals Abatement Program that takes a multi-pathway approach to addressing arsenic, lead, and mercury in yards and homes. All residential properties will be sampled within the BPSOU with remediation when indicated.

- A phased storm water management program combining initial action, aggressive monitoring, source area stabilization, and engineering controls to minimize impacts from storm water runoff and return Silver Bow Creek to its beneficial uses.

- Elevated arsenic and metals occur in stream-bed and bank sediments in Silver Bow Creek at concentrations that present significant risks to aquatic biota. These sediments are most notable within the slag canyon west of Montana Street and within the upper reaches of the Silver Bow Creek channel in Lower Area One and the lower reach of Blacktail Creek. The Selected Remedy will remove contaminated sediments from the stream channel bottom and stream banks, and adjacent floodplain from above the confluence through the slag canyon to the reconstructed floodplain in Lower Area One.

7.4 Basis of Action

The response actions selected in this ROD are necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

Section 8 Remedial Action Objectives and Remedial Goals

The Selected Remedy described in this ROD is intended to be the final remedial action for the BPSOU. EPA has identified site-specific human health and environmental remediation objectives and goals for groundwater, surface water, soils, indoor dust, and mining-related wastes in the BPSOU. Remedial Action Objectives (RAOs) are the final media-specific (e.g., solid media, surface water, etc.) statements regarding the objectives to be achieved by the remedial action. They address the various COCs, media of concern, exposure pathways and receptors, and current and likely future land use in the OU. Remedial Goals (RGs) are numerical cleanup goals for environmental media. The RGs are based on ARARs or are the results of baseline risk assessments for the BPSOU. Remedial actions implemented for the purpose of meeting RGs usually result in attainment of RAOs.

RAOs and RGs were prepared by EPA in accordance with NCP regulations, relevant guidance, and in consultation with DEQ. Consideration was also given to suggestions from the PRP Group and other interested parties and current site conditions. The Preliminary RAOs and RGs initially set by EPA were updated as the RI/FS progressed. The ROD establishes the final RAOs and RGs.

RAOs and RGs for air are not addressed as part of the BPSOU as stand-alone goals, although certain air standards may be ARARs during the conduct of cleanup actions (e.g., dust control). Air is not addressed because any chronic violations of air standards from CERCLA sources are not a pathway of concern at the OU.

In-stream sediments are not specifically addressed in the RGs. However, one goal of the previous response actions and future remedial actions for the OU is to eliminate or minimize sources of contamination to Silver Bow Creek sediment (i.e., surface water transport of contaminated soils or waste) such that excessively contaminated sediments are not present. Sediments were largely addressed during the Lower Area One ERA when the Silver Bow Creek floodplain was reconstructed and when the subdrain was installed in Metro Storm Drain. Additional sediments, defined geographically rather than in reference to specific action levels for sediments, will be addressed through sediment removal along the stream reach between the confluence and Lower Area One, as described in this ROD.

The following specific objectives were developed for each media. The objectives specify the COCs and the exposure routes and receptors at issue for cleanup. The objectives are followed by RGs in the form of ARARs or acceptable levels or ranges of levels for each exposure route.

8.1 Solid Media

Humans are the primary current and future receptors of arsenic and metals from contaminated soils, indoor dust, waste rock, and tailings (solid media) within the OU.

The primary exposure pathways are direct ingestion, incidental ingestion, and dermal contact with these media and the indirect inhalation of contaminated airborne indoor dust.

Solid media are a source of contamination to the underlying alluvial and bedrock aquifers via leaching of contaminants from solid media and the subsequent downward migration through the unsaturated (vadose) zone. Contaminated solid media are also a source of arsenic and metals to surface water within the OU via runoff and other transport.

Secondary exposure pathways for humans are potential direct ingestion, incidental ingestion, and dermal contact with surface and groundwater contaminated by solid media. Aquatic receptors are exposed to arsenic and metals from solid media in surface water and the surrounding environment. For solid media, the COCs are arsenic, lead, and mercury.

8.1.1 Remedial Action Objectives

The RAOs for contaminated solid media in the OU are to:

- Prevent the ingestion of, direct contact with, and the inhalation of, contaminated soils, indoor dust, waste rock, and/or tailings or other process waste that would result in an unacceptable risk to human health assuming current or reasonably anticipated future land uses.
- Prevent releases of contaminated solid media to the extent that they will not result in an unacceptable risk to aquatic environmental receptors.
- Prevent releases of contaminated water from solid media that would result in exceedances of the Montana State Water Quality Standards for surface water.
- Prevent releases of contaminated water from solid media that would result in exceedances of the Montana State Water Quality Standards for groundwater, except where ARAR waivers are appropriate and other means to protect from associated risks are available.
- Remediate contaminated solid media to the extent that it will not result in an unacceptable risk to human health and/or aquatic environmental receptors.
- Prevent release of contaminated water from solid media that would result in degradation of surface water, in accordance with the surface water RGs.

8.1.2 Remedial Goals

Human health risks from exposure to mining related lead and cadmium were evaluated through a series of baseline risk assessment documents that concluded in 1994 as described in Part 2, Section 7 of this ROD. That evaluation determined that human health risks at the OU from exposure to cadmium were not unacceptable to

EPA. Actual and potential risks from exposure to high levels of lead at the OU, however, were unacceptable.

In 1994, the baseline risk assessment for lead was conducted to evaluate potential human health risks associated with exposure to lead within residential areas of the BPSOU (CDM 1994). EPA derived action levels for lead at 1,200 mg/kg in residential yards and play areas (i.e., receptor areas) and 2,300 mg/kg at waste rock dumps or other source areas outside of residential areas to maintain a blood lead level of 10 µg/dl or less for at least 95 percent of the children between the ages of zero and 6 years. These action levels have been used to determine ongoing response actions, including use by Butte-Silver Bow County as part of the lead abatement program.

EPA completed an evaluation of the potential risks to human health from exposure to arsenic contaminated soil and waste rock within the OU. Three pathways of contact with mining-related arsenic were considered: ingesting or inhaling soils, indoor dust, and water and absorbing arsenic through the skin. Based on the risk assessment, EPA set action levels for arsenic. The arsenic action level for residential areas and rail beds that transect residential areas is 250 mg/kg. The commercial/industrial action level for arsenic is 500 mg/kg. The arsenic action level for open space areas that may be used for recreational purposes is 1,000 mg/kg.

In 2003, EPA finalized an additional evaluation of the potential human health risks to children and adults living in Walkerville related to exposure to arsenic, lead, and mercury in outdoor soil and indoor dust. Exposure scenarios considered included: ingestion of outdoor soil and indoor dust (basement soil, living area dust, and attic dust); inhalation of airborne dust from soil and indoor dust; and inhalation of indoor air vapor (mercury only). Based on the results of the Walkerville residential risk analysis, EPA established an indoor residential action level for mercury vapor of 0.43 micrograms per cubic meter ($\mu g/m^3$) and an action level of 147 mg/kg for mercury in residential soil. Previously established residential action levels for arsenic (250 mg/kg) and lead (1,200 mg/kg) were determined to be protective for exposure to indoor dust, and were not changed.

All of these levels apply to areas where a completed pathway of exposure is present. For attic dust, a pathway of exposure is present when attics are remodeled and used or are otherwise altered or broken down in ways that create exposure. RGs for arsenic, lead and mercury will apply to attic dust when exposure pathways are present.

8.2 Groundwater

EPA's September 4, 2001 groundwater risk assessment addendum found unacceptable risk to human receptors from the potential use and ingestion of contaminated alluvial groundwater at the OU, primarily because of arsenic and lead contamination (CDM 2001). The RAOs and human health RGs associated with groundwater contamination at the OU are based on this potential risk. However, the general industrial nature of the area where groundwater exists, along with existing and planned institutional

controls regarding groundwater, may prevent the actual domestic use of the alluvial groundwater in Butte.

Groundwater COCs are arsenic, cadmium, copper, lead, mercury, and zinc.

8.2.1 Remedial Action Objectives

The remedial action objectives for contaminated groundwater are:

- Prevent ingestion of or direct contact with contaminated groundwater that would result in unacceptable risk to human health.
- Prevent groundwater discharge that would lead to violations of surface water ARARs and RGs for the BPSOU.
- Prevent degradation of groundwater that exceeds current standards.

8.2.2 Remedial Goals

Montana classifies groundwater into Classes I through IV based upon its specific conductance and establishes the groundwater quality standards applicable with respect to groundwater classification. Concentration of dissolved substances in Class I or Class II groundwater may not exceed the human health standards listed in the current Montana Numeric Water Quality Standards Circular DEQ-7 (DEQ-7) and shown in Table 8-1. None of the DEQ-7 levels are less stringent than the federally promulgated MCLs or non-zero MCLGs, so those standards are not identified here.

Table 8-1
DEQ-7 Standards for Groundwater
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

COC	Standard (Dissolved)
Arsenic	10 µg/L
Cadmium	5 µg/L
Copper	1,300 µg/L
Lead	15 µg/L
Mercury	2 µg/L
Zinc	2,000 µg/L

For concentrations of parameters for which human health standards are not listed in DEQ-7, ARM 17.30.1006 allows no increase of a parameter to a level that renders the waters harmful, detrimental, or injurious to the beneficial uses listed for Class I or

Class II water. RGs for groundwater may be revised downward, in order to achieve surface water quality standards and RGs. For arsenic, the current Federal MCL of 10 µg/L is the appropriate RG for arsenic in groundwater, along with the recently promulgated State standard of 10 µg/L.

EPA has evaluated the Technical Impracticability (TI) Evaluation document for the alluvial aquifer – a document that EPA completed prior to the release of this ROD – and all other relevant information in the Administrative Record regarding groundwater. EPA has waived the ARAR RGs for groundwater for the alluvial aquifer identified in the TI Evaluation and in this ROD. The groundwater RGs identified in Table 8-1 and this section of the ROD therefore apply only to groundwater outside of the waiver area, which may be defined during remedial design. Further explanation for the ARAR waiver is provided in Section 12 of Part 2 of this ROD.

8.3 Surface Water

There are a number of ARARs related to surface water and storm water control for the OU. The main requirements for the surface water regulations are compliance with Montana's water quality standards (DEQ-7, February 2006). EPA has set as its objective compliance with standards continuously throughout the entire reach of Silver Bow Creek in the OU and downstream, during base flow and storm water conditions.

The State has designated uses for Silver Bow Creek and has promulgated specific standards accordingly. These standards are as stringent as, or more stringent than, the federal water quality criteria. The most stringent human health or aquatic water quality criterion is applied. Silver Bow Creek must meet human health standards and not allow zones of acute aquatic life toxicity (i.e., mixing zones) or allow the aquatic life chronic 4-day average and the acute 1-hour (instantaneous) concentrations to exceed the DEQ-7 aquatic life criteria.

The recently-lowered federal human health standard for arsenic of 10 µg/L was adopted by the State in January 2006. This standard is the correct arsenic ARAR for Silver Bow Creek.

Silver Bow Creek (main stem) from the confluence of Blacktail Creek to Warm Springs Creek is classified "I" for water use. This classification was established to provide a framework for improving waters that have been impacted by human activities with the goal to return waters to beneficial uses.

The Metro Storm Drain (historic Silver Bow Creek channel) from the concentrator tailings pond down stream to Blacktail Creek has no regulatory classification. Blacktail Creek and Grove Gulch are classified "B-1" for their water use. Under both classifications, surface water quality will be restored and/or maintained to support the following uses: drinking; culinary; food processing; bathing; swimming; recreation, growth and propagation of fish (specifically salmonid for B-I creeks) and associated aquatic life, waterfowl, and furbearers; and agricultural and industrial

water supplies. These beneficial uses are generally considered supported when the concentration of toxic, carcinogenic, or harmful parameters in these waters do not exceed the applicable standards specified in the DEQ-7 Circular.

Surface water COCs are aluminum, arsenic, cadmium, copper, iron, lead, mercury, silver, and zinc.

8.3.1 Remedial Action Objectives

The RAOs for contaminated surface water are to:

- Prevent ingestion or direct contact with contaminated surface water that would result in an unacceptable risk to human health.
- Return surface water to a quality that supports its beneficial uses.
- Prevent source areas from releasing contaminants to surface water that would cause the receiving water to violate surface water ARARs and RGs for the OU and prevent degradation of downstream surface water sources, including during storm events.
- Ensure that point source discharges from any water treatment facility (e.g., water treatment plant, wetland, etc.) meet ARARs.
- Prevent further degradation of surface water.
- Meet the more restrictive of chronic aquatic life or human health standards for surface water identified in Circular DEQ-7 (Table 8-2) through the application of B-1 class standards, as more specifically described below.

8.3.2 Remedial Goals

8.3.2.1 Point Sources

For point sources the chronic aquatic life and human health standards specified in Circular DEQ-7 or other applicable standards would apply, as described in EPA's February 2, 1999 letter to ARCO (EPA 1999b). Because the quality of water in Silver Bow Creek has improved to the point where I classification computations are no longer relevant or necessary, new point sources must meet the Circular DEQ-7 standards (Table 8-2). For B-1 waters, the I classification system for new point sources does not apply, and the standards specified in Circular DEQ-7 or other applicable standards would apply to both point source discharges or ambient water.

8.3.2.2 In Stream Standards

For in-stream standards and RGs, state water quality standards form the basis of the RGs. The arsenic RG is based on the maximum contaminant level (MCL), which was adopted by the state. None of the DEQ-7 levels are less stringent than the federally promulgated MCLs or non-zero MCLGs, so those standards are not identified here. The DEQ-7 standard for aluminum is based on dissolved concentrations. All other standards are measured based on the total recoverable amount of the identified chemical. For storm water run-off or "wet weather flows", acute aquatic life standards

promulgated under Circular DEQ-7 (February 2006) are the appropriate performance standards.

Table 8-2 shows the applicable water quality standards with which any remedial action must comply.

Table 8-2
Surface Water Quality Standards
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

COC	DEQ-7 Standard	Standard[1] (Total)
Aluminum[2]	Acute Chronic	750 µg/L 87 µg/L
Arsenic[3]	Acute Chronic Human Health	340 µg/L 150 µg/L 10 µg/L
Cadmium	Acute Chronic	0.52 µg/L [1] 0.097 µg/L [1]
Copper	Acute Chronic	3.79 µg/L [1] 2.85 µg/L [1]
Iron	Chronic	1,000 µg/L
Lead	Acute Chronic Human Health	13.98 µg/L [1] 0.545 µg/L [1] 15 µg/L
Mercury	Acute Chronic Human Health	1.7 µg/L 0.91 µg/L 0.05 µg/L
Silver	Acute	0.374 µg/L [1]
Zinc	Acute Chronic	37 µg/L [1] 37 µg/L [1]

Notes

1. Standards for cadmium, copper, lead, silver, and zinc are hardness-dependent. Value shown is calculated at a hardness of 25 mg/L (Montana Numerical Water Quality Standards, Circular DEQ-7, February 2006).
2. The DEQ-7 standards for aluminum refer to the dissolved fraction.
3. The State adopted the Federal standard for arsenic in January 2006.

Nitrate and fluoride in groundwater or surface water are not associated with mining in this OU, and therefore are not included on this list. Response actions to address these contaminants are outside the scope of the Selected Remedy.

In addition, the dissolved oxygen concentration must not be reduced below 3.0 mg/L; the pH must be maintained within a range of 6.5 to 9.5; no increases are allowed in the

physical properties (e.g., temperature, turbidity, solids [floating or suspended], color, etc.) which will or are likely to create a nuisance or render the water harmful, detrimental, or injurious to public health, recreation, safety, welfare, livestock, wild animals, birds, fish or the wildlife; and no discharges of toxic carcinogenic, or harmful parameters may commence or continue which lower or are likely to lower the overall quality of these waters.

Finally, all substantive requirements of the Montana Pollutant Discharge Elimination System must be adhered to for point sources addressed or created in the remedial process.

For B-1 classification waters, non-degradation rules require that any surface water below the above standards must be maintained and protected unless degradation is allowed under the non-degradation rules.

Section 9 Description of Alternatives

This section presents EPA's alternatives for achieving its objectives at the Butte Priority Soils OU. It briefly describes the alternatives studied, their interaction with past remedial actions, the estimated costs for each alternative, their common elements, and how they differ from one another.

This section provides a detailed description of each alternative so that Section 10 (The Comparative Analysis of Alternatives) can focus on the differences and similarities among the alternatives with respect to the nine NCP criteria. As an introduction, this section briefly describes the development of the alternatives and how previous response actions were integrated into the FS. Due to the complex nature of this OU, remedial alternatives were developed for the various media throughout the entire OU and a separate set of alternatives were developed to address the specific issues of the MSD area. To promote a better understanding of each alternative, the descriptions provided in this section are separated into 1) Site-Wide alternatives and 2) Metro Storm Drain alternatives. The comparative analysis of alternatives in Section 10 integrates these sets of alternatives into "comprehensive" alternatives.

9.1 Development of Alternatives

EPA screened potential cleanup technologies as the first phase of the FS. The screening process identified all the technologies that were potentially feasible for treating or remediating inorganic contaminants in groundwater, surface water, sediment, and soil/mine waste. It then evaluated these technologies for their effectiveness and implementability.

The FS report considered a wide range of media-specific remedial alternatives and special geographic and land use components within the OU. Each component identified for consideration in the FS contained its own unique set of characteristics, including factors such as proximity to surface water bodies or groundwater, potential to impact storm water quality, ground and surface water interaction, potential for development or other uses, or historical significance.

Remedial alternatives for the Metro Storm Drain area were evaluated in the site-wide FS and also in the *Focused Feasibility Study, Metro Storm Drain* (FFS) which provided a greater degree of evaluation and alternative development. The FFS presented additional analysis and interpretation of data resulting from site investigation activities performed by EPA and the Montana Bureau of Mines and Geology after the site-wide FS was drafted.

9.2 Integration of Past Response Actions

CERCLA, or the Superfund law, requires past response actions to be designed and constructed in a manner consistent with a final remedy if possible and requires EPA to ensure an orderly transition from removal action to remedial action. Before deciding if past response actions would be compatible with the final remedy, EPA

evaluated whether the past response actions were consistent with the cleanup objectives and ARARs. That assessment was published in the Response Action Summary Document (October 2, 2003). The assessment concluded that all but three past removal actions complied with ARARs and were consistent with the cleanup objectives established for the final remedy.

Based on the Response Action Summary Document and the administrative record for past response actions, EPA granted a conditional, limited no further action status to all past response action sites, except the Colorado Smelter removal site, Lower Railroad Yard Site 1, and the LAO removal site. However, for sites granted the no further action status, EPA, in consultation with the State, may still select additional actions in the final cleanup plan to address protectiveness or ARAR compliance issues at these sites. These potential additional actions include, but are not limited to: specific management practices, storm water controls, groundwater protection measures, and cap modifications.

EPA has also developed the Butte Reclamation Evaluation System to ensure that reclaimed areas will remain stable and protective. This system is a site-specific tool to evaluate the stability, integrity, and degree of human and environmental protectiveness afforded by EPA-sanctioned response actions initiated on lands impacted by mining within the OU. This system will evaluate, through routine inspections, the:

- Condition and diversity of vegetative cover
- Presence of erosion
- Condition of site edges
- Presence of exposed waste material
- Presence of bulk soil failure or mass instability
- Presence of barren areas or gullies

This system includes corrective action triggers and a database to track trends and schedule maintenance and future field evaluations. The final BRES is attached as Appendix B.

Along with developing findings under the BRES, an operation and maintenance plan will be developed for reclaimed areas. This program will ensure long-term effectiveness and permanence for these areas. Institutional Controls (ICs) are necessary to protect the remedy and human health, and are therefore a component of every alternative, including the preferred alternative. Further details on ICs are provided in subsequent sections of this ROD.

Detailed operation and maintenance of sites where past response actions have occurred is required by the Selected Remedy. Past response actions are also subject to

five-year reviews to ensure that the cleanup actions remain protective. The Butte Reclamation Evaluation System program will ensure long-term effectiveness and permanence for all capped wastes and reclaimed areas.

9.3 Remedial Alternatives

For simplicity, the descriptions of alternatives in this section are separated into two sets: Site-Wide and Metro Storm Drain remedial alternatives. Following the listing of the major components of each alternative, commonalities and differences of the alternatives are presented. The detailed comparison of the alternatives in Section 10 integrates the Metro Storm Drain alternatives with the Site-Wide alternatives; these combined alternatives are then referred to as "comprehensive" alternatives.

Site-Wide Alternatives

The Site-Wide alternatives developed for the OU are:

- Alternative 1 - No Further Action.
- Alternative 2 - Engineered covers/Partial Removal for Solid Media, Treatment of LAO Groundwater, Surface Water best management practices (BMPs), ICs, and Monitoring.
- Alternative 3 - Engineered covers/Partial Removal/Limited Treatment for Solid Media, Groundwater Collection and Redirection to the Berkeley Pit, Surface Water BMPs, ICs, and Monitoring.
- Alternative 4 - Engineered covers/Partial Removal/Limited Treatment for Solid Media, Groundwater Collection and Lime Treatment, Surface Water BMPs, ICs, and Monitoring.
- Alternative 5 - Engineered covers/Partial Removal/Limited Treatment for Solid Media, Groundwater Source Material Partial Removal/Collection and Lime Treatment, Surface Water BMPs, ICs, and Monitoring.
- Alternative 6 - Source Material Removal, Groundwater Source Material Removal/Collection and Lime Treatment, Surface Water BMPs, ICs, and Monitoring.

Metro Storm Drain Area Alternatives

These alternatives were developed in the *Focused Feasibility Study, Metro Storm Drain* to augment the Site-Wide alternatives. Each consists of water treatment and/or waste removal options. Groundwater collection and treatment in this area of the site is intended to prevent discharge of contaminated base flow to Silver Bow Creek. Source removal options are intended to remediate alluvial groundwater within the Metro Storm Drain area.

- Alternative 1 - No Further Action.
- Alternative 2 - Capture and Treatment of Metro Storm Drain Base Flow.

- Alternative 3 - Removal of Accessible Diggings East and North Side Waste Materials (92,580 cubic yards with 35,750 cubic yards of overburden).

- Alternative 4 - Combination of Alternatives 2 and 3: Groundwater Capture and Treatment with Removal of Diggings East and North Side Tailings. Accessible waste material, (92,580 cubic yards with 35,750 cubic yards of overburden) would be removed.

- Alternative 5a - Removal of All Accessible Waste Material in the Metro Storm Drain with Groundwater Capture and Treatment. Total of 480,949 cubic yards of waste and 83,192 cubic yards of overburden from Parrott Tailings and Metro Storm Drain below Harrison Avenue (North Side Tailings, Diggings East Tailings, and the Lower Metro Storm Drain).

- Alternative 5b - Removal of Accessible Waste Material in the Metro Storm Drain with Removal and Reconstruction of the City-County Shops and Groundwater Capture and Treatment. A total of 779,684 cubic yards of waste and 103,735 cubic yards of overburden from the Parrott Tailings and Metro Storm Drain below Harrison Avenue (including the North Side Tailings, Diggings East Tailings, and the Lower Metro Storm Drain) would be removed.

- Alternative 6 - Total Removal of All Waste in the Metro Storm Drain with Groundwater Capture and Treatment. Total removal is 1,397,161 cubic yards of waste with 775,832 cubic yards of overburden for the entire area. All buildings, including residences and a shopping center, would be removed.

9.4 Common Elements of the Site-Wide Alternatives

Site-Wide Alternatives

The different Site-Wide alternatives have many elements in common.

- *Operation and Maintenance/ Corrective Actions.* All alternatives require long-term operation and maintenance of waste caps, solid media, and vegetation consistent with standards set in the Butte Reclamation Evaluation System. Areas that were reclaimed outside an EPA Order will be inspected to determine whether those previous actions are protective or if additional actions are warranted. Operation and maintenance of the LAO collection system and storm water system will continue, as will the monitoring of storm water and groundwater.

- *Institutional Controls.* All of the alternatives require the use of institutional controls to limit access to solid media and groundwater and maintain the integrity of the cleanup.

- *Engineered Covers.* Alternatives 2, 3, 4, and 5 specify the use of soil with revegetation, or rock, asphalt, or concrete covers for areas exceeding lead and arsenic action levels. Multimedia covers would also be used under specific conditions. Consolidation of wastes and grading is also specified for these areas in each of the alternatives.

- *Partial Removal of Material.* Alternatives 2, 3, 4, and 5 require limited, partial removal of areas exceeding lead and arsenic action levels. Areas that were reclaimed, but not under an EPA Order, will be evaluated to determine whether previous actions are protective or additional actions will be required. Residential soils exceeding lead, arsenic, or mercury action levels will be remediated pursuant to the Residential Metals Abatement Program described in other sections.

- *Site Specific Reclamation of Certain Areas.* Reclamation will be conducted for the area adjacent to the Granite Mountain Memorial Area. The Syndicate Pit will be reclaimed to the maximum extent practicable to allow site reuse as a mine training center. The reclamation will include rock covers, parking lot cap and vegetation soil cover over various portions of the pit. The design consists of a west rim berm planted with trees and various surface water controls on the west side of the pit. Surface water controls (e.g., curbs and gutters) will be implemented to direct storm water to the Syndicate Pit. The pit base would continue to be used as a sediment catch basin.

- *Treatment of Wastes.* Alternatives 3, 4, and 5 specify the use of waste treatment of mine wastes that fail TCLP testing to reduce toxicity and mobility.

- *Indoor Residential Contamination.* Alternatives 3, 4, and 5 specify soil and dust sampling and clean up, an attic dust program, and other actions to reduce human health risk.

- *Closure of Waste Repository.* All alternatives specify the closure of the waste repository and siting of new repositories as necessary.

- *Storm Water BMPs.* All alternatives except No Action require use of specific types of management, where appropriate. This may include source removals and controls, engineering controls, sedimentation basins, and routing. A phased approach will be used to determine the need for these management techniques.

- *Sediment Removal.* All alternatives, except no action, specify the removal of sediments and bank/overbank material from Silver Bow Creek in the reach from the confluence of Blacktail Creek and Metro Storm Drain to the point in Silver Bow Creek where the stream was reconstructed at Lower Area One.

- *Collection of Storm Water Runoff and Treatment.* All alternatives, except no action, specify that storm water runoff will be collected and treated or directed to the Berkeley Pit, if BMPs do not achieve cleanup goals.

- *Collection, Routing, and Treatment of Groundwater.* All of the alternatives specify that groundwater collected at LAO (in the hydraulic control channel and hydraulic control pond CT-04) will be treated. The differences among alternatives are in the type of treatment and the routing. Alternatives 4, 5, and 6 specify treatment by lime precipitation and discharge to Silver Bow Creek.

Metro Storm Drain

- *Waste Removal.* Alternatives 3, 4, 5a, 5b, and 6 all require some volume of waste removal. The difference is whether the removal is limited to the removal of accessible wastes or if structures will be removed to excavate otherwise inaccessible wastes.

- *Collection, Routing, and Treatment of Groundwater.* Alternatives 2, 4, 5a, 5b, and 6 all require capture of contaminated groundwater in the Metro Storm Drain and routing to Lower Area One for treatment.

9.5 Distinctions Among Alternatives

The following is a description of the elements that make each alternative unique, these elements may include RAOs to be achieved, estimated quantities of material to be removed, implementation requirements, key ARARs, future land use, estimated time to complete, or estimated costs.

Site-Wide Alternatives

- *Cost.* Costs vary widely with each alternative but are primarily driven by variations in volumes of waste that are considered for removal. Long-term O&M costs do not vary significantly across alternatives because these costs are driven primarily by groundwater treatment costs and the surface water management program. Estimated present value costs for each alternative are presented in Section 9.6.

- *Operation and Maintenance.* Alternatives that call for total removal of upland solid media source areas, residential yard soils, and contaminated interior and/or attic dust will require less O&M and/or institutional controls than partial removals. Where contaminated materials are completely removed, there will be no need for future programs to address contaminated solid media. This is not true for saturated wastes in the floodplain area. Groundwater capture and treatment and the associated O&M activities will be required over the long-term even if wastes are removed from the floodplain because of the residual contaminants in the groundwater and alluvial aquifer matrix, which will remain for over 100 years following removal.

- *Volume of Material Removed.* The volume of waste removed varies with each alternative. For Alternative 1, no more waste would be removed. Alternative 6 specifies total removal of all wastes exceeding lead and arsenic action levels. Because all contaminated materials will be removed, no covers would be required. Under Alternative 6, the Granite Mountain Memorial Area would be regraded and covered, and all slopes in the Syndicate Pit area would be regraded and capped with soil, and the site would not be used as mine training center or as a sediment basin.

- *Lead Intervention and Abatement Program.* For Alternative 1, the lead intervention and abatement program would be discontinued.

- *Indoor Residential Contamination.* Alternatives 1 and 2 have no provisions to address indoor residential contamination. Alternative 6 specifies a one-time cleaning of the

residential interior at properties undergoing yard cleanup or as part of a program to reduce the risk from dust during remodeling activities.

- *Collection, Routing, and Treatment of Groundwater.* Three of the alternatives (4, 5, and 6) require lime treatment of LAO groundwater and discharge to Silver Bow Creek. Alternatives 1 and 2 specify treatment with lime in lagoons in a wetland setting, similar to those evaluated during treatability studies, prior to being discharged to Silver Bow Creek. Alternative 3 specifies that the groundwater would be collected and conveyed via pipeline directly to the Berkeley Pit or to the Berkeley Pit treatment plant for combined treatment with water from the Berkeley Pit.

- *Use of Extraction Wells.* Alternative 6 would add the use of extraction wells installed at the west end of LAO to minimize migration of contaminants.

- *In-stream Flow Augmentation.* Alternative 2 specifies that groundwater base flow in the Metro Storm Drain would not be treated but would be augmented with clean water so that water quality standards are met in Silver Bow Creek

Metro Storm Drain

- *Volume of Material Removed.* Alternatives 3, 4, 5a, 5b, and 6 require some volume of waste removal. Alternatives 3 and 4 both remove only accessible wastes (92,580 cubic yards with 35,750 cubic yards of overburden). Alternative 5a broadens the removal area to include the Parrott tailings (except those under the City-County Shops) for a total of 480,949 cubic yards of waste and 83,192 cubic yards of overburden. Alternative 5b removes the City-County Shops to access more of the Parrott tailings (779,684 cubic yards of waste and 103,735 cubic yards of overburden). Alternative 6 removes all surface structures (including a shopping center and residences) and removes a total of 1,397,161 cubic yards of waste with 775,832 cubic yards of overburden.

- *Collection, Routing, and Treatment of Groundwater.* Alternatives 1 and 3 do not specify collection, routing, and treatment of groundwater from the Metro Storm Drain. Specifically, Alternative 3 evaluated the effectiveness of waste removal alone without groundwater capture and treatment and determined that removal alone would not be protective of Silver Bow Creek.

9.6 Comprehensive Alternatives

To develop the comprehensive alternatives, the Metro Storm Drain alternatives were integrated into Site-Wide alternatives. For example, Comprehensive Alternative 3 includes the components of Site-Wide Alternative 3 and Metro Storm Drain Alternative 2 (Table 9-1). Similarly, Comprehensive Alternative 5 includes the components of Site-Wide Alternative 5 and Metro Storm Drain Alternatives 4, 5a, and 5b. Table 9-2 shows the matrix of comprehensive alternatives in order to more simply present the components of each comprehensive alternative.

Table 9-1
Comprehensive Alternatives Basis

Comprehensive Alternative =A+B	Site-Wide FS (A)	Metro Storm Drain FFS (B)
1	1	1
2	2	1
3	3	2
4	4	2
5	5	4, 5a, 5b
6	6	6

Table 9-3 presents the estimated total costs for each alternative. Costs are broken down into capital costs and O&M costs to better show where costs are incurred and how costs vary across different alternatives and for different media. For this ROD, present value costs were estimated for 100 years using a discount factor of 3 percent. A 100-year period of analysis was selected because the incremental present worth cost beyond this time becomes relatively insignificant. The 3 percent discount factor at 100 years is 0.052. For example, if a cost of $1,000,000 were anticipated in year 100, the present value of this cost would be $52,000. When comparing alternative costs in the tens or hundreds of millions of dollars, these costs are insignificant by comparison. However, even though costs are estimated for 100-year duration, this should not be confused with the actual project duration. For example, groundwater treatment alternatives will be required well beyond 100 years, if not in perpetuity. Because all alternatives will require O&M in perpetuity, use of a consistent 100-year timeframe for all alternatives is appropriate to yield relative comparisons among the alternatives.

As was mentioned briefly in Section 9.5, alternative cost differences are driven by removal costs in the alluvial aquifer in Metro Storm Drain and Lower Area One. Because all alternatives will require some sort of O&M, regardless of removal, O&M costs do not vary significantly across alternatives.

Table 9-2
Matrix of Comprehensive Alternatives

Alternatives	Comprehensive Alternatives					
	1	2	3	4	5	6
SOLID MEDIA						
1. No Further Action [1]	Waste cover, solid media, and vegetation O&M	Waste cover, solid media, and vegetation O&M	Same as 2	Same as 2	Same as 2	Same as 2
2. Institutional Controls (ICs)	Existing ICs	ICs as appropriate	Same as 2	Same as 2	Same as 2	Same as 2
3. Soil, Rock Cover, & Revegetation		Covers for areas exceeding Pb and As action levels	Same as 2	Same as 2	Same as 2	
4. Asphalt/Concrete Cover		Criteria as above; these covers would only apply in site-specific conditions	Same as 2	Same as 2	Same as 2	
5. Consolidation/Grading		In conjunction with partial removal and covers	Same as 2	Same as 2	Same as 2	
6. Removal		In areas exceeding Pb and As action levels	Same as 2	Same as 2	Same as 2	
7. Total Removal						All mine-impacted material exceeding Pb or As action levels
8. Multimedia Cover		These covers would only apply in site-specific conditions (e.g., wastes with toxicity characteristic leaching potential)	Same as 2	Same as 2	Same as 2	
9. Treatment [2]			Treat certain waste areas to reduce toxicity and mobility	Same as 3	Same as 3	
10. Residential Yards		Removal >Pb, As, and Hg action levels[3]	Same as 2	Same as 2	Same as 2	All mine-impacted material >Pb, As, and Hg action levels
11. Indoor Residential Contamination			Soil and dust barriers, removal, dust remodeling program and/or other actions to reduce human health risk	Same as 3.	Same as 3.	One-time cleaning of residential interior for properties undergoing yard remediation; dust remodeling program
12. Waste Repository Closure		Close Repository	Same as 2	Same as 2	Same as 2	Same as 2

1 No Further Action implies that no response action will be taken in areas where a response has not previously been implemented and, areas where a response action has been conducted will be operated and maintained. Additionally, the remedial action for the Priority Soils OU will, at a minimum, include any and all remedial alternatives that have been mandated by a previous administrative order.

2 Method for treatment to be determined in Remedial Design. Water treatment may entail routing to Berkeley Pit treatment system.

3 A programmatic approach will be utilized to address residential yards, taking into account established action levels and sensitive populations.

4 Accessible indicates that wastes are not obstructed by a permanent feature such as a building, municipal infrastructure, or other structure that EPA considers having value sufficient to prohibit demolition for the purpose of removing the wastes.

Table 9-2 (Cont.)
Matrix of Comprehensive Alternatives

Alternatives	Comprehensive Alternatives					
	1	2	3	4	5	6
GROUNDWATER						
1. No Further Action[1]	Groundwater monitoring, operation of LAO collection system	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1
2. Institutional Controls (ICs)	Existing ICs	ICs as appropriate	Same as 2	Same as 2	Same as 2	Same as 2
3. In-Stream Flow Augmentation		Augment MSD base flow to the extent necessary to meet DEQ-7 Standards in SBC.				
4. Collection, Routing, and Treatment[2]	Treatment of LAO groundwater per ERA	LAO groundwater collected and treated by lime treatment in lagoons in a wetland setting.	LAO and MSD groundwater flow collected and redirected to the Berkeley Pit	Routing as needed to facilitate collection and treatment of LAO and MSD groundwater flow	Same as 4.	Same as 4.
5. Source Control		Saturated solid media left in place	Same as 2	Same as 2	Accessible[4] and saturated solid media partial removal	Total saturated solid media removal
SURFACE WATER						
1. No Further Action	Surface water monitoring, O&M of Storm Water TCRA facilities	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1
2. Institutional Controls (ICs)	Existing ICs	ICs as appropriate	Same as 2	Same as 2	Same as 2	Same as 2
3. Best Management Practices (Source Controls, Engineering Controls, Sedimentation Basins, Routing)		Where Appropriate	Same as 2	Same as 2	Same as 2	Same as 2
4. In-Steam Flow Augmentation		Where Appropriate	Same as 2	Same as 2	Same as 2	Same as 2
5. Sediments Removal		Slag canyon and upper reaches of reconstructed channel in SBC	Same as 2	Same as 2	Same as 2	Same as 2
6. Collection/Treatment of Storm Water Runoff		Storm flow and base flow collected[6] and treated as required beyond implementation of BMPs	Same as 2	Same as 2	Same as 2	Same as 2

5 BMPs will be implemented as appropriate and to the extent necessary to mitigate soil erosion and contaminant transport at specific locations at the site. The remedial goal for BMPs is to achieve in-stream surface water quality standards (DEQ-7) in Silver Bow Creek for normal flow and runoff conditions. Individual BMPs will be designed to a location-specific basis and approved by the Agencies. If it is demonstrated that surface water quality standards cannot be achieved with BMPs alone, the Agencies will require surface water (including storm water runoff) treatment.

6 Storm water runoff flows up to specific design if other storm water response actions do not meet DEQ-7 standards. Treatment may entail routing to the Berkeley Pit treatment system.

Table 9-3
Costs of Each Comprehensive Alternative
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

	Comprehensive Alternative 1	Comprehensive Alternative 2	Comprehensive Alternative 3	Comprehensive Alternative 4 (Preferred Alternative)	Comprehensive Alternative 5	Comprehensive Alternative 6
Capital Costs						
Solid Media	–	$16.3	$20.1	$33.4	$20.1	$44.7
Groundwater	–	$0.09 – $2.5	$6.3	$2.2	$11.3 – $57.1	$221.8
Surface Water	–	$3.3 – $13.9	$3.3 – $13.9	$21.3 – $37.4	$3.3 – $13.9	$3.3 – $13.9
New Capital Costs	–	$31	$31	–	$31	$31
Total Capital Costs	**$0.05**	**$49.8 – $62.7**	**$59.8 – $70.4**	**$57.0 – $73.1**	**$64.7 – $121.1**	**$300 – $310**
O&M Costs						
No Further Action	$24.1	$24.1	$15.8	–	$15.8	$15.8
Solid Media	–	$0.8	$0.8	$10.9	$0.8	$2.3
Groundwater	–	$9.3 – $14.0	$15.8	$13.3	$16.9 – $17.1	$18.2
Surface Water	–	$20.5 – $40.5	$20.5 – $40.5	$27.7– $58.6	$20.5 – $40.5	$20.5 – $40.5
O&M Costs	**$24.1**	**$55.0 – $79.9**	**$53.0 – $72.9**	**$52.3 – $83.3**	**$54.8 – $74.8**	**$57.4 – $77.4**
Present Value Cost (100 years)	**$24.2**	**$105 – $143**	**$113 – $143**	**$109.6 – $156.6**	**$119 – $196**	**$357 – $388**

Notes:

All costs in millions of dollars

Costs were modified from those presented in the Final FS and Proposed Plan through escalating 2004 costs to 2006 costs, and using a discount factor of 3% instead of 7%. See Sections 12 and 14 for further discussion.

Insignificant costs are not displayed in the summary table above. These included: Capital Costs for no action alternative and institutional controls; O&M Costs for institutional controls; and Periodic Costs for 5-year reviews

For the preferred alternative, the "No Further Action O&M Costs were allocated as appropriate among solid media, groundwater, and surface water.

The costs for Alternatives 1, 2, 3, 5, and 6 have been modified from those presented in the Proposed Plan to be comparable relative to the modifications to Alternative 4 (escalation of 2004 costs to 2006 costs, and using a discount factor of 3% instead of 7%). However, the costs were not re-calculated as rigorously as those for Alternative 4 (see Section 12), and should be considered approximate for comparative purposes only. Capital costs were multiplied by an escalation factor of 1.174 (2004-2006). O&M Costs were multiplied by 1.174 and then the ratio of the discount factors at 99 years for 3 percent and 7 percent (31.547/14.268 = 2.211). An additional $31 million correction was added to account for the additional capital costs for the storm sewer system and shorter time frame for residential abatements and called "New Capital Costs".

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Section 10 Comparative Analysis of Alternatives

This section explains the rationale for selecting the Selected Remedy. It includes an evaluation of the strengths and weaknesses of each alternative in meeting the nine CERCLA selection criteria. The evaluation identifies the relative advantages and disadvantages of each comprehensive alternative, considers the tradeoffs of each, and explains the selection of the Selected Remedy. A comprehensive and more detailed evaluation of how each of the remedial alternatives fared against each of the nine selection criteria is provided in the FS report.

This comparison focuses on the significant areas of difference, especially the identification of any alternative that is clearly superior. Table 10-1 provides a visual summary and numeric scoring of the comprehensive alternatives relative to the threshold and balancing criteria.

The comparative analysis provided in this section falls into three groups:

- *Threshold criteria.* Requirements that each alternative must meet in order to be eligible for selection. They are 1) overall protection of human health and the environment and 2) compliance with ARARs (unless a waiver is justified).

- *Primary balancing criteria.* Used to weigh major trade-offs among alternatives. They are: 3) long-term effectiveness and permanence; 4) reduction of toxicity, mobility, or volume through treatment; 5) short-term effectiveness; 6) implementability; and 7) cost.

- *Modifying criteria.* They are: 8) community acceptance and 9) State acceptance.

The following discussions demonstrate how each of the comprehensive remedial alternatives fared with respect to the criteria in these three categories.

10.1 Threshold Criteria

Overall Protection of Human Health and the Environment

Comprehensive Alternative 1 does not meet the threshold criteria for protection of human health and the environment. In contrast, Comprehensive Alternatives 3, 4, and 5 will provide a high level of achievement in meeting this criterion. Alternative 2 is expected to perform at a lower level than these because it would not include interior residential living space actions and because flow augmentation of Metro Storm Drain base flow would have less certainty in consistently meeting water quality standards than collection and treatment. Comprehensive Alternative 6 is predicted to have a moderate to high achievement of this criterion. Although this alternative would provide a high level of long-term protection, it would have greater short-term risks than the other alternatives due to the relatively large-scale nature of these actions. The

Table 10-1
Evaluation of Comprehensive Alternatives

	Alternatives	Overall Protection of Human Health and the Environment	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility or Volume Through Treatment	Short-Term Effectiveness	Implementability	Overall Score	Estimated Cost ($ Millions)
1	No Further Action	◐	◔	○	○	◐	●	15	24
2	Engineered Covers/Partial Removal for Solid Media, MSD Flow Augmentation, Treatment of LAO Groundwater, Sediment Removal in Silver Bow Creek, Surface Water BMPs (including treatment), ICs and Monitoring.	◕	◕	◕	◔	●	◕	23	105 – 143[a]
3	Engineered Covers/Partial Removal and Limited Treatment for Solid Media, LAO and MSD Groundwater Collection and Redirection to the Berkeley Pit, Surface Water BMPs (including Treatment), ICs and Monitoring.	●	◕	●	◔	●	◐	24	113 – 143[a]
4	Engineered Covers/Partial Removal and Limited Treatment for Solid Media, Lower Area One and Metro Storm Drain Groundwater Collection and Lime Treatment at LAO, Sediment Removal in Silver Bow Creek, Surface Water Best Management Practices (including treatment if necessary), Institutional Controls, and Monitoring	●	◕	●	◔	●	◕	25	110 – 157[b]
5	Eng.Covers/Partial Removal & Limited Treatment for Solid Media, Range of Partial Removal Options for Groundwater Source Material in MSD/LAO, MSD Groundwater Collection & Treatment, Sediment Removal in Silver Bow Creek, Surface Water BMPs (including Treatment), ICs & Monitoring.	●	◕	●	◔	◐	◐	22	119 – 196[c]
6	Solid Media Removal of unreclaimed areas, Groundwater Source Material Removal/LAO and MSD Groundwater Collection and Lime Treatment, Sediment Removal in Silver Bow Creek, Surface Water BMPs (including Treatment), ICs and Monitoring.	◕	◕	●	◔	○	○	17	357 – 388[a]

● High achievement of criterion. Score = 5 points

◕ Moderate to high achievement of criterion. Score = 4 points

◐ Moderate achievement of criterion. Score = 3 points

◔ Low to moderate achievement of criterion. Score = 2 points

○ Low achievement of criterion. Score = 1 point

a. Low range indicative of groundwater treatment in existing Lower Area One Treatment Lagoons in a Wetland Setting and no storm water treatment. High range indicates lime treatment of both groundwater and storm water in separate and distinct treatment facilities.

b. Low range indicative of groundwater treatment in new conventional treatment plant at Lower Area One and no storm water treatment. High range indicates lime treatment of both groundwater and storm water in separate and distinct treatment facilities.

c. Low range indicative of groundwater treatment in existing Lower Area One Treatment Lagoons in a Wetland Setting, removal of Diggings East and North Side Tailings only in Metro Storm Drain, and no storm water treatment. High range indicates lime treatment of both groundwater and storm water in separate and distinct treatment facilities, and maximum removal of accessible wastes in Metro Storm Drain (including wastes beneath City-County Shop Complex).

greater short-term risks reduce Comprehensive Alternative 6's overall protectiveness ranking.

Compliance with ARARs

The ability of the alternatives to meet contaminant-, location- and action-specific ARARs was evaluated. Alternative 1 would not meet ARARs. Alternatives 2, 3, 4, 5, and 6 would all meet ARARs, except for groundwater within the alluvial aquifer.

EPA does not believe that any of the removal alternatives at the Metro Storm Drain would lead to groundwater ARAR compliance in the next 100 years, because of the low flow rates and abundance of waste in the area. EPA has carefully evaluated the Technical Impracticability Evaluation and all of the relevant information in the Administrative Record. EPA waives groundwater standards within the alluvial aquifer under NCP Section 121(4)(c) and CERCLA Section 300.430 (f)(1)(ii)(c)(3) because it is not technically feasible to meet ARAR requirements within this aquifer, due primarily to the widespread contamination and the very slow overall movement of water flow within the aquifer[4]. Therefore, it is important to understand that under any scenario, a waiver of the Montana DEQ-7 human health standards for groundwater is necessary and appropriate.

10.2 Primary Balancing Criteria

Long-Term Effectiveness and Permanence

For these criteria, the alternatives were evaluated primarily with regard to residual risk present under each comprehensive alternative and the adequacy of controls as follows:

- *Magnitude of Residual Risk.* This includes the potential future effects on human health and the aquatic ecosystem from exposure to contaminated soils/mine waste, groundwater, and surface water left at the site.

- *Adequacy and Reliability of Controls.* This focuses on the use and adequacy of controls, and the implemented or required best management practices.

The FS demonstrated that Comprehensive Alternatives 3 through 6 would provide a high level of long-term protection. Additionally, the detailed Butte Reclamation Evaluation System and monitoring program can ensure that risks are managed effectively with wastes left in place. Comprehensive Alternative 2 would provide a moderate to high level of long-term effectiveness and permanence, because there is less certainty that water quality standards would be met in portions of Silver Bow

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[4] See footnote 3, page D-12, for further classification of the scope of the ARAR waiver in this ROD.

Creek under base flow conditions than the other alternatives, which include collection and treatment of groundwater.

Reduction of Toxicity, Mobility, or Volume through Treatment

This criterion evaluated the alternatives based on the effectiveness of:

- Physically removing mine waste and contaminated soil
- Capping of contaminated media in-place
- Capturing and treating contaminated water
- Implementing best management practices, institutional controls, and monitoring programs

Since little active treatment of contaminated media would occur under any of the alternatives, the FS predicted that the alternatives would have a low to moderate ability to meet this criterion. Although the alternatives contain treatment components that will reduce toxicity, mobility and volume (e.g., groundwater collection and treatment with lime), most remedial components use engineered covers, removal, and administrative or engineering controls to effectively limit mobility and reduce risks. Alternatives that remove wastes rate higher for reduction of mobility, especially in the Metro Storm Drain.

The vast majority of mine wastes and contaminated soils are of large volume and low contaminant concentrations, which cannot be treated effectively. In addition, technical difficulties prevent effective treatment of the various metals present. Thus, active treatment was screened-out as a potential option for the solid media.

Mobility of waste is reduced by effective capping - a primary feature of Comprehensive Alternatives 3 through 5.

Short-Term Effectiveness

The evaluation of alternatives with respect to this criterion included consideration of the following sub-criteria:

- ***Protection of Community and Cleanup Workers during Cleanup.*** This included an evaluation of the volume of materials to be dealt with under each alternative and the time/safety elements. Alternatives involving in-place controls and less removal can be implemented quicker and with less construction activity and fewer traffic problems, and risks can be mitigated more quickly.
- ***Environmental Impacts of Implementation.*** These included impacts on aquatic ecosystems.
- ***Time until Cleanup Objectives are Achieved.*** The estimated time each alternative would take to achieve the remedial objectives and goals was evaluated under this sub-criterion.

The FS concluded that Alternatives 2, 3, and 4 would have a high level of achievement of this criterion. Implementation of any of these alternatives would result in a low level of risk to the community, cleanup workers, and the environment.

Removal and construction activities are performed with standard equipment, such as excavators and trucks. This type and scale of construction has been used extensively at the site and poses low risks to workers and to the community at large. Alternatives 5 and 6 would have an increasingly low ranking under this criterion because risks to the community and to workers would increase as more construction activity occurs.

Other risks, such as those from dust emissions and storm water runoff, also pose low risks under Alternatives 2, 3, and 4. Dust can be easily controlled using common engineering and construction techniques (e.g., water spray) and the migration of storm water can be readily mitigated using standard BMPs. Actions for groundwater (ICs, collection of Metro Strom Drain base flow, and redirection to a treatment plant) would require minor construction activities in the vicinity of the Metro Storm Drain and Lower Area One and would therefore pose a low risk.

Of the five action alternatives evaluated in the FS, the predicted implementation time until protection is achieved is the shortest for Alternatives 3 and 4. Alternative 5 and 6 are predicted to have a moderate and low achievement of this criterion, respectively, due to the time required to address the additional volume of waste material to be removed.

Implementability

Implementability was evaluated in the FS using the following sub-criteria:

- ***Technical Feasibility.*** This sub-criterion involves the ability to conduct and operate the technology, time required for remedial implementation, reliability of the technology, ability to monitor the effectiveness of the technology, and ease of undertaking additional action should it be necessary.

- ***Administrative Feasibility.*** This involves the ability to obtain approvals and coordinate with state and federal regulatory agencies, municipalities, and counties.

- ***Availability of Services and Facilities.*** The availability of needed equipment, specialists, materials (e.g., backfill and cover soil), and location and size of the area for disposal of waste and contaminated soils was evaluated.

Most alternatives would use standard construction equipment and controls. Engineered covers and partial removal of source materials and remediation of residential yards has proven technically feasible. Groundwater flow augmentation, collection, and redirection to the Berkeley Pit or collection and lime treatment (components of Alternatives 2 through 4) are expected to be readily implementable from a technical perspective.

The FS concluded that Alternatives 2 and 4 would have a moderate to high level of implementability, while Alternatives 3 and 5 would have a moderate level of implementability.

Alternative 6 is expected to have a low level of implementability as total removal of saturated solid media from Lower Area One and the Metro Storm Drain would require demolition and replacement of numerous structures, including the Metro Sewage Treatment Plant, City-County Shops, roads, pipelines, and other business/commercial operations. These operations would have to be relocated before saturated solid media removals could be implemented. It is likely that access for this type of work would be very difficult and expensive, as it would severely disrupt businesses over a 5- to 10-year period.

Cost

Net present worth costs for each alternative were compared in Tables 9-3 and 10-1. The range of costs for each alternative represents the range of possible scope of actions to address mine waste and contaminated soil on the Butte Hill, storm water runoff, the treatment of collected groundwater, and different Metro Strom Drain waste material options.

The FS showed that Alternative 6 and portions of Alternative 5, which address Metro Storm Drain removal, would not rank well under the cost-effectiveness criterion because they would not achieve benefits (cleanup of the aquifer) with certainty, would be difficult to implement, and would be very costly. Removal of waste in the Metro Storm Drain area may not meet groundwater RGs and would not eliminate the need for, and cost of, groundwater collection and treatment. This is a primary reason why the O&M costs across all alternatives do not vary significantly, regardless of the scope of the removal.

Remedial Alternative Scores

Based on the comparative evaluation of the alternatives against the threshold and balancing criteria, Alternatives 2, 3, 4, and 5 scored similarly. Alternative 6 scored significantly lower than the other alternatives primarily due to the lack of effectiveness, the increased risks during remediation, the difficulty of implementing a complete removal of waste material, and the low cost effectiveness of the alternative.

In examining these criteria and how each alternative scores under each criteria, EPA believes that Alternative 4 in combination with Alternative 2 from the Focused Feasibility Study, with some modifications, best meets the threshold criteria and provides the appropriate balance of trade-offs among the balancing criteria. EPA notes that, with appropriate operation, maintenance, and monitoring, a modified Alternative 4 can provide long term effectiveness, short term effectiveness, and overall cost effectiveness. It is also readily implementable. The mobility of contaminants will be effectively controlled and reduced, and there are good reasons why toxicity and volume are not significant for this Alternative.

10.3 Modifying Criteria

The FS examined the seven threshold and balancing criteria. The remaining two criteria, community and state acceptance, have been evaluated now that EPA has received positions from citizen's groups, Butte-Silver Bow County, the PRP Group, the State Natural Resources Damages program, the State, and the Tribes. Community and state acceptance of the Preferred Alternative has also been evaluated based on comments on the Proposed Plan.

Community and State Acceptance

The Montana DEQ generally supports the Selected Remedy, except for the decision to leave large volumes of waste in place above the alluvial aquifer. The State believes that significantly more weight should be given to Metro Storm Drain Alternative 5b that calls for removing the Parrott Tailings, Diggings East, and the North Side Tailings. The State's opinion is contained in its letter of partial concurrence, attached as Appendix C. Butte-Silver Bow County is generally supportive of the Selected Remedy, as long as it is accompanied by adequate assurances of funding for implementation. The County believes that economic development funding is a necessary companion step for any remedy in Butte. The County also believes that local implementation of the remedy is important.

Many other commenters were generally supportive of the remedy proposed in the Proposed Plan.

Regarding removal of the Parrott Tailings, public opinion varied. Most statements for removal called for Alternative 5b and restoration of Silver Bow Creek. On the other hand, business owners in the area voiced strong opposition to alternatives, such as Alternative 5b, that would cause them to incur economic hardship and disruption. Contractors were concerned about safety risks to the community due to heavy equipment. Many comments were highly technical concerning contaminant fate and transport. Butte Silver Bow was neutral in its comments on the MSD area removal issue, but wanted assurances that the remedy would be protective and that adequate funding and monetary compensation would be provided.

For some Butte and Walkerville residents and other Butte commenters, the primary concern is contaminated attic and other interior dust. Residents did not accept the "lack of pathways" finding in EPA's risk assessment and asked for removal and/or better risk characterization of attic dust.

Comments were also varied regarding waste left in place on the Butte Hill. There were a number of comments which were blanket statements in favor of removal. Others were more concerned about reclamation standards, long-term funding for maintenance of the caps, and ensuring that the presence of the waste did not hamper economic redevelopment. Some commenters questioned the permanence of the waste-in-place aspects of the proposed alternative presented in the Proposed Plan.

EPA sees general support among many commenters, including Butte-Silver Bow County, for the Selected Remedy, as long as the Selected Remedy can be adequately funded, planned, and implemented. EPA recognizes some community members' strong desire for more aggressive action regarding attic dust source removals and MSD area removals. When weighed with other remedy selection criteria, EPA does not believe the lack of uniform State or community acceptance of all aspects of the Selected Remedy outweighs the high ranking of Alternative 4 and the Selected Remedy regarding other criteria. EPA will work with the State and Butte-Silver Bow County and interested community members on issues of concern - an adequate attic dust program that will address attic dust cleanup when exposure pathways occur; well monitored and maintained areas of waste left in place using the highly developed BRES system; an effective groundwater monitoring and treatment system in the MSD and LAO area; and appropriate financial assurances and implementation plans to ensure the permanence of the Selected Remedy.

EPA also recognizes the lack of State support for the MSD area and alluvial groundwater remediation plans. EPA has worked closely with the State on all other aspects of the Selected Remedy. EPA's detailed responses to state concerns regarding the alluvial groundwater remediation issues are contained in the EPA Response to Comments on the Technical Impracticability Evaluation (EPA 2006b) and in the attached Part 3 Responsiveness Summary. Again, when EPA weighs the Selected Remedy and its high ranking relative to the other remedy selection criteria, the lack of State acceptance for this aspect of the Selected Remedy does not outweigh those others factors in this instance.

Section 11 Principal Threat Wastes

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (NCP §300.430(a)(1)(iii)(A)). Identifying principal threat wastes combines concepts of both hazard and risk. In general, principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be contained in a reliable manner or would present a significant risk to human health or the environment should exposure occur. Conversely, non-principal threat wastes are those source materials that generally can be reliably contained and that would present only a low risk in the event of exposure. The manner in which principal threats are addressed generally will determine whether the statutory preference for treatment as a principal element is satisfied.

The concept of principal threat waste and non-principal threat waste, as developed by EPA in the NCP and guidance, is to be applied on a site-specific basis when defining source materials. "Source materials" are defined as material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration or contamination to groundwater, to surface water, to air, or act as a source for direct exposure. Mining and ore-processing wastes in the BPSOU come in several different forms, including mill tailings, waste rock, slag, smelter fallout, and mixed combinations of each. Arsenic and metals contained in these wastes can be released to soil, surface water, and groundwater. For the BPSOU, source materials are identified as those solid media (i.e., mining-related wastes and contaminated soils) that exceed remedial requirements for human health or have a potential or actual impact to aquatic environmental receptors, surface water quality, or groundwater quality. By definition, contaminated surface water, or groundwater are generally not considered source materials.

EPA has previously required the removal of the large volume of source material at Lower Area One, highly toxic mercury contamination, and other mobile and toxic source areas as part of these prior response actions. EPA has required, and will continue to require, the removal of contaminated yard and indoor dust material above health based action levels. Some additional removal of other source material may be required during remedial design or as otherwise described in Part 2, Section 12 of this ROD. Generally, however, remaining wastes can be effectively managed and controlled in-place. Thus, remaining source materials within the OU are <u>not</u> considered to be "principal threat wastes". Although present in large volumes, source materials within the BPSOU are low in toxicity, can be reliably contained, and present only a relatively low risk in the event of exposure. Arsenic, lead, and mercury exposure pathways are readily mitigated and managed through source controls and the Residential Metals Abatement Program.

The principal/non-principal threat concept and the NCP expectations were established to help streamline and focus the remedy selection process for a site. Independent of this determination, selected remedies must be protective of human

health and the environment, ARARs-compliant, cost-effective, and use permanent solutions or treatment to the maximum extent practicable. Engineering controls, such as capping of source materials, were found to be suitable for reliably containing source materials and limiting exposure. Treatment options were retained, however, for groundwater and surface water. The Selected Remedy utilizes a combination of engineering controls, treatment methods, and institutional controls, as appropriate, to achieve protection of human health and the environment.

Section 12 Selected Remedy

Based on consideration of CERCLA requirements, the detailed analysis of remedial alternatives, State comments, and all public comments, EPA has determined that the preferred remedial alternative presented in the Proposed Plan, site-wide Alternative 4 in combination with Alternative 2 from the Focused Feasibility Study for Metro Storm Drain, as modified in this ROD, is the appropriate remedy for the BPSOU. The Selected Remedy includes components to address contaminated solid media (mine waste, soil, and residential soil and dust), surface water (base flow and storm water runoff), and alluvial groundwater. A detailed description of the Selected Remedy is presented in the sections below for solid media, groundwater and surface water.

12.1 Short Description of the Selected Remedy

12.1.1 Solid Media

Residential Contamination. EPA's action levels for residential, commercial/ industrial, and recreational soils and dust are:

TABLE 12-1
Soil, Dust, and Vapor Action Levels in Residential Areas
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

Contaminant of Concern	Exposure Scenario	Concentration
Lead	Residential	1,200 mg/kg
	Non-Residential	2,300 mg/kg
Arsenic	Residential	250 mg/kg
	Commercial	500 mg/kg
	Recreational	1,000 mg/kg
Mercury	Residential	147 mg/kg
	Residential (vapor)	0.43 $\mu g/m^3$

The Selected Remedy requires residential areas above these action levels, in yards or in indoor dust in living spaces, be remediated if a pathway exists.

Certain residential areas above these levels have been addressed previously under prior removal actions, but many homes and residences have not. The BSB Lead Intervention and Abatement Program, described in Section 12.3.1.1, has been addressing certain targeted homes and residences.

The Selected Remedy calls for the continuation and expansion of the BSB Lead Intervention and Abatement Program. The expansion of this program in the Selected

Remedy requires that all residential properties within the BPSOU must be sampled, assessed, and abated if action levels are exceeded, within a reasonable time frame, for arsenic, lead, and mercury. Abatement includes cleaning up yard soils, indoor dust, and attic dust as described below. Abatement can be done through the existing program, and can be integrated with the comprehensive abatement components of the existing program, which are already established.

If the Superfund remedial requirements are incorporated into the existing and expanded comprehensive program, complete indoor and outdoor assessment (i.e., residential yard soil, indoor and outdoor dust, non-living space dust, lead-based paint, drinking water, and mercury vapor) of all residential properties that are known to be occupied or expected to be occupied must be completed within 8 years of the initiation of the expanded program. During this 8-year period, the cleanup of residential properties that exceed the actions levels will occur in concert with the assessment program. The Selected Remedy requires the assessment and abatement activities be completed in no later than 15 years. This program will be a point of focus during the five-year review process to determine if changes need to be made to improve the program.

As described earlier, it is EPA's preference for this program to be done in conjunction with the remediation of other lead and metal sources, such as indoor plumbing, indoor lead-based paint, and exterior lead-based house paint, as is currently being done under the BSB Lead Intervention Program. Funding and implementing this comprehensive approach requires the voluntary cooperation of the responsible parties (RPs), the county government, and the Agencies.

It is important that the Selected Remedy, if possible, address the non-mining related sources of lead that may not be under the jurisdiction of CERCLA. Interior and exterior leaded paint will re-contaminate indoor households and yards if the lead paint source is not addressed when the home and yard are cleaned of mining related contaminants. If an agreement can be reached between the RPs and the EPA to address lead contamination that is not under the jurisdiction of CERCLA, such as lead-based paint, the Selected Remedy will include a Residential Metals Abatement Program to address lead, mercury, and arsenic contamination in residential settings as described below.

A Residential Metals Abatement Program similar to the current Lead Intervention and Abatement Program being administered by the BSB County Health Department will be required. The Residential Metals Abatement Program will expand the current Lead Intervention and Abatement Program to include arsenic and mercury. The current Lead Intervention and Abatement Program focuses on properties with sensitive populations, such as nursing mothers and children under age 6. The Residential Metals Abatement Program will also provide for a prioritized approach, but is not limited to addressing only properties occupied by sensitive populations. The Residential Metals Abatement Program requires a multi-pathway approach to address arsenic, lead, and mercury in yard soil, indoor dust (living space and direct

exposure to non-living space dust), interior and/or exterior lead paint and lead solder in household drinking water pipes.

Contaminated dust located in portions of homes that are seldom visited (non-living space areas), such as attics or crawl spaces, will be abated if an exposure pathway is identified during sampling and evaluation of the home. If elevated concentrations of heavy metals are found in the attic dust, and there is no avenue for the dust to migrate into the living space, the attic dust will not be removed. Homes where remodeling is planned that would create an exposure pathway to attic dust will be abated. If sampling of living space identifies a pathway of exposure created in other ways, then these homes will also be abated.

Homes in areas that are adjacent to the BPSOU may have contaminated dust in the attics. Homes in areas that are adjacent to the BPSOU that have lead, arsenic, or mercury in attic dust will be addressed in the same manner as homes within the operable unit.

Properties that are not addressed or abated because the owner would not allow access for sampling, or properties with contaminated attics that are not abated because there is no current exposure pathway, or properties that are not currently occupied will be flagged and tracked in the Residential Metals Program database for future action. These properties will be tracked for at least 99 years.

The Residential Metals Abatement Program will require developing and implementing community awareness and educational programs in conjunction with a medical monitoring program.

If the comprehensive program cannot be achieved, the Selected Remedy requires a more rapid assessment and abatement program of all residential areas within the BPSOU site. This program must address mercury, arsenic, and lead sampling for yards and indoor dust attributable in whole or in part to mine waste sources or yard contamination. Residential properties that have sensitive populations may be prioritized for remediation before properties that are occupied by non-sensitive populations, but all known or potential residences must be sampled, assessed, and abated within 3 years of the initiation of the expanded program. Community awareness and educational programs will be implemented. Homes in areas that are adjacent to the BPSOU that have lead, arsenic, or mercury in attic dust will be addressed in the same manner as homes within the operable unit.

Non-Residential Contamination. Contaminated solid media located in non-residential areas at the BPSOU site include waste rock piles, smelter wastes, milling wastes, and contaminated soils. Solid media in non-residential areas including commercial areas, open areas, non-active mining areas, etc. may exceed action levels. These areas may also pose a threat to the environment as a result of storm water runoff. For example, runoff from these areas is a source of copper and zinc loading to receiving waters. Contaminated solid media shall be addressed through a combination of source removal, capping, and land reclamation.

Reclaimed areas, including cover soil caps, must achieve the performance standards described by EPA in the Butte Reclamation Evaluation System (BRES), which is attached to the ROD as Appendix E. This system is a site-specific tool to evaluate the stability, integrity, and degree of human and environmental protectiveness afforded by EPA-sanctioned response actions, or other past reclamation action initiated on lands impacted by mining within the OU. The information obtained from the evaluation will be used to assure that completed response actions both past and future are effective, are meeting established performance standards and are maintained to protect human health and the environment.

Non-residential sites with contaminated solid media are grouped into different categories for remedial action as follows:

1. **Conditional, Limited No-Further Action Sites.** Areas of the OU that were reclaimed during previous cleanups and that were determined to have met standards and cleanup objectives in the Response Action Summary Document will require periodic assessments of reclamation condition in accordance with the BRES. Corrective action will be taken as dictated by the final Butte Reclamation Evaluation System. Separately, if the Surface Water Management Program determines additional remediation is needed, that work must also be done.

2. **Unreclaimed Source Areas Exceeding Action Levels.** Very few unreclaimed source areas remain with arsenic or lead concentrations greater than human health risk action levels. Areas above actions levels that do remain or are discovered will be capped in a manner similar to prior actions, and will be periodically evaluated and addressed in accordance with the BRES.

3. **Unreclaimed Source Areas Not Exceeding Action Levels.** If an unreclaimed, disturbed site does not exceed lead or arsenic action levels, it may still be reclaimed because of contributions to storm water contamination. EPA, in consultation with the State, has determined that the sites listed in Section 12.3.1.2, at a minimum, will be addressed as an initial BMP effort under the Selected Remedy. If it is demonstrated by the surface water monitoring and BMP program that contaminants of concern (i.e., copper and zinc) from other areas are migrating and impacting surface water quality in Silver Bow Creek, Blacktail Creek, or Grove Gulch Creek, to the extent that applicable water quality standards are exceeded, remedial actions will be implemented. The action to be implemented will be determined during remedial design, but will likely be capping with limited removal and reclamation. Reclamation condition will be periodically assessed in accordance with the BRES.

4. **Previously Reclaimed Sites (Not Addressed Under EPA Order).** Sites where reclamation took place outside of removal actions mandated or performed by EPA will require sampling/inspection and possible further reclamation, as necessary. Specific actions to be implemented will be determined during remedial design, but will likely be capping with limited removal. These sites shall also be evaluated

and maintained over the long-term under the Butte Reclamation Evaluation System.

5. **Granite Mountain Memorial Area.** Various reclamation and other enhancements to the historic Granite Mountain Memorial Area shall be implemented. These include: reclaiming source areas in publicly used areas, restricting access to certain areas of the historic mining landscape, installing picnic areas and walking trails, enhancing existing vegetation, and diverting storm water runoff to the Berkeley Pit. These actions shall be consistent with historical preservation requirements and other standards and the county's historical park plan.

6. **Syndicate Pit.** The Syndicate Pit shall be reclaimed, to the extent practicable, for use as a mine training center. Shallow to moderate slopes will be reclaimed using soil caps, rock caps, and gravel parking areas. Steep slopes will not be reclaimed. The pit base will continue to be used as a sediment catch basin.

7. **Butte Mine Waste Repository.** The existing Butte Mine Waste Repository will be closed in compliance with ARARs. A new repository will be sited next to the existing repository if that capacity is needed. It, too, would be closed using the same standards.

8. **Sites Not Granted "Conditional, Limited No Further Action" Status.** Areas of the OU that have been reclaimed during previous TCRAs or N-TCRAs and that were determined NOT to meet ARARs and preliminary remedial action objectives (RAOs) in the Response Action Summary Document were the Colorado Smelter, Lower Railroad Yard Site 1, and Lower Area One. The Selected Remedy Components for the Colorado Smelter and the Lower Railroad Yard Site 1 are discussed in Section 12.3.1.2. The Selected Remedy for the Lower Area One site is described with the Groundwater Components.

9. **Buried and/or saturated solid media in Lower Area One and Metro Storm Drain.** The Selected Remedy for Lower Area One and Metro Storm Drain is described in the Groundwater portion of the text.

12.1.2 Groundwater

The Selected Remedy for groundwater includes the following components:

1. **Waste Left in Place.** Areas of waste and contaminated, saturated soils will be left in place in LAO and MSD. To reduce the loading of metals to groundwater in the area overlying the Parrott Tailings (e.g., the ball fields and BSB County Shops), infiltration barriers shall be considered during remedial design and implemented if determined to be appropriate by EPA, in consultation with DEQ. The sedimentation basin/former wetland demonstration project area near the intersection of Kaw Avenue and George Street shall also be reclaimed according to the intended future land use, and may be used as a potential storm water retention/detention basin under the Surface Water Management Program.

2. **Groundwater Capture and Treatment - MSD Area.** Contaminated alluvial groundwater in the MSD shall be captured with the subdrain under the MSD channel, and/or another appropriate groundwater collection system as determined under remedial design. The captured groundwater shall continue to be pumped from the terminal vault in the MSD to the treatment facility at LAO. The captured and pumped water will be treated by lime precipitation technology as described below in subparagraph 4 before being discharged to Silver Bow Creek. However, because issues regarding long-term performance of the subdrain have not been fully addressed to date, the Selected Remedy also includes a 5-year shakedown period to evaluate the reliability of the MSD subdrain collection system. During this shakedown period, an approved operation and maintenance plan shall be developed for the collection system. If during the shakedown period, monitoring data demonstrate that the subdrain is not effectively collecting contaminated groundwater, or is spreading contamination downgradient, a new or modified groundwater collection system will be designed and built.

3. **Groundwater Capture and Treatment - LAO.** Contaminated alluvial groundwater at LAO and base flow from Missoula Gulch shall be intercepted in a hydraulic control channel, which runs parallel to Silver Bow Creek, and routed to the treatment lagoon facility described below. If groundwater inflow between the MSD and LAO capture systems (i.e., between the end of the MSD subdrain and the start of the hydraulic control channel) is found to adversely affect surface water quality, additional groundwater capture and hydraulic control systems shall be implemented. In addition, water from the Mine Flooding OU West Camp System will be routed to the hydraulic control channel at Lower Area One for treatment through the treatment facility described below.

4. **Groundwater Treatment Facility.** As part of the RI/FS, Atlantic Richfield has constructed a lagoon treatment system at Lower Area One as a demonstration project. Treatment discharge data suggest that the system has been meeting state water quality standards for copper, cadmium, and zinc at the point of discharge arsenic standards have been met on all but a few occasions. These data are especially encouraging for cadmium discharges - conventional treatment systems have had problems meeting the cadmium standard because of reduced holding times in such facilities. The lagoon treatment system's longer holding times appear to be effective in the treatment of cadmium. Accordingly, the Selected Remedy includes retention and continued operation of the lagoon system for treating captured and routed groundwater prior to discharge to Silver Bow Creek. However, because issues regarding long-term performance and sludge removal and disposal have not been fully addressed to date, the Selected Remedy also includes the following:

    a. A 5-year shakedown period will be in place for the lagoon treatment system. The captured groundwater will be treated to DEQ-7 standards (Table 8-2) prior to discharge. The lagoon treatment system must demonstrate successful water treatment and full compliance with the standards, when operating at designed capacity, and when operating

under a wide range of conditions. Also, it must be demonstrated that sludge removal and sludge management can be performed effectively without causing system upsets. AR made modifications to expand the capacity of the treatment lagoons that did not go through the formal EPA design, review, and approval process. Therefore, those modifications and any additional design of the expanded treatment lagoon system will need to go through the formal EPA review and approval process. The lagoon treatment system shall be designed to prevent the release of untreated contaminated waters into Silver Bow Creek, as a result of upset periods due to flooding, equipment malfunction or failure, or extended periods of cold, etc. ARAR compliant sludge removal, management, and disposal plans must be developed and approved.

b. Using the Butte Reduction Works area, near the lagoon treatment system, for sludge drying and sludge management is not allowed, since it is a dedicated open space area more suitable for public use.

c. If at any time during the shakedown period, or thereafter, the system fails to meet discharge standards and cannot be adjusted or modified to meet standards, or if sludge removal, management, and disposal cannot be done in compliance with ARARs and in a protective manner, a conventional lime treatment system shall be designed and built at Lower Area One. The conventional system shall use lime treatment technology to treat the captured contaminated water and meet all discharge standards.

d. To prevent the discharge of untreated water into Silver Bow Creek, the design will be required to include contingencies for how to manage and store collected groundwater during extended periods of upset (e.g., flooding, equipment malfunction or failure, extended periods of freezing, etc.)

5. **Groundwater Monitoring.** A comprehensive groundwater monitoring plan shall be prepared and implemented for the entire alluvial aquifer to ensure that groundwater capture systems are effective; to determine that contaminated groundwater is not leaving the TI Zone or discharging to surface water; to provide additional information as necessary on the movement, quality, and quantity groundwater; and to provide data for review of the groundwater remedy. The groundwater monitoring program will include installing additional monitoring wells, regular measurement of water quality and water levels in a monitoring network, and shall provide thorough monitoring that includes, but is not limited to, groundwater in upper and lower MSD, groundwater near the southern extent of the TI zone, between the MSD and LAO groundwater capture systems, and in the area adjacent to, and downgradient of the lagoon treatment system. An initial outline of groundwater monitoring requirements is included in Section 12.3.2.3.

6. **Controlled Groundwater Area.** A controlled groundwater area shall be established for the alluvial aquifer to prevent domestic use of this water and to

prevent any well development that would exacerbate or spread existing contamination. Other institutional controls, such as county laws or regulations regarding domestic use of groundwater in the area, may also be required.

The Selected Remedy for groundwater will be implemented primarily in the Metro Storm Drain and Lower Area One areas. Under the Selected Remedy, buried and partially saturated wastes in these areas will be left in place with appropriate groundwater monitoring and institutional controls. This will provide a continued understanding of the extent of groundwater contamination and long-term protection of human health and surface water resources.

Contaminated alluvial groundwater in the MSD will be captured and routed to a lime treatment facility for treatment and discharge to Silver Bow Creek, per the conditions described above. The groundwater collection system at MSD and LAO has and will significantly reduce the loading of metals to Silver Bow Creek. The groundwater remedy will provide the level of protection of Silver Bow Creek needed to achieve remedial action objectives during non-wet weather (base flow) conditions.

Although previous response actions have removed a substantial quantity of waste material from LAO, wastes remain beneath the Municipal Sewage Treatment Plant, structures such as the aqueduct and slag walls being retained for their historic value, and below the vertical excavation limits established during the design of LAO ERA. Existing hydraulic controls constructed during the LAO cleanup to capture, control, and extract contaminated alluvial groundwater and to prevent groundwater discharge to Silver Bow Creek are incorporated into the Selected Remedy. This system has operated since 1998 and, based on improvements in water quality in Silver Bow Creek, appears to be effectively capturing contaminated alluvial groundwater.

Under the Selected Remedy, groundwater captured in the interception and collection systems at LAO and MSD will be combined with contaminated base flow from Missoula Gulch and the groundwater from the West Camp bedrock system of the Mine Flooding OU for combined treatment in the treatment lagoon facility, to be evaluated and possibly re-designed or modified during remedial design (per the conditions described above). If monitoring data demonstrate that the current subdrain is not capturing the contaminated groundwater, or contaminated groundwater is leaving the site, or the system is not otherwise effective, additional groundwater capture systems and/or extraction wells will be implemented to ensure full effectiveness of the system. The treated water shall be subsequently discharged to Silver Bow Creek or used for other beneficial purposes. Treatment capacity for the treatment lagoon system will be evaluated and finalized during remedial design. Groundwater quality ARARs are waived as described in Section 12.3.2 and Appendix A - ARARs.

12.1.3 Surface Water

The Selected Remedy for surface water is directed at achieving the primary objectives of returning Silver Bow Creek to its beneficial uses and protecting downstream receptors from releases of contamination from BPSOU. The Selected Remedy will

protect human health and the environment, achieve water quality standards for COCs in Grove Gulch, Blacktail Creek and Silver Bow Creek, and meet all ARARs that are not waived. The Selected Remedy for surface water consists of the following components:

1. The Surface Water Management Program, which utilizes BMPs to address contaminated storm water runoff and improve storm water quality.

2. Excavation and removal to a repository of contaminated sediments from the stream bed, banks, and adjacent floodplain along Blacktail Creek and Silver Bow Creek, from just above the confluence of Blacktail Creek and Metro Storm Drain to the beginning of the reconstructed Silver Bow Creek floodplain at Lower Area One. Following removal of the in-stream sediments, further evaluation of surface water quality in this area will be conducted. If groundwater inflow is found to adversely affect surface water quality, additional hydraulic controls and groundwater capture shall be implemented.

3. Capturing and treating storm water runoff up to a specified maximum storm event, if BMPs implemented under the Surface Water Management Program do not achieve the goal of meeting surface water standards in Silver Bow Creek, Grove Gulch, and Blacktail Creek during storm water events.

4. Hydraulic control, capture, and treatment of contaminated groundwater to prevent its discharge to Silver Bow Creek surface water (as described above and in Section 12.3.2).

5. In-stream flow augmentation as appropriate. Flow augmentation will not be considered until the major remedial components described in this ROD are designed and implemented.

Hydraulic control, capture, and treatment of contaminated groundwater have largely addressed surface water contamination during base flow conditions. The additional removal actions described above will continue this process. Storm water BMPs will be used to control storm water runoff from the OU and reduce the level of contamination of Silver Bow Creek, Blacktail Creek, and Grove Gulch from heavy metals and arsenic to below state water quality standards. The BMPs that will be implemented include, but are not limited to, actions such as source controls including waste removal, engineered sediment controls, curb and gutters, subsurface drains, detention/retention basins, and routing storm flows away from receiving waters. If surface water quality standards cannot be met in Silver Bow Creek, Grove Gulch, or Blacktail Creek, lime treatment of storm water runoff may be required. Under this contingency, storm flows up to a specific design criterion would be collected and treated by lime treatment or redirected to the Berkeley Pit. If treatment is required, a conventional lime treatment plant dedicated for that purpose would be constructed.

The Selected Remedy permits augmenting stream flows by adding other water sources if necessary to increase flows and improve water quality. The objective of

augmentation is to enhance the performance of other components of the surface water remedy and increase the probability of meeting surface water standards on a consistent basis within Silver Bow Creek.

Elevated levels of arsenic and heavy metals occur in streambed sediments, the stream banks, and nearby floodplain materials from the confluence Metro Storm Drain and Blacktail Creek to the reconstructed Silver Bow Creek channel at Lower Area One. To prevent these materials from being a source of contaminants to Silver Bow Creek, these materials shall be excavated and removed to an appropriate mine waste repository. The stream channel and floodplain shall then be reconstructed to meet engineering and performance standards.

12.1.4 Institutional Controls

The Selected Remedy includes the following minimum ICs:

1. A controlled groundwater area will be established in the Alluvial Aquifer TI Zone to prevent domestic use of contaminated water, exacerbation or spreading of existing contamination, or release of highly contaminated groundwater to surface water resources through irrigation. The controlled groundwater area will prevent new well development, except for CERCLA monitoring wells, well systems that treat contaminated water prior to use, and the use of existing domestic and commercial wells. To the extent a controlled groundwater area will not prevent the use of existing wells, an education and well abandonment program will be implemented to persuade owners not to use contaminated water and to voluntarily take existing wells out of service in exchange, for example, for being hooked up to public water. An administrative entity will be identified under RD/RA to monitor and enforce these restrictions.

2. County zoning and permit requirements will be implemented to ensure that capped waste areas, discrete areas of waste left in place, and other control measures such as storm water controls are not disturbed, mismanaged, or inappropriately developed and that waste taken from these areas is disposed of at the Butte Mine Waste Repository, or if identified as a hazardous waste disposed of at a RCRA C facility. These controls and permits are best implemented with adequate funding for appropriate redevelopment and re-use of affected sites.

3. Deed notices will be required for all areas where wastes were capped and left in place or where engineered controls were constructed or other discrete wastes were left in place. The deed notices will notify current and subsequent landowners of the presence of these wastes or engineered controls and ensure that these wastes are not disturbed. In addition, fencing and signs may be required to ensure the integrity of caps and engineered controls.

4. Where private landowners require fencing or use posting for legitimate reasons relating to the prevention of remedy disruption, the Selected Remedy requires the installation of these fences or signs.

Item 2 above is likely to be implemented by Butte Silver Bow County.

EPA will work with the county and responsible parties to ensure that workable and adequate zoning controls and permit requirements are enacted and enforced. This will require funding for the county, and the funding issue will have to be addressed in any enforcement action for this ROD. Item 1 above has been developed by the local water district with funding from the responsible parties, and efforts to finalize and submit the application for a controlled groundwater area to the State Department of Natural Resources, and enforcement of the ban once enacted, will require additional funding. Item 3 above is an issue that responsible parties and Butte Silver Bow County will need to work on cooperatively with all affected landowners. Fences and signs are actions that can be taken by the responsible parties which implement the remedy, again in cooperation with local landowners.

12.1.5 Operations and Maintenance

There are several short-term Operation and Maintenance (O&M) plans in existence for various actions within the BPSOU site. The Selected Remedy requires the development of long-term and integrated comprehensive monitoring and O&M plans for all aspects of the Selected Remedy.

12.1.6 Section Organization

The remainder of this section describes the Selected Remedy in detail in accordance with the following subsections:

- Section 12.2: Rationale for the Selected Remedy
- Section 12.3: Detailed Description of the Selected Remedy by Media
- Section 12.4: Estimated Cost of Selected Remedy
- Section 12.5: Expected Outcomes of the Selected Remedy
- Section 12.6: Performance Standards

12.2 Rationale for the Selected Remedy

The Selected Remedy provides the best balance of tradeoffs among media-specific alternatives, and attains an equal or higher level of achievement of the threshold and balancing criteria than other site-wide alternatives that were evaluated. The Selected Remedy achieves substantial risk reduction and is feasible, implementable, and cost-effective. Residual risks are effectively eliminated, mitigated, or managed under the Selected Remedy. The successful performance of the Selected Remedy is demonstrated by several years of reclamation performance monitoring at response action sites in the OU, experience with groundwater and storm water controls, and the success of the Lead Intervention and Abatement Program. Further, the Selected Remedy is compatible with land reuse and redevelopment within Butte and

Walkerville, and EPA and the State will continue to work cooperatively with the local county government and the RP Group to continue redevelopment efforts. Further rationale for the Selected Remedy is provided below with respect to the media of concern (solid media, groundwater, and surface water).

Solid Media

The Selected Remedy for solid media includes a variety of components that together represent an effective and practical remedial solution for the type of waste and the associated level of risk at the BPSOU. The site has a high volume of relatively low toxicity mining-related waste within the OU. As discussed in Section 11, the mining-related wastes still remaining in the BPSOU do not constitute a "principal threat," meaning that the level of hazard and risk is relatively low and contamination associated with the wastes can be reliably contained. Further, the absence of principal threat wastes reduces the need and expectation for treatment of wastes. Considering the low level of risk associated with mining wastes, complete (total) removal of all contaminated solid media within the urban area of Butte is not practical, nor is it feasible considering the ubiquitous nature of the wastes, the degree of disruption to the community, and the costs associated with such a large scale removal. The components of the Selected Remedy for solid media accomplish overall protection of human health and the environment and compliance with ARARs or appropriate ARAR waivers equally as well or better than other alternatives evaluated[5]. Threshold criteria are achieved through removal and/or capping of contaminated mine wastes, residential yard removals, and abatement of residential metal sources that exceed established risk-based action levels and have a demonstrated pathway of exposure. Also, source controls for solid media (capping, removal, reclamation) will be used to prevent contaminants from entering surface water that would result in exceedances of water quality standards. Although complete or total removal of all wastes would provide a high level of long-term protection, the benefits of a total removal in Butte would be offset by high short-term risks associated with a removal of this magnitude. The Selected Remedy effectively eliminates, mitigates, or manages risk and provides for long-term protection through source controls, proactive community education and medical monitoring program, residential contamination abatement, and continuous evaluation and performance monitoring of the remedy with the Butte Reclamation Evaluation System.

Groundwater

Under the Selected Remedy, contaminated groundwater is captured and pumped to a treatment facility prior to being discharged to Silver Bow Creek or used for other beneficial purposes. Institutional controls in the form of controlled groundwater areas will regulate the use of alluvial groundwater and prohibit human exposure to groundwater contaminants. The Selected Remedy will not directly remediate the

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[5] See footnote 3 on page D-12 for an explanation of how the waiver of groundwater ARARs also applies to possible floodplain or solid waste ARARs which may apply to waste left in place in current floodplains.

alluvial aquifer and a waiver of groundwater ARARs is appropriate[6], as discussed in Section 12.3.2. Extensive analysis of the chemistry and hydrogeology of the alluvial aquifer has demonstrated that active remediation of the alluvial groundwater is not technically practicable and cannot return the aquifer to its beneficial uses (e.g., comply with ARARs) within a reasonable time frame (100 years). The components of the Selected Remedy for groundwater accomplish overall protection of human health and the environment equally as well or better than other alternatives evaluated. Protection is achieved through capturing and treating of contaminated groundwater to prevent discharges to Silver Bow Creek in excess of standards, monitoring contaminant plumes within the TI waiver zone and containment if necessary to prevent the plumes from leaving the TI zone, and implementation of institutional controls to prohibit human contact with contaminated groundwater. Large-scale removal of source materials was carefully evaluated but when compared with the Selected Remedy was found to be significantly more costly and less effective over the short-term. Large-scale removal would also present significant risks to workers and the Butte citizenry, and cause unacceptable socio-economic impacts to the community. Also, despite removal of source material, residual contaminants in the alluvial aquifer and groundwater would persist for an unreasonable period of time at levels above groundwater ARARs. Finally, regardless of the scale of any potential removal, groundwater capture and treatment would still be required over the long-term to control the release of residual contaminants.

Surface Water

The Selected Remedy protects human health and the environment and achieves compliance with ARARs for surface water. In addition to the hydraulic control, capture, and treatment of contaminated groundwater, protection is achieved through removing source materials from the Silver Bow Creek floodplain, channel reconstruction, removing contaminated sediment and stream bank material, and implementing BMPs. The Selected Remedy calls for an aggressive storm water monitoring and BMP program to reduce contaminant loading to surface water and meet surface water quality standards during wet-weather flow conditions (snow-melt and precipitation runoff). If ARAR compliance is not achieved through implementing storm water BMPs, contaminated storm water will be captured and treated to achieve ARARs.

Due to the severe impacts to Silver Bow Creek water quality observed early on in the RI/FS process, EPA implemented response actions to address surface water contamination issues (Lower Area One N-TCRA, Storm Water TCRA, source area removals on the Butte Hill, and collecting and rerouting groundwater in the Metro Storm Drain). As a result, many protective actions for surface water have been implemented and base flow water quality is greatly improved. Remedial approaches

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[6] See footnote 3 on page D-12 for an explanation of how the waiver of groundwater ARARs also applies to possible floodplain or solid waste ARARs which may apply to waste left in place in current floodplains.

available to address the remaining sources of surface water contamination at the BPSOU are limited, and as a result, components of the Selected Remedy that remain to be implemented for surface water (source controls, sediment removal, and surface water management and BMP program) were common among all the active remedial alternatives evaluated for the BPSOU (site-wide alternatives 2-6). Thus, the Selected Remedy attains an equal or higher level of achievement of the threshold and balancing criteria for surface water than other site-wide alternatives that were evaluated.

Overall, the Selected Remedy for the BPSOU meets the requirements of CERLCA and the NCP by effectively removing or addressing the principal contaminant sources in solid media, groundwater, and surface water such that human and environmental receptors are protected and ARARs are achieved over the long term or appropriately waived.

12.3 Detailed Description of the Selected Remedy

The Selected Remedy is described in detail in the sections that follow. Details of the Selected Remedy may be modified somewhat as a result of the remedial design and construction processes. Design changes will be documented.

12.3.1 Selected Remedy for Solid Media

The Selected Remedy addresses residential and non-residential contaminated solid media in the form of mining-related wastes, contaminated soils, and interior residential dust (including both living space and attic dust). The Residential Metals Abatement Program is an important component of the remedy for solid media that addresses overall human exposure to arsenic, lead and mercury within the residential environment. The Residential Metals Abatement Program combines site-wide sampling and remediation of all residential properties that exceed the action levels for arsenic, lead and mercury. The program continues a multi-pathway approach that prioritizes sensitive populations within the community to address potentially harmful exposures to residential metals contained in yard soil, interior living space dust, attic dust, and non-mining related sources (lead paint, lead solder) within the residential environment. In addition to the prioritized approach, the Selected Remedy includes a component to methodically sample and remediate all properties that exceed action levels.

The Selected Remedy for solid media is discussed below in two categories, residential and non-residential contamination.

12.3.1.1 BPSOU Residential Metals Abatement Program

The Selected Remedy for residential contamination implements the BPSOU Residential Metals Abatement Program, which uses a multi-pathway approach for mitigating residential exposures. The program is designed to mitigate harmful exposure of BPSOU residents to lead, arsenic, and mercury from both mining-related (waste-rock, tailings, aerial emissions) and non-mining sources (lead paint and lead solder). The potential sources of lead, arsenic, and/or mercury exposure that will be

addressed include yard soil, interior living space dust, interior and/or exterior lead based paint, lead in drinking water from pipe solder, and non-living space dust when exposure pathways are identified. In addition, the program uses community awareness and education in conjunction with medical monitoring to target affected and sensitive individuals and prioritizes sampling and remediation in locations where these people live. Although the Residential Metals Abatement Program will utilize this prioritized approach, the program is not limited to addressing only properties occupied by sensitive populations. The Residential Metals Abatement Program requires a multi-pathway approach to address both mining and non-mining-related contamination at all residential properties within the BPSOU. Affected populations are those determined through medical monitoring to have elevated levels of lead or mercury in blood samples or elevated arsenic in urine samples. Sensitive populations include young children and pregnant or nursing mothers.

Human health risk assessments at the BPSOU quantified potential risks to human receptors within residential settings due to chronic exposure to arsenic, lead, and mercury contained in yard soil, interior living space dust, non-living space (attic) dust, interior air (mercury only) and to non-mining-related contaminants such as lead in paint and water supply pipe solder. As a result, action levels were established for arsenic, lead, and mercury in residential yard soil and interior dust, and for mercury vapor in indoor air. Residential action levels are described above in Table 12-1.

Within the BPSOU, there are many pathways that expose people to metals and arsenic originating from mining activities, including ingestion of and dermal contact with soil, mine wastes, dust, surface water and sediment; ingestion of soil or garden-grown food; and inhalation of particulates (dust). Butte residents may also be exposed to lead from non-mining sources in and around their homes, such as lead-based paint, and water in contact with lead solder in water supply pipes. When multiple, interrelated sources may be present, the relative importance of the various potential sources of arsenic, lead, or mercury exposure with respect to their impact on personal health is difficult to identify with any degree of certainty. For this reason, the Selected Remedy uses a multi-pathway approach for identifying and addressing residential exposures to arsenic, lead, and mercury from the various potential sources. The multi-pathway approach is intended to mitigate lead, arsenic, and/or mercury exposures from both mining-related and non-mining-related sources in residential settings. The BPSOU Residential Metals Abatement Program requires that all residential properties throughout the BPSOU be systematically sampled. Sampling will include residential yard soil, interior living space dust, non-living-space dust, and lead-based paint. Those properties with yard soil or interior living space dust exceeding solid media action levels, or indoor air exceeding the mercury vapor RG, will be remediated. Also, in homes where there is plumbing that may contain lead pipes and/or lead solder, water samples will be collected and analyzed for lead.

The Selected Remedy requires that all residential properties be sampled, assessed, and abated within 15 years. A complete indoor and outdoor assessment (i.e., residential yard soil, indoor and outdoor dust, non-living space dust, lead-based paint, drinking water, and mercury vapor) of all residential properties that are known

to be occupied or expected to be occupied must be completed within the first 8 years of the initiation of the expanded program. During this 8-year period, the clean-up of residential properties that exceed the action levels will occur in concert with the assessment program. The Selected Remedy also requires a long-term assessment and abatement program to address O&M issues and to administer the attic dust component of the residential metals program. Since attic dust will not be cleaned-up unless there is an established pathway of exposure as explained elsewhere in this document, there will be a long-term requirement to assess and abate attic dust problems as they surface. Following the completion of the Consent Decree, a detailed Residential Metals Abatement Work Plan must be prepared to describe the scope and administration of the Residential Metals Abatement Program in accordance with the Record of Decision.

There are approximately 4,400 total residential properties within the BPSOU boundaries. The RI Report (PRP Group 2002) indicated that 660 residential yards had been sampled as of December 31, 2000 under the Butte Lead Intervention and Abatement Program. This indicates that there are at least 3,740 residential properties remaining in the BPSOU to be sampled. This ROD requires that all residential properties be assessed within 8 years. Thus, at least 468 residential properties will be sampled annually until the untargeted sampling program is completed. Further, information presented in Appendix F-3 of the FS Report (PRP Group 2004) indicates that on average, 44 percent of the properties sampled in the past have exceeded one or more of the solid media action levels. Assuming that this ratio of properties exceeding action levels continues, an estimated 1,408 residential properties will require remediation. This number of properties is expected to be higher than will actually be required, because recent activities have focused on Walkerville and portions of Butte where historical mining activities were more intensive and where lead, arsenic and mercury levels in soils would be expected to be higher than in other residential portions of the BPSOU, such as the area closer to Interstate 90, which will likely have lower contaminant concentrations. At least 94 properties per year will need to be addressed to complete the remediation of all residential properties within the required 15 years.

According to BSB, 59 percent of properties that have required residential soil abatements have also needed house abatements, resulting in an estimated 831 homes that may require remediation. Using this estimate, about 56 house abatements will need to be conducted per year to complete remediation within the required 15 years.

The Residential Metals Abatement Program will be a point of focus during the five year review process to determine if changes need to be made to improve the program.

The Selected Remedy requires a long-term tracking and database program to ensure that properties that were not occupied or the owner refused access during the assessment period will be abated in the future if necessary. In addition, the tracking program will follow changes in ownership and remodeling of homes that were found to have contaminated attic dust but no current pathway. The long-term tracking program will be continued for at least 99 years.

If the comprehensive program cannot be achieved, the Selected Remedy requires a more rapid assessment and abatement program of all residential areas within the BPSOU site. This program must address mercury, arsenic, and lead sampling for yards and indoor dust attributable in whole or in part to mine waste sources or yard contamination. Residential properties that have sensitive populations may be prioritized for remediation before properties that are occupied by non-sensitive populations, but all known or potential residences must be addressed within 3 years of the initiation of the expanded program.

Non-Living Space (Attic) Dust

The possible presence of lead, arsenic, and mercury in portions of a residence that are seldom, if ever, visited (e.g., attics) will be addressed under the BPSOU Residential Metals Abatement Program through an education and awareness program, with dust removal conducted only if an exposure pathway is identified. The program will ensure that all interior living spaces, including rentals, will be inspected to determine that attic dust is not entering living spaces. This program will also address homes that are in areas adjacent to the boundary of BPSOU. Aerial emissions from the mining activities located within the BPSOU may have contaminated attics in areas adjacent to BPSOU. Homes in areas that are adjacent to the BPSOU that have lead, arsenic, or mercury in attic dust will be addressed in the same manner as homes within the operable unit.

Non-living space dust does not present a risk to occupants of the home as long as it is contained within areas of the home that are not regularly accessed. An exposure pathway is identified through the sampling of interior dust or if the residents begin remodeling activities that could release contaminated dust into the living space of the residence. If elevated concentrations of heavy metals are found in the attic dust, and there is no avenue for the dust to migrate into the living space, the attic dust will not be removed. Non-living space dust will be sampled along with yard soil and living space dust whenever residential sampling is conducted under the BPSOU Residential Metals Abatement Program. The "attic dust" component of the multi-pathway program will rely on educational materials to make the home owners aware of the presence of lead, arsenic, and/or mercury in the specific, seldom-accessed portions of their homes (e.g., the attic) and understand the importance of taking special precautions when accessing those areas. In addition, the program will provide dust control and removal services as requested by home owners planning a remodeling effort that could cause dust in the seldom-accessed living areas to be released to the regularly used portions of the home. Trained and certified professionals will perform all remedial action clean-ups under the multi-pathway portion of the BPSOU Residential Metals Abatement Program.

The regulatory agencies will evaluate the residential abatement program in 18 months, 36 months, and 5 years after the initiation of the expanded program. If these reviews show that the program is not protective of human health, the Agencies will modify the criteria that trigger the abatement of sources of attic dust contamination.

If a Residential Metals Abatement Program cannot be achieved, the attic dust program described here shall be incorporated into the rapid assessment and abatement program described previously.

Community Awareness and Education

An extensive community awareness and education program to manage lead, arsenic, and/or mercury exposure within the BPSOU will be an integral part of the BPSOU Residential Metals Abatement Program. The focus of the community awareness program will be to raise general public awareness of potential risks from these metals, especially risks to young children from lead exposure, and to encourage participation in the program. The Center for Disease Control (CDC) states that education is critical to the success of any metals intervention and abatement program.

The proposed multi-pathway program will include a range of education programs to enhance and maintain the community's awareness of potential sources and exposure risks to lead, arsenic, and/or mercury in and around homes, as well as approaches residents can take to avoid exposures. The program would include advertising and outreach programs, periodic mailings to property owners and residents within the BPSOU, and distributing free educational materials to various target groups.

The education and outreach program would specifically address portions of homes that are seldom, if ever, visited (i.e., non-living space areas). Addressing non-living space portions of a residence through education and outreach, with dust removal only occurring in conjunction with remodeling or other activities that create an exposure pathway, is based on the findings of the human health risk assessment completed in Walkerville (UOS 2003). The program would rely on educational materials to ensure that home owners, remodeling contractors, and weatherization workers are: (1) aware of the potential presence of lead, arsenic, and/or mercury in the seldom-accessed portions of their homes, (2) understand the importance of restricting access to those areas by sensitive populations and taking measures to avoid tracking dust from those areas into the interior living space when infrequent access occurs, and (3) provided with the proper contact information prior to implementing any remodeling efforts to ensure that dusts and soil are appropriately handled and disposed of by a responsible entity and/or by approved contractors. The educational materials would be provided at the time any remediation of the home is implemented (whether interior or exterior) as well as when building permits are sought for remodeling projects. In addition, education will be provided to all participants in the program, including individual face-to-face consultations with residents and customized recommendations for specific actions that will reduce the residents' risk associated with metals exposures. The recommendations made to each resident will be based on the results of environmental sampling at their homes and specific information collected by the program about their daily habits and activities.

The education and outreach program should target remodeling contractors and weatherization workers as they may be exposed to many attics. The weatherization program is coordinating with the Butte-Silver Bow County Health Department to

assure that contaminated attic dust is not disturbed or tracked into living spaces or inappropriately covered by insulation.

Medical Monitoring

The Residential Metals Abatement Program or residential abatement efforts will include medical monitoring. Participation in the medical monitoring will be encouraged through community awareness and education. Medical monitoring will use blood lead, blood mercury, and urinary arsenic data to identify individuals who have concentrations of those elements above risk-based thresholds. When individuals are found to have elevated blood lead, blood mercury, or urinary arsenic, the home where the affected person or persons live will be scheduled for immediate sampling and evaluation. Residential remediation will be performed if sampling determines that yard soil, interior living-space dust, or mercury vapor action levels are exceeded. Residential properties would be prioritized for remediation based on the following criteria, arranged from highest priority to lowest priority level:

- Homes occupied by one or more children with a blood lead equal to or greater than 10 µg/dL (which is considered to be an elevated blood lead).
- Homes occupied by an individual with elevated urinary arsenic.
- Homes occupied by an individual with elevated blood mercury.
- Secondary residences or subsequent homes occupied by children with elevated blood lead.
- Homes previously occupied by children with elevated blood lead, even if no child is currently living at the address.
- Homes with very young children (e.g. <1 year) and blood lead of 5-9 µg/dL.
- Homes with no children, but with one or more sources (paint, water, soil, house dust) with a lead concentration that exceeds the 95th percentile as determined by the Butte-Silver Bow (BSB) Environmental Health Lead Study (University of Cincinnati, 1992). Particular attention should be given to homes built prior to 1940.
- Designated playgrounds.
- Informal play areas frequented by children with or without property owner's permission.
- All other actual or potential residential areas.

Residential Remediation

In summary, residential properties will be remediated if sampling data indicate that action levels for yard soil or interior living space dust are exceeded, or for indoor air when mercury concentrations exceed the mercury vapor RG. Residential remediation will involve removing and replacing the yard and a thorough one-time house

cleaning to mitigate the RG exceedances inside. If an exposure pathway is identified by sampling interior dust or if the residents begin remodeling activities that could release contaminated dust into the living space of the residence, the attic dust will be cleaned up by trained and certified professionals. EPA will work with all parties to see that this effort is accomplished under a Residential Metals Abatement Program. Yard removal and replacement will only be performed if samples of yard soil exceed action levels. House cleaning will be performed if outdoor soil, interior dust, and/or mercury vapor action levels are exceeded. Remediation of houses may include interior painting, exterior painting, and/or installation of siding if lead paint is found. If lead exists in the home's plumbing system that results in elevated concentrations of lead in the drinking water, the plumbing system will be modified or replaced. The decision-making process for remediation of residential properties is summarized in Figure 12-1.

Residential soil sampling, removal, and replacement will be implemented in accordance with an EPA-approved work plan such as a Residential Metals Abatement Program Work Plan and Sampling and Analysis Plan (WP/SAP). If agreement on a comprehensive program is reached, this WP/SAP will be consistent with the existing Butte-Silver Bow Lead Intervention and Abatement Program protocol for residential yard sampling and removal. At a minimum, soil will be sampled from the 0 to 2-inch depth interval within decision units (e.g., front yard, back yard, play area, driveway, etc.) and those decision units exceeding the action levels will be subject to soil removal and replacement to a minimum depth of 18 inches. Removal and replacement depths will be 24 inches in gardens that could be used to grow vegetables for human consumption. Other materials, such as road base, gravel, etc., will be used as replacement material where appropriate (e.g., driveways, walkways, etc.). A lightweight geotextile marker fabric will be placed beneath the clean soil cover to indicate that the underlying soil may contain lead, arsenic and/or mercury in excess of the action levels. Soil will be removed and replaced in all accessible areas; inaccessible soil under buildings, paved areas, etc., will not be sampled or removed. All sampling and remediation activities will be implemented under a Residential Access Agreement approved by EPA. Soil remediation, where required, will be subject to a remedial action plan for each site, to be approved by EPA in consultation with DEQ.

Soil that is removed as part of the remediation program will be transported to the Butte Mine Waste Repository, which will be subject to ongoing operations and maintenance to ensure that the soils no longer pose a risk to the general public.

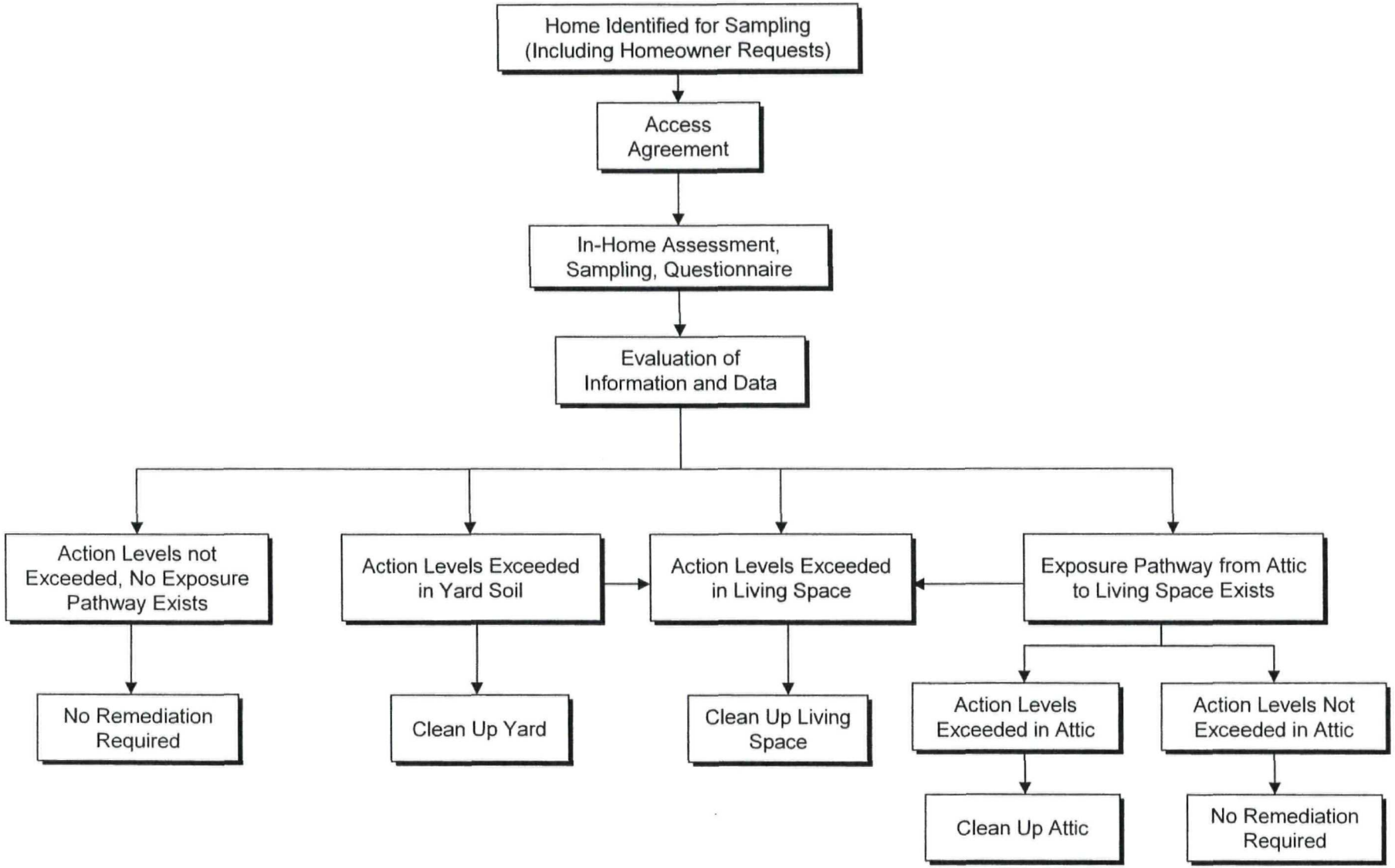

Figure 12-1
Residential Remediation Decision Process Flowchart
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area Site

The following properties are identified under the Selected Remedy to be addressed under the BPSOU Residential Metals Abatement Program (Figure 12-2):

- Anaconda Sampling Works Site 137
- PA012 Dump Site 113
- 33 West Missoula

Other residential properties will be identified by the residential sampling and evaluation component of the Residential Metals Abatement Program, as described above.

12.3.1.2 Non-Residential Contamination

Contaminated solid media located outside of residential areas at the BPSOU consists of waste rock piles, mill tailings, slag, contaminated soils, and aerial emissions. As described in earlier sections, much of the contaminated solid media at the BPSOU has been addressed previously through EPA response actions. Previous response actions involved a variety of engineering applications, including caps over mine waste and removals. In particular, land reclamation involving the partial or total removal of waste, grading, and covering with vegetated cover-soil caps was a vital component of most previous response actions. These response actions were designed to be consistent with the final remedy for the site and evaluations performed during the FS process determined that most previous response actions complied with ARARs and were consistent with RAOs and, therefore, were granted conditional, limited no further action status. This status does not preclude EPA from identifying additional actions to be implemented at a site (such as BMPs, storm water controls, modification of cap design, etc.), should future monitoring data indicate that the site presents undue storm water or groundwater concerns in contrast to RAOs and action levels.

Under the Selected Remedy, remaining contaminated solid media outside of residential areas will be addressed through partial or total removal and/or capping. Caps over mine waste will generally consist of vegetated cover-soil caps and will be designed and constructed in accordance with the Butte Hill Revegetation Specifications (Appendix E - BRES). Other cover types may be used in specific areas if appropriate. For example, multimedia covers may be used for mine wastes that exhibit significant leaching characteristics based on the toxicity characteristic leaching potential (TCLP) test. Concrete or asphalt covers may be used where development requires construction of parking lots or other structures.

Under the Selected Remedy, reclaimed areas (including previous response action sites and sites that are capped, reclaimed, or otherwise addressed under this ROD) will be monitored, evaluated, and maintained as necessary to achieve performance standards established in the Butte Reclamation Evaluation System. Performance standards for vegetated cover-soil caps and reclaimed lands at the BPSOU are described further in Section 12.6.1 and the entire Butte Reclamation Evaluation System document is included as Appendix E of this ROD.

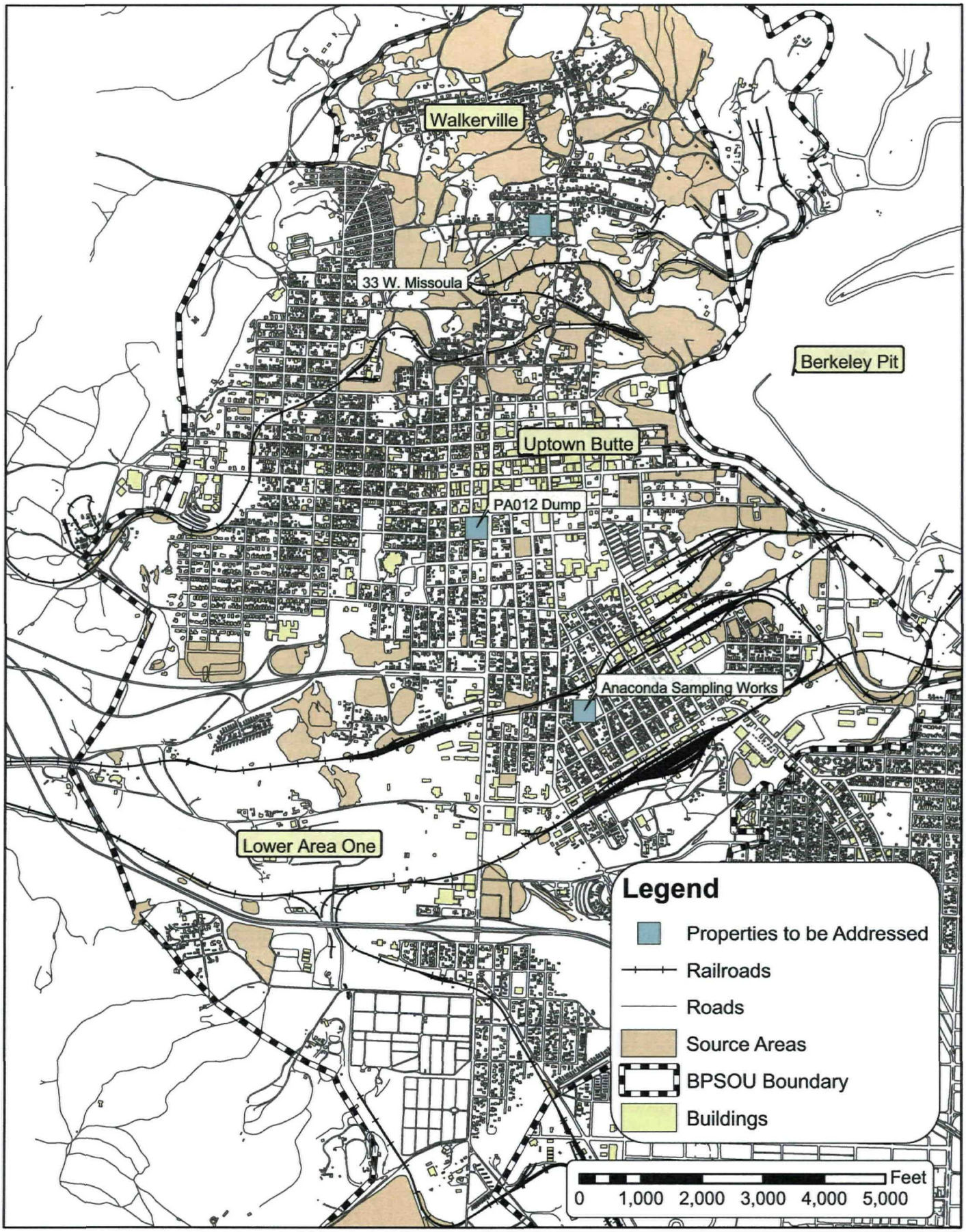

Figure 12-2: Residential Metals Abatement Properties

Record of Decision

Butte Priority Soils Operable Unit

Silver Bow Creek/Butte Area NPL Site

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

There are six separate categories of non-residential sites within the BPSOU that contain contaminated solid media to be addressed under the Selected Remedy, including:

- Unreclaimed source areas containing COCs exceeding action levels;
- Source areas reclaimed under EPA order and granted "conditional, limited, no further action" status;
- Previously reclaimed sites not granted "conditional, limited, no further action" status;
- Previously reclaimed sites (not addressed under EPA order);
- Buried and/or saturated solid media in Lower Area One and the Metro Storm Drain; and
- Unreclaimed source areas not exceeding action levels but impacting surface water quality.

In addition, the Granite Mountain Memorial Interpretive Area, the Syndicate Pit Area, and the Butte Mine Waste Repository are addressed separately under the Selected Remedy in accordance with the end land use goals for these particular sites.

Unreclaimed Source Areas Exceeding Action Levels

Risk-based action levels established for non-residential areas are shown in Table 12-2.

Table 12-2
Action Levels for Contaminated Solid Media in Non-Residential Areas
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

Contaminant	Commercial/Industrial	Recreational
Lead	2,300 mg/kg	2,300 mg/kg
Arsenic	500 mg/kg	1,000 mg/kg

Very few unreclaimed source areas remain at the BPSOU with arsenic or lead concentrations greater than action levels. Areas that are identified will be removed or capped in accordance with the Butte Hill Revegetation Specifications and site-specific design plans. Remaining source areas at the BPSOU that exceed the lead or arsenic action levels are shown in Figure 12-3 and include:

- Goldsmith Dumps Site 161
- Arctic Site 1530
- Wake Up Jim Site 1615
- Small waste areas surrounding Clark Mill Tailings repository
- Caledonia Street
- Moose Dump Site 12

Also, in the future, if and when any new source areas are identified that exceed the risk-based action levels for lead and/or arsenic they will be remediated accordingly.

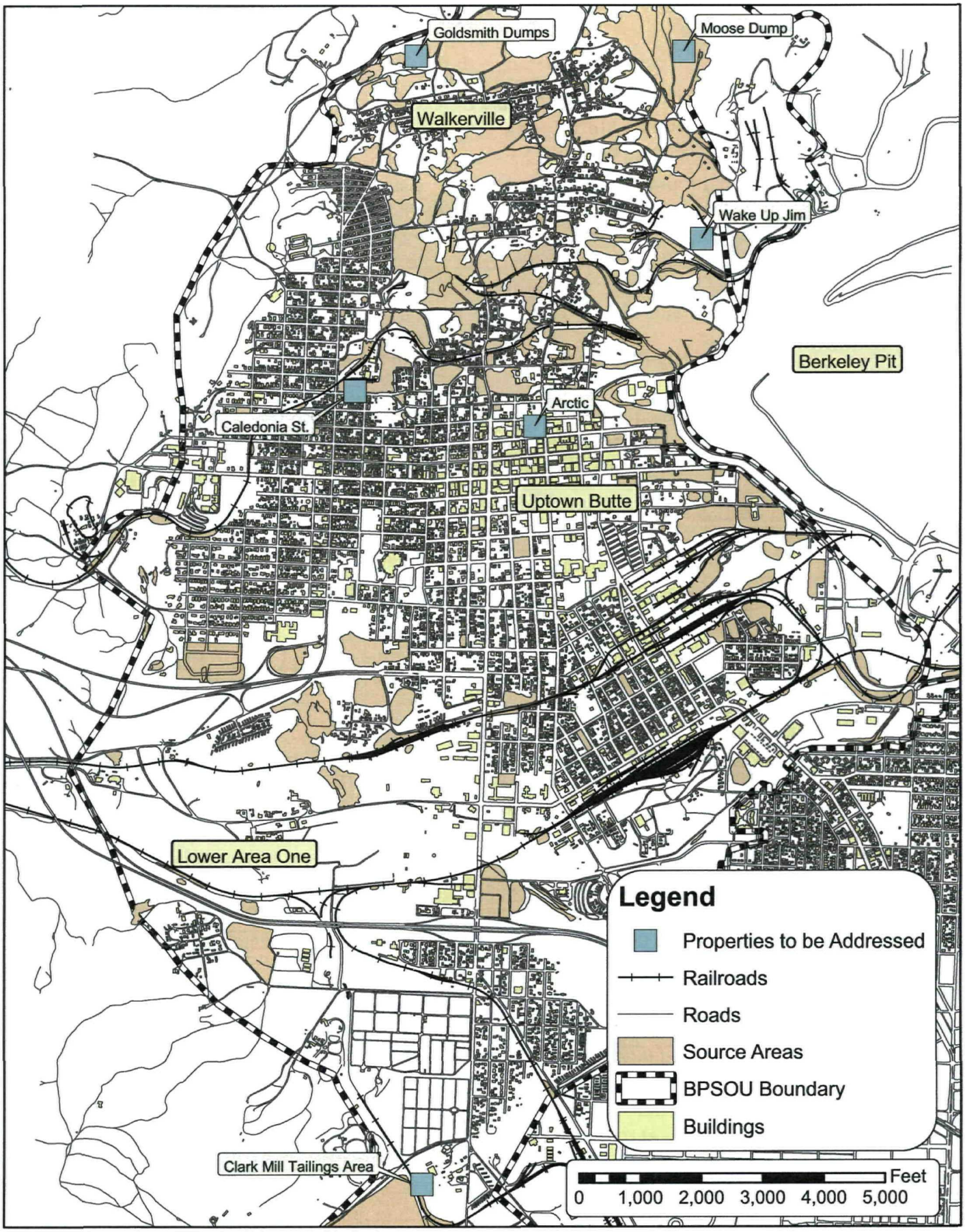

Figure 12-3: Non-Residential Metals Abatement Properties

Record of Decision

Butte Priority Soils Operable Unit

Silver Bow Creek/Butte Area NPL Site

Source Areas Reclaimed Under EPA Order and Granted Conditional, Limited No-Further Action Status

Areas of the BPSOU that have been reclaimed during previous actions and that met ARARs and remedial action objectives as reported in the Response Action Summary Document will require periodic evaluation pursuant to the Butte Reclamation Evaluation System (Appendix E). If any of these sites are identified as sources of heavy metals or arsenic to surface water runoff, they are subject to additional actions to be taken under the Storm Water BMP program in accordance with the Butte Hill Revegetation Specifications and site-specific design plans.

Previously Reclaimed Sites Not Granted "Conditional, Limited No Further Action" Status

Areas of the BPSOU that have been addressed during previous response actions and that were determined NOT to meet ARARs and RAOs in the Response Action Summary Document were the following three sites (Figure 12-4):

- Colorado Smelter
- Lower Railroad Yard Site 1
- Lower Area One

The basis for not granting these sites conditional, limited, no further action status is described below together with the remedial action plans for each site, respectively, under the Selected Remedy.

The Colorado Smelter Site was addressed in 1990 and 1991 under EPA Unilateral Administrative Order Docket No. CERCLA-VIII-92-04. The response action involved removing approximately 40,000 cubic yards of mine waste and consolidating the waste in an on-site repository in the southeastern corner of the property adjacent to Greenwood Avenue. The site was subsequently reclaimed and drainage channels were installed. Additional response actions in 1996 consisted of reshaping of an existing ditch to reroute storm water runoff to the culvert passing under Interstate 90.

The Colorado Smelter Site was found to potentially be out of compliance with ARM 17.50.505 regarding location specific requirements for solid waste facilities. Additionally, the rationale for granting a variance did not sufficiently demonstrate the necessary substantive conditions for the variance found at § 75-10-206 Montana Code Annotated (MCA) regarding the requirement for adequate separation between waste materials and groundwater. Subsequent to the evaluation performed in the Response Action Summary Document, an evaluation of the depth to groundwater beneath the repository at the Colorado Smelter Site suggests that that there may be adequate separation between the groundwater and the base of the wastes (> 10 feet) under most site conditions. However, monitoring well control at the site is limited and data from the existing wells suggest that the depth to groundwater beneath the wastes in the repository may be less than 10 feet during exceptionally wet years when the groundwater table rises more than normal.

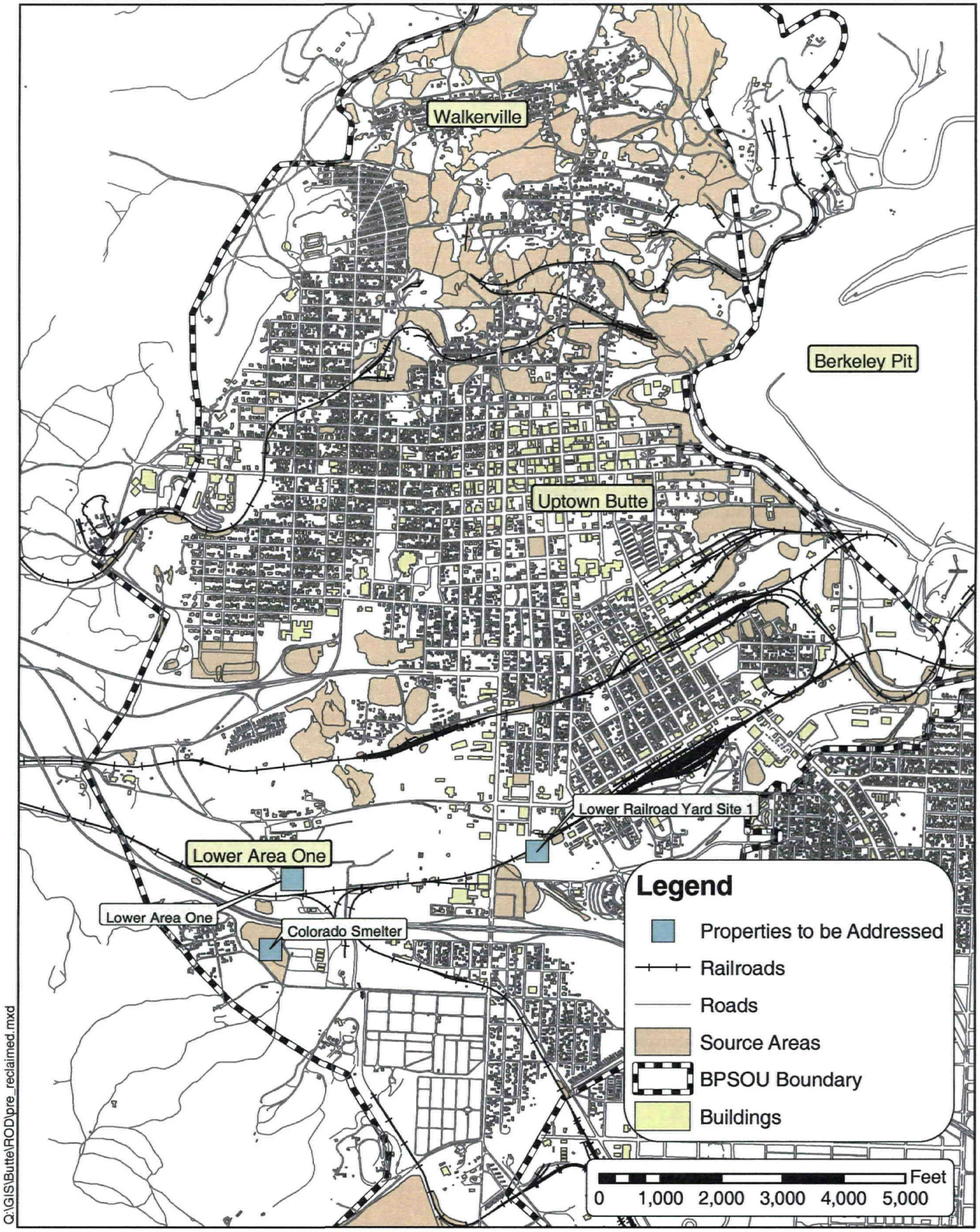

Figure 12-4: Previously Reclaimed Sites not Meeting ARARs

Record of Decision

Butte Priority Soils Operable Unit

Silver Bow Creek/Butte Area NPL Site

N

Under the Selected Remedy, a work plan specific to this area will be prepared and approved by EPA. The document will present a plan to obtain time-series groundwater elevation data for determining the frequency and duration of periods when the surface of the groundwater table rises to within 10 feet of the base of the wastes in the repository. At a minimum, two additional groundwater monitoring wells will be installed at locations adjacent to the repository. Data loggers will be placed in the existing and the new wells located near the repository to obtain water level data on a daily or more frequent basis for each well. Also, during wet weather conditions when flow occurs in the drainage channels near the repository, flow data will be collected and recorded at least once over the reach upstream and through the Colorado Smelter Site to determine if infiltration from the channels may be influencing groundwater elevation beneath the repository area. Groundwater elevation data will be obtained for a period of no less than four years and until EPA is satisfied that the reasonable maximum range of seasonal fluctuations in the water table beneath the Colorado Smelter Site repository is understood. If the data indicate that groundwater levels rise to within 10 feet of the base of the repository, violating the separation required by the ARAR, then the wastes at the Colorado Smelter Site will be removed and placed in the Butte Mine Waste Repository. The excavated site will then be reclaimed.

The Lower Railroad Yard Site 1 was addressed as part of the Railroad Beds TCRA conducted from 1999 through 2004. The Lower Railroad Site 1 is located within the Silver Bow Creek floodplain. Similar to the Colorado Smelter Site described above, the Response Action Summary Document determined that the Lower Railroad Site 1 was not in compliance with ARM 17.50.505 regarding location specific requirements for solid waste facilities. Wastes from the Lower Railroad Site 1 will be removed to a designated repository.

The Lower Area One Site was addressed under the Lower Area One N-TCRA in 1997 and 1998. Approximately 1.2 million cubic yards of waste and contaminated soil was removed from the Silver Bow Creek floodplain and Silver Bow Creek was reconstructed at a higher elevation to prevent the gaining of contaminated groundwater during Phase I. Also, a hydraulic interception system was constructed to capture contaminated groundwater so it cannot discharge to Silver Bow Creek. During Phase II, groundwater and surface water quality and characteristics were thoroughly monitored and evaluated to assess the effectiveness of hydraulic controls and movement of groundwater. Wetland treatment lagoons to treat captured groundwater were evaluated during Phase II to assist in reaching a final decision on treatment technology selection. The final reclamation and land use decisions for Lower Area One are the objectives of Phase III. These decisions and implementation of actions at Lower Area One are incorporated into this ROD.

The full Selected Remedy for the Lower Area One site is described below in Groundwater Components (Section 12.3.2).

Unreclaimed Source Areas Not Exceeding Action Levels

Many areas within the BPSOU that contain mining related wastes or contaminated soils were not addressed during previous response actions because action levels for arsenic or lead were not exceeded. Many of these areas remain unreclaimed at the site because they do not pose a human health risk and there has been no demonstrated aquatic risks linked to these sites.

Under the Selected Remedy, an unreclaimed, disturbed site that does not exceed lead or arsenic action levels, will still be addressed if future data collection under the surface water monitoring and BMP program demonstrates that contaminants of concern (i.e., copper and zinc) from the site are migrating off-site and impacting surface water quality in Silver Bow Creek, Blacktail Creek, or Grove Gulch Creek. To the extent that applicable water quality standards are exceeded, remedial actions will be implemented. The action to be implemented will be determined during design, but will likely be capping with limited removal and reclamation. These sites will also be evaluated and maintained over the long-term in accordance with the Butte Reclamation Evaluation System, the Butte Hill Revegetation Specifications, and site-specific design plans.

EPA, in consultation with the State, has determined that the following list of sites will be addressed as an initial BMP action under the Selected Remedy (Figure 12-5):

- Back Fill 007 Site 65
- Unnamed Dump Site 148
- New and Mahoney Street
- 413 Boardman Street
- Jenny Dell Site 33
- Kelley Mine Yard Entrance
- North Wyoming Street
- 800 North Main
- North Corner of Granite and Arizona
- Green Mountain Shaft
- Stream banks, sediment and over bank deposits from and including the Blacktail Creek/Metro Storm Drain confluence area to Lower Area One
- 424 North Washington Street
- 131 West Copper Street

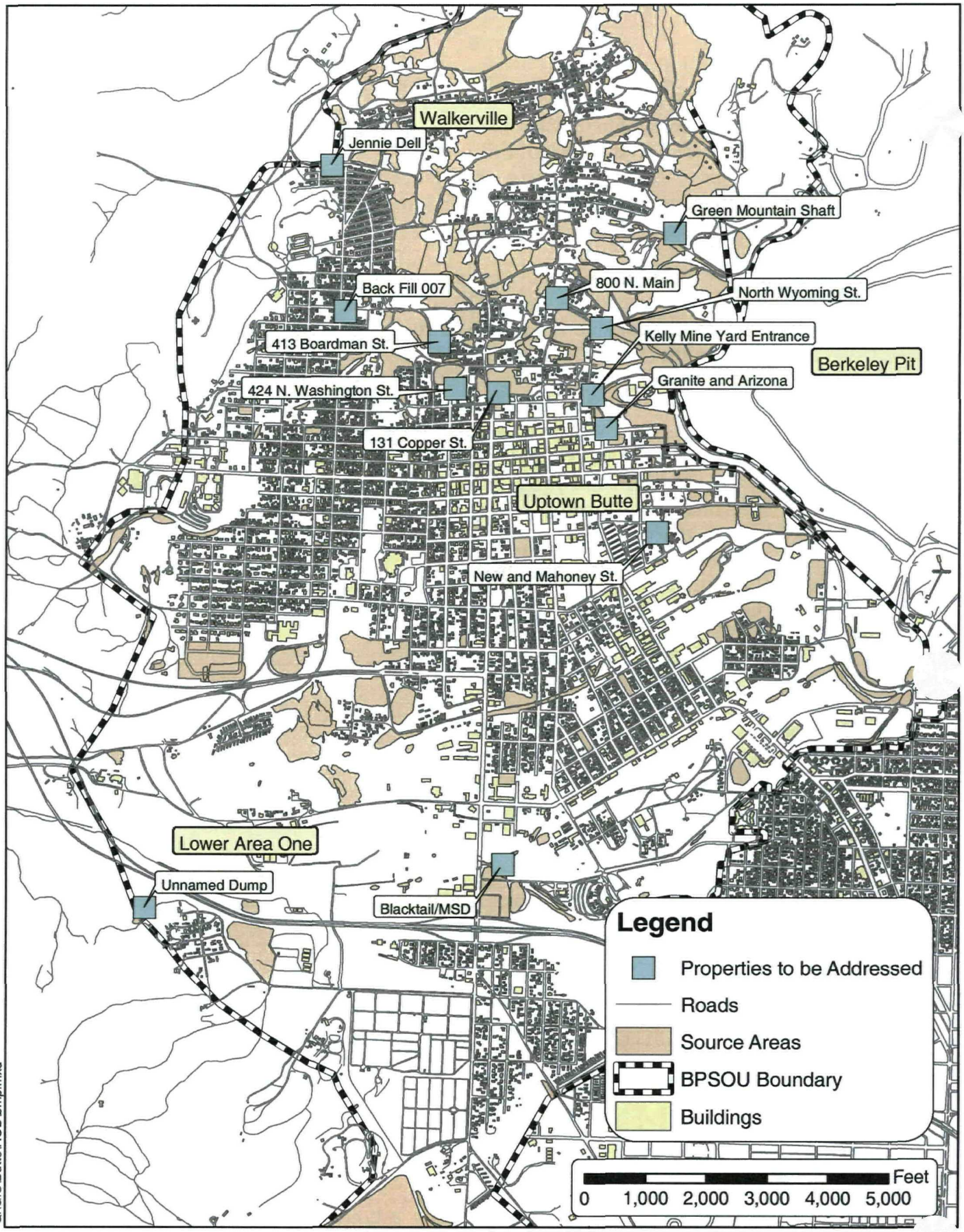

Figure 12-5: Sites to be Addressed as Initial BMP Actions

Record of Decision

Butte Priority Soils Operable Unit

Silver Bow Creek/Butte Area NPL Site

N

Previously Reclaimed Sites (Not Addressed Under EPA Order)

Sites where reclamation took place outside of removal actions mandated by EPA will require inspection and possible further reclamation. These sites will be evaluated in accordance with the Butte Reclamation Evaluation System. If it is determined that further action is needed, construction specifications will be determined during design. Additional actions that may be required include removal and capping of wastes in a manner that is determined by the use of the Butte Hill Revegetation Specifications.

Buried and/or Saturated Solid Media in Lower Area One and the Metro Storm Drain

Buried and/or saturated solid media in Lower Area One and Metro Storm Drain will remain in place with appropriate groundwater monitoring and institutional controls.

Granite Mountain Memorial Area

Under the Selected Remedy, the conceptual design plan for the Granite Mountain Memorial Interpretive Area (Appendix E-4 of the Final FS Report [PRP Group 2004]) will be finalized with EPA approval and implemented. The Granite Mountain Memorial Interpretive Area will be a part of Montana's Copperway Regional Heritage Park. Various reclamation and other enhancements to the historic Granite Mountain Memorial Area will be implemented. These include: reclaiming source areas in publicly used areas, restricting access to certain areas of the historic mining landscape, installing picnic areas and walking trails, enhancing existing vegetation, and diverting storm water runoff to the Berkeley Pit. These actions will be consistent with historical preservation requirements and other standards and the county's historical park plan.

Syndicate Pit

The Selected Remedy for the Syndicate Pit calls for its for reuse as a mine training center with reclamation to the maximum extent practicable (Syndicate Pit remedial Option 2 - Appendix E-2B of the Final FS Report [PRP Group 2004]), as further developed and approved by EPA during remedial design. Shallow to moderate slopes will be reclaimed using soil caps, rock caps, and gravel parking areas. Steep slopes will not be reclaimed. The base of the pit will continue to be used to detain storm water and capture sediment during wet-weather runoff conditions.

Butte Mine Waste Repository

When full, the existing Butte Mine Waste Repository will be closed in accordance with an EPA-approved design plan and closure will be performed in compliance with all pertinent ARARs. A new repository will be sited next to the existing repository if and when additional capacity is needed. All future repositories used to contain mine wastes from the BPSOU will be closed in a manner consistent with the initial repository closure, according to site-specific design plans, and shall comply with all pertinent ARARs. Closed repositories will be evaluated and maintained over the long-term in accordance with the Butte Reclamation Evaluation System, the Butte Hill Revegetation Specifications, and site-specific design plans.

12.3.2 Selected Remedy for Groundwater

The alluvial aquifer within the BPSOU lies beneath the Silver Bow Creek floodplain and extends from the upper Metro Storm Drain near the south rim of the Berkeley Pit to the west end of Lower Area One where Silver Bow Creek exits the OU. Approximately 3.4 million cubic yards of mine waste (primarily mill and smelter tailings) were historically impounded within the Silver Bow Creek floodplain. Roughly 2.0 million cubic yards of tailings associated with the historic Colorado Smelter and Butte Reduction Works were deposited in Lower Area One; 1.2 million cubic yards of which were removed in 1997 and 1998. Additionally, tailings and slag associated with the historic Parrott Smelter together with waste rock, contaminated soil, and other fill material in the Metro Storm Drain Area total an estimated 1.4 million cubic yards. Waste materials present in Lower Area One and Metro Storm Drain have lain directly over or below the water table for the past century and have had a severe impact on groundwater quality throughout the Silver Bow Creek corridor. COC concentrations exceed action levels throughout most of the alluvial aquifer between upper Metro Storm Drain and the west end of Lower Area One, and often by several orders of magnitude. Within the Metro Storm Drain, groundwater is contaminated to depths exceeding 150 feet.

Prior to Superfund action in Butte, surface water quality in Silver Bow Creek was impaired by the inflow of severely contaminated groundwater and from direct contact with waste materials. To reduce contaminant loads in Silver Bow Creek and protect remedial actions at other OUs downstream of Butte, EPA implemented expedited response actions within the BPSOU. Capturing and treating groundwater is the most effective means to address groundwater contamination as the Expedited Response Action at Lower Area One has demonstrated. Similarly, the Focused Feasibility Study for the Metro Storm Drain concluded that the alluvial aquifer in the Metro Storm Drain cannot be remediated to the degree that groundwater would meet ARARs within a reasonable time frame, even if waste materials were totally removed. EPA has concluded that total removal of all sources of groundwater contamination is not feasible and, more significantly, that remediation of the alluvial aquifer is not technically practicable. This is due to the difficulty of removing all discrete wastes, much of which are difficult to access because of infrastructure and the chronic release of contaminants for residual contamination in the alluvial aquifer. The cost-effectiveness of a total removal remedy is further reduced by the common acknowledgement that capture and treatment of alluvial groundwater would still be required over the long-term (for centuries), even if source areas are removed. Because groundwater contamination within the alluvial aquifer is expected to exceed ARARs for the long-term and because statutory and regulatory conditions for a technical impracticability waiver are met, applicable groundwater ARARs have been waived for the alluvial aquifer within the boundary of the technical impracticability (TI) zone (Figure 12-6) and wastes will be left in place with appropriate groundwater monitoring and institutional controls. The TI Evaluation is contained in the Administrative Record for the BPSOU, along with EPA's detailed response to comments on the draft TI Evaluation.

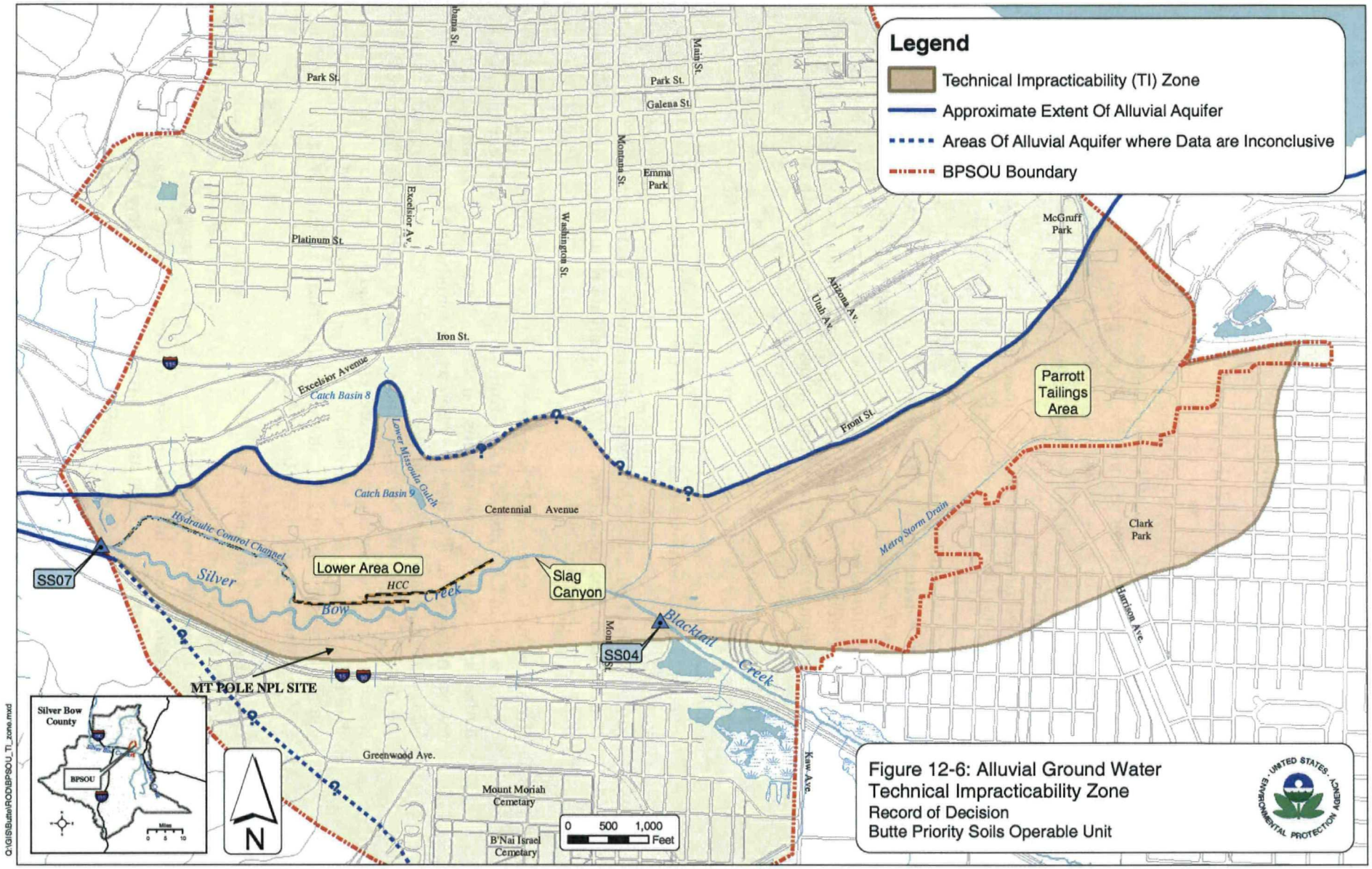

Figure 12-6: Alluvial Ground Water Technical Impracticability Zone
Record of Decision
Butte Priority Soils Operable Unit

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The Selected Remedy for groundwater includes the following components:

1. **Waste Left in Place.** Buried and/or saturated solid media in Lower Area One and Metro Storm Drain will remain in place with appropriate groundwater monitoring and institutional controls. To reduce the loading of metals to groundwater from the Parrott Tailings, the Diggings East, and Northside Tailings, infiltration barriers shall be considered during remedial design and implemented if determined to be appropriate by EPA, in consultation with DEQ. The sedimentation basin/former wetland demonstration project area near the intersection of Kaw Avenue and George Street shall also be reclaimed according to the intended future land use, and may be used as a potential storm water retention/detention basin under the Surface Water Management Program.

2. **Groundwater Capture and Treatment - MSD Area.** Contaminated alluvial groundwater in the MSD shall be captured with the subdrain under the MSD channel, and/or another appropriate groundwater collection system. The captured groundwater shall continue to be pumped from the terminal vault in the MSD to the treatment facility at LAO. The captured and pumped water will be treated by lime precipitation technology as described below in subparagraph 4 before being discharged to Silver Bow Creek. However, because issues regarding long-term performance of the subdrain have not been fully addressed to date, the Selected Remedy also includes a 5-year shakedown period to evaluate the reliability of the MSD subdrain collection system. During this shakedown period, an approved operation and maintenance plan shall be developed for the collection system. If during the shakedown period, monitoring data demonstrate that the subdrain is not effectively collecting contaminated groundwater, or is spreading contamination downgradient, a new or modified groundwater collection system shall be designed and built.

3. **Groundwater Capture and Treatment - LAO.** Contaminated alluvial groundwater at LAO and base flow from Missoula Gulch shall be intercepted in a hydraulic control channel that runs parallel to Silver Bow Creek and routed to the treatment lagoon facility described below. If groundwater inflow between the MSD and LAO capture systems (i.e., between the end of the MSD subdrain and the start of the hydraulic control channel) is found to adversely affect surface water quality, additional groundwater capture and hydraulic control systems shall be designed and built. In addition, water from the Mine Flooding OU West Camp System will be routed to the hydraulic control channel at Lower Area One for treatment through the treatment facility.

4. **Groundwater Treatment Facility.** As part of the RI/FS, Atlantic Richfield has constructed a lagoon treatment system at Lower Area One as a demonstration project. Data from discharges from this system is encouraging. The system has been meeting aquatic life standards for copper, cadmium, and zinc at the point of discharge. Arsenic standards have been met on all but a few occasions. These data are especially encouraging for cadmium discharges - conventional treatment systems have had problems meeting the cadmium standard because of reduced

holding times in such facilities. The lagoon treatment system's longer holding times appear to be effective in treating cadmium. Accordingly, the Selected Remedy includes retention and continued operation of the lagoon system for treating captured and routed groundwater prior to discharge to Silver Bow Creek. However, because issues regarding long-term performance and sludge removal and disposal have not been fully addressed to date, the Selected Remedy also includes the following:

a. A 5-year shakedown period will be in place for the lagoon treatment system. The captured groundwater will be treated to DEQ-7 standards (Table 8-2) prior to discharge. The lagoon treatment system must demonstrate successful water treatment and full compliance with the standards, when operating at designed capacity, and when operating under a wide range of conditions. Also, it must be demonstrated that sludge removal and sludge management can be performed effectively without causing system upsets. AR made modifications to expand the capacity of the treatment lagoons that did not go through the formal EPA design, review, and approval process. Therefore, those modifications and any additional design of the expanded treatment lagoon system will need to go through the formal EPA review and approval process. The lagoon treatment system shall be designed to prevent the release of untreated contaminated waters into Silver Bow Creek, as a result of upset periods due to flooding, equipment malfunction or failure, or extended periods of cold, etc. ARAR compliant sludge removal, management, and disposal plans must be developed and approved.

b. Using the Butte Reduction Works area, near the lagoon treatment system, for sludge drying and sludge management is not allowed, since it is a dedicated open space area more suitable for public use.

c. If at any time during the shakedown period or thereafter the system fails to meet discharge standards and cannot be adjusted or modified to meet standards, or if sludge removal, management, and disposal cannot be done in compliance with ARARs and in a protective manner, a conventional lime treatment system shall be designed and built at the Lower Area One area, which shall use lime treatment technology to treat the captured contaminated water and meet all discharge standards.

d. To prevent the discharge of untreated water into Silver Bow Creek, the design will be required to include contingencies for how to manage and store collected groundwater during extended periods of upset (e.g., flooding, equipment malfunction or failure, extended periods of freezing, etc.).

5. **Groundwater Monitoring.** A comprehensive groundwater monitoring plan shall be prepared and implemented for the entire alluvial aquifer to ensure that groundwater capture systems are effective; to determine that contaminated

groundwater is not leaving the TI Zone or discharging to surface water; to provide additional information as necessary on the movement, quality, and quantity groundwater; and to provide data for review of the groundwater remedy. This monitoring system shall include expanded wells and measurements from the existing system, and shall provide for the careful and thorough monitoring that includes, but is not limited to, groundwater near Blacktail Creek, the groundwater between the MSD and LAO groundwater capture systems, groundwater adjacent to the lagoon treatment system, and groundwater downgradient (west) of the BPSOU. An initial outline of groundwater monitoring requirements is included in Section 12.3.2.3.

6. **Controlled Groundwater Area.** A controlled groundwater area shall be established for the alluvial aquifer to prevent domestic use of this water and to prevent any well development that would exacerbate or spread existing contamination. Other institutional controls, such as county laws or regulations regarding domestic use of groundwater in the area, may also be required.

12.3.2.1 Metro Storm Drain

Mine waste materials in the Metro Storm Drain area include the Parrott Tailings, North Side Tailings, Diggings East Tailings and Lower Metro Storm Drain Tailings. These buried and partially saturated deposits consist of overburden, tailings, slag, waste rock, and other miscellaneous contaminated fill material with an estimated total volume of 2.2 million cubic yards.

The Selected Remedy requires the buried and partially saturated wastes be left in place with appropriate groundwater monitoring and ICs. A thorough monitoring plan will be required to provide information to assure that the groundwater collection system is effective and that contaminant plumes are not expanding or are a threat to Blacktail Creek or Silver Bow Creek. The data provided by the monitoring plan will build upon prior monitoring of the BPSOU alluvial aquifer. A controlled groundwater area will be established through the appropriate process for the alluvial aquifer, including the Metro Storm Drain, which will provide for long-term protection of human health.

Current land use practices in the MSD, particularly in some areas overlying portions of the Parrott Tailings, do not limit recharge of groundwater. Irrigated ball fields and unpaved portions of the City County Shops overlie a portion of the Parrott Tailings. Recharge of the groundwater is significantly increased by irrigation of the ball fields, and plowed snow is frequently piled on the County Shop property. To reduce the loading of metals to groundwater in the area overlying the Parrott Tailings, infiltration barriers shall be considered during the design phase and implemented if determined to be appropriate by EPA, in consultation with the State. Installation of infiltration barriers under the ball fields and additional paving at the County Shops (or construction of some other suitable barrier) can be expected to reduce loading of metals to the aquifer. Infiltration barriers shall also be considered in the lower portion of the MSD below Harrison Avenue (e.g., Diggings East Tailings, Northside Tailings, etc.) during remedial design.

The sedimentation basin/former wetland demonstration project area near the intersection of Kaw Avenue and George Street shall also be reclaimed according to the intended future land use and may be used as a potential storm water retention/detention basin under the Surface Water Management Program.

The subdrain, which was installed in 2003 and 2004, extends approximately 4,000 feet through lower Metro Storm Drain. Contaminated alluvial groundwater in the MSD shall be captured with the subdrain under the MSD channel, and/or another appropriate groundwater collection system. The captured groundwater shall continue to be pumped from the terminal vault in the MSD to the treatment facility at LAO. The captured and pumped water will be treated by lime precipitation technology as described below before being discharged to Silver Bow Creek. However, because issues regarding long-term performance of the subdrain have not been fully addressed to date, the Selected Remedy also includes a 5-year shakedown period to evaluate the reliability of the MSD subdrain collection system. During this shakedown period, an approved operation and maintenance plan shall be developed for the collection system. If during the shakedown period, monitoring data demonstrate that the subdrain is not effectively collecting contaminated groundwater, or is spreading contamination downgradient, a new or modified groundwater collection system will be designed and built.

Collection of groundwater by the interception field under the channel of Metro Storm Drain will protect Silver Bow Creek and Blacktail Creek from the input of contaminated groundwater that has threatened these receiving waters in the past.

12.3.2.2 Lower Area One

Waste materials remain at Lower Area One and the Butte Reduction Works following the removal action performed in the area. There are inaccessible wastes and contaminated soils underlying the Municipal Sewage Treatment Plant, the utilities that cross the area and the historic slag walls and aqueduct. In addition, there are wastes and contaminated soils that were not removed by the Lower Area One ERA because they were below the vertical excavation limit established as a performance standard for the ERA.

In the same way that remaining wastes will be managed for the Metro Storm Drain component of the remedy described above, remaining wastes and contaminated soils at Lower Area One will be left in place with appropriate groundwater monitoring and institutional controls.

Hydraulic controls constructed in the vicinity of the historic Colorado Tailings and Butte Reduction Works during the Lower Area One ERA to capture, control, and extract contaminated alluvial groundwater are incorporated into the Selected Remedy. These groundwater control measures consist of a hydraulic control channel and a series of three open water areas that will be operated to manage groundwater elevations and manipulate flow to enhance the effectiveness of the collection system. In addition, Silver Bow Creek was reconstructed during the ERA at a higher elevation to prevent any groundwater discharge to the creek as it flows through Lower Area

One. The system has operated since 1998 and has effectively prevented contaminated alluvial groundwater from flowing off site due to an alluvial groundwater capture efficiency that exceeds 90 percent effectiveness based on mass balance studies.

Groundwater controls have not been implemented between the end of the MSD subdrain and the start of the hydraulic control channel. Contaminated sediment in this area will be removed (see the remedy description under Surface Water). Following removal of the in-stream sediments, further evaluation of surface water quality in this area will be conducted. If groundwater inflow between the MSD and LAO capture systems is found to adversely affect surface water quality, additional groundwater capture and hydraulic control shall be developed and implemented in this area.

12.3.2.3 Groundwater Monitoring

A comprehensive groundwater monitoring plan shall be prepared and implemented for the entire alluvial aquifer to ensure that groundwater controls are effective; to provide additional information as necessary on the movement, quality, and quantity groundwater; and to provide data for review of the groundwater remedy. This monitoring system shall include expanded wells and measurements from the existing system, and shall provide for the careful and thorough groundwater monitoring near Blacktail Creek and the groundwater between the MSD and LAO groundwater capture systems. The monitoring plan will also include wells down-gradient of BPSOU to gather information on the characteristics of the groundwater and to assure that downstream waters are not being affected by groundwater leaving BPSOU.

If the data suggest that the contaminant plume(s) is a threat to surface water or clean groundwater, the remedy will be enhanced to address the threat. The selection of engineering improvements to enhance the Selected Remedy shall be based on thorough evaluation and interpretation of the additional data.

An initial outline of the minimum requirements of the groundwater monitoring program follows. The details of the monitoring program will be developed during remedial design:

1. All monitoring wells in the BPSOU alluvial aquifer (MSD, LAO, and between) will be sampled every 5 years. Additionally, EPA in consultation with DEQ will identify a network of wells for annual water quality sampling.

2. Water levels will be measured in all wells and certain surface water locations twice per year. Water levels will be measured in a select network on a monthly basis, or more frequently if necessary for operation of the capture and treatment system.

3. Monitoring activities will be coordinated with the Butte Mine Flooding Operable Unit monitoring program managed by the Montana Bureau of Mines and Geology as there is overlap in the monitoring well networks.

4. Additional monitoring wells will be installed throughout the MSD as needed to determine flow direction, gradients, and groundwater quality. Additional monitoring wells will be installed in areas where the extent(s) of groundwater plumes are uncertain. These will also include additional nested well sets in key areas of the floodplain, additional mid-level and deep wells, and possibly bedrock wells.

5. Wells will also be installed, as necessary, to monitor the subdrain.

6. One pumping test will be conducted on a mid-level well, in upper MSD to determine if the sub-drain will influence flow in the mid-level portion of the aquifer.

7. The groundwater loads entering the MSD sub-drain will be monitored annually in the fall (base flow) using dye tracer methods to determine flow and standard sampling to measure metals and arsenic concentrations. Load monitoring will assure that the sub-drain continues to operate as expected, and is not fouling or clogging. In addition, the mass balance will be used to determine if the pumping rate is matching the groundwater collection rate, and assure that the sub-drain is not adding contaminated groundwater back into the aquifer in the vicinity of the pump vault. In addition, two monitoring wells will be installed adjacent to MSD; just down-gradient of the pump vault to assure that captured groundwater is not leaving the capture system.

8. A network of nested wells will be installed between the Metro Storm Drain and Blacktail Creek.

9. At least two nested well groupings (three wells each grouping) will be installed at the very west end of the BPSOU as Point of Compliance wells. Each well group will consist of a shallow alluvial aquifer well and a deeper weathered bedrock well, and a deep solid bedrock well.

12.3.2.4 Waste Left in Place in Metro Storm Drain and Lower Area One

Under the Selected Remedy wastes and contaminated soils will be left in place in the Metro Storm Drain and Lower Area One areas overlying the TI zone. This would include the Parrott Tailings, Northside Tailings, Diggings East Tailings and the non-discrete wastes and contaminated soils dispersed throughout the Metro Storm Drain floodplain. Removal of waste material within these areas and restoration of groundwater beneath has been determined by EPA to be technically impracticable and not cost effective. Groundwater will be captured and treated to performance standards for surface water prior to its discharge to Silver Bow Creek. The Selected Remedy also requires that the contaminated plumes be prevented from migrating outside the established TI zone (Figure 12-6) and that a controlled groundwater area and other institutional controls be implemented to prevent exposure to contaminated groundwater. ARARs waivers and performance standards for alluvial groundwater are defined in Section 12.6.2.

12.3.2.5 Controlled Groundwater Area

A controlled groundwater area will be established in the Alluvial Aquifer TI Zone to prevent domestic use of contaminated water, exacerbation or spreading of existing contamination or release of highly contaminated groundwater to surface water resources through irrigation. The controlled groundwater area will prevent new well development, except for CERCLA monitoring wells, well systems that treat contaminated water prior to use, and use of existing domestic and commercial wells. To the extent a controlled groundwater area will not prevent the use of existing wells, an education and well abandonment program will be implemented to persuade owners not to use contaminated water and to voluntarily take existing wells out of service in exchange, for example, for being hooked up to public water. An administrative entity will be identified under RD/RA to monitor and enforce these restrictions. The RP Group will be responsible for developing, funding and implementing the ICs as part of the final site-wide ICs Plan.

12.3.2.6 Groundwater Treatment

The Selected Remedy requires treating groundwater captured by the network of hydraulic controls at Lower Area One and the Metro Storm Drain. In addition, groundwater from the West Camp bedrock system of the Mine Flooding OU, and base flow from the Missoula Gulch drainage will be routed to the treatment facility. The treatment facility will consist of a treatment lagoon system to be operated for an initial 5-year shakedown period, as described above. The treatment lagoon system must be designed to meet discharge standards and surface water ARARs. The treated water will then be discharged to Silver Bow Creek or potentially used for other beneficial purposes. Treatment capacity for the facility will be determined during remedial design.

12.3.3 Selected Remedy for Surface Water

The Selected Remedy for surface water consists of the following components:

1. The Surface Water Management Program which utilizes BMPs to address contaminated storm water runoff and improve storm water quality.

2. Excavation and removal to a repository of contaminated sediments from the stream bed, banks, and adjacent floodplain along Blacktail Creek and Silver Bow Creek, from just above the confluence of Blacktail Creek and Metro Storm Drain to the beginning of the reconstructed Silver Bow Creek floodplain at Lower Area One. Following removal of the in-stream sediments, further evaluation of surface water quality in this area will be conducted. If groundwater inflow is found to adversely affect surface water quality, additional hydraulic controls and groundwater capture shall be implemented.

3. Capture and treatment of storm water runoff up to a specified maximum storm event, if BMPs implemented under the Surface Water Management

Program do not achieve the goal of meeting surface water standards in Silver Bow Creek during storm water events.

4. Hydraulic control, capture, and treatment of contaminated groundwater to prevent its discharge to Silver Bow Creek surface water (as described in Section 12.3.2).

5. In-stream flow augmentation as appropriate. Flow augmentation will not be considered until the major remedial components described in this ROD are designed and implemented.

12.3.3.1 Surface Water Management for Storm Water Remediation

The Surface Water Management Program will employ a diverse range of BMPs to control loading of heavy metals and arsenic to Silver Bow Creek, Blacktail Creek, and Grove Gulch during storm water flow conditions. Performance standards for surface water are presented in Section 12.6.3. The document guiding the Surface Water Management Program, which includes the elements described in this section, will be finalized during remedial design.

The Surface Water Management Program employs an iterative process to achieve the ultimate goal of meeting surface water standards during storm events. Each cycle consists of monitoring the drainages and BMP components and then using the data to optimize the BMP components and/or evaluate the need for additional BMPs through loading analysis. After a cycle is completed, the results will be evaluated to determine the progress made in achieving surface water standards during storm flows. Monitoring, analysis, BMP implementation, and program reporting will be completed annually. If goals have not been achieved, the cycle will be repeated. The following 5 steps will be performed for each annual cycle:

1. **Monitoring.** Surface water monitoring will be performed to measure progress in achieving surface water quality standards during storm water flow and to measure the performance on the BMPs implemented in the preceding cycle to provide data for analysis of compliance with action levels and performance standards and to evaluate the degree and location of continued contaminant loading to receiving surface waters.

2. **Compliance Analysis.** Analysis of data to evaluate compliance with performance standards.

3. **Loading Analysis.** Assess contaminant loading to receiving surface waters. This helps identify potential loading sources and assists in determining where new BMPs may be needed.

4. **BMP Selection.** Identification and prioritization (based on the previous steps and other indicators) of specific new BMPs (type and location).

5. **BMP Implementation.** BMPs will be implemented to address compliance with regulatory goals.

In addition, specific monitoring on the performance of catch basins CB-8 and CB-9 shall be conducted during remedial design to determine the effectiveness of these sediment basins and how to optimize their operation.

Under the Selected Remedy, BMPs include, but are not limited to:

- Source controls on mine wastes or contaminated soil with arsenic and lead concentrations below human health action levels, but with elevated concentrations of other contaminants of concern. These could include waste removal or engineered covers over source material along with consolidation and grading.

- Temporary or permanent engineered sediment controls such as: subsurface drains, earthen dikes, straw bale dikes, silt fences, brush barriers, drainage swales, check dams, pipe slope drains, rock outlet protection, sediment traps, manhole sumps, retaining walls, drop structures, or filter strips.

- Curb and gutters to channel run-on and runoff away from source areas.

- Detention/retention basins within storm water drainage basins to reduce (detention) or capture (retention) storm flows and reduce suspended sediment loads from defined precipitation events. Monitoring will be used to determine optimum holding times for suspended load reduction.

- Routing of storm flows away from receiving surface water (i.e., to the Berkeley Pit or to isolated areas or sedimentation basins).

- Removing source materials to a repository.

If BMPs are not effective in achieving surface water quality standards in Silver Bow Creek within a reasonable time frame, lime treatment of storm water runoff will be required. Following the implementation of the remedy, EPA will evaluate the performance of the surface water management and BMP program periodically as part of the five-year review process required by the NCP. Annual storm water compliance analyses will be reviewed every 5 years and compared against past data to identify trends and compared against action levels (DEQ-7 acute aquatic life standards) to assess the magnitude of exceedances. EPA, in consultation with DEQ, will consider data trends and the magnitude of exceedances observed to assess the likelihood that additional BMPs will continue to decrease contaminant loading during wet weather runoff conditions to the point where action levels will be achieved. If EPA determines that further BMPs will not effectively achieve action levels, the RP Group will be directed to begin capturing and treating storm water runoff to the extent practicable. Existing detention/retention basins may be used to capture and store storm water for treatment. To provide ample time for BMPs to be implemented and evaluated for effectiveness, the phased BMP program will be operated through at least two consecutive five-year review cycles or 10 years. Also, a maximum period of 15 years

will be permitted for the phased BMP approach to achieve action levels (DEQ-7 acute aquatic life criteria) before storm water treatment is required.

An evaluation of the amount of storm water that could practicably be treated shall be performed during design. Storm flows up to the maximum practicable design criterion would then be collected and treated by lime precipitation technology. If treatment is required, a conventional lime treatment plant will be constructed for this purpose.

As described in the Solid Media Components, EPA has consulted with the State and other parties to identify appropriate "upfront" BMPs as an initial phase of this portion of the remedy. Sites that have been identified for implementing initial BMPs under the Selected Remedy are listed in Unreclaimed Source Areas Not Exceeding Action Levels, Section 12.3.1.2.

12.3.3.2 Sediment Removal from Blacktail and Silver Bow Creek Channels

Elevated arsenic and metals occur in streambed sediments, the stream banks, and nearby floodplain from Blacktail Creek just above the confluence and through Silver Bow Creek to Lower Area One. The Selected Remedy shall require excavation of contaminated sediment, stream banks, and floodplain wastes from the reach of Blacktail Creek just above the confluence with Metro Storm Drain down to the reconstructed floodplain and stream channel in Lower Area One.

Excavated sediments and other wastes shall be hauled and placed in the Butte Mine Waste Repository or other appropriate EPA-approved disposal site. Contaminated sediments, stream banks, and nearby floodplain wastes and contaminated soils will be removed to minimize impacts to surface water quality. The streambed, stream channel and associated floodplains will be reconstructed in a manner that minimizes the potential for groundwater to discharge to surface water, and planted with appropriate grasses, forbs, trees and shrubs. The stream and floodplain will be reconstructed according to an EPA-approved design.

Following removal of the in-stream sediments, further evaluation of surface water quality in this area will be conducted. If groundwater inflow is found to adversely affect surface water quality, additional hydraulic controls and groundwater capture shall be implemented.

12.3.3.3 Surface Water Management for Base Flow Remediation

During base flow conditions, the discharge of contaminated groundwater to surface water is the primary cause of metals and arsenic contamination in Silver Bow Creek. The groundwater component of the Selected Remedy will be the primary remedial action in addressing surface water contamination during base flow conditions (see Section 12.3.2). This has been clearly demonstrated by the groundwater controls that have been implemented at Lower Area One. As was discussed in Section 5, there has been an order of magnitude improvement in surface water quality in Silver Bow Creek since contaminated groundwater has been prevented from discharging to Silver Bow Creek (see Figure 5-19). The groundwater controls that the Selected Remedy

requires for Metro Storm Drain will provide additional protection of surface waters in Silver Bow and Blacktail Creeks. If groundwater that is not captured by the existing LAO and MSD capture systems is found to discharge to surface water and adversely affect surface water quality, additional appropriate hydraulic controls and groundwater capture shall be implemented.

The BMPs implemented as part of the Selected Remedy for storm water will also benefit water quality during base flow. Finally, the removal of sediments from Silver Bow Creek and Blacktail Creek as described in Section 12.3.3.3 is part of the Selected Remedy for protecting surface water during base flow conditions.

12.3.3.4 In-Stream Flow Augmentation

The Selected Remedy may include the addition of off-site source water if necessary to supplement surface water remedial components to improve the flow and quality characteristics of the water within Silver Bow Creek. However, flow augmentation will not be considered until the major remedial components described in this ROD are designed and implemented. If after major remedial components are implemented, the receiving water is not meeting performance standards, and more improvement to water quality is considered by EPA to be necessary and appropriate, then in-stream flow augmentation may be used. Administrative authorizations will be needed from the Montana Department of Natural Resources and Conservation for water use, per the Montana Water Use Act. Specific engineering evaluations will be performed during design to determine appropriate locations, flow volume modifications, and conveyance channel or culvert sizes and slopes.

12.3.4 Role of Institutional Controls in the Selected Remedy

ICs are non-engineering tools that are integral components of the overall remedy for the OU. ICs serve to protect the response actions (past and future) from degradation. For groundwater, ICs limit use of the resource in order to prevent the public from unacceptable levels of exposure to COCs.

The specific ICs to be used at the site may include some or all of the following: local government use and permitting requirements; Montana floodplain regulations; restrictive covenants; environmental control easements; conservation easements; local zoning; dedicated developments; public groundwater controls; information devices; and enforcement and permit tools with institutional components. A summary of the basic types of ICs and the specific ICs to be used at the site is presented below.

Basic Types of ICs

ICs to be used at the OU were chosen from four basic categories:

- *Governmental.* Significant governmental controls, similar to those used to operate and manage urban areas throughout the country, are already in effect within the BPSOU. BSB currently regulates land use through its zoning regulations and uses the Guidebook for Reclaimed Areas in connection with developing reclaimed areas. State Law requires floodplain regulations and local ordinances must be at least as restrictive

as the State's requirements. These regulations limit the allowable land uses and types of development that can occur to land uses that are consistent and compatible with the technical remedy. The BSB planning office, which administers the building permitting process, enforces these regulations.

- *Proprietary.* These are measures that may be implemented by a landowner by the executing and recording in the county public records an instrument transferring the property or certain interests in the property subject to restrictions and/or affirmative obligations. These restrictions and/or affirmative obligations are in the chain of title to the property and are binding on subsequent landowners. These proprietary ICs may be either private, when the rights or interests are held by a private party, or combination, when the rights or interests are held by a governmental entity or have some potential or actual governmental involvement. They include restrictive covenants, easements, conservation easements, and environmental control easements. Restrictive covenants and easements generally are between private parties and are thus considered "private" forms of proprietary measures. Conservation easements and environmental control easements may be held by either a governmental entity or a statutorily determined "qualified" private entity and may require (in the case of environmental control easements) governmental approval.

- *Informational Devices.* Tools that provide information or notification that residual or capped contamination may remain on site constitute an IC. Such tools already established by BSB County, in cooperation with Atlantic Richfield, include the Blood Lead Poisoning and Abatement Program and a geographical information system.

- *Enforcement and Permit Tools with Institutional Components.* EPA has authority to issue or negotiate UAOs and AOCs to compel the landowner to limit or require certain activities on Federal lands and to issue or negotiate UAOs, AOCs, and consent decrees with respect to private lands. Through the use of such tools, EPA may allocate responsibility among RPs and designate primary and secondary parties.

ICs Specified as Part of the Selected Remedy at the OU

The ICs specified for the OU were created by combining appropriate elements of the categories of ICs listed above, considering both short- and long-term effectiveness. At a minimum, they will include:

- *Controlled Groundwater Area.* A controlled groundwater area will be established in the Alluvial Aquifer TI Zone to prevent domestic use of contaminated water, exacerbation or spreading of existing contamination, or release of highly contaminated groundwater to surface water resources through irrigation. The controlled groundwater area will prevent new well development, except for CERCLA monitoring wells, well systems that treat contaminated water prior to use, and the use of existing domestic and commercial wells. To the extent a controlled groundwater area will not prevent the use of existing wells, an education and well abandonment program will be implemented to persuade owners not to use contaminated water and to voluntarily take existing wells out of service in exchange, for example, for being hooked up to

public water. An administrative entity will be identified under RD/RA to monitor and enforce these restrictions.

- *County zoning and permit requirements.* County zoning and permit requirements will be implemented to ensure that capped waste areas, discrete areas of waste left in place, and other control measures such as storm water controls are not disturbed, mismanaged, or inappropriately developed and that waste taken from these areas is disposed of at the Butte Mine Waste Repository, or if identified as a hazardous waste disposed of at a RCRA C facility. These controls and permits are best implemented with adequate funding for appropriate redevelopment and re-use of affected sites.

- *Deed Notices.* Deed notices will be required for all areas where wastes were capped and left in place or where engineered controls were constructed or other discrete wastes were left in place. The deed notices will notify current and subsequent landowners of the presence of these wastes or engineered controls and ensure that these wastes are not disturbed. In addition, fencing and signs may be required to ensure the integrity of caps and engineered controls.

- *Fencing and Posting.* Where private landowners require fencing or use posting for legitimate reasons relating to prevention of remedy disruption, the Selected Remedy requires the installation of these fences or signs. As noted above, EPA encourages redevelopment and reuse where possible, but that is not always compatible with a landowner's legitimate use plans at a given site.

Zoning and permit requirements are likely to be implemented by Butte Silver Bow County.

EPA will work with the county and responsible parties to ensure that workable and adequate zoning controls and permit requirements are enacted and enforced. This will require funding for the county, and the funding issue will have to be addressed in any enforcement action for this ROD. The controlled groundwater area has been developed by the local water district with funding from the responsible parties, and efforts to finalize and submit the application for a controlled groundwater area to the State Department of Natural Resources, and enforcement of the ban once enacted, will require additional funding. Deed notices are an issue that responsible parties and Butte Silver Bow County will need to work on cooperatively with all affected landowners. Fences and signs are actions that can be taken by the responsible parties which implement the remedy, again in cooperation with local landowners.

12.4 Estimated Cost of the Selected Remedy

A summary of the capital and operations and maintenance costs for the Selected Remedy is provided in Tables 12-3 through 12-9. Costs were derived from the final FS, along with appropriate changes to reflect costs of the expanded BPSOU Residential Metals Abatement Program and upgrades to the storm sewer system. Capital costs are summarized for solid media, groundwater, and surface water in Tables 12-3, 12-4, and 12-5. Annual O&M costs for solid media, groundwater, and surface water are summarized in Tables 12-6, 12-7, and 12-8. Capital and O&M costs for institutional

controls (site wide) are summarized in Table 12-9. Detailed cost backup is provided in Appendix F of the Final FS. Present value analyses are incorporated into the individual tables, where appropriate. The present value analysis was carried forward for 100 years at a discount rate of three percent. Costs for each media in the Selected Remedy were then calculated. These media-specific capital costs and O&M costs were compiled into a cost summary table presented in Table 12-10.

The cost estimate differs from the estimate in the proposed plan. Capital costs were first escalated by a factor of 17.4 percent to reflect inflation in the construction industry from 2004 (FS costs are 2004 costs) to 2006 (USACE 2006). Then, a discount factor of three percent was used in the present value analysis instead of seven percent. A three percent discount factor is used in this ROD because it reflects more realistic investment return and inflation conditions. The cost estimation guidance allows the use of other interest (discount) rates as published by the Office of Management and Budget (OMB). The 30-year real interest rate is three percent, and OMB allows that rate for programs that will have a duration longer than 30 years (OMB Circular No. A-94, January 2006).

A 100-year period of analysis was selected because at a discount rate of 3 percent, the incremental present worth cost beyond this time becomes insignificant. The discount factor at 100 years is 0.052. For example, if a cost of $1,000,000 were anticipated in year 100, the present value of this cost would only be $52,000. When comparing alternative costs in the tens or hundreds of millions of dollars, these costs are insignificant by comparison. However, even though costs are estimated for 100-year duration, this should not be confused with the actual project duration. For example, groundwater treatment alternatives will be required well beyond 100 years, if not in perpetuity.

The present value of the estimated cost of the Selected Remedy is approximately $110 to $157 million (Table 12-10). The range in costs reflects the potential need to build and operate a treatment plant for storm water, in the event that BMPs alone are not effective in achieving water quality standards in Silver Bow Creek. For cost estimation purposes, it was assumed that this decision regarding storm water treatment would be made after about 10 years. The time frame to implement the majority of the components of the Selected Remedy is about 15 years; however, O&M activities will be carried forward in perpetuity.

These cost estimates are based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during engineering design. This is an order of magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

Table 12-3
Summary of Capital Costs for Selected Remedy - Solid Media
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

Item	Notes	Start Year	End Year	FS or PP Cost	Escalation (2004 to 2006)[h]	Unit Cost	Annual Quantity	Total Cost per Year[d]	Discount Factor at 3%[b]	Present Value[g]
Covers in Mine Waste Areas *(areas exceeding lead and/or arsenic action levels needing to be reclaimed)*	I-3, a,b,c,d,h	0	1	$30,800/acre	1.174	$36,160/acre[d]	13.25 acres[a]	$ 691,838	0.971	$ 1,363,613
Granite Mountain Memorial Area	I-10, b,c,h	0	1			--	--	$ 1,198,634	0.971	$ 2,362,508
Syndicate Pit	I-6 c,h	0	0	$ 144,491	1.174	--	--	$ 169,632	--	$ 169,632
Mine Waste Repository Closure	I-16 c,h	0	0	$ 202,007	1.174	--	--	$ 237,156	--	$ 237,156
Residential Metals										
Yard Sampling and Remediation	I-13, c,e,g,h	0	14	$12,300/house	1.174	$14,440/ house	94	$ 1,357,360	11.296	$ 16,690,099
Multi-Pathway/Attic Dust/ Medical Monitoring - first 15 years	I-14, c,f,g,h	0	14	$15,400/house	1.174	$18,080/house	56	$ 1,012,480	11.296	$ 12,449,454
Multi-Pathway/Attic Dust/ Medical Monitoring - after 15 years	I-14, c,f,h,i	15	99			$2,000/house	3	$ 6,000	20.251	$ 121,506
TOTAL PRESENT VALUE CAPITAL COSTS - SOLID MEDIA										**$ 33,390,000**

Notes:

3% discount factor used for Present Value Calculations. Although EPA guidance uses a 7% discount factor for present value calculations, a 3% figure is used in this ROD because it reflects more realistic investment return and inflation conditions. The FS guidance allows the use of other interest (discount) rates as published by the Office of Management and Budget (OMB)The 30-year real interest rate is 3%, and OMB allows that rate for programs that will have a duration longer than 30 years (OMB Circular No. A-94, January 2006).

2004 Costs from the Final FS involving construction activities were escalated to 2006 costs by an index of 17.4 percent. Factor obtained from March 2006 US Army Corps of Engineers Civil Works Construction Cost Index System (USACE CWCCIS) for time period between first quarter fiscal year 2004 to fourth quarter fiscal year 2006 (pages A-17 and A-18).

Notes referencing "I-X" are referring to specific cost tables in the Final FS from 2004.

FS or PP Cost refers to costs as presented in the Final Feasibility Study or Proposed Plan.

Burden and profits included in unit costs.

a. Construction expected to take two years - remaining acreage 27.5 acres, assumed 2 year duration to complete reclamation, total cost divided in half.

b. Construction expected to take two years - total cost for Granite Mountain Memorial Area from FS divided in half.

c. Total Cost represents estimated annual costs and includes direct and indirect costs, contingency, remedial design, and construction management.

d. Unit cost per acre back-calculated from Table I-3 in FS and represents a variety of cover types, but does not include mobilization/demobilization, contingencies, design, etc. The total cost presented above includes these additional indirect costs, but calculation of these costs is not presented in the table.

e. Differs from the Final FS Costs. Assumed 44% of BPSOU properties exceed solid media RGs (see Section 5.2.1.) 0.44x3,200 = 1,408 requiring remediation (see Section 12.3.1.1). Assumed 94 properties per year would need abatement to meet the 15-year timeframe (1,408/15=94). Unit cost based on actual program costs provided by BSB for sampling and remediation, escalated 17.4 percent from 2004 to 2006.

f. Per BSB, 59% of properties needing yard abatements also need house abatements (59% of 1,408 = 831 properties, over 15 years = 56 properties/year). Also partially accounts for medical monitoring and attic dust abatements. Assumed 3 houses per year are abated for attic dust only ($2,000/house) after the 15 year abatement period through year 99.

g. Present Value cost = total cost per year + total cost per year x discount factor. In this way, year zero is not discounted.

h. Costs from 2004 FS escalated to 2006 costs by factor of 17.4 percent (USACE 2006).

i. Discount factor = Year 99-Year 14 (31.4569-11.2961).

Table 12-4

Summary of Capital Costs for Selected Remedy - Groundwater

Record of Decision

Butte Priority Soils Operable Unit

Silver Bow Creek/Butte Area NPL Site

Item	Notes	Start & End Years	Quantity	FS or PP Cost	Escalation (2004 to 2006)[c]	Total Cost	Discount Factor at 3%	Present Value
Groundwater Collection System Components								
MSD Collection and Conveyance	I-23, c			$ 187,720	1.174	$ 220,383		
LAO Collection and Conveyance - modifications	I-23, c			$ 4,000	1.174	$ 4,696		
Treatment Lagoon Components								
Treatment Lagoon Equipment Subtotal	I-23, c			$ 518,220	1.174	$ 608,390		
Direct Construction Subtotal						**$ 833,469**		
Mobilization/Demobilization	I-23		5%			$ 41,673		
Water/Sediment Control	I-23		5%			$ 41,673		
Indirect Construction Subtotal						**$ 83,347**		
Contingency (10% Bid, 5% Scope)	I-23		15%			$ 137,522		
Construction Subtotal						**$ 1,054,338**		
Remedial Design	I-23, e		10%			$ 105,434		
Construction Management	I-23		5%			$ 52,717		
Groundwater Collection and Treatment Total						**$ 1,212,489**		
Cost per year (assume 3 years)	a,f	0-2				**$ 404,163**	1.913	**$ 1,177,327**
Reclamation of Ball Fields and Wetland Demonstration Area								
Wetland Demonstration Area Reclamation	I-3, b		6.7 Acres	$ 206,360	1.174	$ 242,267		
Ball Fields Reclamation	I-3, b		11 Acres	$ 338,800	1.174	$ 397,751		
Direct Construction Subtotal						**$ 640,018**		
Mobilization/Demobilization	I-3		5%			$ 32,001		
Water/Sediment Control	I-3		5%			$ 32,001		
Indirect Construction Subtotal						**$ 64,002**		
Contingency (10% Bid, 5% Scope)	I-3		15%			$ 105,603		
Construction Subtotal						**$ 809,623**		
Remedial Design	I-3		5%			$ 40,481		
Construction Management	I-3		5%			$ 40,481		
Reclamation Total						**$ 890,585**		
Cost per year (assume 3 years)	a,f	0-2				**$ 296,862**	1.913	**$ 864,759**
Saturated Solid Media Managed in Place	I-29	0				**$ 20,000**		**$ 20,000**
Groundwater Monitoring Program Setup								
Install Groundwater Monitoring Wells *(assume 30 wells, avg. 30 feet deep each for costing, $75/ft)*	g	0	30 wells			**$ 67,500**		
Personnel *(2 FTE, 3 weeks, 40 hour week, $50/hour)*	g	0	240 hours			**$ 12,000**		
MSD Pump Test *(2 FTE, 40 hour week, $50/hour)*	g	0	80 hours			**$ 4,000**		
Pump Test Equipment	g	0				**$ 1,000**		
Pump Test Report	g	0				**$ 20,000**		
MSD Subdrain Tracer Test *(2 FTE, 40 hour week, $50/hour)*	g	0	80 hours			**$ 4,000**		
Tracer Test equipment	g	0				**$ 2,000**		
Analytical *(20 samples, $100/sample)*	g	0				**$ 2,000**		
Tracer Test Report	g	0				**$ 20,000**		
Develop GW Monitoring Plan						**$ 25,000**		
Groundwater Monitoring Program Subtotal		0				**$ 157,500**	--	**$ 157,500**
TOTAL PRESENT VALUE CAPITAL COSTS - GROUNDWATER								**$ 2,220,000**

Notes:

3% discount factor used for Present Value Calculations. Although EPA guidance uses a 7% discount factor for present value calculations, a 3% figure is used in this ROD because it reflects more realistic investment return and inflation conditions. The FS guidance allows the use of other interest (discount) rates as published by the Office of Management and Budget (OMB). The 30-year real interest rate is 3%, and OMB allows that rate for programs that will have a duration longer than 30 years (OMB Circular No. A-94, January 2006).

2004 Costs from the Final FS involving construction activities were escalated to 2006 costs by an index of 17.4 percent. Factor obtained from March 2006 US Army Corps of Engineers Civil Works Construction Cost Index System (USACE CWCCIS) for time period between first quarter fiscal year 2004 to fourth quarter fiscal year 2006 (pages A-17 and A-18).

Burden and profits included in unit costs.

Notes referencing "I-X" are referring to specific cost tables in the Final FS.

FS or PP Costs refers to original costs as presented in the Final Feasibility Study or Proposed Plan.

a. Construction expected to take three years, total cost divided by three.

b. Cost of reclamation per acre based on FS table I-3, Construction Subtotal of $847,416/27.5 acres = $30,800 per acre, escalated 17.4%=$36,160.

c. Costs from 2004 FS escalated to 2006 costs by factor of 17.4 percent (USACE 2006).

d. FTE = Full Time Employee

e. Remedial design costs increased from 5% to 10% due to shakedown period evaluation and potential re-design issues.

f. Present Value cost = total cost per year + total cost per year x discount factor. In this way, year zero is not discounted.

g. Groundwater Monitoring Program estimates based on description in Section 12 and professional judgement.

Table 12-5

Summary of Capital Costs for Selected Remedy - Surface Wate

Record of Decision

Butte Priority Soils Operable Unit

Silver Bow Creek/Butte Area NPL Site

Item	Notes	Start and End Years	FS or PP Cost	Escalation (2004 to 2006)[e]	Unit Cost	Quantity	Total Cost	Discount Factor at 3%	Present Value
BMP Program Costs									
Warren Avenue	I-17, a,e		$ 131,697	1.174			$ 154,612		
Anaconda Road/Butte Brewery	I-17, a,e		$ 66,174	1.174			$ 77,688		
Buffalo Gulch	I-17, a,e		$ 415,000	1.174			$ 487,210		
Metro Storm Drain	I-17, a,e		$ 993,420	1.174			$ 1,166,275		
Missoula Gulch	I-17, a,e		$ 537,600	1.174			$ 631,142		
Lower Area One/Butte Reduction Works	I-17, a,e		$ 169,720	1.174			$ 199,251		
Grove Gulch	I-17, a,e		$ 101,037	1.174			$ 118,617		
Blacktail Creek	I-17, a,e		$ 115,185	1.174			$ 135,227		
Silver Bow Creek	I-17, a,e		$ 190,704	1.174			$ 223,886		
Site Wide Storm Sewer Upgrade					$75/ft	40 miles	$ 15,840,000		
BMP Program Costs - Subtotal							**$ 19,033,908**		
Contingency (10% Bid, 5% Scope)	I-17					15%	$ 2,855,086		
Construction Subtotal							**$ 21,888,994**		
Remedial Design	I-17					5%	$ 1,094,450		
Construction Management	I-17					5%	$ 1,094,450		
BMP Program Total							**$ 24,077,894**		
Cost per year (assume 10 years)	c,f	0-9					**$ 2,407,789**	**7.786**	**$ 21,154,834**
Purchase ISCO Surface Water Monitors	I-1		$ 3,500	1.174	$4,109	6	$ 24,654		
Contingency (10% Bid, 0% Scope)						10%	$ 2,465		
ISCO Equipment Total		0-0					**$ 27,119**	--	**$ 27,119**
Silver Bow Creek Sediment Removal:		0-0					**$ 280,000**	--	**$ 280,000**
Storm Water Treatment Plant Components (if necessary)									
Collection and Conveyance System	I-19 e		$ 2,416,804	1.174			$ 2,837,328		
Lime Plant Equipment Subtotal	I-19 e		$ 6,951,080	1.174			$ 8,160,568		
Lime Plant System & Improvements Subtotal	I-19 e		$ 3,684,072	1.174			$ 4,325,101		
Direct Construction Subtotal							**$ 15,322,997**		
Mobilization/Demobilization	I-19					5%	$ 766,150		
Water/Sediment Control	I-19					5%	$ 766,150		
Indirect Construction Subtotal							**$ 1,532,300**		
Contingency (10% Bid, 10% Scope)	I-19					20%	$ 3,371,059		
Construction Subtotal							**$ 20,226,356**		
Remedial Design	I-19					5%	$ 1,011,318		
Construction Management	I-19					5%	$ 1,011,318		
Storm Water Treatment Plant Total (if necessary)							**$ 22,248,992**		
Cost per year (assume 3 years)	c	10-12					**$ 7,416,331**	**2.175**	**$ 16,130,520**
TOTAL PRESENT VALUE CAPITAL COSTS (Low Range)	d								**$ 21,460,000**
TOTAL PRESENT VALUE CAPITAL COSTS (High Range)	d								**$ 37,590,000**

Notes:

3% discount factor used for Present Value Calculations. Although EPA guidance uses a 7% discount factor for present value calculations, a 3% figure is used in this ROD because it reflects more realistic investment return and inflation conditions. The FS guidance allows the use of other interest (discount) rates as published by the Office of Management and Budget (OMB). The 30-year real interest rate is 3%, and OMB allows that rate for programs that will have a duration longer than 30 years ((Circular No. A-94, January 2006).

2004 Costs from the Final FS involving construction activities were escalated to 2006 costs by an index of 17.4 percent. Factor obtained from March 2006 US Army Corps of Engineers Civil Works Construction Cost Index System (USACE CWCCIS) for time period between first quarter fiscal year 2004 to fourth quarter fiscal year 2006 (pages A-17 and A-18).

Burden and profits included in unit costs.

Notes referencing "I-X" are referring to specific cost tables in the Final FS.

FS or PP Costs refers to original costs as presented in the Final Feasibility Study or Proposed Plan.

a. BMP Costs estimated by acreage and engineering judgement as to what may be needed and what can be built in each drainage. See Attachment D of Appendix I of FS.

b. Volume estimate assumes 1,200 feet length x 15 feet width x 1 ft depth.

c. Total cost divided by 10 years for BMP Program and 3 years for storm water treatment plant.

d. Low range cost does not include storm water treatment, while high range costs include storm water treatment in a conventional lime treatment plant.

e. Costs from 2004 FS escalated to 2006 costs by factor of 17.4 percent (USACE 2006).

f. Present Value cost = total cost per year + total cost per year x discount factor. In this way, year zero is not discounted.

Table 12-6
Summary of O&M Costs for Selected Remedy - Solid Media
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

Item	Notes	Start and End Years	Quantity	FS or PP Cost	Escalation (2004 to 2006)[d]	Unit Cost	Total Cost per Year [a]	Discount Factor at 3%	Present Value
Source Area O&M - Completed Reclamation	I-1, d		422 Acres	$300/acre	1.174	$352/acre	$ 148,544		
Contingency (10% Scope, 5% Bid)	I-1, I-3		15%				$ 22,282		
Subtotal		1-99					**$ 170,826**	31.547	**$ 5,389,048**
Source Area O&M - New Reclamation	I-3, d	2-99	27.5 Acres	$300/acre	1.174	$352/acre	$ 9,680		
Contingency (10% Scope, 5% Bid)	I-1, I-3		15%				$ 1,452		
Subtotal		2-99					**$ 11,132**	30.576	**$ 340,372**
BRES Program Costs	I-1, c	1-99	1.5 FTE			$ 93,600	**$ 140,400**	31.547	**$ 4,429,199**
Complete Reclamation Repair	1-3, d,e	50	25	$30,800/acre	1.174	$ 36,160	$ 904,000		
Contingency (10% Scope, 5% Bid)			15%				$ 135,600		
Subtotal							**$ 1,039,600**	0.228	**$ 237,029**
Source Area O&M Total									**$ 10,395,648**
Granite Mountain Memorial Area (includes contingency)	I-10	2-99	40 Acres	$300/acre	1.174	$352/acre	$ 14,080	30.576	**$ 430,510**
Syndicate Pit (includes contingency)	I-6	1-99	4 Acres	$300/acre	1.174	$352/acre	$ 1,408	31.547	**$ 44,418**
Residential Metals	b						$ -		
Mine Waste Repository	I-16	1-99	4.4 Acres	$300/acre	1.174	$352/acre	$ 1,549	31.547	**$ 48,866**
TOTAL ANNUAL O&M COSTS - SOLID MEDIA									**$ 10,920,000**

Notes:

3% discount factor used for Present Value Calculations. Although EPA guidance uses a 7% discount factor for present value calculations, a 3% figure is used in this ROD because it reflects more realistic investment return and inflation conditions. The FS guidance allows the use of other interest (discount) rates as published by the Office of Management and Budget (OMB). The 30-year real interest rate is 3%, and OMB allows that rate for programs that will have a duration longer than 30 years (OMB Circular No. A-94, January 2006).

2004 Costs from the Final FS involving construction activities were escalated to 2006 costs by an index of 17.4 percent. Factor obtained from March 2006 US Army Corps of Engineers Civil Works Construction Cost Index System (USACE CWCCIS) for time period between first quarter fiscal year 2004 to fourth quarter fiscal year 2006 (pages A-17 and A-18).

Burden and profits included in unit costs.

Notes referencing "I-X" are referring to specific cost tables in the Final FS.

FS or PP Costs refers to original costs as presented in the Final Feasibility Study or Proposed Plan.

a. Total Cost represents estimated annual costs.

b. Residential Metals program O&M costs accounted for with capital costs in Table 12-3.

c. FTE = Full Time Employee.

d. Costs from 2004 FS escalated to 2006 costs by factor of 17.4 percent (USACE 2006).

e. Assumption for scenario that previous reclamation fails and needs to be completely redone. Assumed 5 percent of all reclaimed acreage (422+27.5+40+4+4.4 acres) would be reclaimed again in year 50.

Table 12-7
Summary of O&M Costs for Selected Remedy - Groundwater
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

Item	Notes	Start and End Years	Quantity	FS or PP Cost	Escalation (2004 to 2006)[g]	Unit Cost	Total Cost	Discount Factor at 3%	Present Value
Annual Groundwater Treatment Costs									
Lime	I-1, I-23, b		378 tons	$100/ton	1.174	$117/ton	$ 44,226		
Staff (1 operator @ $64,800/yr)	I-23						$ 64,800		
Effluent Quality Testing	I-24						$ 30,000		
Annual Monitoring Reports	I-24						$ 30,000		
Repair/Replace Equipment	I-23 g		5% capital cost		–		$ 58,866		
Sludge Removal/Disposal	I-1, I-23, b			$ 50,000	1.174		$ 58,700		
Electrical/Utilities	I-23, b		1 Year	$ 25,000	1.174	$ 29,350	$ 29,350		
Subtotal							**$ 315,942**		
Contingency (5% Scope, 10% Bid)	I-24		15%				$ 47,391		
Treatment Lagoons O&M Total		1-99					**$ 363,333**	31.547	**$ 11,462,066**
Saturated Solid Media Managed in Place	I-29	1-99					**$ 2,500**	31.547	**$ 78,868**
Reclaimed Ball Fields and Wetland Area O&M	I-3, b	3-99	17.7 acres	$300/acre	1.174	$352/acre	**$ 6,230**	28.663	**$ 178,570**
Groundwater Monitoring	c,d								
Monthly Water Levels (subset)									
Personnel (1 FTE, 1 day, $50/hour)			10 months			$ 400	$ 4,000		
Bi-Annual Water Levels (all wells)									
Personnel (1 FTE, 2 days, $50/hour)			2 months			$ 800	$ 1,600		
Annual Sampling									
Personnel (2 FTE, 3 days, $50/hour)			1 event			$ 2,400	$ 2,400		
Equipment Costs							$ 500		
Analytical Costs (30 samples, $100/sample)			30 samples			$ 100	$ 3,000		
Annual Groundwater Monitoring Reports							$ 30,000		
Subtotal							**$ 41,500**		
Contingency (10% scope, 5% bid)						15%	$ 6,225		
Groundwater Monitoring Total	f	0-99					**$ 47,725**	31.547	**$ 1,553,306**
TOTAL O&M COSTS									**$ 13,270,000**

Notes:

3% discount factor used for Present Value Calculations. Although EPA guidance uses a 7% discount factor for present value calculations, a 3% figure is used in this ROD because it reflects more realistic investment return and inflation conditions. The FS guidance allows the use of other interest (discount) rates as published by the Office of Management and Budget (OMB). The 30-year real interest rate is 3%, and OMB allows that rate for programs that will have a duratio longer than 30 years (OMB Circular No. A-94, January 2006).

2004 Costs from the Final FS involving construction activities were escalated to 2006 costs by an index of 17.4 percent. Factor obtained from March 2006 US Army Corps of Engineers Civil Works Construction Cost Index System (USACE CWCCIS) for time period between first quarter fiscal year 2004 to fourth quarter fiscal year 2006 (pages A-17 and A-18).

Notes referencing "I-X" are referring to specific cost tables in the Final FS

FS or PP Costs refers to original costs as presented in the Final Feasibility Study or Proposed Plan

a. Cost approximate based on sludge management pilot testing at treatment lagoons in 2005

b. Costs from 2004 FS escalated to 2006 costs by factor of 17.4 percent (USACE 2006)

c. Groundwater monitoring costs developed from preliminary monitoring plan outline in Section 12 and judgement. Periodic sampling of all wells every 5 years will occur, however, the cost of the additional effort to sample and report on all wells versus a subset of wells is not significant because the largest cost is the reporting.

d. Groundwater monitoring will include periodic sampling of all wells every 5 years. However, for this cost estimate, the additional effort to sample and report on all wells versus a subset of wells is not significant.

f. Present Value cost = total cost per year + total cost per year x discount factor. In this way, year zero is not discounted.

g. Cost for equipment replacement 5% of capital cost from Table 12-4, which already includes escalation from 2004 to 2006

Table 12-8
Summary of O&M Costs for Selected Remedy - Surface Water
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

Item	Notes	Start and End Years	FS or PP Cost	Escalation (2004 to 2006)[c]	Quantity	Total Cost	Discount Factor at 3%	Present Value
Storm Water TCRA O&M	I-1	1-99	$ 53,000	1.174		$ 62,222	31.547	**$ 1,962,917**
Surface Water Monitoring	I-1	1-99				$ 150,000	31.547	**$ 4,732,050**
BMP Program								
BMP Program O&M (Years 1-5)	I-17, a		$ 383,200	1.174		$ 449,877		
Contingency (15% Scope, 5% Bid)					20%	$ 89,975		
Subtotal		1-4				**$ 539,852**	3.717	**$ 2,006,630**
BMP Program O&M (After Year 5)	I-17, a		$ 484,100	1.174		$ 568,333		
Contingency (15% Scope, 5% Bid)					20%	$ 113,667		
Subtotal		5-99				**$ 682,000**	27.830	**$ 18,980,060**
Surface Water O&M Total								**$ 27,680,000**
Storm Water Treatment Plant (if necessary)								
Storm Water Collection and Conveyance	I-19, c		$ 55,400	1.174		$ 65,040		
Treatment Plant Operation (lime, staff, utilities, sludge management, monitoring, etc.)	I-19, c		$ 960,854	1.174		$ 1,128,043		
Subtotal						**$ 1,193,083**		
Contingency (10% scope, 10% bid)	I-19				20%	$ 238,617		
Storm Water Treatment Plant O&M Total (if necessary)	I-19	13-99				**$ 1,431,700**	21.593	**$ 30,914,698**
TOTAL ANNUAL O&M COSTS (Low Range)								**$ 27,680,000**
TOTAL ANNUAL O&M COSTS (High Range)								**$ 58,590,000**

Notes:

3% discount factor used for Present Value Calculations. Although EPA guidance uses a 7% discount factor for present value calculations, a 3% figure is used in this ROD because it reflects more realistic investment return and inflation conditions. The FS guidance allows the use of other interest (discount) rates as published by the Office of Management and Budget (OMB). The 30-year real interest rate is 3%, and OMB allows that rate for programs that will have a duration longer than 30 years (OMB Circular No. A-94, January 2006).

2004 Costs from the Final FS involving construction activities were escalated to 2006 costs by an index of 17.4 percent. Factor obtained from March 2006 US Army Corps of Engineers Civil Works Construction Cost Index System (USACE CWCCIS) for time period between first quarter fiscal year 2004 to fourth quarter fiscal year 2006 (pages A-17 and A-18).

Notes referencing "I-X" are referring to specific cost tables in the Final FS.

FS or PP Costs refers to original costs as presented in the Final Feasibility Study or Proposed Plan.

a. BMP Costs estimated by acreage and engineering judgement as to what may be needed and what realistically can be built in each drainage. See Attachment D of Appendix I of FS.

b. Total Cost represents estimated annual costs.

c. Costs from 2004 FS escalated to 2006 costs by factor of 17.4 percent (USACE 2006).

Table 12-9

Summary of Capital and O&M Costs for Selected Remedy - Institutional Controls

Record of Decision

Butte Priority Soils Operable Unit

Silver Bow Creek/Butte Area NPL Site

Item	Notes	Start and End Years	Total Cost	Discount Factor at 3%	Present Value
Capital Costs					
Establish IC's	I-2, a	0	$ 50,000	--	$ 50,000
Total Capital Cost					**$ 50,000**
Annual O&M Costs					
Implement Existing IC's	I-1	1-99	$ 5,000	31.547	$ 157,735
Implement New IC's	I-2, c	1-99	$ 10,000	31.547	$ 315,470
Annual O&M Total					**$ 473,200**
TOTAL PRESENT VALUE COSTS					**$ 523,000**

Notes:

3% discount factor used for Present Value Calculations. Although EPA guidance uses a 7% discount factor for present value calculations, a 3% figure is used in this ROD because it reflects more realistic investment return and inflation conditions. The FS guidance allows the use of other interest (discount) rates as published by the Office of Management and Budget (OMB). The 30-year real interest rate is 3%, and OMB allows that rate for programs that will have a duration longer than 30 years (OMB Circular No. A-94, January 2006).

Notes referencing "I-X" are referring to specific cost tables in the Final FS

a. Assumed 600 hours, $75/hr, with 10% project management

b. No Capital Cost associated with existing IC's

c. Assumed annual cost to implement new IC's was 20% of total capital cost

d.Total Cost represents estimated annual costs

Table 12-10
Cost Summary for Selected Remedy
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

Item	Reference Table	Present Value (Low Range)	Present Value (High Range)
Capital Costs			
Solid Media	Table 12-3	$ 33,390,000	$ 33,390,000
Groundwater	Table 12-4	$ 2,220,000	$ 2,220,000
Surface Water (no storm water treatment)	Table 12-5	$ 21,460,000	$ -
Surface Water (storm water treatment necessary)	Table 12-5	$ -	$ 37,590,000
Institutional Controls	Table 12-9	$ 50,000	$ 50,000
Total Capital Costs		$ 57,120,000	$ 73,250,000
Annual Costs			
Solid Media	Table 12-6	$ 10,920,000	$ 10,920,000
Groundwater	Table 12-7	$ 13,270,000	$ 13,270,000
Surface Water (no storm water treatment)	Table 12-8	$ 27,680,000	$ -
Surface Water (storm water treatment necessary)	Table 12-8	$ -	$ 58,590,000
Institutional Controls	Table 12-9	$ 473,200	$ 473,200
Total Annual Costs		$ 52,343,200	$ 83,253,200
Periodic Costs			
5-Year Reviews		$ 306,500	$ 306,500
SELECTED REMEDY COST		**$ 109,800,000**	**$ 156,800,000**

Notes:

3% discount factor used for Present Value Calculations. Although EPA guidance uses a 7% discount factor for present value calculations, a 3% figure is used in this ROD because it reflects more realistic investment return and inflation conditions. The FS guidance allows the use of other interest (discount) rates as published by the Office of Management and Budget (OMB). The 30-year real interest rate is 3%, and OMB allows that rate for programs that will have a duration longer than 30 years (OMB Circular No. A-94, January 2006).

5-Year Review Cost = $50,000 each

12.5 Expected Outcomes of the Selected Remedy

The BPSOU includes a large portion of Walkerville and part of Butte. Most of the OU is located in an older, historic urban setting. The OU encompasses all land use types typical of urban areas: residential, industrial, commercial, and recreational (see Figure 1-3). It includes a number of private and public schools, parks, and playing fields. Several rail lines also run through the OU. There is no agricultural land within the OU, and studies have shown that, due to climate and soil type, gardening is not a common practice in Butte. Table 12-11 presents a summary of the anticipated outcomes of the Selected Remedy by media (solid media, groundwater, and surface water). The expected outcome of the solid media remedy is described separately with respect to residential and non-residential components of the Selected Remedy.

Table 12-11
Expected Outcomes of the Selected Remedy
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

Site Scenario	Residential Components – Solid Media
Land Use and Time Frame	All residential properties within the BPSOU will be sampled and remedial action will be taken for properties exceeding RGs within a 15-year time frame at the most, if done in conjunction with a comprehensive program. If not, yard and indoor dust remediation will be accomplished within 3 years. This will quantify conditions at all residential properties. If done under a comprehensive program, human health will be protected not just from contaminated soils, but also from potential exposures via non-mining related sources.
Groundwater Use and Time Frame	NA
Anticipated Socio-Economic and Community Revitalization Impacts	The residential metals program will be protective of human health and particularly protective of sensitive populations (children, pregnant or nursing mothers, etc.) by prioritizing abatement of their residences. By quantifying COC concentrations at all residential properties, conditions site-wide are known to all residents and BSB county, who can then manage properties appropriately, and after residential properties are abated, can move beyond the "stigma" associated with Superfund in the Butte Community.
Anticipated Environmental and Ecological Impacts	In general, similar to non-residential components, yard removals would mitigate a pathway between source areas and the environment and address human health risks at the BPSOU effectively.
Site Scenario	**Non-Residential Components – Solid Media**
Land Use and Time Frame	Additional reclamation at source areas that exceed RGs for arsenic and lead will protect human health. The remaining reclamation can be completed within a few years. Additional reclamation will enhance the appearance of the Butte Hill. The Granite Mountain Memorial Area reclamation plan will be consistent with local land use planning and will protect visitors from source areas exceeding RGs, while preserving a viewscape of the mining setting that is in a location where risks to human health and the environment are minimized. The Syndicate Pit will be reclaimed in a protective manner and used as a mine training center.
Groundwater Use and Time Frame	NA
Anticipated Socio-Economic and Community Revitalization Impacts	Reclamation in general improves the appearance of the Butte Hill. Reclaimed areas can be used for recreation (open space, trails, etc.) Source areas can be considered for remedy-compatible development (buildings, parking lots, etc. generally make good covers) and should not hamper redevelopment.
Anticipated Environmental and Ecological Impacts	Caps will serve as a barrier between waste materials and the environment, thus effectively addressing human health and environmental impacts. Long term maintenance under the detailed BRES program will ensure long term protection.

Table 12-11 - *Continued*
Expected Outcomes of the Selected Remedy
Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

Site Scenario	Groundwater Components
Land Use and Time Frame	The removals and groundwater capture components already built at LAO and the MSD have drastically decreased contaminant loading to Silver Bow Creek, improved habitat, and have made the areas more attractive visually than before. At LAO, land use will be devoted to water treatment and hydraulic control, but development could be considered in the future as long as it was compatible with the remedy. Existing land use in the MSD will not likely change (i.e., business district) and appropriate development can be considered for the lower reaches of the MSD.
Groundwater Use and Time Frame	There are no viable groundwater resources in the upland setting. Alluvial groundwater has not been used as a municipal source in the past. The remedy will not restore the aquifer to applicable standards in a reasonable period of time. Waste will be left in place. A technical impracticability ARAR waiver, ICs, and a controlled groundwater area will be required.
Anticipated Socio-Economic and Community Revitalization Impacts	No negative socio-economic impacts because extensive and disruptive removal of saturated waste materials will not occur.
Anticipated Environmental and Ecological Impacts	Groundwater will be captured and treated, preventing degradation of Silver Bow Creek.
Site Scenario	**Surface Water Components**
Land Use and Time Frame	Regulatory driver for additional reclamation on the Butte Hill (i.e., source areas that do not exceed human health RGs). Silver Bow Creek channel reconstruction and sediment removal will further protect environmental receptors, enhance environmental habitat, and make the stream corridor attractive for recreation and development that would be compatible with the remedy.
Groundwater Use and Time Frame	NA
Anticipated Socio-Economic and Community Revitalization Impacts	The BMP program will also improve/upgrade storm water infrastructure and the upland setting on the Butte Hill, further enhancing the appearance of the Butte Hill.
Anticipated Environmental and Ecological Impacts	With groundwater capture and treatment, channel reconstruction, sediment removal, an effective BMP program, environmental conditions in Silver Bow Creek will likely be able to support a fishery, meeting this RAO. BMPs will decrease contaminant loading to Silver Bow Creek during storm events to acceptable levels.

12.6 Performance Standards

This ROD defines performance standards for solid media, groundwater, and surface water at the BPSOU that will be used to measure the overall effectiveness of the remedy over the long term. Performance standards are directly linked to the long-term protection of human health and the environment from contaminants of concern present at the BPSOU, and include the final ARARs for the site (Appendix A). Performance will be monitored through comprehensive and interrelated monitoring programs for each media, respectively. These monitoring programs will be planned, reviewed, and approved by EPA.

12.6.1 Solid Media

Action levels for contaminated solid media in residential and non-residential portions of the BPSOU are shown in Tables 12-1 and 12-2, respectively. All contaminated solid media within the BPSOU containing concentrations of arsenic, lead, or mercury above the respective action levels will be addressed. Also, source areas that do not exceed action levels will be addressed if diagnostic monitoring performed as part of the surface water management and BMP program indicates that the source area contributes contaminant loads to receiving surface waters during wet weather runoff conditions. In residential areas, yard soils will be removed and replaced and interior dust will be removed. In non-residential areas, source areas will be addressed using land reclamation techniques including partial removal of contaminated materials, grading, capping with coversoil, and revegetation.

The Butte Reclamation Evaluation System establishes the performance standard for all solid media response actions under the Selected Remedy. The system is specifically designed for use in the upland environment of Butte. To accommodate the diverse land types and end land uses within the BPSOU, the BRES is designed to address reclaimed uplands in residential, recreational, and commercial/industrial land settings, excluding: manicured residential lawns and yards, and playgrounds. The system also has components that allow it to be applied to areas reclaimed as open space within this urban setting. Reclaimed areas, including cover soil caps, must achieve the proposed performance standards described by EPA in the Butte Reclamation Evaluation System document (Appendix E). This system is a site-specific tool to evaluate the stability, integrity, and degree of human and environmental protectiveness afforded by response actions initiated on lands impacted by mining within the OU.

The Butte Reclamation Evaluation System is an evaluation tool for reclaimed and revegetated land, relying on routine inspections to assess the:

- Condition and diversity of vegetative cover
- Presence of erosion
- Condition of site edges
- Presence of exposed waste material
- Presence of bulk soil failure or mass instability
- Presence of barren areas or gullies

The system also sets corrective action "triggers" as listed above. Based on the periodic monitoring and evaluation of response action sites, the triggers noted above will prompt corrective action. Vegetated cover soil caps must support a diverse plant community including native species to the extent that the constituents of the vegetation cover are not incompatible with the remedy.

12.6.2 Groundwater

The Selected Remedy requires the capturing and treating groundwater as described above. The Selected Remedy will not and is not intended to clean up groundwater to meet groundwater standards (MCLs). As stated above, groundwater standards for the alluvial aquifer will be waived. Therefore, there are no performance standards for groundwater in the alluvial aquifer that is covered by the TI waiver. The TI boundary is shown in Figure 12-6. Since the Selected Remedy requires that contaminated plumes be prevented from migrating outside the established TI zone, the boundary for the TI zone represents the Point of Compliance boundary for groundwater. Groundwater quality standards (Table 8-1) will apply to groundwater at and beyond the edge of this boundary.

In other areas of the TI zone, neither the extent of contamination nor the groundwater flow direction is well enough defined. Based on the data collected during the groundwater monitoring program, additional points of compliance may be determined necessary in remedial design (e.g., southern edge of the MSD).

Groundwater contamination outside of the boundary of the TI zone in excess of groundwater performance standards identified in Table 8-1 shall constitute a violation triggering one or more of the following actions by EPA: 1) re-assess groundwater collection and treatment effectiveness components of the Selected Remedy (e.g., use of additional subdrains, hydraulic control channels, or extraction wells); or 2) complete a TI evaluation for the aquifer in areas of groundwater contamination located outside the compliance boundary.

Design of a groundwater treatment system and sludge disposal facility must be approved by EPA, in consultation with DEQ, and the construction, operation, and maintenance of the facility will be monitored by EPA and the State. The facility will be designed to meet State and Federal water quality standards. Design, construction, maintenance, and monitoring of the facility will be conducted according to the engineering standards established during remedial design, and must be approved by EPA in consultation with the State. Treated water discharged to Silver Bow Creek shall meet all discharge requirements set forth in the ARARs (Appendix A), and this ROD (see Section 12.6.3.1). Discharge from the groundwater treatment plant will meet applicable water quality criteria. This discharge to surface water is discussed in greater detail in the following section.

12.6.3 Surface Water

The overall remedial goal for Silver Bow Creek is to maintain the in-stream concentration of site-specific COCs (aluminum, arsenic, cadmium, copper, lead, mercury, silver and zinc) below the numeric surface water quality standards identified in DEQ-7 for all flow conditions throughout the length of Blacktail Creek, Grove Gulch Creek and Silver Bow Creek within and directly downstream of the BPSOU.

This ROD requires an EPA approved comprehensive, long-term surface water monitoring program that will include collection of compliance and diagnostic flow

and chemistry data for normal flow and wet weather conditions in receiving surface waters and within intermittent storm water conveyances at the BPSOU. The monitoring program will use and build upon monitoring and sampling components described in the BPSOU RI/FS and Lower Area One Expedited Response Action Phase II Monitoring Program (ESA 1998) and the Interim Surface Water Monitoring Plan, which was developed for storm water data collection during the interim period between the completion of the RI/FS and the Consent Decree.

12.6.3.1 Point Source Discharge from Groundwater Treatment Facility

As previously described, the lagoon treatment facility will be evaluated and re-designed, if necessary, to treat contaminated groundwater captured from MSD and LAO. Treated water discharged to Silver Bow Creek shall meet all Federal and State discharge requirements. Because of the water quality improvements in Silver Bow Creek, basing the effluent standards on "I" class standards ("one-half of the mean in-stream concentration") is becoming less and less relevant. Therefore, the treatment plant will meet "end of pipe" discharge standards defined as the lesser of the chronic or human health surface water quality standards presented in Table 8-2.

Paired total recoverable and dissolved samples will be collected. Hardness-based standards will be calculated using the hardness of the sample collected from the treatment plant discharge, as directed by Circular DEQ-7. Two, 24-hour composite samples will be collected each week on random days to monitor compliance (for example, sampling will not be limited to Mondays and Thursdays).

Other analytes that shall be monitored include: dissolved calcium and magnesium (for hardness calculations), total alkalinity, total dissolved solids, total suspended solids, and sulfate. Temperature and pH will be monitored daily. Additional required field parameters will be determined based on the operational needs of the facility.

12.6.3.2 In-Stream Compliance during Normal Flow Conditions

In-stream surface water quality must meet surface water ARARs during normal flow conditions. Surface water flow and chemistry will be collected at least monthly from compliance monitoring stations GG-01 (Grove Gulch), SS-04 (Blacktail Creek), and stations SS-05, SS-05A, SS-06A, SS-06G, and SS-07 in Silver Bow Creek (Figure 12-7). All in-stream water quality samples shall be collected using the channel width integrated composite technique specified in the Clark Fork River Superfund Site Investigations Standard Operating Procedure (CFRSSI SOP) SW-1 - Collection of Surface Water Samples. Because of poor mixing at station SS-07, and the critical nature of this station, samples at SS-07 shall be collected using the depth and width integrating technique (used by the USGS), breaking the stream into 20 to 25 sections from bank to bank, and a churn splitter. Annual data summary and interpretation reports will be submitted to EPA showing the location, frequency and duration, and magnitude of exceedances for all COCs. The annual report will also present an interpretation for the source and significance of exceedances that occurred during the monitoring year.

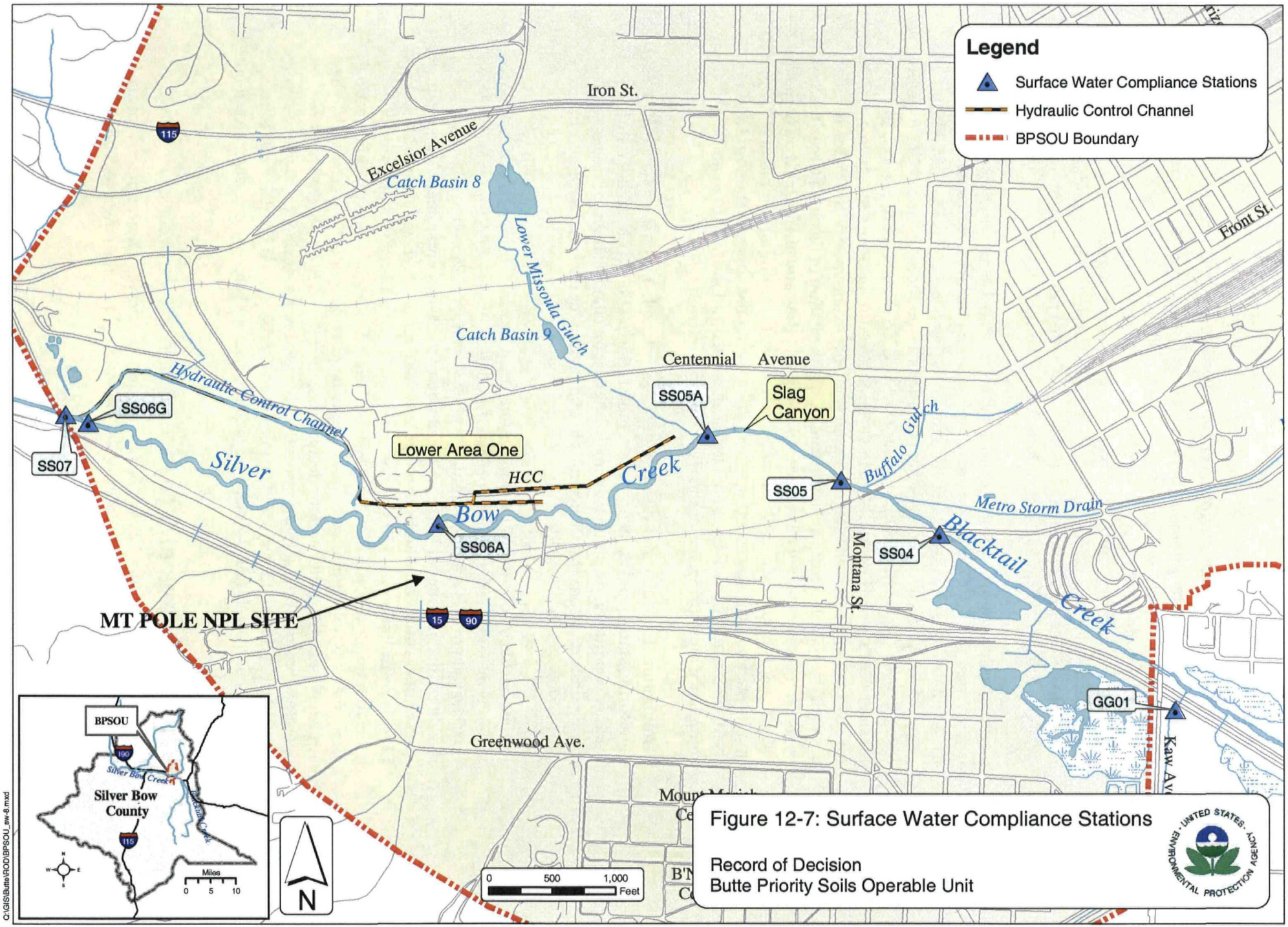

Figure 12-7: Surface Water Compliance Stations

Record of Decision
Butte Priority Soils Operable Unit

12.6.3.3 Compliance during Wet Weather Flow Conditions

Wet weather flow conditions are defined as flow greater than 50 cfs at monitoring station SS-07 in Silver Bow Creek or greater than 35 cfs at station SS-04 in Blacktail Creek. These threshold flows are substantially above normal base flows at the respective monitoring stations and were chosen as general guidelines to help ensure that data are collected during true wet weather conditions. These guidelines are subject to change depending on climatic or other site changes (e.g., prolonged drought, future discharge from the Butte Mine Flooding OU, etc.).

Compliance during wet weather conditions means consistently measuring concentrations of COCs at in-stream compliance monitoring locations that are below the Montana DEQ-7 acute aquatic life standards (Table 8-1). This ROD establishes points of compliance for wet weather conditions at monitoring stations GG-01 (Grove Gulch), SS-04 (Blacktail Creek), and stations SS-05, SS-05A, SS-06A, SS-06G, and SS-07 in Silver Bow Creek (Figure 12-7). However, to account for upstream sources of COCs that will not be addressed by the Selected Remedy, event-specific flow and chemistry data will be collected from an additional upstream station in Blacktail Creek (above SS-04) and these data will be considered relative to flow and chemistry data at the in-stream points of compliance in surface water when determining compliance. If water quality standards are exceeded upstream, flow weighted concentrations of COCs at the upstream station will be subtracted from concentrations measured at the compliance monitoring stations to determine compliance.

A minimum of one automated sampler will be installed at each compliance monitoring station and at the upstream monitoring station to obtain data during wet weather conditions. Additional samplers may be installed as deemed necessary during design, at some or all locations to obtain data for different portions of the storm hydrograph.

At the conclusion of each wet weather monitoring season, an annual data summary and interpretation report will be prepared and submitted to EPA for review. EPA will consider data trends and the magnitude of exceedances observed to assess the likelihood that additional BMPs will continue to decrease contaminant loading during wet weather runoff conditions to the point where action levels will be achieved. If EPA, in consultation with DEQ, determines that further BMPs will not effectively achieve action levels, the RP Group will be directed to begin capturing and treating storm water runoff to the extent practicable. To provide ample time for BMPs to be implemented and evaluated for effectiveness, the phased BMP program will be operated through at least two consecutive five-year review cycles or 10 years. Also, a maximum period of 15 years will be permitted for the phased BMP approach to achieve action levels (DEQ-7 acute aquatic life criteria) before storm water treatment is required.

12.7 Environmental Justice

In 1994, Executive Order 12898, "Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations," became effective. The purpose

of the Executive Order is to ensure that environmental actions or decisions do not result in disproportionately high and adverse human health or environmental effects by ensuring that the analysis of these effects includes the examination of secondary effects, cultural concerns, and cumulative impacts/effects.

The objective of the environmental justice evaluation conducted at the BPSOU was to determine if high disproportionate and adverse human health or environmental effects resulted from remediation activities at the site.

Achieving environmental protection for all communities is a fundamental part of the EPA's mission. Since 1992, the Agency has made this unequivocal commitment to identifying and addressing disproportionately high and adverse human health and environmental effects in minority and/or low income communities.

The Environmental Justice Program has completed its evaluation of the environmental actions undertaken at the BPSOU and based on a review of the Administrative Record and interviews of the site program managers, has determined that the EPA has taken significant steps to address environmental and health concerns at the BPSOU. Residents that live in the BPSOU area are the beneficiaries of the remedial and removal work that EPA has performed. The results of the environmental response actions demonstrate that low-income and minority citizens are being protected from disproportionate impacts.

Based upon a review of the Administrative Record, discussions with the staff of the Montana EPA Office, and citizen concerns, the Region 8 Environmental Justice Office offers the following conclusions and recommendations:

1. In Butte, Montana, EPA's overall mission has been to ensure that all of Butte's citizens receive protection from significant risks to human health and the environment. This mission has been a priority from the time that the designation as an NPL site was first made. Although the Montana EPA office may not have stated explicitly that they are dealing with a low-income community, they have acted to protect the low-income community as they have in fact provided environmental protection to all segments of the population of the BPSOU.

2. The Administrative Record indicates that the low-income community at the BPSOU has been provided with means that ensure that their views are heard. Public meetings are well advertised, efforts have been made to be inclusive to all interested groups and meeting places and times have been varied so that the largest groups of people could attend.

3. Because of the complexity of the BPSOU site, several removal actions are to be expected as EPA works to protect human health and the environment. The feasibility study developed by the EPA, reviewed each of the removal actions taken at the BPSOU and reviewed those actions utilizing the nine NPL evaluation criteria.

4. The Montana EPA Office has investigated the attic dust concern. The BSB Lead Abatement Program has cleaned up numerous attics.

5. EPA has designated a local spokesperson for the BPSOU site and has established a project office in the City of Butte. The Montana EPA Office has designated a local spokesperson for the BPSOU for each emergency response action taken. Both spokespersons work to keep the public informed and to respond to questions that may arise.

6. Low-income mothers and children have been determined to be an at-risk group and therefore, EPA has initiated several different environmental and health programs to address lead contamination. Residential yards, homes, parks and play areas have been remediated. Homes have had attics, basements, siding, carpets, and paint removed, replaced, or remediated by an acceptable method. Low-income citizens at this site do not appear to be receiving any negative or disparate treatment.

In conclusion, the Region 8 Environmental Justice Program believes that the EPA has served all communities at the BPSOU in the same manner as others similarly situated. Looking at the totality of circumstances at this site and at this potential Environmental Justice low-income community, the EPA has worked to protect all Butte citizens from significant risks to human health and the environment. This work has been done in a fair manner, with meaningful public involvement.

Section 13 Statutory Determinations

Under CERCLA Section 121 and the NCP, EPA must select a remedy that is protective of human health and the environment, complies with or appropriately waives ARARs, is cost effective, and utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that includes treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element. The following sections discuss how the Selected Remedy meets these statutory requirements.

13.1 Protection of Human Health and the Environment

The Selected Remedy includes components to address human health and environmental risks associated with mining-related wastes and contaminated soils in residential and non-residential areas, residential indoor and attic dusts, alluvial groundwater, and surface water. Unacceptable human health or environmental risks identified in the risk assessment process will be addressed. The Selected Remedy will be monitored and maintained through comprehensive programs using institutional controls, monitoring, and maintenance. There are no short-term threats associated with the Selected Remedy that cannot be readily controlled through applicable health and safety requirements, monitoring, and standard construction practices. In addition, no adverse cross-media impacts are expected from the Selected Remedy.

13.1.1 Solid Media

Non-Residential Source Areas

Non-residential areas include previously reclaimed source areas, unreclaimed source areas, sites not granted "conditional no further action status", and areas such as the Syndicate Pit and Granite Mountain Memorial. The Selected Remedy will protect human health and the environment through the prevention of direct contact with contaminants in these areas. Engineering controls will effectively isolate waste materials, thus preventing human and environmental exposures. These engineering controls include source removal to a repository, consolidation, grading, capping, and land reclamation for areas exceeding lead and arsenic action levels and other source areas demonstrated to contribute contaminant loads to receiving surface waters. Protection will be maintained via a comprehensive O&M plan to ensure the reclamation is achieving performance standards set forth in the BRES. Institutional controls, such as county zoning and permit requirements, will be implemented to ensure that the remedy is not disturbed inappropriately.

Residential Areas

The Selected Remedy addresses elevated arsenic, lead, and mercury in residential areas in two ways. First, all residential properties in the OU will be sampled and those that exceed action levels will be remediated. Second, the Selected Remedy hopes to retain the multi-pathway program intended to further protect human health by

providing a reduction in COCs from a range of potential sources. The program is designed to comprehensively help prevent residential exposures with actions that address a variety of sources, some of which are not mining-related and would not normally be remediated under Superfund (e.g., lead-based paint). The potential sources of lead, arsenic, and/or mercury exposure that will be addressed include soil, house dust, non-living space dust (only if an exposure pathway is established), and interior paint (lead only for paint). This inclusive approach prioritizes residential cleanups to take into account the presence of affected or sensitive populations and non-mining sources of contaminants. EPA believes that the combined programs are the most protective of human health in the BPSOU in the long-term. The multi-pathway program protects sensitive populations from all pathways of exposure, while the all-encompassing sampling and remediation program ensures that all properties within the BPSOU that exceed RGs will ultimately be addressed.

13.1.2 Groundwater

Hydrogeologic conditions in the Metro Storm Drain and LAO areas (i.e., shallow bedrock) allow for the capture of nearly all alluvial groundwater prior to exiting the basin. This groundwater will be routed to a lime precipitation treatment facility at LAO for removal of contaminants and then discharged to Silver Bow Creek. The discharge shall meet the lesser of the chronic aquatic life or human health surface water quality standards presented in Table 8-2. Although the Selected Remedy will not achieve compliance with State standards (DEQ-7) for groundwater in a reasonable time-frame, discharge of metals-contaminated groundwater to surface waters will be prevented.

Base flow from Missoula Gulch will be routed to the LAO hydraulic control channel for treatment along with captured groundwater.

West Camp water from the Butte Mine Flooding Operable Unit will also be routed to the LAO treatment facility. The LAO treatability study showed that the lime treatment facility could effectively treat the combination of West Camp water and alluvial groundwater.

Municipal drinking water is provided from a source outside Butte and domestic use of contaminated groundwater is presently controlled by an ordinance that discourages residential well use. As part of the ICs package, use of alluvial groundwater will be prevented by the expansion of a groundwater control area to include other portions of the BPSOU and possibly other measures. Extensive groundwater monitoring will be conducted to ensure that the groundwater controls are effective and protective of receiving surface waters.

13.1.3 Surface Water

The Selected Remedy will address human health and environmental risks to surface water through the removal of remaining contaminated stream sediments and streambank wastes, and the implementation of a surface water management and BMP program to reduce contaminant loading from storm water runoff. Sediments and

streambank wastes will be removed from Blacktail Creek just above the confluence with the Metro Storm Drain and along Silver Bow Creek down to the reconstructed channel at LAO.

Metals occur in discrete waste piles and are disseminated in soils across the surface of the Butte Hill and, as a result, are readily carried by storm water runoff resulting in exceedances of acute water quality standards in receiving streams during most runoff events. The BMP approach for storm water compliance is established nationally as the most effective means to mitigate impacts from runoff at urban and industrial sites. The BMP approach specified in this ROD is an iterative, site-specific program designed to monitor, identify sources of contamination, and take appropriate corrective action. It will be an aggressive program to monitor water quality in Silver Bow Creek, use these data to target problem areas on the Butte Hill, and design and implement site-appropriate BMPs. The effectiveness of the BMPs will be assessed through continued monitoring. It is likely that monitoring will identify previously unknown source areas that should be addressed. If BMPs are not effective in achieving surface water quality standards in Silver Bow Creek, lime treatment of storm water runoff would be required.

13.2 Compliance with ARARs

The final determination of ARARs by EPA is listed in Appendix A of this ROD. Section 121(d) of CERCLA requires that remedial actions attain a degree of cleanup that ensures protection of human health and the environment and that those remedial actions comply with or appropriately waive ARARs. There are three types of ARARs: contaminant-specific, action-specific, and location-specific.

ARARs for the Butte Priority Soils OU were identified and thoroughly evaluated by EPA as part of the Feasibility Study Analysis of Alternatives. Overall, the preferred remedy is expected to eventually achieve compliance with the key ARARs, except for Federal and State groundwater quality standards in the alluvial aquifer in the Metro Storm Drain and in Lower Area One. A waiver for certain groundwater ARARs is provided in this ROD[7].

The following briefly discusses the most significant of those ARARs for solid media, groundwater, and surface water. Except where noted, this discussion applies to both the Selected Remedy site-wide and the Selected Remedy for the Metro Storm Drain.

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[7] See footnote 3 on page D-12 for an explanation of how this waiver of groundwater ARARs also applies to possible floodplain or solid waste ARARs, which may apply to waste left in place in current floodplains.

13.2.1 Solid Media

The Selected Remedy for solid media at the BPSOU includes monitoring engineering covers, vegetation, and solid media left in place; operations and maintenance of past and future actions; ICs; compliance with existing mandated actions; the BPSOU Residential Metals Abatement Program for residential contamination; source area covers; limited future waste removal; and waste repository management. Waste removal refers to the potential removal of source areas possibly identified by the storm water monitoring program or by the ICs.

Because "active management" of solid wastes is planned for certain waste areas (not all waste left in place), certain location-specific federal solid waste[8], mining, and waste regulations and state[9] solid waste regulations are ARARs at the BPSOU. Also, action-specific state solid waste requirements are applicable ARARs[10], and will by complied with if wastes are excavated and disposed in the future.

Action-specific reclamation requirements related to solid media are ARARs for the OU[11] and will be met by the Selected Remedy. This requires revegetation of the land as rapidly, completely, and effectively as the most modern technology and the most advanced state of the art will allow. Relevant and appropriate hydrogeology regulations under this act are also ARARs that will be met by the Selected Remedy.

13.2.2 Groundwater

Capturing groundwater and diverting for treatment provides for long-term protection of Silver Bow Creek but does not achieve ARARs in the alluvial aquifer. The contaminant-specific ARARs for groundwater, shown in Section 8, will not be met. The Selected Remedy does not call for removal of any additional source areas within LAO or Metro Storm Drain. EPA has determined that complete removal of these source areas is not feasible and would not have a significant impact on the eventual attainment of ARARs, because contamination has already spread well beyond the boundaries of the source areas and secondary sources within the alluvium will continue to result in exceedances of groundwater quality standards even if source areas are removed. Additionally, the cost and disruption to the community from removing wide-spread source areas in this urban corridor cannot be justified by the results. This is explained more fully in the TI Evaluation document, and in EPA's detailed response to comments on the TI Evaluation.

The contaminant-specific ARARs for alluvial groundwater will be waived within the TI Evaluation boundary. Groundwater contamination will be addressed via

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[8] Solid Waste Disposal Act, Surface Mining Control and Reclamation Act, Resource Conservation and Recovery Act

[9] Montana Solid Waste Management Act (75-10-201 et. seq. MCA)

[10] Montana Solid Waste Management Regulations (ARM 15.50.505(2))

[11] Montana Strip and Underground Mine Reclamation Act (82.4.201 to 205 MCA)

groundwater capture and lime treatment. Groundwater will be controlled and captured via the LAO hydraulic control channel and the subdrain in the Metro Storm Drain. Captured groundwater will be routed to a lagoon treatment facility at LAO. Remaining saturated solid media in LAO and the Metro Storm Drain will be left in place. Treated water discharged to Silver Bow Creek shall meet all State and Federal point source discharge requirements. Compliance monitoring locations will be specified in the site-wide monitoring program and finalized during Consent Decree negotiations. Sludge produced shall be disposed of in compliance with Federal and State solid waste regulations.

The Selected Remedy for groundwater also specifies the establishment of ICs to prevent use of the aquifer as a drinking water source and an operations and maintenance programs to monitor past and future groundwater actions. To the extent a controlled groundwater area will not prevent the use of existing wells, an education and well abandonment program will be implemented to persuade owners not to use contaminated water and to voluntarily take existing wells out of service in exchange, for example, for being hooked up to public water. An administrative entity will be identified under RD/RA to monitor and enforce these restrictions. The RP Group will be responsible for developing, funding and implementing the ICs as part of the final site-wide ICs Plan.

13.2.3 Surface Water

The State of Montana has promulgated specific water quality standards applicable to the use designation of Silver Bow Creek[12]. Those standards will be applied to all chemicals of concern identified at the BPSOU, both to point sources affected or created by the cleanup and to ambient water. However, discharges from groundwater and storm water treatment systems must meet the lesser of the chronic aquatic life or human health surface water quality standards presented in Table 8-2. If the State standards are changed to be less stringent, the Federal water quality criteria will be identified as the appropriate ARARs.

Surface water at the BPSOU is impacted by contributions of contaminated groundwater and storm water. The Selected Remedy will evaluate the contribution from groundwater as remediation progresses and will ensure that appropriate storm water controls are implemented.

Storm water controls will be implemented based on site-specific evaluation. These controls may include, but are not limited to: storm water retention basins, rerouting, and engineered sediment controls. The storm water controls will meet the applicable state storm water ARARs[13] that require general storm water permits for certain

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[12] MT Water Quality Act (Administrative Rules of Montana [ARM] 17.30.607 (l)(a)(iii)]

[13] MT Pollutant Discharge Elimination System (ARM 17.30.601 et seq. and 17.30.1301 et seq., including 17.30.1332)

activities and refer to the requirement of BMPs to minimize or prevent discharge that may adversely affect human health or the environment.

A monitoring program will evaluate the impacts of the storm water controls on receiving water quality. Additional controls will be implemented if the monitoring program indicates further action is needed.

This combination of monitoring and controls is expected to gradually reduce concentrations of contaminants in surface water, allowing eventual achievement of the concentration-specific ARARs. The ARARs allow for the gradual attainment of requirements in already impacted streams, with the goal of eventual attainment of ARARs.

If the storm water controls are not effective, storm water up to a specific design storm will be captured and treated with lime before being released. EPA, in consultation with DEQ, will make the final determination concerning the effectiveness of the storm water program. The preferred remedies also specify the use of ICs and an operation and maintenance program to ensure the success of interim and final remedial actions.

Certain Federal and State location-specific ARARs are applicable to surface water at the BPSOU because much of the site lies within the floodplain of Silver Bow Creek[14]. It is not anticipated that the Selected Remedy for the OU will have an adverse impact on floodplains or wetlands at the site; if anything, the Selected Remedy would likely improve these areas. However, EPA will consult with the U.S. Fish and Wildlife Service to determine the existence and category of wetlands present at the site and any needed avoidance or replacement. If the Selected Remedy, or subsequent alterations, will impact stream banks or streambeds, EPA will also consult with the U.S. Fish and Wildlife Service; Montana Department of Fish, Wildlife and Parks; Butte-Silver Bow, and the local conservation district, as needed.

13.2.4 Other ARARs

Several federal location-specific ARARs are applicable to the OU and will be met by the Selected Remedy through consultation with the appropriate state and federal agencies and other resources. These ARARs include a variety of acts and treaties[15]

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[14] Federal: Fish and Wildlife Coordination Act (40 CFR 6.302(g)), Floodplain Management Order and Protection of Wetlands Order ((40 CFR Part 6 Appendix A Exec. Order 11,988 and 11990, respectively). State: Floodplain and Floodway Management Act (ARM 36.15.101(13)) Natural Streambed and Land Preservation Standards (Montana Code Annotated [MCA] 87-5-502 and 504)

[15] Endangered Species Act (40 CFR 6.302(h)); National Historic Preservation Act (40 CFR 6.301(b)); Archeological and Historic Preservation Act (40 CFR 6.301(c)); Historic Sites, Buildings, and Antiquities Act (40 CFR 6.310(a)); Migratory Bird Treaty; Bald Eagle Protection Act; and Native American Grave Protection and Repatriation Act

designed to protect endangered species, bald eagles, and migratory birds; encourage historic, archeological, and antiquities preservation; and protect Native American graves. EPA will involve the Tribes and the U.S. Fish and Wildlife Service and historical preservation agencies in remedial design to ensure compliance with these ARARs.

Federal and state standards for air[16] are action-specific ARARs at the OU. These standards are applicable to releases of lead and particulate matter during remediation. EPA anticipates that these ARARs can be met through the implementation of appropriate, standard operating procedures.

13.3 Cost Effectiveness

In EPA's judgment, the Selected Remedy is cost-effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness" [NCP § 300.430(f)(1)(ii)(D)]. This was accomplished by evaluating the overall effectiveness of the Selected Remedy and comparing that effectiveness to the overall costs. Overall effectiveness was evaluated by examining how the Selected Remedy meets three of the balancing criteria in combination - long-term effectiveness and permanence; reduction in toxicity, mobility, and volume; and short-term effectiveness. Overall effectiveness of the remedial alternatives was then compared to costs to determine cost-effectiveness. The relationship of the overall effectiveness of the alternatives was not necessarily proportional to costs.

It is important to note that more than one cleanup alternative may be cost-effective, and that Superfund does not mandate the selection of the most cost-effective cleanup alternative. In addition, the most cost-effective remedy is not necessarily the remedy that provides the best balance of tradeoffs with respect to the remedy selection criteria nor is it necessarily the least-costly alternative that is both protective of human health and the environment and ARAR-compliant.

Net present worth costs for each alternative were compared (see the evaluation of comprehensive alternatives in Table 10-1). The range of costs for each alternative represents the range and possible scope of actions to address mine waste and contaminated soil on the Butte Hill, storm water runoff, the treatment of collected groundwater, and different Metro Storm Drain waste material options. The cost of the Selected Remedy is expected to be $110 to $157 million (Table 12-10). EPA believes an appropriate balance between cost-effectiveness and adequate protectiveness is achieved in the Selected Remedy.

A significant amount of attention was focused on the remedy for the Metro Storm Drain area. Complete removal of the wastes in the Metro Storm Drain, as discussed in the analysis of alternatives, could cost $220 million, but would not effectively clean up

[16] Federal Clean Air Act(40 CFR 50.6) and Clean Air Act of MT (ARM 17.8.233)

the aquifer within a reasonable time frame to the point that groundwater standards are achieved or that long-term capture and treatment is not required. Analyses indicated that even by removing wastes, low aquifer permeability and wide distribution of residual contamination would prohibit the aquifer from meeting groundwater standards for hundreds of years. Regardless of the scale of the removal, groundwater would need to be treated for the foreseeable future. Additionally, extensive removals in the urban Metro Storm Drain corridor would cause significant disruption and pose short-term risks to the community. Managing the wastes in-place was determined by EPA to be both cost-effective and protective.

13.4 Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable

This determination looks at whether the Selected Remedy provides the best balance of trade-offs among the alternatives with respect to the balancing criteria set forth in NCP §300.430(f)(1)(i)(B), such that it represents the maximum extent to which permanence and treatment can be practicably utilized at this site. NCP §300.430(f)(1)(ii)(E) provides that the balancing shall emphasize the factors of "long-term effectiveness" and "reduction of toxicity, mobility, or volume through treatment," and shall consider the preference for treatment and bias against off-site disposal. The modifying criteria were also considered in making this determination.

EPA has determined that the Selected Remedy represents the maximum extent to which permanent solutions and treatment technologies can be used in a cost-effective manner at the BPSOU. Of those alternatives that are protective of human health and the environment and comply with ARARs or justify a waiver, EPA has determined that the Selected Remedy provides the best balance of trade-offs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element and bias against off-site treatment and disposal, and considering State and community acceptance.

Mine wastes and contaminated soils at the BPSOU are generally of large volume and low contaminant of concern concentration, which is difficult to treat effectively. In addition, technical difficulties prevent effective treatment of various metals present. Thus, active treatment was screened out as potential option for the solid media and long-term effectiveness is achieved through monitored engineering controls. Compared to the large-scale partial and total removal options, the Selected Remedy is expected to have greater short-term effectiveness with a lower level of risk to the community, cleanup workers, and the environment. The Selected Remedy was also among the more implementable of the remedial alternatives considered.

Treatment options were retained, however, for groundwater and surface water. Under the Selected Remedy, groundwater captured at LAO will be combined with contaminated groundwater from the West Camp bedrock system of the BMFOU and contaminated alluvial groundwater from Metro Storm Drain and routed to a lime treatment facility, where it will be treated to meet discharge standards and ARARs,

and subsequently discharged to Silver Bow Creek. Storm water discharge may also be similarly treated if BMPs are not effective in achieving surface water quality standards in Silver Bow Creek.

13.5 Preference for Treatment as a Principal Element

Treatment does not constitute a major component of the remedy for the BPSOU and the Selected Remedy does not satisfy the statutory preference for treatment as a principal element. However, EPA has determined that the source materials present in the BPSOU do not represent a principal threat, thus eliminating the expectation for treatment of these source materials. Although present in large volumes, source materials within the BPSOU are low in toxicity, can be reliably contained, and present only a relatively low risk in the event of exposure.

13.6 Five Year Reviews

Because the Selected Remedy results in contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted pursuant to CERCLA §121(c) and NCP §300.430(f)(5)(iii)(C). EPA shall conduct a review of remedial actions no less often than each five years after the initiation of such remedial action to assure that the remedy is, or will be, protective of human health and the environment.

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Section 14 Documentation of Significant Changes

The Proposed Plan for the BPSOU was released for public comment in December 2004. The Proposed Plan identified Comprehensive Alternative 4 (Engineered Covers/Partial Removal/ Limited Treatment for Solid Media, Groundwater Collection and Lime Treatment, Surface Water BMPs, ICs, and Monitoring) as the preferred alternative. EPA reviewed all written and verbal comments submitted during the public comment period. It was determined that, with some exceptions, no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary. However, based on the public's concern over potential health risks from residential metals, particularly attic dust, EPA decided to enhance the medical monitoring program already in place as part of the current Lead Intervention and Abatement Program to include the general population (not just sensitive populations) and to include evaluation of urinary arsenic and blood mercury with the blood lead evaluation. EPA will support all efforts to make the attic dust portion of a residential abatement plan workable and effective.

The Proposed Plan identified construction of a new water treatment plant for captured groundwater. The ROD allows the continued use, after appropriate remedial design, of the lagoon treatment system on a demonstration basis. This is based on the continuing data reports which show a general compliance with water standards from the treatment lagoon system, and on the continued consultation with DEQ and Butte Silver Bow County, both of whom found use of the lagoon treatment system on a demonstration basis acceptable. EPA, DEQ, and Butte Silver Bow will carefully evaluate the sludge excavation and disposal activities associated with this aspect of the Selected Remedy during remedial design.

Finally, the estimated cost of the Selected Remedy increased from costs presented in the Proposed Plan. Additional costs were included for upgrades to the storm water system and for the expanded residential metals abatement program. Capital costs were escalated by a factor of 17.4 percent to reflect inflation in the construction industry from 2004 (FS costs are 2004 costs) to 2006. Then, for the present value analysis, a discount factor of three percent was used instead of seven percent. The Agencies believe the three percent discount rate reflects more realistic investment return and inflation conditions. It is more conservative considering the importance of long-term O&M of the Selected Remedy. As a result of these changes, the cost of the Selected Remedy more than doubled.

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Section 15 Coordination with Natural Resource Damage Restoration Actions

The Butte Priority Soils OU has received considerable attention from the State Natural Resource Trustees, as described in section 107(f) of CERCLA. The State has undertaken efforts to develop restoration plans and/or secure restoration money from potentially responsible parties to restore the BPSOU to baseline conditions, or the condition that would exist absent the release of hazardous substances. The State developed and will further refine a restoration plan which, if implemented, would provide for certain actions to restore the injured resources or replace the loss of use of such resources. The State's existing plan is likely to be revised following the issuance of this Record of Decision.

The Selected Remedy is not intended to and will not restore natural resources in the BPSOU to baseline conditions.

The State Trustee may select restoration actions applicable to portions of the BPSOU. If this occurs, EPA will work with the Trustee in the design and implementation of the remedial action to coordinate the implementation of the Selected Remedy with these restoration actions to avoid duplication of effort and unnecessary costs and to maximize benefits to the area, where feasible and practical, and where coordination will not result in substantial delays to remedy implementation.

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IDENTIFICATION AND DESCRIPTION OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FOR FEASIBILITY STUDY ANALYSIS OF ALTERNATIVES

SILVER BOW CREEK/BUTTE AREA SUPERFUND SITE
BUTTE PRIORITY SOILS OPERABLE UNIT (OU 8)

September 2006

LIST OF ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirements
ATSDR	Agency of Toxic Substances and Disease Registry
BAT	Best Available Technology Economically Achievable
BCT	Best Conventional Pollutant Control Technology
BPCTCA	Best Practicable Control Technology Currently Available
BPJ	Best Professional Judgment
BPSOU	Butte Priority Soils Operable Unit
BTCA	Best Technology Currently Available
CCC	Criterion Continuous Concentration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended
CMC	Criteria Maximum Concentration
DEQ	State of Montana Department of Environmental Quality
DEQ-7	Circular DEQ-7, Montana Numeric Water Quality Standards
EPA	U.S. Environmental Protection Agency
HWM	Hazardous Waste Management
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MGWPCS	Montana Groundwater Pollution Control System
MPDES	Montana Pollutant Discharge Elimination System
NCP	National Contingency Plan, as amended
NESHAPS	National Emissions Standards for Hazardous Air Pollutants
NPL	National Priorities List
NPDES	National Pollutant Discharge Elimination System
POTW	Public Owned Treatment Works
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
RD/RA	Remedial Design and Remedial Action
ROD	Record of Decision
SHPO	State Historic Preservation Officer (Montana)
SIP	State Implementation Plan
TCB	To Be Considered
TU	Turbidity Unit
UIC	Underground Injection Control

INTRODUCTION

Section 121(d) of CERCLA, 42 U.S.C. § 9621(d), certain provisions of the current National Contingency Plan (the NCP), 40 CFR Part 300 (1990), and guidance and policy issued by the Environmental Protection Agency (EPA) require that remedial actions taken pursuant to Superfund authority shall require or achieve compliance with substantive provisions of applicable or relevant and appropriate standards, requirements, criteria, or limitations from state environmental and facility siting laws, and from federal environmental laws, at the completion of the remedial action, during the implementation of the remedial action, or both, depending on the nature of the requirements, unless a waiver is granted[1]. If contaminant or location specific ARARs are not being met before the commencement of a remedial action, it is not necessary to invoke a waiver to justify their non-attainment during the action; although they must be obtained (or appropriately waived) for remedial action to be complete and the remedy to be successful[2]. These requirements are threshold standards that any selected remedy must meet, unless adequate basis for a waiver is present. See Section 121 (d) (4) of CERCLA, 42 U.S.C. § 9621 (d) (4); 40 CFR § 300.430 (f) (1). EPA calls standards, requirements, criteria, or limitations identified pursuant to section 121 (d) "ARARs," or applicable or relevant and appropriate requirements.

ARARs are either applicable or relevant and appropriate. Applicable requirements are those standards, requirements, criteria, or limitations promulgated under federal or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, or contaminant, remedial action, location, or other circumstance found at a CERCLA site. 40 CFR § 300.5. Relevant and appropriate requirements are those standards, requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not "applicable" to hazardous substances, pollutants, contaminants, remedial actions, locations, or other circumstances found at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site such that their use is well suited to the particular site. Id. Factors which may be considered in making this determination are presented in 40 CFR 300.400(g) (2). Compliance with both

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[1] See 55 Fed Reg 8666, 8755 (March 8, 1990)

[2] EPA CERCLA Compliance with Other Laws Manual 1-8 (OSWER 9234 1-01, August 1988)

applicable and relevant and appropriate requirements is mandatory, unless compliance is waived. 42 U.S.C. § 121(d)(4); 40 CFR 300.430(f)(1)(C).

Each ARAR or group of related ARARs identified here is followed by a specific statutory or regulatory citation, a classification describing whether the ARAR is applicable or relevant and appropriate, and a description which summarizes the requirements, and addresses how and when compliance with the ARAR will be measured (some ARARs will govern the conduct of the remedial action, some will define the measure of success of the remedial action, and some will do both)[3]. The descriptions given here are provided to allow the user a reasonable understanding of the requirements without having to refer constantly to the statute or regulation itself. However in the event of any inconsistency between the law and the summary provided in this document, the applicable or relevant and appropriate requirement is ultimately the requirement as set out in the law, rather than any paraphrase of the law provided here.

Also contained in this list are policies, guidance or other sources of information which are "to be considered" in the selection of the remedy and implementation of the record of decision (ROD). Although not enforceable requirements, these documents are important sources of information which EPA and the State of Montana Department of Environmental Quality (DEQ) may consider during selection of the remedy, especially in regard to the evaluation of public health and environmental risks; or which will be referred to, as appropriate, in selecting and developing cleanup actions.

Finally, this list contains a non-exhaustive list of other legal provisions or requirements which should be complied with during the implementation of the ROD[4].

ARARs are divided into contaminant specific, location specific, and action specific requirements, as described in the NCP and EPA guidance. For contaminant specific ARARs, ARARs are listed according to the appropriate media.

Contaminant specific ARARs include those laws and regulations governing the release to the environment of materials possessing

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[3] 40 CFR § 300 435(b)(2), Preamble to the Proposed NCP, 53 Fed Reg 51440 (December 21, 1988), Preamble to the Final NCP, 55 Fed Reg 8755-8757 (March 8, 1990)

[4] 40 CFR § 300 400(g)(3), 40 CFR § 300 515(h)(2), Preamble to the Final NCP, 55 Fed Reg 8744-8746 (March 8, 1990)

certain chemical or physical characteristics or containing specific chemical compounds. Contaminant specific ARARs generally set health or risk based numerical values or methodologies which, when applied to site-specific conditions, result in the establishment of numerical values. These values establish the acceptable amount or concentration of a chemical that my be found in, or discharged to, the ambient environment. Location specific ARARs are restrictions placed on the concentration of hazardous substances or the conduct of cleanup activities because they are in specific locations. Location specific ARARs related to the geographic or physical position of the site, rather than to the nature of site contaminants. Action specific ARARs are usually technology or activity based requirements or limitations on actions taken with respect to hazardous substances.

Only the substantive portions of the requirements are ARARs[5]. Administrative requirements are not ARARs and thus do not apply to actions conducted entirely on-site. Administrative requirements are those which involve consultation, issuance of permits, documentation, reporting, record keeping, and enforcement. The CERCLA program has its own set of administrative procedures which assure proper implementation of CERCLA. The application of additional or conflicting administrative requirements could result in delay or confusion[6]. Provision of statutes or regulations which contain general goals that merely express legislative intent about desired outcomes or conditions but are non-binding are not ARARs.[7].

Many requirements listed here are promulgated as identical or nearly identical requirements in both federal and state law, usually pursuant to delegated environmental programs administered by both EPA and the states, such as many of the requirements of the federal Clean Water Act and the Montana Water Quality Act. The Preamble to the final NCP states that such a situation results in citation to the state provision as the appropriate standard, but treatment of the provisions as a federal requirement. ARARs and other laws which are unique to state law are identified separately by the State of Montana.

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[5] 40 CFR § 300 5 See also Preamble to the Final NCP, 55 Fed Reg 8756-8757 (March 8, 1990)

[6] Preamble to the Final NCP, 55 Fed Reg 8756-8757 (March 8, 1990), Compliance with Other Laws Manual, Vol 1, pp 1-11 - 1-12

[7] Preamble to the Final NCP, 55 Fed Reg 8746 (March 8, 1990)

This list constitutes EPA's and DEQ's detailed description of potential ARARs for use in the feasibility study for the Silver Bow Creek/Butte Area (Butte Portion) Site, Butte Priority Soils operable unit, and resulting remedial action decisions. This list will be used in evaluating the compliance of the various remedial alternatives with ARARs. However, the final determination of ARARs that will ultimately apply to the operable unit and the final determination of compliance with ARARs or applicability of ARAR waivers will be presented in the ROD.

The ARAR analysis is based on section 121(d) of CERCLA, 42 U.S.C. § 9621 (d); CERCLA Compliance with Other Laws Manual, Volumes I and II; OSWER Directives 9234.1-01 and -02 (August 1988 and August 1989 respectively; various CERCLA ARARs Fact Sheets issued as OSWER Directives; the Preamble to the Proposed NCP, 53 Fed.Reg. 51394 et seq. (December 21, 1988); the Preamble to the Final NCP, 55 Fed.Reg. 8666-8813 (March 8, 1990); and the final NCP, 40 CFR Part 300; other applicable guidances; and the substantive provisions of law discussed in this document.

FEDERAL ARARS

I. FEDERAL CONTAMINANT SPECIFIC REQUIREMENTS

A. Groundwater Standards - Safe Drinking Water Act (Relevant and Appropriate) [8]

The National Primary Drinking Water Standards (40 CFR Part 141), better known as maximum contaminant levels and maximum contaminant level goals (MCLs and MCLGs), are not applicable to the Butte Priority Soils Operable Unit (BPSOU) because the aquifer underlying the area is not a current public water system, as defined in the Safe Drinking Water Act, 42 U.S.C. § 300f(4). These standards are relevant and appropriate standards, however, because the groundwater in the alluvial aquifer is a potential source of drinking water.

According to the Butte-Silver Bow Health Department only one well within the BPSOU is used as a source of drinking water. EPA has determined that a waiver of ground water standards is appropriate for the area within the zone defined in the Technical

[8] 42 U S C §§ 300f et seq

Impracticability Evaluation for the BPSOU (EPA 2006) for all standards9. The waiver is based on section 121(d)(4)(C) of CERCLA, 42 U.S.C. Section 9621(d)(4)(C) and corresponding NCP provisions. Outside of the zone, the standards do apply. EPA notes that the aquifer discharges to Silver Bow Creek which is designated as a potential source of drinking water. Since Silver Bow Creek is also a potential source of drinking water, these standards are relevant and appropriate for that surface water as well.

Use of these standards for this action outside of the TI waiver zone is fully supported by EPA regulations and guidance. The Preamble to the NCP clearly states that MCLs are relevant and appropriate for groundwater that is a current or potential source of drinking water (55 Fed.Reg. 8750, March 8, 1990), and this determination is further supported by requirements in the regulations governing conduct of the RI/FS studies found at 40 CFR § 300.430(e)(2)(i)(B). EPA's guidance on Remedial Action for Contaminated Groundwater at Superfund Sites states that "MCLs developed under the Safe Drinking Water Act generally are ARARs for current or potential drinking water sources." MCLGs which are above zero are relevant and appropriate under the same conditions (55 Fed.Reg. 8750-8752, March 8, 1990). See also, State of Ohio v. EPA, 997 F.2d 1520 (D.C. Cir. 1993), which upholds EPA's application of MCLs and non-zero MCLGs as ARAR standards for groundwater which is a potential drinking water source.

As noted earlier, standards such as the MCL and MCLG standards are promulgated pursuant to both federal and state law. Under the Safe Drinking Water Act, EPA has granted the State of Montana primacy in implementation of the Safe Drinking Water Act. The State has promulgated its own public water supply ground water standards through the Public Water Safety Act for most contaminants of concern, primarily through incorporation by reference of the federal standard. These standards are also identified here.

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9 The Technical Impracticability ARAR waiver would also apply to the prohibition on the disposal or storage of tailings/mine wastes/toxic or hazardous materials in the floodplain to the extent that any part of the remedial action for wastes left in place in the floodplain would constitute the active management or storage of those wastes

Chemical	MCLG	MCL
Arsenic	NA	10 ug/l[10]
Cadmium	5 ug/l[11]	5 ug/l[12]
Copper	1300 ug/l[13]	1300 ug/l[14]
Lead	NA [15]	15 ug/l[16]
Mercury	2 ug/l	2 ug/l

These standards incorporate potentially relevant and appropriate Resource Conversation Act (RCRA) standards for groundwater ground at 40 CFR Part 264, Subpart F, which is incorporated pursuant to state law at ARM 17.54.702. The RCRA standards are the same or less stringent than the MCLs or MCLGs identified above.

B. Surface Water - Ambient and Point Source Discharges - Clean Water Act. (Applicable or Relevant and Appropriate)

CERCLA and the NCP provide that federal water pollution criteria that match designated or anticipated surface water uses are the usual surface water standards to be used at Superfund cleanups, as relevant and appropriate standards, unless the state has promulgated surface water quality standards pursuant to the delegated state water quality act. The State of Montana has designated uses for Silver Bow Creek, and has promulgated specific numeric water quality standards accordingly. Those standards as well as other surface water standards are included in the State ARARs identified below. These standards will be applied to all chemicals of concern identified in the BPSOU remedial investigation, both to point sources affected or created

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[10] See 66 FR 6976 (January 22, 2001) and 66 FR 28341 - 28350 (May 22, 2001); 40 CFR § 141 11 and 40 CFR § 141.62

[11] 40 CFR § 141 51

[12] 40 CFR § 141 62

[13] 40 CFR § 141 51

[14] 40 CFR § 141 80(c) The requirement is an action level rather than a simple numerical standard

[15] The MCLG for lead is zero, which is not an appropriate standard for Superfund site cleanups

[16] 40 CFR § 141 80(c) The requirement is an action level rather than a simple numerical standard

by the BPSOU cleanup and to ambient water in the BPSOU. If State standards are changed to be less stringent than existing Federal Water Quality Criteria (FWQC), then FWQC will be identified as the appropriate ARARs. FWQC may also become replacement standards for State standards if appropriate waivers are invoked for the state standards. The FWQC standards are identified here.

Chemical	FWQC[17] CMC (acute)	FWQC CCC (chronic)
Aluminum	750 ug/l	87 ug/l (pH 6.5 - 9.0, Non-Priority Pollutant)
Arsenic	340 ug/l	150 ug/l
Cadmium	4.3 ug/l	2.2 ug/l
Copper	13 ug/l	9.0 ug/l
Iron	NA	1000 ug/l (Non-Priority Pollutant)
Lead	65 ug/l	2.5 ug/l
Mercury	1.4 ug/l	0.77 ug/l
Silver	3.4 ug/l	NA
Zinc	120 ug/l	120 ug/l

C. Surface Water - Point Source Discharges - Stormwater Regulations - Clean Water Act. (Applicable)

If point sources of water contamination are retained or created by any BPSOU remediation activity, applicable Clean Water Act standards would apply to those discharges. These include the general requirements and storm water regulations found at 40 CFR Parts 122 and 125 (general conditions and industrial activity conditions). The storm water regulations address non-agricultural sources of storm water discharges which adversely affect water quality. Generally, the permits require the permittee to implement Best Management Practices (BMP) and to take all reasonable steps to minimize or prevent any discharge which has a reasonable likelihood of adversely affecting human health or the environment.[18] However, if there is evidence indicating potential or realized impacts on water quality due to any storm water discharge associated with the activity, substantive standards associated with an individual National Pollutant Discharge Elimination System (NPDES) permit or alternative general permit

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[17] Pursuant to Section 304(a) of the Clean Water Act. National Recommended Water Quality Criteria- Correction US EPA, EPA 822-Z-99-001, April 1999

[18] For further explanation of storm water applications, see the letter from EPA to Chuck Stilwell, ARCO, dated February 2, 1999, which describes that treatment, in addition to BMPs, may be necessary if in-stream standards are not met after implementation of BMPs

may be required (or Montana Pollutant Discharge Elimination System (MPDES) permit or alternative general permit under the State program).

D. Air Standards - Clean Air Act (Applicable)

Federal air quality standards are not currently exceeded in the BPSOU. Limitations on air emissions resulting from cleanup activities or emissions resulting from wind erosion of exposed hazardous substances are set forth-in the action specific requirements, below.

II. FEDERAL LOCATION SPECIFIC REQUIREMENTS

A. Fish and Wildlife Coordination Act (Applicable)

These standards are found at 16 U.S.C. §§ 661 et seq. and 40 CFR § 6.302(g) . They require that federally funded or authorized projects ensure that any modification of any stream or other water body affected by a federally funded or authorized action provide for adequate protection of fish and wildlife resources. Compliance with this ARAR necessitates EPA consultation with the U.S. Fish and Wildlife Service (USFWS) and the State of Montana Department of Fish, Wildlife, and Parks. Further consultation with these agencies will occur during cleanup selection and implementation, and specific mitigative or other measures may be identified to achieve compliance with this ARAR, if streambank or streambed measures are chosen. The purpose of consultation is to develop measures to prevent, mitigate, or compensate for project-related losses to fish and wildlife. Mitigative measures must be performed by the persons who implement any selected remedy.

B. Floodplain Management Order (Applicable)

This requirement (40 CFR Part 6, Appendix A, Executive Order No. 11,988) mandates that federally funded or authorized actions within the 100 year floodplain avoid, to the maximum extent possible, adverse impacts associated with development of a floodplain. Compliance with this requirement is detailed in EPA's August 6, 1985 "Policy on Floodplains and Wetlands Assessments for CERCLA Actions." If the selected remedial action adversely impacts the Silver Bow Creek floodplain, specific measures to minimize adverse impacts may be identified following EPA consultation with the appropriate agencies.

In addition, if the remedial action selected for the BPSOU is found to potentially adversely impact the floodplain, the

following information will be produced: a Statement of Findings which will set forth the reasons why the proposed action must be located in or affect the floodplain; a description of significant facts considered in making the decisions to locate in or affect the floodplain or wetlands including alternative sites or actions; a statement indicating whether the selected action conforms to applicable state or local floodplain protection standards; a description of the steps to be taken to design or modify the proposed action to minimize the potential harm to or within the floodplain; and a statement indicating how the proposed action affects the natural or beneficial values of the floodplain.

C. Protection of Wetlands Order (Applicable)

This requirement (40 CFR Part 6, Appendix A, Executive Order No. 11,990) mandates that federal agencies and potentially responsible parties (PRPs) avoid, to the extent possible, the adverse impacts associated with the destruction or loss of wetlands and to avoid support of new construction in wetlands if a practicable alternative exists. Section 404(b)(1), 33 U.S.C. § 1344(b)(1), also prohibits the discharge of dredged or fill material into waters of the United States. Together, these requirements create a "no net loss" of wetlands standard.

Compliance with this ARAR will be achieved through EPA consultation with the U.S. Fish and Wildlife Service, to determine the existence and category of wetlands present at the site, and any avoidance or mitigation and replacement which may be necessary. Avoidance, mitigation, or replacement activities will be done by the persons who implement any selected remedy. Avoidance or mitigation and replacement of wetlands must be addressed in remedy selection and implementation. In July 1993, ARCO published a report titled "Wetlands and Threatened/Endangered Species Inventory with Determination of Functionally Effective Wetland Area" EPA also approved ARCO's August 1992 Evaluation Form for Determining Wetland Functional Value and Effective Wetland Area in Upper Clark Fork River superfund Sites for use in wetland evaluations.

D. The Endangered Species Act (Applicable)

This statute and implementing regulations (16 U.S.C. §§ 1531 - 1544, 50 CFR Part 402, and 40 CFR § 6.302(h)) require that any federal activity or federally authorized activity may not jeopardize the continued existence of any threatened or endangered species known to live or to have lived in the affected environment or destroy or adversely modify a critical habitat.

This ARAR requires EPA to ensure that the selected remedy is sufficiently protective of the environment containing the threatened or endangered species, with an emphasis on reducing the risks from the contaminants of concern to the listed species described in the EPA risk assessment to an acceptable level, with consideration given to the special status of the listed or threatened species - see 40 CFR Sections 300.430(d)(2)(vii) and (e)(2)(i)(G) and EPA Guidance Document OSWER Dir. No. 9285.7-28P, Ecological Risk Assessment and Risk Management principles for Superfund Sites (October, 1999) page 3; and to ensure that the selected remedy is implemented in a manner that effects on any existing the threatened or endangered species from the active remedy implementation activities are avoided or mitigated - see page 4-12 of the CERCLA Compliance with Other Laws Manual: Volume II (EPA August 1989).

Compliance with this ARAR has to date involved consultation with USFWS, and a determination of the presence of listed or proposed species or critical habitats present at the BPSOU. The USFWS has indicated that general and informal consultation only is required for this ARAR at this operable unit, and that a full biological assessment and biological opinion will not be necessary. In July 1993, ARCO published a report titled "Wetlands and Threatened/Endangered Species Inventory with Determination of Functionally Effective Wetland Area". The bald eagle and the peregrine falcon were identified as potentially occurring at the BPSOU. Subsequently, the bull trout was listed by the FWS as a threatened species.

E. The National Historic Preservation Act (Applicable)

This statute and implementing regulations (16 U.S.C. § 470 et seq, 40 CFR § 6.301(b), 36 CFR Part 800) require federal agencies or federal projects to take into account the effect of any federally assisted undertaking or licensing on any district, site building, structure, or object that is included in, or eligible for, the Register of Historic Places. If effects cannot be avoided reasonably, measures should be implemented to minimize or mitigate the potential effect. In addition, Indian cultural and historical resources must be evaluated, and effects avoided, minimized, or mitigated.

Compliance with this ARAR has been described in the First and Second Programmatic Agreements (Programmatic Agreement, April 6, 1992 and Second Programmatic Agreement, December 14, 1994) and various mitigative and replacement measures have been undertaken under those agreements. The Second Programmatic Agreement also describes a notification and consultation process, which must be

observed during remedial design and remedial action activities at BPSOU. The Salish and Kootenai Confederated Tribe (the Tribe) is currently cataloguing protected Indian resources, in partial compliance with this ARAR, and additional consultation measures may be required involving the Tribe.

F. Archaeological and Historic Preservation Act (Applicable)

The statute and implementing regulations (16 U.S.C. § 469 et seq., 40 CFR § 6.301(c)) establish requirements for evaluation and preservation of historical and archaeological data, including Indian cultural and historic data, which may be destroyed through alteration of terrain as a result of federal construction projects or a federally licensed activity or program. If eligible scientific, prehistorical, or archaeological data are discovered during site activities, they must be preserved in accordance with these requirements.

G. Historic Sites, Buildings, and Antiquities Act (Applicable)

This statute and implementing regulations (16 U.S.C. § 461 et seq., 40 CFR § 6.310(a)) state that in conducting an environmental review of a proposed EPA action, the responsible official shall consider the existence and location of natural landmarks using information provided by the National Park Service pursuant to 36 CFR § 62.6(d) to avoid undesirable impacts upon such landmarks.

H. Migratory Bird Treaty (Applicable)

This requirement (16 U.S.C.§§ 703 et seq.) establishes a federal responsibility for the protection of the international migratory bird resource and requires continued consultation by EPA with the USFWS during remedial design and remedial construction to ensure that the cleanup of the site does not unnecessarily impact migratory birds. Specific mitigative measures may be identified for compliance with this requirement as appropriate for performance by the persons who implement the remedy.

I. Bald Eagle Protection Act (Applicable)

This requirement (16 U.S.C. §§ 668 et seq.) establishes a federal responsibility for protection of bald and golden eagles, and requires continued consultation by EPA with the USFWS during remedial design and remedial construction to ensure that any cleanup of the site does not unnecessarily adversely affect the

bald and golden eagle. Specific mitigative measures may be identified for compliance with this requirement as appropriate, and will be done by the persons who implement any selected remedy.

J. Resource Conservation and Recovery Act (Relevant and Appropriate)

Any discrete waste units created or actively managed by the BPSOU site cleanup must comply with the siting restrictions and conditions at 40 CFR § 264.18 (a) and (b). These sections require management units to be designed, constructed, operated, and maintained to avoid washout, if they are within or near the current 100 year flood plain.

K. Native American Grave Protection and Repatriation Act, 25 U.S.C. § 3001; 43 CFR §§ 10.1 - 10.17 (Applicable or Relevant and Appropriate)

NAGPRA and its implementing regulations provide for the disposition of Native American remains and objects inadvertently discovered on federal or tribal lands after November, 1990. 25 U.S.C. Section 3002(d). If the response activities result in the discovery of Native American human remains or related objects, the activity must stop while the head of the federal land management agency (if federal lands are involved) and appropriate Indian tribes are notified of the discovery. After the discovery, the response activity must cease and a reasonable effort must be made to protect the Native American human remains or related objects. The response activity may later resume. 42 CFR Section 10.4. Accordingly, depending on the facts of the discovery and the location of the response action, NAGPRA could be applicable or relevant and appropriate to the response action.

III. FEDERAL ACTION SPECIFIC REQUIREMENTS

A. Solid Waste (Applicable), Surface Mining Control and Reclamation (Relevant and Appropriate), and RCRA (Relevant and Appropriate) Requirements

The contamination at the BPSOU is primarily mining waste from mining mills and smelters in Butte. This waste may not be RCRA hazardous waste, although EPA reserves its rights to make a more formal determination in this regard at a later date. For any active management (i.e., treatment, storage, disposal, grading,

or in-situ treatment) or removal of tailings or mixed tailings and soils[19] contamination, the following requirements are ARARs.

1. Requirements described at 40 CFR §§ 257.3-1(a), 257.3-3, and 257.3-4, governing waste handling, storage, and disposal, including retention of the waste, in general[20], and 257.3-5, relating to precautions necessary to ensure that cadmium is not taken up into crops, including pasture grasses that may enter the food chain.

2. For any discrete waste units which are created or actively managed by the BPSOU cleanup, reclamation and closure regulations found at 30 CFR Parts 816 and 784, governing coal and to a lesser extent, non-coal mining, are relevant and appropriate requirements[21].

3. RCRA regulations found at 40 CFR §§ 264.116 and .119 (governing notice and deed restrictions), 264.228(a)(2)(ii (addressing de-watering of wastes prior to disposal), and 264.228(a)(2)(iii)(B), (C), and (D) and .251(c), (d), and (f) (regarding run-on and run-off controls), are relevant and appropriate requirements for any waste management units created or actively managed at the BPSOU[22].

B. Air Standards - Clean Air Act (Applicable)

These standards, promulgated pursuant to section 109 of the Clean Air Act[23], are applicable to releases into the air from any BPSOU cleanup activities.

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[19] Federal and State solid waste requirements would be relevant and appropriate for contaminated soils if these materials are not used in conjunction with other removal or remedial measures such as deep plowing.

[20] Solid waste regulations are promulgated pursuant to the federal Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, 42 U S C §§ 6901 et seq They are applicable regulations, although the State of Montana has the lead role in regulating solid waste disposal in the State of Montana

[21] The Surface Mining Control and Reclamation Act is promulgated at 30 U S C §§ 1201 - 1326

[22] As noted earlier, federal RCRA regulations are incorporated by reference into applicable State Hazardous Waste Management Act regulations See ARM 17 53 801 Use of select RCRA regulations for mining waste cleanups is appropriate when discrete units are addressed by a cleanup and site conditions are distinguishable from EPA generic determination of low toxicity/high volume status for mining waste See Preamble to the Final NCP, 55 Fed Reg 8763 - 8764 (March 8, 1990), CERCLA Compliance with Other Laws Manual, Volume II (August 1989 OSWER Directive #9234 1-02) p 6-4, Preamble to the Proposed NCP, 53 Fed Reg 51447 (Dec 21, 1988), and guidance entitled Consideration of RCRA Requirements in Performing CERCLA Responses at Mining Wastes Sites, August 19, 1986 (OSWER)

[23] 42 U S C §§ 7401 et seq

1. Lead: No person shall cause or contribute to concentrations of lead in the ambient air which 3 exceed 1.5 micrograms per cubic meter (ug/m) of air, measured over a 90-day average. These standards are promulgated at ARM 17.8.222 as part of a federally approved State Implementation Plan (SIP), pursuant to the Clean Air Act of Montana, §§ 75-2-101 et seq. MCA. Corresponding federal regulations are found at 40 CFR § 50.12[24].

2. Particulate matter that is 10 microns in diameter or smaller (PM-10): No person shall cause or contribute to concentrations of PM-10 in the ambient air which exceed:

- 150 ug/m3 of air, 24 hour average, no more than one expected exceedance per calendar year;
- 50 ug/m3 of air, annual average.

These regulations are promulgated at ARM 17.8.223 as part of a federally approved SIP, pursuant to the Clean Air Act of Montana, §§ 75-2-101 et seq. MCA. Corresponding federal regulations are found at 40 CFR § 50.6.

Ambient air standards under section 109 of the Clean Air Act are also promulgated for carbon monoxide, hydrogen sulfide, nitrogen dioxide, sulfur dioxide, and ozone. If emissions of these compounds were to occur at the site in connection with any cleanup action, these standards would also be applicable. See ARM 17.8.222 and .223, and 40 CFR Part 50.

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[24] Ambient air standards established as part of Montana's approved State Implementation Plan in many cases provide more stringent or additional standards The federal standards by themselves apply only to major sources, while the State standards are fully applicable throughout the state and are not limited to major sources See ARM 17 8 205 and 17 8 212- 223 As part of an EPA approved State Implementation Plan, the state standards are also federally enforceable Thus, the state standards which are equivalent to the federal standards are identified in this section A more detailed list of State standards, which include standards which are not duplicated in federal regulations, is contained in the State ARAR identification section

C. Point Source Controls - Clean Water Act (Applicable)

If point sources of water contamination are retained or created by any BPSOU remediation activity, applicable Clean Water Act standards would apply to those discharges. The regulations are discussed in the contaminant specific ARAR section, above, and in the State of Montana identification of ARARs. These regulations would include storm water runoff regulations found at 40 CFR Parts 121, 122, and 125 (general conditions and industrial activity conditions). These would also include requirements for best management practices and monitoring found at 40 CFR §§ 122.44(i) and 440.148, for point source discharges.

D. Dredge and Fill Requirements (Applicable)

Regulations found at 40 CFR Part 230 address conditions or prohibitions against depositing dredge and fill material into water of the United States. If remediation activities would result in an activity subject to these regulations, they would be applicable. Compliance with this requirement will be achieved at the site of dredge and fill activity within the BPSOU during construction activities.

E. Underground Injection Control (Applicable)

Requirements found at 40 CFR Part 144, promulgated pursuant to the Safe Drinking Water Act, allow the re-injection of treated groundwater into the same formation from which it was withdrawn for aquifers such as the aquifer beneath the reservoir sediments operable unit, and addresses injection well construction, operation, maintenance, and capping/closure. These regulations would be applicable to any reinjection of treated groundwater.

F. Transportation of Hazardous or Contaminated Waste (Relevant and Appropriate)

40 CFR Part 263 establishes regulations for the transportation of hazardous waste. These regulations would govern any on-site transportation of contaminated material. Any off-site transportation would be fully subject to applicable regulations and permitting.

STATE OF MONTANA ARARS

As provided by Section 121 of CERCLA, 42 U.S.C. § 9621, only those state standards that are more stringent than any federal standard and that have been identified by the state in a timely manner are appropriately included as ARARs. DEQ has identified some state standards that are potentially duplicative of federal standards to ensure their timely identification and consideration in the event that they are not identified or retained in the federal ARARs. Duplicative or less stringent standards will be deleted as appropriate when the final determination of ARARs is presented.

IV. MONTANA CONTAMINANT SPECIFIC REQUIREMENTS

A. Water Quality

1. Surface Water Quality Standards (Applicable)

Under the Montana Water Quality Act, §§ 75-5-101 et seq., MCA, the state has promulgated water quality standards to protect, maintain, and improve the quality and potability of the state's surface water for water supplies, wildlife, fish and aquatic life, agricultural, industry, recreation, and other beneficial uses. The requirements listed below are applicable water quality standards with which any remedial action must comply.

ARM 17.30.607(1)(a)(iii)(Applicable) provides that Silver Bow Creek (mainstem) from the confluence of Blacktail Creek to Warm Springs Creek is classified "I" for water use. Waters in the operable unit that are not specifically listed under 17.30.607(1)(a), for example, Blacktail Creek, are classified B-1.

The "I" classification standards are contained in ARM 17.30.628 (Applicable) of the Montana water quality regulations. This section states:

> [T]he goal of the state of Montana is to have these waters fully support the following uses: drinking, culinary, and food processing purposes after conventional treatment; bathing, swimming, and recreation; growth and propagation of fishes and associated aquatic life, waterfowl, and furbearers; and agricultural and industrial water supply.

These beneficial uses are considered supported when the concentrations of toxic, carcinogenic, or harmful parameters in these waters do not exceed the applicable standards specified in department Circular DEQ-7 when stream flows equal or exceed the stream flows specified in ARM 17.30.635(4)(10-year 7-day low flow, i.e., minimum consecutive 7-day average flow which may be expected to occur on the average of once in 10 years).[25] These standards set the contaminant specific requirement for ambient water quality in the stream.

To allow a gradual attainment of these requirements in already impacted streams, the I classification allows point source discharges to be permitted at the higher concentration of (1) the applicable standards specified in department Circular DEQ-7, (2) the site-specific standards, or (3) one-half of the mean in-stream concentrations immediately upstream of the discharge point. This effectively requires eventual attainment of the Circular DEQ-7 levels in the stream, while allowing consideration of the current, impacted stream quality (a graduated reduction of point source discharge concentrations based on the mean in-stream concentration where the stream is substantially degraded). As the quality of the stream improves due to control of other sources, including cleanup of non-point source areas, point source dischargers must improve the quality of their discharges down to the in-stream standards (either DEQ-7 or, for aquatic life only, site specific standards).

ARM 17.30.623 (Applicable) requires that waters classified B-1 are to be maintained suitable for drinking, culinary and food processing purposes after conventional treatment, bathing, swimming and recreation, growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers, and agricultural and industrial water supply.

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[25] Alternatively, site-specific criteria may be developed using the procedures given in the Water Quality Standards Handbook, Second Edition (EPA-823-B-94-005a), provided that other routes of exposure to toxic parameters by aquatic life are addressed. Such other routes of exposure in this operable unit would include, for example, contaminated sediment/food chain routes of exposure However, no site specific standards have been developed for Silver Bow Creek to date, and the applicable numeric standards are those set forth in DEQ-7

This section provides that concentrations of carcinogenic, bioconcentrating, toxic or harmful parameters which would remain in water after conventional water treatment may not exceed standards set forth in department circular DEQ-7. Discharges may not cause receiving water concentrations to exceed the applicable standards specified in DEQ-7 when stream flows equal or exceed the design flows specified in ARM 17.30.635(4) and also must conform with ARM Title 16, Chapter 20, Subchapter 7 (the nondegradation rules).

The B-1 classification standards at ARM 17.30.623 also include the following criteria: 1) dissolved oxygen concentration must not be reduced below the levels given in department circular DEQ-7; 2) induced variation of hydrogen ion concentration (pH) within the range of 6.5 to 8.5 must be less than 0.5 pH unit. Natural pH outside of this range must be maintained without change. Natural pH above 7.0 must be maintained above 7.0; 3) the maximum allowable increase above naturally occurring turbidity is 5 nephelometric turbidity units except as permitted in 75-5-318, MCA; 4) temperature increases must be kept within limits prescribed in this section; 5) no increases above naturally occurring concentrations of sediment or suspended sediment, settleable solids, oils, floating solids, which will or are likely to create a nuisance or render the waters harmful, detrimental, or injurious to public health, recreation, safety, welfare, livestock, wild animals, birds, fish or other wildlife are allowed; 6) true color must not be increased more than five units above naturally occurring color.

To the extent any of these standards are violated due to hazardous substances or Superfund response action, they must be complied with as part of any selected remedial action.

With respect to the remediation of non-point sources, the DEQ-7 standards effectively set the ambient water quality standards that are to be attained by the remedial action. As an ambient standard, the point of compliance for these standards would be throughout the stream, and compliance should be measured by monitoring at several different points within the stream, as determined by any significant point sources or significant reaches of non-point sources.

For the primary contaminants of concern, the DEQ-7 levels are listed below. DEQ-7 provides that "whenever both Aquatic Life Standards and Human Health Standards exist for the same analyte, the more restrictive of these values will be used as the numeric Surface Water Quality Standard." Surface water is measured in total recoverable form, according to DEQ-7.

Chemical	DEQ-7[26] Standards (total recoverable form, except as noted)
Aluminum (dissolved)	750 ug/l acute (pH 6.5-9.0) 87 ug/l chronic (pH 6.5-9.0)
Arsenic	340 µg/l acute 150 ug/l chronic 10 ug/l human health
Cadmium	0.52 ug/l @ 25 mg/l hardness acute 0.097 ug/l @ 25 mg/l hardness chronic 5 ug/l human health
Copper	3.79 ug/l @ 25 mg/l hardness acute 2.85 ug/l @ 25 mg/l hardness chronic 1300 ug/l human health
Iron	1000 ug/l chronic
Lead	13.98 ug/l @ 25 mg/l hardness acute 0.545 µg/l @ 25 mg/l hardness chronic 15 ug/l human health
Mercury	1.7 ug/l acute 0.91 ug/l chronic 0.05 µg/l human health
Silver	0.374 ug/l @ 25 mg/l hardness NA acute
Zinc	37 ug/l @ 25 mg/l hardness acute and chronic

I classification standards also include the following criteria:

1. Dissolved oxygen concentration must not be reduced below 3.0 milligrams per liter.

2. Hydrogen ion concentration (pH) must be maintained within the range of 6.5 to 9.5.

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[26] Circular DEQ-7, Montana Numeric Water Quality Standards, February 2006 See note 12 in DEQ-7 for an explanation of how the standards are a function of total hardness in mg/l $CaCO_3$

3. No increase in naturally occurring turbidity, temperature, concentrations of sediment or suspended sediment, settleable solids, oils, floating solids, or true color is allowed which will or is likely to create a nuisance or render the waters harmful, detrimental, or injurious to public health, recreation, safety, welfare, livestock, wild animals, birds, fish or other wildlife.

4. No discharges of toxic, carcinogenic, or harmful parameters may commence or continue which lower or are likely to lower the overall water quality of these waters.

Additional restrictions on any discharge to surface waters are included in:

ARM 17.30.637 (Applicable), which prohibits discharges containing substances that will:

(a) settle to form objectionable sludge deposits or emulsions beneath the surface of the water or upon adjoining shorelines;
(b) create floating debris, scum, a visible oil film (or be present in concentrations at or in excess of 10 milligrams per liter) or globules of grease or other floating materials;
(c) produce odors, colors or other conditions which create a nuisance or render undesirable tastes to fish flesh or make fish inedible;
(d) create concentrations or combinations of materials which are toxic or harmful to human, animal, plant or aquatic life;
(e) create conditions which produce undesirable aquatic life.

ARM 17.30.637 states that no waste may be discharged and no activities conducted which, either along or in combination with other waste activities, will cause violation of surface water quality standards.

ARM 17.30.637 also provides that leaching pads, tailing ponds, or water, waste, or product holding facilities must be located, constructed, operated and maintained in such a manner and of such materials to prevent any discharge, seepage, drainage, infiltration, or flow which may result in pollution of state waters, and a monitoring system may be required to ensure such compliance.

ARM 17.30.705 provides that for any surface water, existing and anticipated uses and the water quality necessary to protect these uses must be maintained and protected unless degradation is allowed under the non-degradation rules at ARM 17.30.701 et seq.

ARM 17.30.1203 (Applicable), which adopts and incorporates the provisions of 40 C.F.R. Part 125 for criteria and standards for the imposition of technology-based treatment requirements in MPDES permits. Although the permit requirement would not apply to on-site discharges, the substantive requirements of Part 125 are applicable, i.e., for toxic and non-conventional pollutants treatment must apply the best available technology economically achievable (BAT); for conventional pollutants, application of the best conventional pollutant control technology (BCT) is required. Where effluent limitations are not specified for the particular industry or industrial category at issue, BCT/BAT technology-based treatment requirements are determined on a case by case basis using best professional judgment (BPJ). See CERCLA Compliance with Other Laws Manual, Vol. I, August 1988, p. 3-4 and 3-7.

Applicable for both surface water and ground water, § 75-5-605, MCA, provides that it is unlawful to cause pollution as defined in 75-5-103 of any state waters or to place or cause to be placed any wastes where they will cause pollution of any state waters. Applicable for both surface water and ground water, § 75-5-303, MCA, states that existing uses of state waters and the level of water quality necessary to protect the uses must be maintained and protected.

Section 75-5-308, MCA, allows DEQ to grant short-term exemptions from the water quality standards or short-term use that exceeds the water quality standards for the purpose of allowing certain emergency environmental remediation activities. Such exemptions typically extend for a period of 30-60 days. However, any exemption must include conditions that minimize to the extent possible the magnitude of the violation and the length of time the violation occurs. In addition, the conditions must maximize the protection of state waters by ensuring the maintenance of beneficial uses immediately after termination of the exemption. Water quality and quantity monitoring and reporting may also be included as conditions.

Montana Pollutant Discharge Elimination System (MPDES) - stormwater and other point sources.

ARM 17.30.1342 - 1344 set forth the substantive requirements applicable to all MPDES permits. The substantive requirements, including the requirement to properly operate and maintain all facilities and systems of treatment and control are applicable requirements.

Under ARM 17.30.601, ARM 17.30.1101 et seq., and ARM 17.30.1301 et seq., the Montana Department of Environmental Quality has issued general stormwater permits for certain activities. Generally, the permits require the permittee to implement Best Management Practices (BMP) and to take all reasonable steps to minimize or prevent any discharge which has a reasonable likelihood of adversely affecting human health or the environment.[27] However, if there is evidence indicating potential or realized impacts on water quality due to any storm water discharge associated with the activity, the substantive standards associated with an individual Montana Pollutant Discharge Elimination System (MPDES) permit or alternative general permit may be required. The substantive requirements of the following permits are applicable for the following activities:

> For construction activities: General Permit for Storm Water Discharges Associated with Construction Activity, Permit No. MTR 100000 (June 8, 2002);
>
> For mining activities: General Permit for Storm Water Discharges Associated with Mining and with Oil and Gas Activities, Permit No. MTR300000 (November 17, 2002)[28];
>
> For industrial activities: General Permit for Storm Water Discharges Associated with Industrial Activity, Permit No. MTR000000 (October 1, 2001).

Generally, the permits listed above require the permittee to implement Best Management Practices (BMP) and to take all reasonable steps to minimize or prevent any discharge which has a reasonable likelihood of adversely affecting human health or the

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[27] For further explanation of storm water applications, see the letter from EPA to Chuck Stilwell, ARCO, dated February 2, 1999, which describes that treatment, in addition to BMPs, may be necessary if in-stream standards are not met after implementation of BMPs

[28] This permit covers point source discharges of storm water from mining and milling activities (including active, inactive, and abandoned mine and mill sites) including activities with Standard Industrial Code 14 (metal mining)

environment.[29] However, if there is evidence indicating potential or realized impacts on water quality due to any storm water discharge associated with the activity, the substantive standards associated with an individual MPDES permit or alternative general permit may be required.

A related mine reclamation requirement is set out in ARM 17.24.633 (relevant and appropriate), which requires that all surface drainage from disturbed areas that have been graded, seeded or planted must be treated by the best technology currently available (BTCA) before discharge. Sediment control through BTCA practices must be maintained until the disturbed area has been reclaimed, the revegetation requirements have been met, and the area meets state and federal requirements for the receiving stream.

2. Groundwater Water Standards

As noted above, EPA has waived all ground water standard within the zone defined in the final BPSOU TI Evaluation document (EPA 2006), pursuant to its authority under CERCLA. The following standards apply outside of the TI waiver zone.

In addition to the standards set forth below, relevant and appropriate MCLs and MCLGs are included in the federal ARARs identified above.

a. Montana Maximum Contaminant Levels (relevant and appropriate)

Pursuant to the Public Water Safety Act, 75-6-101 et seq. MCA and ARM 17.28.203, the MCLS specified in 40 CFR Part 141 (Primary Drinking Water Standards) are incorporated by reference into State law.

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[29] For further explanation of storm water applications, see the letter from EPA to Chuck Stilwell, ARCO, dated February 2, 1999, which describes that treatment, in addition to BMPs, may be necessary if in-stream standards are not met after implementation of BMPs

b. Groundwater Quality Standards (Applicable)

ARM 17.30.1006 classifies groundwater into Classes I through IV based upon the its specific conductance and establishes the groundwater quality standards applicable with respect to each groundwater classification. Based upon its specific conductance, the majority of the groundwater in the defined alluvial aquifer of the BPSOU is considered Class I or Class II groundwater.[30]

Concentrations of substances in Class I and Class II groundwater may not exceed the human health standards for groundwater listed in department Circular DEQ-7. For the primary chemicals of concern these levels are listed below.

For concentrations of parameters for which human health standards are not listed in DEQ-7, ARM 17.30.1006 allows no increase of a parameter to a level that renders the waters harmful, detrimental or injurious to listed beneficial uses. For Class I and II groundwaters, 17.30.1006 also allows no increase of a parameter that causes a violation of the nondegradation provisions of § 75-5-303, MCA.

ARM 17.30.1006 (Applicable) establishes the groundwater quality standards applicable with respect to each groundwater classification. Concentrations of dissolved substances in Class I or II groundwater (or Class III groundwater which is used as a drinking water source) may not exceed the human health standards listed in department Circular DEQ-7. For the primary contaminants of concern these levels are listed below. Ground water is measured in dissolved form, according to DEQ-7.

Chemical	DEQ-7 Human Health Standards
Arsenic	20 ug/1
Cadmium	5 ug/1
Copper	1300 ug/1
Lead	15 ug/1
Mercury	2 ug/l
Zinc	2000 ug/1

[30] ARM 17 30 1006 provides that Class I groundwaters are those with specific conductance of less than 1000 microSiemens per centimeter at 25C C, Class II groundwaters 1000 to 2500, Class III groundwaters 2500 to 15,000, and Class IV groundwaters over 15,000

ARM 17.30.1011 provides that groundwater whose existing quality is higher than the standard for its classification must be maintained at that high quality unless degradation may be allowed under the principles established in § 75-5-303, MCA, and the nondegradation rules at ARM 17.30.701 et seq.

An additional concern with respect to ARARs for groundwater is the impact of groundwater upon the surface water. If significant loadings of contaminants from groundwater sources to Silver Bow Creek or other surface water contribute to the inability of the surface water to meet its class standards, then alternatives to alleviate such groundwater loading must be evaluated and, if appropriate, implemented. Groundwater in certain areas may need to be remediated to levels more stringent than the groundwater classification standards in order to achieve the standards for affected surface water. See Compliance with Federal Water Quality Criteria, OSWER Publication 9234.2-09/FS (June 1990) ["Where the ground water flows naturally into the surface water, the ground-water remediation should be designed so that the receiving surface-water body will be able to meet any ambient water-quality standards (such as State WQSs or FWQC) that may be ARARs for the surface water."].

B. Air Quality

In addition to the standards identified in the federal action specific ARARs above, the State of Montana has identified certain air quality standards in the action-specific section of the State ARARs below.

V. MONTANA LOCATION SPECIFIC REQUIREMENTS

A. Floodplain and Floodway Management Act and Regulations (Applicable)

The Floodplain and Floodway Management Act and regulations specify types of uses and structures that are allowed or prohibited in the designated 100-year floodway[31] and floodplain[32].

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[31] The floodway is the channel of a watercourse or drainway and those portions of the floodplain adjoining the channel which are reasonably required to carry and discharge the floodwater of the water course or drainway. ARM 36 15 101(13)

[32] The floodplain is the area adjoining the water course or drainway which would be covered by the floodwater of a base (110 year) flood except for sheet flood areas that receive less than one foot of water per occurrence The floodplain consists of the floodway and flood fringe ARM 36 15 101

These standards are applicable to all actions contemplated for this site within the floodplain.

1. Allowed Uses. The law recognizes certain uses as allowable in the floodway and a broader range of uses as allowed in the floodplain. Residential use is among the possible allowed uses expressly recognized in both the floodway and floodplain. "Residential uses such as lawns, gardens, parking areas, and play areas," as well as certain agricultural, industrial-commercial, recreational and other uses are permissible within the designated floodway, provided they do not require structures other than portable structures, fill or permanent storage of materials or equipment. 76-5-401, MCA; ARM 36.15.601.[33] In addition, in the flood fringe (i.e., within the floodplain but outside the floodway), residential, commercial, industrial, and other structures may be permitted subject to certain conditions relating to placement of fill, roads, floodproofing, etc. § 76-5-402, MCA; ARM 36.15.701. Domestic water supply wells may be permitted, even within the floodway, provided the well casing is watertight to a depth of 25 feet and the well meets certain conditions for floodproofing, sealing, and positive drainage away from the well head. ARM 36.15.602(6).

2. Prohibited Uses Uses prohibited anywhere in either the floodway or the floodplain are:

a. solid and hazardous waste disposal; and

b. storage of toxic, flammable, hazardous, or explosive materials.

ARM 36.15.605(2) and 36.15.703.

In the floodway, additional prohibitions apply, including prohibition of:

a. a building for living purposes or place of assembly or permanent use by human beings;

b. any structure or excavation that will cause water to be diverted from the established floodway, cause erosion, obstruct the natural flow of water, or reduce the carrying capacity of the floodway; and

[33] However, see EPA's 1997 Human Health Risk Assessment for a determination of likely land use at the CFR OU, based on local zoning requirements and other factors

c. the construction or permanent storage of an object subject to flotation or movement during flood level periods.

Section 76-5-403, MCA.

3. Applicable considerations in use of floodplain or floodway

Applicable regulations also specify factors that must be considered in allowing diversions of the stream, changes in place of diversion of the stream, flood control works, new construction or alteration of artificial obstructions, or any other nonconforming use within the floodplain or floodway. Many of these requirements are set forth as factors that must be considered in determining whether a permit can be issued for certain obstructions or uses. While permit requirements are not directly applicable to remedial actions conducted entirely on site, the substantive criteria used to determine whether a proposed obstruction or use is permissible within the floodway or floodplain are applicable standards. Factors which must be considered in addressing any obstruction or use within the floodway or floodplain include:

1. the danger to life and property from backwater or diverted flow caused by the obstruction or use;

2. the danger that the obstruction or use will be swept downstream to the injury of others;

3. the availability of alternate locations;

4. the construction or alteration of the obstruction or use in such a manner as to lessen the danger;

5. the permanence of the obstruction or use; and

6. the anticipated development in the foreseeable future of the area which may be affected by the obstruction or use.

See 76-5-406, MCA; ARM 36.15.216 (substantive provisions only).

Conditions or restrictions that generally apply to specific activities within the floodway or floodplain are:

1. the proposed activity, construction, or use cannot increase the upstream elevation of the 100-year flood a significant

amount (one-half foot or as otherwise determined by the permit issuing authority) or significantly increase flood velocities, ARM 36.15.604 (Applicable, substantive provisions only); and

2. the proposed activity, construction, or use must. be designed and constructed to minimize potential erosion, see ARM 36.15.605.

For the substantive conditions and restrictions applicable to specific obstructions or uses, see the following applicable regulations:

Excavation of material from pits or pools- ARM 36.15.602 (1).
Water diversions or changes in place of diversion ARM 36.15.603.
Flood control works - ARM 36.15.606.
Roads, streets, highways and rail lines (must be designed to minimize increases in flood heights) - ARM 36.15.701(3) (c).
Structures and facilities for liquid or solid waste treatment and disposal (must be floodproofed to ensure that no pollutants enter flood waters and may be allowed and approved only in accordance with MDEQ regulations, which include certain additional prohibitions on such disposal) - ARM 36.15.701(3) (d).
Residential structures - ARM 36.15.702(1).
Commercial or industrial structures - ARM 36.15.702(2).

B. Solid Waste Management Regulations (Applicable)

Regulations promulgated under the Solid Waste Management Act, §§ 75-10-201 et seq. MCA, specify requirements that apply to the location of any solid waste management facility. Under ARM 17.50.505, a facility for the treatment, storage or disposal of solid wastes:

(a) must be located where a sufficient acreage of suitable land is available for solid waste management;

(b) may not be located in a 100-year floodplain;

(c) may be located only in areas which will prevent the pollution of ground and surface waters and public and private water supply systems;

(d) must be located to allow for reclamation and reuse of the land;

(e) drainage structures must be installed where necessary to prevent surface runoff from entering waste management areas; and

(f) where underlying geological formations contain rock fractures or fissures which may lead to pollution of the ground water or areas in which springs exist that are hydraulically connected to a proposed disposal facility, only Class III disposal facilities may be approved[34].

Even Class III landfills may not be located on the banks of or in a live or intermittent stream or water saturated areas, such as marshes or deep gravel pits which contain exposed ground water. ARM 17.54.505(2)(j).

In addition, § 75-10-212 prohibits dumping or leaving any debris or refuse upon or within 200 yards of any highway, road, street, or alley of the State or other public property, or on privately owned property where hunting, fishing, or other recreation is permitted. However, the restriction relating to privately owned property does not apply to the owner, his agents, or those disposing of debris or refuse with the owner's consent.

C. Natural Streambed and Land Preservation Standards (Applicable)

Sections 87-5-502 and 504, MCA, (substantive provisions only) provide that a state agency or subdivision shall not construct, modify, operate, maintain or fail to maintain any construction project or hydraulic project which may or will obstruct, damage, diminish, destroy, change, modify, or the natural existing shape and form of any stream or its banks or tributaries in a manner that will adversely affect any fish or game habitat. The requirement that any such project must eliminate or diminish any adverse effect on fish or game habitat is applicable to the state in concurring upon any remedial actions to be conducted. The Natural Streambed and Land Preservation Act of 1975, MCA 75-7-101

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[34] Group III consist of primarily inert wastes, including industrial mineral wastes which are essentially inert and non-water soluble and do not contain hazardous waste constituents ARM 17 50 503(1)(b)

et seq. includes substantive requirements and is applicable to private parties as well as government agencies.

While the administrative/ procedural requirements including the consent and approval requirement set forth in these statutes and regulations are not ARARs, the party designing and implementing the remedial action for the CFR OU is encouraged to continue to consult with the Montana Department of Fish, Wildlife and Parks and any conservation district or board of county commissioners (or consolidated city/county government) as provided in the referenced statutes, to assist in the evaluation of factors discussed above.

ARM 36.2.410 establishes minimum standards which would be applicable if a remedial action alters or affects a streambed, including any channel change. Projects must be designed and constructed using methods that minimize adverse impacts to the stream (both upstream and downstream) and future disturbances to the stream. All disturbed areas must be managed during construction and reclaimed after construction to minimize erosion. Temporary structures used during construction must be designed to handle high flows reasonably anticipated during the construction period. Temporary structures must be completely removed from the stream channel at the conclusion of construction and the area must be restored to a natural or stable condition. Channel alternation must be designed to retain original stream length or otherwise provide hydrologic stability. Streambank vegetation must be protected except where removal of such vegetation is necessary for the completion of the project. When removal of vegetation is necessary, it must be kept to a minimum. Riprap, rock, and other material used in a project must be of adequate size, shape and density and must be properly placed to protect the streambank from erosion. The placement of road fill material in a stream, the placement of debris or other materials in a stream where it can erode or float into the stream, projects that permanently prevent fish migration, operation of construction equipment in a stream, and excavation of streambed gravels are prohibited unless specifically authorized by the district. Such projects must also protect the use of water for any useful or beneficial purpose. See 75-7-102, MCA.

VI. MONTANA ACTION SPECIFIC REQUIREMENTS

A. Water Quality Statute and Regulations (Applicable):

Causing of pollution: Section 75-5-605 of the Montana Water Quality Act prohibits the causing of pollution of any state

waters. Pollution is defined as contamination or other alteration of physical, chemical, or biological properties of state waters which exceeds that permitted by the water quality standards.

Placement of Wastes: Section 75-5-605, MCA states that it is unlawful to place or caused to be placed any wastes where they will cause pollution of any state waters. Placement of waste is not prohibited if the authorization for placement contains provisions for review of the placement of materials to ensure it will not cause pollution to state waters.

Nondegradation: Section 75-5-303, MCA states that existing uses of state waters and the level of water quality necessary to protect the uses must be maintained and protected. Section 75-5-317, MCA, provides an exemption from nondegradation requirements which allows changes of existing water quality resulting from an emergency or remedial activity that is designed to protect the public health or the environment and that is approved, authorized, or required by the department. Changes determined to meet these requirements may be considered nonsignificant. In determining that remedial actions are protective of public health and the environment and in approving, authorizing, or requiring such remedial activities, no significant degradation should be approved, considering the criteria for a determination of non-significance set out in 75-5-301(5)(c), which (i) equate significance with the potential for harm to human health, a beneficial use or the environment, (ii) consider both the quantity and strength of the pollutant, (iii) consider the length of time the degradation will occur, and (iv) consider the character of the pollutant so that greater significance is associated with carcinogens and toxins that bioaccumulate or biomagnify and lesser significance is associated with substances that are less harmful or less persistent. Under ARM 17.30.715(1)(b), concentrations of carcinogenic parameters or parameters with a bioconcentration factor greater than 300 cannot exceed the concentration in the receiving water in order for a discharge to be considered nonsignificant and thus exempt from nondegradation requirements under § 75-5-317.

ARM 17.30.705 provides that for any surface water, existing and anticipated uses and the water quality necessary to protect these uses must be maintained and protected unless degradation is allowed under the nondegradation rules at ARM 17.30.701 et seq.

ARM 17.30.1011 provides that any groundwater whose existing quality is higher than the standard for its classification must be maintained at that high quality unless degradation may be

allowed under the principles established in § 75-5-303, MCA, and the nondegradation rules at ARM 17.30.701 et seq.

B. Montana Pollutant Discharge Elimination System (MPDES)-stormwater and other point sources.

ARM 17.30.1342 - 1344 set forth the substantive requirements applicable to all MPDES permits. The substantive requirements, including the requirement to properly operate and maintain all facilities and systems of treatment and control are applicable requirements.

Under ARM 17.30.601 et seq., and ARM 17.30.1301 et seq., including ARM 17.30.1332, the Water Quality Division has issued general stormwater permits for certain activities. Generally, the permits require the permittee to implement Best Management Practices (BMP) and to take all reasonable steps to minimize or prevent any discharge which has a reasonable likelihood of adversely affecting human health or the environment.[35] However, if there is evidence indicating potential or realized impacts on water quality due to any storm water discharge associated with the activity, an individual Montana Pollutant Discharge Elimination System (MPDES) permit or alternative general permit may be required. The substantive requirements of the following permits are applicable for the following activities:

> For construction activities: General Permit for Storm Water Discharge Associated with Construction Activity, Permit No. MTR 100000 (June 8, 2002);
>
> For mining activities: General Discharge Permit for Storm Water Associated with Mining and with Oil and Gas Activities, Permit No. MTR300000 (November 17, 2002)[36];
>
> For industrial activities: General Permit for Storm Water Discharge Associated with Industrial Activity, Permit No. MTR000000 (October 1, 2001).

Generally, the permits require the permittee to implement Best Management Practices (BMP) and to take all reasonable steps to minimize or prevent any discharge which has a reasonable

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[35] For further explanation of storm water applications, see the letter from EPA to Chuck Stilwell, ARCO, dated February 2, 1999, which describes that treatment, in addition to BMPs, may be necessary if in-stream standards are not met after implementation of BMPs

[36] This permit covers point source discharges of storm water from mining and milling activities (including active, inactive, and abandoned mine and mill sites) including activities with Standard Industrial Code 14 (metal mining)

likelihood of adversely affecting human health or the environment. However, if there is evidence indicating potential or realized impacts on water quality due to any storm water discharge associated with the activity, an individual MPDES permit or alternative general permit may be required.

A related mine reclamation requirement is set out in ARM 17.24.633 (relevant and appropriate), which requires that all surface drainage from disturbed areas that have been graded, seeded or planted must be treated by the best technology currently available (BTCA) before discharge. Sediment control through BTCA practices must be maintained until the disturbed area has been reclaimed, the revegetation requirements have been met, and the area meets state and federal requirements for the receiving stream.

C. Air Quality

Air Quality Regulations (Applicable)

Dust suppression and control of certain substances likely to be released into the air as a result of earth moving, transportation and similar actions related to remedial activity at the BPSOU may be necessary to meet air quality requirements. Certain ambient air standards for specific contaminants and particulates are set forth in the federal action specific section above. Additional air quality regulations under the state Clean Air Act, §§ 75-2-101 et seq., MCA, are discussed below.

ARM 17.8.604 (Applicable) lists certain wastes that may not be disposed of by open burning, including oil or petroleum products, RCRA hazardous wastes, chemicals, and treated lumber and timbers. Any waste which is moved from the premises where it was generated and any trade waste (material resulting from construction or operation of any business, trade, industry or demolition project) may be open burned only in accordance with the substantive requirements of 17.8.611 or 612.

ARM 17.8.308 (Applicable) provides that no person shall cause or authorize the production, handling, transportation or storage of any material; or cause or authorize the use of any street, road, or parking lot; or operate a construction site or demolition project, unless reasonable precautions to control emissions of airborne particulate matter are taken. Normally, emissions of airborne particulate matter must be controlled so that they do not "exhibit an opacity of twenty percent (20%) or greater averaged over six consecutive minutes." However, more stringent standards apply to non- attainment areas, including the

requirements to apply best available control technology (BACT) for new sources emitting less than 100 tons per year to particulate matter. ARM 17.8.308(4). Under the State Implementation Plan, the Air Quality Permitting Program applies a 5% opacity limit for haul roads. This more stringent limits would apply in Butte, which is a non-attainment area for particulate matter. See also ARM 17.8.304(2) (Applicable).

In addition, state law provides an ambient air quality standard for settled particulate matter. Particulate matter concentrations in the ambient air shall not exceed the following 30-day average: 10 grams per square meter. ARM 17.8.220 (Applicable). Whenever this standard is exceeded, the activity resulting in such exceedance shall be suspended until such time as conditions improve.

ARM 17.24.761 (Relevant and Appropriate) specifies a range of measures for controlling fugitive dust emissions during mining and reclamation activities. Some of these measures could be considered relevant and appropriate to control fugitive dust emissions in connection with excavation, earth moving and transportation activities conducted as part of the remedy at the site. Such measures include, for example, paving, watering, chemically stabilizing, or frequently compacting and scraping roads, promptly removing rock, soil or other dust-forming debris from roads, restricting vehicle speeds, revegetating, mulching, or otherwise stabilizing the surface of areas adjoining roads, restricting unauthorized vehicle travel, minimizing the area of disturbed land, and promptly revegetating regraded lands.

D. Solid Waste Management Regulations (Applicable)

As noted above, the Solid Waste Management Regulations are applicable to the disposal or active management of the tailings and similar wastes within the BPSOU. Certain of these regulations are identified in the state location specific ARARs above. Action specific solid waste regulations are discussed below:

ARM 17.50.505(2) specifies standards for solid waste management facilities, including the requirements that:

1. Class II[37] landfills must confine solid waste and leachate to the disposal facility. If there is the potential for leachate[38] migration,
it must be demonstrated that leachate will only migrate to underlying formations which have no hydraulic continuity with any state waters;

2. adequate separation of group II wastes from underlying or adjacent water must be provided[39]; and

3. no new disposal units or lateral expansions may be located in wetlands.

ARM 17.50.506 specifies design requirements for landfills[40]. Landfills must either be designed to ensure that MCLs are not exceeded or the landfill must contain a composite liner and leachate collection system which comply with specified criteria.

ARM 17.50.511 sets forth general operational and maintenance and design requirements for solid waste management systems. Specific operational and maintenance requirements specified in ARM 17.50.511[41] that are relevant and appropriate are requirements for run-on and runoff control systems, requirements that sites be fenced to prevent unauthorized access, and prohibitions of point source and nonpoint source discharges which would violate Clean Water Act requirements.

ARM 17.50.523 specifies that solid waste must be transported in such a manner as to prevent its discharge, dumping, spilling or leaking from the transport vehicle.

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[37] Generally Class II landfills are licensed to receive Group II and Group III waste, but not regulated hazardous waste Class III landfills may only receive Group III waste

[38] Leachate is defined as a liquid which has contacted passed through, or emerged from solid waste and contains soluble, suspended, or miscible materials removed from the waste ARM 17 50 502(29)

[39] The extent of separation shall be established on a case-by-case basis, considering terrain and the type of underlying soil formations, and facility design The Waste Management Section of DEQ has generally construed this to require a 10 to 20 foot separation from groundwater

[40] Landfills are defined as an area of land or an excavation where wastes are placed for permanent disposal, and is not a land application unit, surface impoundment, injection well, or waste pile ARM 17 50 502(27)

[41] ARM 17 50 511(1)(j), 17 50 511(1)(k) and 17 50 511(1)(l)

ARM 17.50.530 sets forth the closure[42] requirements for landfills. Class II landfills must meet the following criteria:

1. install a cover that is designed to minimize infiltration and erosion;

2. design and construct the final cover system to minimize infiltration through the closed unit by the use of an infiltration layer that contains a minimum 18 inches of earthen material and has a permeability less than or equal to the permeability of any bottom liner, barrier layer, or natural subsoils or a permeability no greater than 1 X 10-5 cm/sec, whichever is less;

3. minimize erosion of the final cover by the use of a seed bed layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth and protecting the infiltration layer from frost effects and rooting damage; and

4. revegetate the final cover with native plant growth within one year of placement of the final cover.

ARM 17.50.530(1)(b) allows an alternative final cover design if the infiltration layer achieves reduction in infiltration at least equivalent to the stated criteria and the erosion layer provides protection equivalent to the stated criteria.

ARM 17.50.531 sets forth post closure care requirements for Class II landfills. Post closure care must be conducted for a period sufficient to protect human health and the environment. Post closure care requires maintenance of the integrity and effectiveness of any final cover, including making repairs to the cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, and preventing run-on and run-off from eroding or otherwise damaging the cover and comply with the groundwater monitoring requirements found at ARM Title 17, chapter 50, subchapter 7.

[42] Closure means the process by which the operator closes all or part of the facility

Section 75-10-206, MCA, allows variances[43] to be granted from solid waste regulations if failure to comply with the rules does not result in a danger to public health or safety or compliance with specific rules would produce hardship without producing benefits to the health and safety of the public that outweigh the hardship. In certain circumstances relating to waste nature and volume and the provisions of the Superfund law regarding ongoing maintenance and review, certain of the Solid Waste regulations regarding design of landfills, operational and maintenance requirements, and landfill closure and post-closure care may appropriately be subject to variance for the BPSOU. For example, the barrier layer and leachate collection and removal system requirements of ARM 17.50.506 may be subject to variance as long as the design ensures that concentration values listed in Table 1, ARM 17.50.506, will not be exceeded in the uppermost aquifer, measured at the appropriate location. Similarly, the ground water monitoring requirements of ARM 17.50.701 et seq. can be considered and coordinated with any other monitoring requirements under CERCLA.

E. Reclamation Requirements

The Strip and Underground Mine Reclamation Act, §§ 82-4-201 through 254, MCA, technically applies to coal and uranium mining, but that statute and the regulations promulgated under that statue and discussed in this section set out the standards that mine reclamation should attain. Those requirements identified here have been determined to be relevant and appropriate requirements for this action. Section 82-4-231 (Relevant and Appropriate) requires the reclamation and revegetation of the land as rapidly, completely, and effectively as the most modern technology and the most advanced state of the art will allow. In developing a method of operation and plans of backfilling, water control, grading, topsoiling and reclamation, all measures shall be taken to eliminate damages to landowners and members of the public, their real and personal property, public roads, streams, and all other public property from soil erosion, subsidence, landslides, water pollution, and hazards dangerous to life and property. Sections 82-4-231(10)(j) and (10)(k)(i) and ARM 17.24.751 (Relevant and Appropriate) provide that reclamation of mine waste materials

[43] See the letter from EPA to Chuck Stilwell, ARCO, dated May 21, 2002, which describes the application of variances to solid waste management rules for the Railroad Bed Time Critical Removal Action (TCRA) at the BPSOU

shall, to the extent possible using the best technology currently available, minimize disturbances and adverse impacts of the operation on fish, wildlife, and related environmental values and achieve enhancement of such resources where practicable, and shall avoid acid or other toxic mine drainage by such measures as preventing or removing water from contact with toxic producing deposits. ARM 17.24.641 (Relevant and Appropriate) also provides that drainage from acid forming or toxic-forming spoil into ground and surface water must be avoided by preventing water from coming into contact with such spoil. ARM 17.24.505 (Relevant and Appropriate) similarly provides that acid, acid forming, toxic, toxic-forming or other deleterious materials must not be buried or stored in proximity to a drainage course so as to cause or pose a threat of water pollution.

Reclamation Activities - Hydrology Regulations (Relevant and Appropriate)

The hydrology regulations promulgated under the Strip and Underground Mine Reclamation Act, §§ 82-4-201 et seq., MCA, provide detailed guidelines for addressing the hydrologic impacts of mine reclamation activities and earth-moving projects and are relevant and appropriate for addressing these impacts in the BPSOU.

ARM 17.24.631 (Relevant and Appropriate) provides that long-term adverse changes in the hydrologic balance from mining and reclamation activities, such as changes in water quality and quantity, and location of surface water drainage channels shall be minimized. Water pollution must be minimized and, where necessary, treatment methods utilized. Diversions of drainage to avoid contamination must be used in preference to the use of water treatment facilities. Other pollution minimization devices must be used if appropriate, including stabilizing disturbed areas through land shaping, diverting runoff, planting quickly germinating and growing stands of temporary vegetation, regulating channel velocity of water, lining drainage channels with rock or vegetation, mulching, and control of acid-forming, and toxic-forming waste materials.

ARM 17.24.633 (Relevant and Appropriate) provides water quality performance standards that may be invoked in the event that runoff from the treated areas threatens water quality or sediments in the stream, including the requirement that all surface drainage from a disturbed area must be treated by the best technology currently available (BTCA). Treatment must continue until the area is stabilized.

ARM 17.24.634 (Relevant and Appropriate) provides that, in reclamation of drainage, drainage design must emphasize channel and floodplain dimensions that approximate the pre-mining configuration and that will blend with the undisturbed drainage above and below the area to be reclaimed. The average stream gradient must be maintained with a concave longitudinal profile. This regulation provides specific requirements for designing the reclaimed drainage to:

1. approximate an appropriate geomorphic habit or characteristic pattern;
2. remain in dynamic equilibrium with the system without the use of artificial structural controls;
3. improve unstable premining conditions;
4. provide for floods and for the long-term stability of the landscape; and
5. establish a premining diversity of aquatic habitats and riparian vegetation.

ARM 17.24.635 through 26.4.637 (Relevant and Appropriate) set forth requirements for temporary and permanent diversions.

ARM 17.24.638 (Relevant and Appropriate) specifies sediment control measures to be implemented during operations.

ARM 17.24.639 (Relevant and Appropriate) sets forth requirements for temporary and permanent sedimentation ponds.

ARM 17.24.640 (Relevant and Appropriate) provides that discharge from sedimentation ponds, permanent and temporary impoundments, and diversions shall be controlled by energy dissipaters, riprap channels, and other devices, where necessary, to reduce erosion, prevent deepening or enlargement of stream channels, and to minimize disturbance of the hydrologic balance.

ARM 17.24.643 (Relevant and Appropriate) requires protection of groundwater resources.

ARM 17.24.645 (Relevant and Appropriate) sets forth requirements for groundwater monitoring.

ARM 17.24.646 (Relevant and Appropriate) sets forth requirements for surface water monitoring.

Reclamation and Revegetation Requirements (Relevant and Appropriate)

ARM 17.24.501 (Relevant and Appropriate) gives general backfilling and final grading requirements. Backfill must be placed so as to minimize sedimentation, erosion, and leaching of acid or toxic materials into waters, unless otherwise approved. Final grading must be to the approximate original contour of the land and final slopes must be graded to prevent slope failure, may not exceed the angle of repose, and must achieve a minimum long term static safety factor of 1:3. The

disturbed area must be blended with surrounding and undisturbed ground to provide a smooth transition in topography.

ARM 17.24.519 (Relevant and Appropriate) provides that an operator may be required to monitor settling of regraded areas.

ARM 17.24.702(4), (5), and (6) (Relevant and Appropriate) requires that during the redistributing and stockpiling of soil (for reclamation):

1. regraded areas must be deep-tilled, subsoiled, or otherwise treated to eliminate any possible slippage potential, to relieve compaction, and to promote root penetration and permeability of the underlying layer; this preparation must be done on the contour whenever possible and to a minimum depth of 12 inches;

2. redistribution must be done in a manner that achieves approximate uniform thicknesses consistent with soil resource availability and appropriate for the postmining vegetation., land uses, contours, and surface water drainage systems; and

3. redistributed soil must be reconditioned by subsoiling or other appropriate methods.

ARM 17.24.703 (Relevant and Appropriate) requires that when using materials other than, or along with, soil for final surfacing in reclamation, the operator must demonstrate that the material (1) is at least as capable as the soil of supporting the approved vegetation and subsequent land use, and (2) the medium must be the best available in the area to support vegetation. Such substitutes must be used in a manner consistent with the requirements for redistribution of soil in ARM 17.24.701 and 702.

ARM 17.24.711 (Relevant and Appropriate) requires that a diverse, effective, and permanent vegetative cover of the same seasonal variety native to the area of land to be affected shall be established except on road surfaces and below the low-water line of permanent impoundments. See also § 82-4-233, MCA (Relevant and Appropriate). Vegetative cover is considered of the same seasonal variety if it consists of a mixture of species of equal or superior utility when compared with the natural vegetation during each season of the year (See also ARM 17.24.716 and 719 below regarding substitution of introduced species for native-species). This requirement may not be appropriate where other cover is more suitable for the particular land use or another cover is requested by the landowner.

ARM 17.24.713 (Relevant and Appropriate) provides that seeding and planting of disturbed areas must be conducted during the first appropriate period for favorable planting after final seedbed preparation.

ARM 17.24.714 (Relevant and Appropriate) requires use of a mulch or cover crop or both until an adequate permanent cover can be established. Use of mulching and temporary cover may be suspended under certain conditions.

ARM 17.24.716 (Relevant and Appropriate) establishes the required method of revegetation, and provides that introduced species may be substituted for native species as part of an approved plan.

ARM 17.24.717 (Relevant and Appropriate) relates to the planting of trees and other woody species if necessary, as provided in § 82-4-233, MCA, to establish a diverse, effective, and permanent vegetative cover of the same seasonal variety native to the affected area and capable of self-regeneration and plant succession at least equal to the natural vegetation of the area, except that introduced species may be used in the revegetation process where desirable and necessary to achieve the approved land use plan.

ARM 17.24.718 (Relevant and Appropriate) requires the use of soil amendments and other means such as irrigation, management, fencing, or other measures, if necessary to establish a diverse and permanent vegetative cover.

ARM 17.24.721 (Relevant and Appropriate) specifies that rills or gullies in reclaimed areas must be filled, graded or otherwise stabilized and the area reseeded or replanted if the rills and gullies are disrupting the reestablishment of the vegetative

cover or causing or contributing to a violation of water quality standards for a receiving stream.

ARM 17.24.723 (Relevant and Appropriate) sets forth requirements for vegetation, soils, wildlife, and other monitoring.

ARM 17.24.724 (Relevant and Appropriate) specifies that revegetation success must be measured against approved unmined reference areas or by comparison with technical standards from historic data. More than one reference area or historic record must be established for vegetation types with significant variation due to a number of factors.

ARM 17.24.726 (Relevant and Appropriate) sets forth vegetation production, cover, diversity, density, and utility requirements.

ARM 17.24.728 (Relevant and Appropriate) sets forth performance standards for native species and introduced species in revegetated areas.

ARM 17.24.733 (Relevant and Appropriate) sets forth performance standards for composition and stocking of trees, shrubs, and half shrubs on the revegetated area and for measurement of revegetation success.

TO BE CONSIDERED DOCUMENTS (TBCS)

The use of documents identified as TBCs is addressed in the Introduction, above. A list of TBC documents is included in the Preamble to the NCP, 55 Fed. Reg. 8765 (March 8, 1990) . Those documents, plus any additional similar or related documents issued since that time, will be considered by EPA and DEQ during the conduct of the RI/FS, during remedy selection, and during remedy implementation.

OTHER LAWS (NON-EXCLUSIVE LIST)

CERCLA defines as ARARs only federal environmental and state environmental and siting laws. Remedial design, implementation, and operation and maintenance must nevertheless comply with all other applicable laws, both state and federal, if the remediation work is done by parties other than the federal government or its contractors.

The following "other laws" are included here to provide a reminder of other legally applicable requirements for actions

being conducted at this operable unit. They do not purport to be an exhaustive list of such legal requirements, but are included because they set out related concerns that must be addressed and, in some cases, may require some advance planning. They are not included as ARARs because they are not "environmental or facility siting laws." As applicable laws other than ARARs, they are not subject to ARAR waiver provisions.

Section 121(e) of CERCLA exempts removal or remedial actions conducted entirely on-site from federal, state, or local permits. This exemption is not limited to environmental or facility siting laws, but applies to other permit requirements as well.

Other Federal Laws

Occupational Safety and Health Regulations

The federal Occupational Safety and Health Act regulations found at 29 CFR § 1910 are applicable to worker protection during conduct of RI/FS or remedial activities.

Other Montana Laws

1. Groundwater Act

Section 85-2-505, MCA, (Applicable) precludes the wasting of groundwater. Any well producing waters that contaminate other waters must be plugged or capped, and wells must be constructed and maintained so as to prevent waste, contamination, or pollution of groundwater.

Section 85-2-516, MCA, states that within 60 days after any well is completed a well log report must be filed by the driller with the DNRC and the appropriate county clerk and recorder.

2. Public Water Supply Regulations

If remedial action at the site requires any reconstruction or modification of any public water supply line or sewer line, the construction standards specified in ARM 17.38.101 (Applicable) must be observed.

3. Water Rights

Section 85-2-101, MCA, declares that all waters within the state are the state's property, and may be appropriated for beneficial uses. The wise use of water resources is encouraged for the

maximum benefit to the people and with minimum degradation of natural aquatic ecosystems.

Parts 3 and 4 of Title 85, Chapter 2, MCA, set out requirements for obtaining water rights and appropriating and utilizing water. All requirements of these parts are laws which must be complied with in any action using or affecting waters of the state. Some of the specific requirements are set forth below.

Section 85-2-301, MCA, of Montana law provides that a person may only appropriate water for a beneficial use.

Section 85-2-302, MCA, specifies that a person may not appropriate water or commence construction of diversion, impoundment, withdrawal or distribution works therefore except by applying for and receiving a permit from the Montana Department of Natural Resources and Conservation. While the permit itself may not be required under federal law, appropriate notification and submission of an application should be performed and a permit should be applied for in order to establish a priority date in the prior appropriation system.

Section 85-2-306, MCA, specifies the conditions on which groundwater may be appropriated, and, at a minimum, requires notice of completion and appropriation within 60 days of well completion.

Section 85-2-311, MCA, specifies the criteria which must be met in order to appropriate water and includes requirements that:

1. there are unappropriated waters in the source of supply;
2 the proposed use of water is a beneficial use; and
3. the proposed use will not interfere unreasonably with other planned uses or developments.

Section 85-2-402, MCA, specifies that an appropriator may not change an appropriated right except as provided in this section with the approval of the DNRC.

Section 85-2-412, MCA, provides that, where a person has diverted all of the water of a stream by virtue of prior appropriation and there is a surplus of water, over and above what is actually and necessarily used, such surplus must be returned to the stream.

4. Controlled Ground Water Areas

Pursuant to § 85-2-507, MCA, the Montana Department of Natural Resources and Conservation may grant either a permanent or a

temporary controlled ground water area. The maximum allowable time for a temporary area is two years, with a possible two-year extension.

Pursuant to § 85-2-506, MCA, designation of a controlled ground water area may be proposed if: (i) excessive ground water withdrawals would cause contaminant migration; (ii) ground water withdrawals adversely affecting ground water quality within the ground water area are occurring or are likely to occur; or (iii) ground water quality within the ground water area is not suited for a specific beneficial use.

5. Occupational Health Act, §§ 50-70-101 et seq., MCA.

ARM § 17.74.101 addresses occupational noise. In accordance with this section, no worker shall be exposed to noise levels in excess of the levels specified in this regulation. This regulation is applicable only to limited categories of workers and for most workers the similar federal standard in 29 CFR 1910.95 applies.

ARM § 17.74.102 addresses occupational air contaminants. The purpose of this rule is to establish maximum threshold limit values for air contaminants under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse health effects. In accordance with this rule, no worker shall be exposed to air contaminant levels in excess of the threshold limit values listed in the regulation. This regulation is applicable only to limited categories of workers and for most workers the similar federal standard in 29 CFR § 1910.1000 applies.

6. Montana Safety Act

Sections 50-71-201, 202 and 203, MCA, state that every employer must provide and maintain a safe place of employment, provide and require use of safety devices and safeguards, and ensure that operations and processes are reasonably adequate to render the place of employment safe. The employer must also do every other thing reasonably necessary to protect the life and safety of its employees. Employees are prohibited from refusing to use or interfering with the use of safety devices.

7. Employee and Community Hazardous Chemical Information

Sections 50-78-201, 202, and 204, MCA, state that each employer must post notice of employee rights, maintain at the work place a

list of chemical names of each chemical in the work place, and indicate the work area where the chemical is stored or used. Employees must be informed of the chemicals at the work place and trained in the proper handling of the chemicals.

Appendix B

ABBREVIATIONS

MEASUREMENT BASIS (BASIS)
DRY - Dry weight
WET - Wet weight (whole water or undried soil)

FIELD OR DUPLICATE SAMPLE (STYPE)
FD - Environmental measurement (as opposed to data reported for QC)
DU - Field duplicate or replicate sample

QA/QC LEVEL (QLEV)
0 - Data have not been validated and qualified
1 - Data reviewed and flagged by laboratory
2 - Data have been validated and qualified by PRP
3 - Data have been validated and qualified by EPA/State or data validation oversight completed by EPA/State
4 - Data have been validated but qualifiers not imported to system; or non-standard validation process.

ANALYSIS QUALIFIERS
U - Undetected, value is estimated
J - Value is estimated
B - Detected but less than Contract Required Detection Limit
R - Rejected as unusable

BSBLP - Butte-Silver Bow Lead Program
BS - Basement
DR - Driveway
EP - East Perimeter
EY - East Yard
GD - Garden
NP - North Perimeter
NY - North Yard
OT - Other
PA - Play Area
SP - South Perimeter
SY - South Yard
WP - West Perimeter
WY - West Yard

ABLEV
A - Meets level A criteria
B - Meets level B criteria
U - Unknown

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
1	BUTGW89A	GS-50	27-Jul-89	07/27/89-	WSO	1234488	744181	5476	8-78597	MHT997	FD			3	37		0	UJ	6	B	1	B	20	B		*15 ft N of alley, a			N	N	N	Y	
20	BUTSD89A	SD-107	13-Jun-89	01	DRY	1222000	743000	5422	8-93666	MHN561	FD	0	0.1	3	62		0	UJ	69		49	J	251						Y	Y	N	N	
21	BUTSD89A	SD-107	13-Jun-89	01	DRY	1222000	743000	5422	8-93666	MHN561	FD	0	0.1	3	63	U	10		249	U	258	U	302						Y	Y	N	Y	
22	BUTSD89A	SD-108	13-Jun-89	01	DRY	1222000	742900	5415	8-93688	MHN582	FD	0	0.1	3	323		1	U	561	B	693		1180						N	Y	N	Y	
23	BUTSD89A	SD-108	13-Jun-89	01	DRY	1222000	742900	5415	8-93688	MHN582	FD	0	0.1	3	283		6		533		678		1609						N	Y	N	N	
24	BUTSD89A	SD-109	13-Jun-89	01	DRY	1222500	743200	5419			FD	0	0.1	3	63	U	8		498		258	U	324						N	Y	N	Y	
25	BUTSD89A	SD-110	13-Jun-89	01	DRY	1223100	743000	5423			FD	0	0.1	3	270	U	9		760		702		1948						N	Y	N	Y	
26	BUTSD89A	SD-111	13-Jun-89	01	WSO	1223500	742800	5425	8-86794	MHS394	FD	0	0.1	3	10	J	360	J	150	B	0	UJ	39000						N	N	N	N	
27	BUTSD89A	SD-111	13-Jun-89	01	DRY	1223500	742800	5425	8-93682	MHN576	FD	0	0.1	3	156		35	J	1360	B	747	J	9830						N	Y	N	N	
28	BUTSD89A	SD-111	13-Jun-89	01	DRY	1223500	742800	5425	8-93682	MHN576	FD	0	0.1	3	270	U	56		5793		1196		15420						N	Y	N	Y	
29	BUTSD89A	SD-112	13-Jun-89	01	DRY	1222100	742900	5421	8-93680	MHN574	FD	0	0.1	3	89		6	J	1040	B	110	J	1490						N	Y	N	N	
30	BUTSD89A	SD-112	13-Jun-89	01	DRY	1222100	742900	5421	8-93680	MHN574	FD	0	0.1	3	270	U	10		1583		444	U	1668						N	Y	N	Y	
31	BUTSD89A	SD-112	13-Jun-89	07	DRY	1222100	742900	5421	8-94446	MHN580	FD	0	0.1	3	0		0		0		0		0						N	N	N	N	
32	BUTSD89A	SD-113	13-Jun-89	01	WSO	1223000	742200	5430	8-86796	MHS396	FD	0	0.2	3	34		0	UJ	7	B	0	UJ	20	BJ					N	N	N	N	
33	BUTSD89A	SD-113	13-Jun-89	01	DRY	1223000	742200	5430	8-93658	MHN553	FD	0	0.2	3	54		0	B	127	B	80		275						N	Y	N	N	
34	BUTSD89A	SD-113	13-Jun-89	01	DRY	1223000	742200	5430	8-93658	MHN553	FD	0	0.2	3	63	U	6		249	U	258	U	327						N	Y	N	Y	
35	BUTSD89A	SD-114	13-Jun-89	01	DRY	1223300	741900	5435	8-93675	MHN569	DU	0	0.1	3	1590		17	J	2730	U	1110	J	4760						Y	Y	N	N	
36	BUTSD89A	SD-114	13-Jun-89	01	DRY	1223300	741900	5435	8-93671	MHN565	FD	0	0.1	3	1580		17	J	2680	U	906	J	4930						Y	Y	N	N	
37	BUTSD89A	SD-114	13-Jun-89	01	SRN	1223300	741900	5435	8-21657	MHS202	FD	0	0.1	3	251		134		25000	U	152		37000						N	N	N	N	
38	BUTSD89A	SD-114	13-Jun-89	01	DRY	1223300	741900	5435	8-93671	MHN565	FD	0	0.1	3	1318		25		2633		1563		1682						Y	Y	N	N	
39	BUTSD89A	SD-114	13-Jun-89	01 +	SND	1223300	741900	5435	8-93703	MHN303	FD	0	0.1	3	1650	J	33		4170	U	232	J	9730	J					N	N	N	N	
40	BUTSD89A	SD-114	13-Jun-89	01 -	FNE	1223300	741900	5435	8-93704	MHN304	FD	0	0.1	3	4640	J	20		5380	U	2990	J	6280	J					N	N	N	Y	
41	BUTSD89A	SD-115	14-Jun-89	01	DRY	1225300	741800	5433	8-93684	MHN578	FD	0	0.1	3	236		5	J	637	B	285	J	1970						Y	Y	N	N	
42	BUTSD89A	SD-115	14-Jun-89	01	DRY	1225300	741800	5433	8-93684	MHN578	FD	0	0.1	3	270	U	11		990		487		164						Y	Y	N	Y	
43	BUTSD89A	SD-116	14-Jun-89	01	DRY	1225400	741800	5436	8-93628	MHN525	FD	0	0	3	4220		44		21400	B	991		11500						Y	Y	N	N	
44	BUTSD89A	SD-116	14-Jun-89	01	DRY	1225400	741800	5436	8-93628	MHN525	FD	0	0	3	2900		42		28120		1966		16920						Y	Y	N	Y	
45	BUTSD89A	SD-117	14-Jun-89	01	WSO	1225900	741900	5439	8-86795	MHS395	FD	0	0.1	3	9	J	0	UJ	6	U	0	UJ	86						N	N	N	N	
46	BUTSD89A	SD-117	14-Jun-89	01	DRY	1225900	741900	5439	8-93626	MHN524	FD	0	0.1	3	827		10		293	B	1990		3560						N	Y	N	Y	
47	BUTSD89A	SD-117	14-Jun-89	01	DRY	1225900	741900	5439	8-93626	MHN524	FD	0	0.1	3	394		11		118	U	997		4783						N	Y	N	N	
48	BUTSD89A	SD-118	14-Jun-89	01	DRY	1226100	742700	5439			FD	0	0.1	3	270	U	14		601		1679		2257						N	Y	N	Y	
49	BUTSD89A	SD-119	14-Jun-89	01	DRY	1226800	742700	5434	8-87456	MHN598	FD	0	0.8	3	324		0	U	254	B	193		620						N	Y	N	N	
50	BUTSD89A	SD-119	14-Jun-89	01	DRY	1226800	742700	5434	8-87456	MHN598	FD	0	0.8	3	270	U	8		118	U	444	U	1043						N	Y	N	Y	
51	BUTSD89A	SD-120	15-Jun-89	01	DRY	1227100	743000	5449	8-87477	MHT919	FD	0	0.1	3	93		4		1090		397		1070						N	Y	N	N	
52	BUTSD89A	SD-120	15-Jun-89	01	DRY	1227100	743000	5449	8-87477	MHT919	FD	0	0.1	3	270	U	2		118	U	444	U	1035						N	Y	N	Y	
53	BUTSD89A	SD-121	15-Jun-89	01	WSO	1228400	742200	5439	8-86793	MHS393	FD	0	0.1	3	7		220	J	3300	B	0	UJ	92000						N	N	N	N	
54	BUTSD89A	SD-121	15-Jun-89	01	DRY	1228400	742200	5439	8-93655	MHN550	FD	0	0.1	3	203		8		2320	B	274		3910						Y	Y	N	N	
55	BUTSD89A	SD-121	15-Jun-89	01	DRY	1228400	742200	5439	8-93655	MHN550	FD	0	0.1	3	270	U	21		3120		475		3922						Y	Y	N	Y	
56	BUTSD89A	SD-122	15-Jun-89	01	DRY	1229000	742200	5439	8-87479	MHT921	FD	0	0.1	3	266		2		746	B	211		1460						Y	Y	N	N	
57	BUTSD89A	SD-122	15-Jun-89	01	DRY	1229000	742200	5439	8-87479	MHT921	FD	0	0.1	3	270	U	2	U	1061		444	U	873						Y	Y	N	Y	
58	BUTSD89A	SD-123	15-Jun-89	01	WSO	1229700	742100	5443	8-86792	MHS392	FD	0	0.1	3	5		66	J	660	B	0	UJ	11000						N	N	N	N	
59	BUTSD89A	SD-123	15-Jun-89	01	DRY	1229700	742100	5443	8-93657	MHN552	FD	0	0.1	3	162		13		3360	B	469		6770						Y	Y	N	N	
60	BUTSD89A	SD-123	15-Jun-89	01	DRY	1229700	742100	5443	8-94440	MHN552	FD	0	0.1	3	10	B	110	J	0		33	BJ	0						N	N	N	N	
61	BUTSD89A	SD-123	15-Jun-89	01	DRY	1229700	742100	5443	8-93657	MHN552	FD	0	0.1	3	270	U	42		6750		802		8196						Y	Y	N	Y	
62	BUTSD89A	SD-124	16-Jun-89	01	SRN	1230000	742300	5445	8-21659	MHS204	FD	0	0.1	3	12		537		1560	B	6		230000						N	N	N	N	
63	BUTSD89A	SD-124	16-Jun-89	01	DRY	1230000	742300	5445	8-21659	MHS204	FD	0	0.1	3	270	U	17		2556		721		4184						Y	Y	N	Y	
64	BUTSD89A	SD-124	16-Jun-89	01 +	SND	1230000	742300	5445	8-93711	MHN311	FD	0	0.1	3	89	J	1	B	1190		244	J	2560	J					N	N	N	N	
65	BUTSD89A	SD-124	16-Jun-89	01 -	FNE	1230000	742300	5445	8-93712	MHN312	FD	0	0.1	3	229	J	6		2560		672	J	6870	J					N	N	N	N	
66	BUTSD89A	SD-125	16-Jun-89	01	DRY	1230000	742200	5445	8-93648	MHN544	DU	0	0.2	3	190		7		2020	B	444		5920						Y	Y	N	N	
67	BUTSD89A	SD-125	16-Jun-89	01	WSO	1230000	742200	5445	8-86785	MHS385	FD	0	0.2	3	25	J	280	J	750	B	0	UJ	110000						N	N	N	N	
68	BUTSD89A	SD-125	16-Jun-89	01	DRY	1230000	742200	5445	8-93647	MHN543	FD	0	0.2	3	185		8		2010	B	460		6310						Y	Y	N	N	
69	BUTSD89A	SD-125	16-Jun-89	01	DRY	1230000	742200	5445	8-93647	MHN543	FD	0	0.2	3	270	U	25		3635		777		5982						Y	Y	N	Y	
70	BUTSD89A	SD-125	16-Jun-89	01	WSO	1230000	742200	5445	8-86788	MHS388	FD			3	24	J	270	J	800	B	0	UJ	100000						N	N	N	N	
71	BUTSD89A	SD-126	16-Jun-89	01	WSO	1230400	742400	5447	8-86787	MHS387	FD	0	0.2	3	110		0	UJ	40	B	0	UJ	40	J					N	N	N	N	
72	BUTSD89A	SD-126	16-Jun-89	01	DRY	1230400	742400	5447	8-93633	MHN530	FD	0	0.2	3	302		6		1150	B	1030		2170						Y	Y	N	Y	
73	BUTSD89A	SD-126	16-Jun-89	01	DRY	1230400	742400	5447	8-93633	MHN530	FD	0	0.2	3	270	U	12		1587		579		2597						Y	Y	N	N	
74	BUTSD89A	SD-127	16-Jun-89	01	DRY	1230500	742100	5450			FD	0	0.2	3	270	U	10		379		444	U	890						Y	Y	N	Y	
75	BUTSD89A	SD-128	16-Jun-89	01	WSO	1231200	742500	5447	8-86786	MHS386	FD	0	0.2	3	4		22	J	1300	B	1	J	27000						N	N	N	N	
76	BUTSD89A	SD-128	16-Jun-89	01	DRY	1231200	742500	5447	8-93630	MHN527	FD	0	0.2	3	201		2		362	B	240		1570						Y	Y	N	N	
77	BUTSD89A	SD-128	16-Jun-89	01	DRY	1231200	742500	5447	8-93630	MHN527	FD	0	0.2	3	270	U	16		484		444	U	1458						Y	Y	N	Y	
78	BUTSD89A	SD-130	16-Jun-89	01	DRY	1231500	742100	5448	8-93699	MHN592	FD	0	0.1	3	160		7		576	B	418		2090						Y	Y	N	N	
79	BUTSD89A	SD-130	16-Jun-89	01	DRY	1231500	742100	5448	8-93699	MHN592	FD	0	0.1	3	270	U	17		1077		444	U	2272						Y	Y	N	Y	
80	BUTSD89A	SD-131	16-Jun-89	01	DRY	1231800	743100	5452	8-93696	MHN589	DU	0	0.1	3	146		14		443	B	156		5920						Y	Y	N	N	
81	BUTSD89A	SD-131	16-Jun-89	01	WSO	1231800	743100	5452	8-86791	MHS391	FD	0	0.1	3	9		100	J	57	U	0	UJ	26000						N	N	N	N	
82	BUTSD89A	SD-131	16-Jun-89	01	DRY	1231800	743100	5452	8-93690	MHN584	FD	0	0.1	3	135		13		449	B	187		5960						Y	Y	N	N	
83	BUTSD89A	SD-131	16-Jun-89	01	DRY	1231800	743100	5452	8-93690	MHN584	FD	0	0.1	3	270	U	41		2837		444	U	6178						Y	Y	N	Y	
84	BUTSD89A	SD-131	16-Jun-89	01	WSO	1231800	743100	5452	8-86798	MHS398	FD			3	10		110	J	48	B	0	UJ	27000						N	N	N	N	
85	BUTSD89A	SD-132	16-Jun-89	01	WSO	1232100	743600	5457	8-86771	MHS371	DU	0	0.1	3	47	J	0		57	B	2	J	13	B					N	N	N	N	
86	BUTSD89A	SD-132	16-Jun-89	01	WSO	1232100	743600	5457	8-86767	MHS367	FD	0	0.1	3	45	J	0	B	57	U	1	J	22						N	N	N	N	
87	BUTSD89A	SD-132	16-Jun-89	01	DRY	1232100	743600	5457	8-93635	MHN532	FD	0	0.1	3	45		4		269	B	487		1190						Y	Y	N	Y	
88	BUTSD89A	SD-132	16-Jun-89	01	DRY	1232100	743600	5457	8-93635	MHN532	FD	0	0.1	3	270	U	11		414		444	U	1677						Y	Y	N	N	
89	BUTSD89A	SD-134	16-Jun-89	01	WSO	1234000	744100	5468	8-86769	MHS369	FD	0	0.1	3	46	J	100		41000		0	UJ	21000						N	N	N	N	
90	BUTSD89A	SD-134	16-Jun-89	01	DRY	1234000	744100	5468	8-93634	MHN531	FD	0	0.1	3	161		0	U	749	B	221		451						Y	Y	N	N	
91	BUTSD89A	SD-134	16-Jun-89	01	DRY	1234000	744100	5468	8-93634	MHN531	FD	0	0.1	3	270	U	5		573		444	U	472						Y	Y	N	Y	
92	BUTSD89A	SD-135	20-Jun-89	01	DRY	1228600	741700	5443			FD	0	0.2	3	63	U	6		249	U	258	U	240	U					N	Y	N	Y	
93	BUTSD89A	SD-136	20-Jun-89	01	DRY	1228700	741800	5439	8-93697	MHN590	FD	0	0.1	3	222		6		1610	B	463		1320						N	Y	N	N	

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
94	BUTSD89A	SD-136	20-Jun-89	01	DRY	1228700	741800	5439	8-93697	MHN590	FD	0	0.1	3	356		11		1494		561		1454						N	Y	N	Y	
95	BUTSD89A	SD-137	20-Jun-89	01	DRY	1232100	743200	5453			FD	0	0.2	3	270	U	22		3680		468		4219						Y	Y	N	Y	
96	BUTSD89A	SD-138	20-Jun-89	01	DRY	1229900	741100	5442	8-86665	MHT955	FD	0	0.7	3	68		2		255	B	139		617						Y	Y	N	N	
97	BUTSD89A	SD-138	20-Jun-89	01	DRY	1229900	741100	5442	8-86665	MHT955	FD	0	0.7	3	63	U	8		353		392		705						Y	Y	N	Y	
98	BUTSD89A	SD-139	20-Jun-89	01	DRY	1228800	742000	5442	8-86661	MHT951	FD	0	0.8	3	226		15		2540	B	614		3670						Y	Y	N	N	
99	BUTSD89A	SD-139	20-Jun-89	01	DRY	1228800	742000	5442	8-86661	MHT951	FD	0	0.8	3	282		27		5074		882		4652						Y	Y	N	Y	
100	BUTSD89A	SD-140	21-Jun-89	01	DRY	1232900	744900	5478	8-86680	MHT970	DU	0	0.2	3	279		0	UJ	700	B	439		320						Y	Y	N	N	
101	BUTSD89A	SD-140	21-Jun-89	01	WSO	1232900	744900	5478	8-86797	MHS397	FD	0	0.2	3	3900		89	J	27000		2		25000						N	N	N	N	
102	BUTSD89A	SD-140	21-Jun-89	01	DRY	1232900	744900	5478	8-86678	MHT968	FD	0	0.2	3	264		0	UJ	629	B	434		317						Y	Y	N	N	
103	BUTSD89A	SD-140	21-Jun-89	01	DRY	1232900	744900	5478	8-86678	MHT968	FD	0	0.2	3	270	U	4		345		444	U	407						Y	Y	N	Y	
104	BUTSD89A	SD-140	21-Jun-89	01	WSO	1232900	744900	5478	8-86799	MHS399	FD			3	3500		80	J	25000		12		24000						N	N	N	N	
105	BUTSD89A	SD-141	21-Jun-89	01	DRY	1233000	744900	5473	8-87454	MHN596	FD	0	0.1	3	6		0	U	41	B	18		93						Y	Y	N	N	
106	BUTSD89A	SD-141	21-Jun-89	01	DRY	1233000	744900	5473	8-87454	MHN596	FD	0	0.1	3	63	U	2	U	249	U	258	U	240	U					Y	Y	N	Y	
107	BUTSD89A	SD-142	21-Jun-89	01	DRY	1234500	744800	5487	8-86654	MHT945	FD	0	0.2	3	213		0	U	1100	B	157		844						Y	Y	N	N	
108	BUTSD89A	SD-142	21-Jun-89	01	DRY	1234500	744800	5487	8-86654	MHT945	FD	0	0.2	3	270	U	6		1134		444	U	651						Y	Y	N	Y	
109	BUTSD89A	SD-143	21-Jun-89	01	DRY	1233700	745300	5492			FD	0	0.1	3	270	U	9		546		444	U	497						Y	Y	N	Y	
110	BUTSD89A	SD-144	21-Jun-89	01	DRY	1233600	744300	5467	8-86667	MHT957	FD	0	0.3	3	47		2		260	B	169		466						Y	Y	N	N	
111	BUTSD89A	SD-144	21-Jun-89	01	DRY	1233600	744300	5467	8-86667	MHT957	FD	0	0.3	3	63	U	10		429		258	U	475						Y	Y	N	Y	
112	BUTSD89A	SD-145	22-Jun-89	01	WSO	1227800	742100	5441	8-86770	MHS370	FD	0	0.1	3	130	J	0	B	91	B	1	BJ	21						N	N	N	N	
113	BUTSD89A	SD-145	22-Jun-89	01	DRY	1227800	742100	5441	8-93637	MHN534	FD	0	0.1	3	144		8		783	B	810		1510						N	Y	N	Y	
114	BUTSD89A	SD-145	22-Jun-89	01	DRY	1227800	742100	5441	8-93637	MHN534	FD	0	0.1	3	270	U	9		628		684		1816						N	Y	N	N	
115	BUTSD89A	SD-146	22-Jun-89	01	DRY	1234900	744900	5490	8-86664	MHT954	DU	0	0.2	3	164		2		562	B	224		794						Y	Y	N	N	
116	BUTSD89A	SD-146	22-Jun-89	01	DRY	1234900	744900	5490	8-86663	MHT953	FD	0	0.2	3	192		2		595	B	177		628						Y	Y	N	N	
117	BUTSD89A	SD-146	22-Jun-89	01	SRN	1234900	744900	5490	8-21660	MHS205	FD	0	0.2	3	42		62		8650	B	76		13000						N	N	N	N	
118	BUTSD89A	SD-146	22-Jun-89	01	DRY	1234900	744900	5490	8-86663	MHT953	FD	0	0.2	3	270	U	8		822		444	U	730						Y	Y	N	Y	
119	BUTSD89A	SD-146	22-Jun-89	01 +	SND	1234900	744900	5490	8-93713	MHN313	FD	0	0.2	3	255	J	1	B	902	B	291	J	1060	J					N	N	N	N	
120	BUTSD89A	SD-146	22-Jun-89	01 -	FNE	1234900	744900	5490	8-93714	MHN314	FD	0	0.2	3	413	J	1		1470	B	411	J	1390	J					N	N	N	N	
121	BUTSD89A	SD-147	22-Jun-89	01	WSO	1235600	745000	5525	8-86768	MHS368	FD	0	0.1	3	15		370		730	B	0	UJ	86000						N	N	N	N	
122	BUTSD89A	SD-147	22-Jun-89	01	DRY	1235600	745000	5525	8-93644	MHN540	FD	0	0.1	3	119		13		1000	B	206		3400						Y	Y	N	N	
123	BUTSD89A	SD-147	22-Jun-89	01	DRY	1235600	745000	5525	8-93644	MHN540	FD	0	0.1	3	270	U	26		2668		444	U	3139						Y	Y	N	Y	
124	BUTSD89A	SD-148	22-Jun-89	01	DRY	1231800	743100	5452	8-87458	MHT901	FD	0	0.1	3	267		29		1300	B	793		11300						Y	Y	N	N	
125	BUTSD89A	SD-148	22-Jun-89	01	DRY	1231800	743100	5452	8-87458	MHT901	FD	0	0.1	3	270	U	59		5319		954		1302						Y	Y	N	Y	
126	BUTSD89A	SD-149	22-Jun-89	01	DRY	1226800	742500	5455	8-87473	MHT915	FD	0	0.1	3	285		0	U	800		28		133						N	Y	N	N	
127	BUTSD89A	SD-149	22-Jun-89	01	DRY	1226800	742500	5455	8-87473	MHT915	FD	0	0.1	3	288		4		654		444	U	171						N	Y	N	Y	
128	BUTSD89A	SD-150	22-Jun-89	01	DRY	1226400	742000	5443	8-87461	MHT904	FD	0	0.1	3	695		19		660		3300		5460						N	Y	N	Y	
129	BUTSD89A	SD-150	22-Jun-89	01	DRY	1226400	742000	5443	8-87461	MHT904	FD	0	0.1	3	286		12		118	U	1107		6483						N	Y	N	N	
130	BUTSD89A	SD-151	22-Jun-89	01	WSO	1226700	742600	5450	8-86773	MHS373	FD	0	0.2	3	12		26	J	8100	B	1	J	21000						N	N	N	N	
131	BUTSD89A	SD-151	22-Jun-89	01	DRY	1226700	742600	5450	8-93639	MHN536	FD	0	0.2	3	617		0	U	1040	B	822		1050						N	Y	N	N	
132	BUTSD89A	SD-151	22-Jun-89	01	DRY	1226700	742600	5450	8-93639	MHN536	FD	0	0.2	3	634		12		766		894		1162						N	Y	N	Y	
133	BUTSD89A	SD-151	22-Jun-89	02	DRY	1226700	742600	5450	8-94447	MHN599	FD			3	0		0		0		0		0						N	N	N	N	
134	BUTSD89A	SD-170	03-Aug-89	01	DRY	1235400	744500	5479	8-86673	MHT963	FD	0	0.1	3	61		3		811	B	154		505				OUTSIDE OPERABLE UNI		N	N	R	N	Y
135	BUTSD89A	SD-170	03-Aug-89	01	DRY	1235400	744500	5479	8-86673	MHT963	FD	0	0.1	3	63	U	8		768		276		355						N	N	N	Y	
136	BUTSD89A	SD-171	03-Aug-89	01	DRY	1232800	744500	5469		5371	FD	0	0.1	3	270	U	14		1700		952		4220				IN PAVED AREA NEAR O		Y	Y	N	Y	
137	BUTSD89A	SD-171	03-Aug-89	03	DRY	1232800	744500	5469	8-94449	MHT964	FD			3	0		0		0		0		0						N	N	N	N	
138	BUTSD89A	SD-172	03-Aug-89	01	DRY	1231700	743300	5452			FD	0	0.2	3	270	U	10		1001		735		2571						Y	Y	N	Y	
139	BUTSD89A	SD-173	03-Aug-89	01	DRY	1231200	742500	5447	8-87488	MHT930	DU	0	0.1	3	260		9		2870	B	330		4100						Y	Y	N	N	
140	BUTSD89A	SD-173	03-Aug-89	01	WSO	1231200	742500	5447	8-86775	MHS375	FD	0	0.1	3	4		10	J	98	U	0	UJ	1400						N	N	N	N	
141	BUTSD89A	SD-173	03-Aug-89	01	DRY	1231200	742500	5447	8-87487	MHT929	FD	0	0.1	3	258		9		3420	B	339		5240						Y	Y	N	N	
142	BUTSD89A	SD-173	03-Aug-89	01	SRN	1231200	742500	5447	8-21662	MHS207	FD	0	0.1	3	13		29		25000	U	2		2000						N	N	N	N	
143	BUTSD89A	SD-173	03-Aug-89	01	DRY	1231200	742500	5447	8-87487	MHT929	FD	0	0.1	3	270	U	11		3079		543		5713						Y	Y	N	Y	
144	BUTSD89A	SD-173	03-Aug-89	01 +	SND	1231200	742500	5447	8-93715	MHN315	FD	0	0.1	3	190	J	4		2190	B	188	J	3320	J					N	N	N	N	
145	BUTSD89A	SD-173	03-Aug-89	01 -	FNE	1231200	742500	5447	8-93717	MHN317	DU	0	0.1	3	241	J	5		3210	B	393	J	4670	J					N	N	N	N	
146	BUTSD89A	SD-173	03-Aug-89	01 -	FNE	1231200	742500	5447	8-93716	MHN316	FD	0	0.1	3	239	J	5		3230	B	404	J	4650	J					N	N	N	N	
147	BUTSD89A	SD-174	03-Aug-89	01	WSO	1230400	742600	5450	8-86778	MHS378	FD	0	0.1	3	160		0	UJ	23	U	2	J	21						N	N	N	N	
148	BUTSD89A	SD-174	03-Aug-89	01	DRY	1230400	742600	5450	8-93646	MHN542	FD	0	0.1	3	149		6		660	B	787		1440						Y	Y	N	N	
149	BUTSD89A	SD-174	03-Aug-89	01	SRN	1230400	742600	5450	8-21663	MHS208	FD	0	0.1	3	247		29		1460	B	185		1410						N	N	N	N	
150	BUTSD89A	SD-174	03-Aug-89	01	DRY	1230400	742600	5450	8-93646	MHN542	FD	0	0.1	3	270	U	5		534		515		1193						Y	Y	N	N	
151	BUTSD89A	SD-174	03-Aug-89	01	DRY	1230400	742600	5450	8-86683	MHT973	FD	0	0.1	3	133		6	J	540	B	830		1270						Y	Y	N	N	
152	BUTSD89A	SD-174	03-Aug-89	01 +	SND	1230400	742600	5450	8-93718	MHN318	FD	0	0.1	3	161	J	6		853	B	959	J	1760	J					N	N	N	N	
153	BUTSD89A	SD-174	03-Aug-89	01 -	FNE	1230400	742600	5450	8-93719	MHN319	FD	0	0.1	3	428	J	12		1910		1480	J	3290	J					N	N	N	Y	
154	BUTSD89A	SD-175	03-Aug-89	01	DRY	1229500	742800	5452			FD	0	0.2	3	270	U	23		1434		689		5685						Y	Y	N	Y	
155	BUTSD89A	SD-176	03-Aug-89	01	DRY	1228500	742300	5462	8-86689	MHT978	DU	0	0.1	3	502		0	UJ	809	B	681		665						Y	Y	N	Y	
156	BUTSD89A	SD-176	03-Aug-89	01	DRY	1228500	742300	5462	8-93664	MHN559	FD	0	0.1	3	545		0	U	832	B	427		585						Y	Y	N	N	
157	BUTSD89A	SD-176	03-Aug-89	01	DRY	1228500	742300	5462	8-93664	MHN559	FD	0	0.1	3	448		4		660		581		737						Y	Y	N	N	
158	BUTSD89A	SD-177	03-Aug-89	01	DRY	1228600	742300	5439	8-87462	MHT905	DU	0	0.1	3	286		0	U	2140	B	390		1140						Y	Y	N	N	
159	BUTSD89A	SD-177	03-Aug-89	01	DRY	1228600	742300	5439	8-87464	MHT907	FD	0	0.1	3	288		0	U	2120	B	387		1150						Y	Y	N	N	
160	BUTSD89A	SD-177	03-Aug-89	01	SRN	1228600	742300	5439	8-21664	MHS209	FD	0	0.1	3	19		68		14000	B	18		23400						N	N	N	N	
161	BUTSD89A	SD-177	03-Aug-89	01	DRY	1228600	742300	5439	8-87464	MHT907	FD	0	0.1	3	270	U	4		1715		444	U	1087						Y	Y	N	Y	
162	BUTSD89A	SD-177	03-Aug-89	01 +	SND	1228600	742300	5439	8-93720	MHN320	FD	0	0.1	3	151	J	0	U	1340	B	165	J	1010	J					N	N	N	N	
163	BUTSD89A	SD-177	03-Aug-89	01 -	FNE	1228600	742300	5439	8-93721	MHN321	FD	0	0.1	3	317		0	U	2110	B	429		958						N	N	N	N	
164	BUTSD89A	SD-178	03-Aug-89	01	DRY	1223400	742800	5423	8-87484	MHT926	FD	0	0.1	3	116		7		759	B	326		3940						N	Y	N	N	
165	BUTSD89A	SD-178	03-Aug-89	01	DRY	1223400	742800	5423	8-87484	MHT926	FD	0	0.1	3	270	U	18		1207		520		4672						N	Y	N	Y	
166	BUTSD89A	SD-178	03-Aug-89	01	DRY	1223400	742800	5423	8-87489	MHT931	FD	0	0.1	3	126		7		706	B	311		3420						N	Y	N	N	
167	BUTSD89A	SD-178	03-Aug-89	01	DRY	1223400	742800	5423	8-86671	MHT961	FD	0	0.1	3	302		7		1210	B	349		3680						N	Y	N	N	
168	BUTSD89A	SD-179	04-Aug-89	01	DRY	1230700	741700	5453	8-94450	MHN556	FD	0	5.58	3	0		0		0		0		0						N	N	N	Y	

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
169	BUTSD89A	SD-184	04-Aug-89	01	WSO	1226600	743100	5444	8-86781	MHS381	FD	0	0.1	3	8900		1800	J	900000		0	UJ	660000						N	N	N	N	
170	BUTSD89A	SD-184	04-Aug-89	01	DRY	1226600	743100	5444	8-86658	MHT949	FD	0	0.1	3	996		20		8590	B	725		6270						N	Y	N	N	
171	BUTSD89A	SD-184	04-Aug-89	01	SRN	1226600	743100	5444	8-21665	MHS210	FD	0	0.1	3	9600		971		873000		823		434000						N	N	N	N	
172	BUTSD89A	SD-184	04-Aug-89	01	DRY	1226600	743100	5444	8-86658	MHT949	FD	0	0.1	3	692		25		7551		1118		4939						N	Y	N	Y	
173	BUTSD89A	SD-184	04-Aug-89	01 +	SND	1226600	743100	5444	8-93724	MHN324	FD	0	0.1	3	161		0	U	197	U	230		101						N	N	N	N	
174	BUTSD89A	SD-184	04-Aug-89	01 -	FNE	1226600	743100	5444	8-93725	MHN325	FD	0	0.1	3	938		1		1480	U	1050		746						N	N	N	N	
175	BUTSD89A	SD-185	04-Aug-89	01	DRY	1227100	742300	5455	8-86666	MHT956	FD	0	0.1	3	346		0	U	5650	B	127		394						N	Y	N	N	
176	BUTSD89A	SD-185	04-Aug-89	01	DRY	1227100	742300	5455	8-86666	MHT956	FD	0	0.1	3	270	U	5		4204		444	U	286						N	Y	N	Y	
177	BUTSD89A	SD-186	04-Aug-89	01	SRN	1225600	742200	5464	8-21667	MHS212	DU	0	0.3	3	51		1990		1380000		80		980000						N	N	N	N	
178	BUTSD89A	SD-186	04-Aug-89	01	DRY	1225600	742200	5464	8-94444		DU	0	0.3	3	5	BJ	931	J	0		58	BJ	0						N	N	N	N	
179	BUTSD89A	SD-186	04-Aug-89	01	WSO	1225600	742200	5464	8-86780	MHS380	FD	0	0.3	3	20		2000	J	42000		7		670000						N	N	N	N	
180	BUTSD89A	SD-186	04-Aug-89	01	DRY	1225600	742200	5464	8-86692	MHT980	FD	0	0.3	3	548		63	J	11900	B	1210		22800						N	Y	N	N	
181	BUTSD89A	SD-186	04-Aug-89	01	SRN	1225600	742200	5464	8-21666	MHS211	FD	0	0.3	3	66		2900		1300000		142		1030000						N	N	N	N	
182	BUTSD89A	SD-186	04-Aug-89	01	DRY	1225600	742200	5464	8-94443	MHT980	FD	0	0.3	3	7	BJ	917	J	0		447	J	0						N	N	N	N	
183	BUTSD89A	SD-186	04-Aug-89	01	DRY	1225600	742200	5464	8-86692	MHT980	FD	0	0.3	3	406		45		11940		1110		13220						N	Y	N	N	
184	BUTSD89A	SD-186	04-Aug-89	01	DRY	1225600	742200	5464	8-86695	MHT983	FD	0	0.3	3	657		40	J	12400	B	937		12700						N	Y	N	N	
185	BUTSD89A	SD-186	04-Aug-89	01 +	SND	1225600	742200	5464	8-93726	MHN326	FD	0	0.3	3	1040		6		6980		461		3110						N	N	N	N	
186	BUTSD89A	SD-186	04-Aug-89	01 -	FNE	1225600	742200	5464	8-87544	MHN327	FD	0	0.3	3	1680		8		10300	B	4850		2950						N	N	N	Y	
187	BUTSD89A	SD-500	19-Jun-89	01	DRY	1226144	742746	5439			FD	0	0.1	3	275		18		1195		444	U	1006						N	Y	N	Y	
188	BUTSD89A	SD-501	06-Jul-89	01	DRY	1225611	742855	5447	8-94389	MHT839	FD	0	0.1	3	3530		1	U	312		278		728						N	Y	N	N	
189	BUTSD89A	SD-501	06-Jul-89	01	DRY	1225611	742855	5447	8-94389	MHT839	FD	0	0.1	3	1999		8		118	U	613		1079						N	Y	N	Y	
190	BUTSD89A	SD-502	23-Jun-89	01	DRY	1225510	743039	5448			FD	0	0.1	3	270	U	23		1447		1364		5033						Y	Y	N	Y	
191	BUTSD89A	SD-503	06-Jul-89	01	DRY	1225201	742790	5439	8-94393	MHT844	FD	0	0.1	3	151		8	J	653	J	3370	J	6960	J					N	Y	N	Y	
192	BUTSD89A	SD-503	06-Jul-89	01	DRY	1225201	742790	5439	8-94393	MHT844	FD	0	0.1	3	270	U	37		1482		2756		6424						N	Y	N	N	
193	BUTSD89A	SD-504	06-Jul-89	01	DRY	1225396	742597	5439	8-94395	MHT845	FD	0	0.1	3	249		8	J	969	J	1660	J	4570	J					N	Y	N	Y	
194	BUTSD89A	SD-504	06-Jul-89	01	DRY	1225396	742597	5439	8-94395	MHT845	FD	0	0.1	3	270	U	17		838		945		5236						N	Y	N	N	
195	BUTSD89A	SD-505	06-Jul-89	01	WSO	1225460	741956	5431	8-86751	MHS351	FD	0	0.1	3	4	J	470	J	370000	J	0	UJ	150000						N	N	N	N	
196	BUTSD89A	SD-505	06-Jul-89	01	DRY	1225460	741956	5431	8-94400	MHT850	FD	0	0.1	3	97		4	J	3980	J	256	J	1960	J					N	Y	N	N	
197	BUTSD89A	SD-505	06-Jul-89	01	SRN	1225460	741956	5431	8-21669	MHS214	FD	0	0.1	3	24		1270		950000		97		441000						N	N	N	N	
198	BUTSD89A	SD-505	06-Jul-89	01	DRY	1225460	741956	5431	8-78113	MHT850	FD	0	0.1	3	3	BJ	300	J	0		25	UJ	0						N	N	N	N	
199	BUTSD89A	SD-505	06-Jul-89	01	DRY	1225460	741956	5431	8-94400	MHT850	FD	0	0.1	3	270	U	13		4809		444	U	2017						N	Y	N	N	
200	BUTSD89A	SD-505	06-Jul-89	01	WSO	1225460	741956	5431	8-86752	MHS352	FD			3	5	J	520	J	300000	J	0	UJ	160000						N	N	N	N	
201	BUTSD89A	SD-505	06-Jul-89	01 +	SND	1225460	741956	5431	8-86748	MHT748	FD	0	0.1	3	106		2		1970		291		1200						N	N	N	N	
202	BUTSD89A	SD-505	06-Jul-89	01 -	FNE	1225460	741956	5431	8-86749	MHT749	FD	0	0.1	3	283		4		7250		983		2780						N	N	N	Y	
203	BUTSD89A	SD-506	20-Jun-89	01	DRY	1225067	742455	5435			FD	0	0.1	3	270	U	61		3980		1286		11460						N	Y	N	Y	
204	BUTSD89A	SD-507	20-Jun-89	01	DRY	1225300	742303	5435	8-94258	MHT858	FD	0	0.1	3	1260		9	J	3480	J	4120	J	6610	J					N	Y	N	N	
205	BUTSD89A	SD-507	20-Jun-89	01	SRN	1225300	742303	5435	8-21672	MHS217	FD	0	0.1	3	139		101		2610		521		30800						N	N	N	N	
206	BUTSD89A	SD-507	20-Jun-89	01	DRY	1225300	742303	5435	8-94258	MHT858	FD	0	0.1	3	820		9		3064		2835		7799						N	Y	N	N	
207	BUTSD89A	SD-507	20-Jun-89	01 +	SND	1225300	742303	5435	8-93772	MHT772	FD	0	0.1	3	429		16		3090		2080		6220						N	N	N	N	
208	BUTSD89A	SD-507	20-Jun-89	01 -	FNE	1225300	742303	5435	8-93773	MHT773	FD	0	0.1	3	1270		11		3750		4870		7210						N	N	N	Y	
209	BUTSD89A	SD-507	20-Jun-89	11	DRY	1225300	742303	5435	8-93603	MHN503	FD	0	0.1	3	464		18		518		1870		6290						N	N	N	N	
210	BUTSD89A	SD-508	21-Jun-89	01	DRY	1225469	742171	5431			FD	0	0.1	3	363		2	U	2300		462		1565						N	Y	N	Y	
211	BUTSD89A	SD-509	22-Jun-89	01	DRY	1225082	742061	5433			FD	0	0.1	3	838		120		17260		1855		29840						N	Y	N	Y	
212	BUTSD89A	SD-509	22-Jun-89	09	WSO	1225082	742061	5433	8-86757	MHS357	FD	0	0.1	3	23		4100		330000	J	15		740000						N	N	N	N	
213	BUTSD89A	SD-509	22-Jun-89	09	DRY	1225082	742061	5433	8-93604	MHN504	FD	0	0.1	3	2480	J	173	J	21300	J	1850		49200						N	N	N	N	
214	BUTSD89A	SD-509	06-Jul-89	01A	DRY	1225082	742061	5433	8-93737	MHT737	FD	0	0	3	924		61	J	8440	J	695	J	23300						N	Y	N	N	
215	BUTSD89A	SD-509	06-Jul-89	01A	SRN	1225082	742061	5433	8-21675	MHS220	FD	0	0	3	103		4990		532000		40		3150000						N	N	N	N	
216	BUTSD89A	SD-509	06-Jul-89	01A	DRY	1225082	742061	5433	8-93737	MHT737	FD	0	0	3	838		120		17260		1855		29840						N	N	N	Y	
217	BUTSD89A	SD-509	06-Jul-89	01A +	SND	1225082	742061	5433	8-93779	MHT779	FD	0	0	3	513		6		2620		325		2390						N	N	N	N	
218	BUTSD89A	SD-509	06-Jul-89	01A -	FNE	1225082	742061	5433	8-93781	MHT781	DU	0	0	3	1960		45		10100		1600		15600						N	N	N	N	
219	BUTSD89A	SD-509	06-Jul-89	01A -	FNE	1225082	742061	5433	8-93780	MHT780	FD	0	0	3	2000		31		9060		1580		10900						N	N	N	N	
220	BUTSD89A	SD-510	19-Jun-89	01	DRY	1225037	741939	5433			FD	0	0.1	3	394		28		4009		1385		3855				MAYBE FIELD DUPE FOR		N	Y	N	N	
221	BUTSD89A	SD-510	19-Jun-89	01A	DRY	1225037	741939	5433	8-94267	MHT867	FD	0	0.1	3	338		20		3400		1140		5580						N	Y	N	N	
222	BUTSD89A	SD-510	19-Jun-89	01A	SRN	1225037	741939	5433	8-21679	MHS224	FD	0	0.1	3	370	J	4000	J	420000		170	J	840000						N	N	N	N	
223	BUTSD89A	SD-510	19-Jun-89	01A	DRY	1225037	741939	5433	8-94267	MHT867	FD	0	0.1	3	692		57		7101		1447		8821						N	Y	N	N	
224	BUTSD89A	SD-510	19-Jun-89	01A +	SND	1225037	741939	5433	8-93784	MHT784	FD	0	0.1	3	148		4		141		185		1010						N	N	N	N	
225	BUTSD89A	SD-510	19-Jun-89	01A -	FNE	1225037	741939	5433	8-93785	MHT785	FD	0	0.1	3	1850		24		2260		3110		7580						N	N	N	Y	
226	BUTSD89A	SD-511	21-Jun-89	01	DRY	1224917	741886	5437	8-94268	MHT868	FD	0	0.1	3	245		26		3590		324		5810						N	Y	N	N	
227	BUTSD89A	SD-511	21-Jun-89	01	DRY	1224917	741886	5437	8-94268	MHT868	FD	0	0.1	3	270	U	23		4180		476		3507						N	Y	N	Y	
228	BUTSD89A	SD-516	22-Jun-89	01A +	SND	1223764	742501	5425	8-93786	MHT786	FD	0	0.1	3	346		13		395		216		3770						N	N	N	N	
229	BUTSD89A	SD-516	22-Jun-89	01A -	FNE	1223764	742501	5425	8-93787	MHT787	FD	0	0.1	3	1530		18		1370		1260	J	5140	J					N	N	N	Y	
230	BUTSD89A	SD-516	06-Jul-89	01A	DRY	1223764	742501	5425	8-94283	MHT883	FD	0	0.1	3	552		11		520		306		2210	J					N	Y	N	N	
231	BUTSD89A	SD-516	06-Jul-89	01A	SRN	1223764	742501	5425	8-21680	MHS225	FD	0	0.1	3	710	J	650	J	18000	J	380	J	75000						N	N	N	N	
232	BUTSD89A	SD-516	06-Jul-89	01A	DRY	1223764	742501	5425	8-94283	MHT883	FD	0	0.1	3	428		11		1165		444	U	758						N	Y	N	N	
233	BUTSD89A	SD-517	06-Jul-89	01	DRY	1223063	742186	5428	8-94290	MHT890	FD	0	0.1	3	249		3		219		250		1080	J					N	Y	N	N	
234	BUTSD89A	SD-517	06-Jul-89	01	SRN	1223063	742186	5428	8-21682	MHS227	FD	0	0.1	3	780	J	11	J	1900	J	720	J	2200						N	N	N	N	
235	BUTSD89A	SD-517	06-Jul-89	01	DRY	1223063	742186	5428	8-94290	MHT890	FD	0	0.1	3	338		6		31		247		333						N	Y	N	N	
236	BUTSD89A	SD-517	06-Jul-89	01 +	SND	1223063	742186	5428	8-93791	MHT791	FD	0	0.1	3	325		8		222		203	J	2380	J					N	N	N	N	
237	BUTSD89A	SD-517	06-Jul-89	01 -	FNE	1223063	742186	5428	8-93792	MHT792	FD	0	0.1	3	1540		14		851		1450	J	4710	J					N	N	N	Y	
238	BUTSD89A	SD-518	06-Jul-89	01	DRY	1222439	743071	5420	8-94296	MHT896	FD	0	0	3	216		6		644		359		1590	J					N	Y	N	N	
239	BUTSD89A	SD-518	06-Jul-89	01	SRN	1222439	743071	5420	8-21685	MHS230	FD	0	0	3	800	J	600	J	110000	J	58	J	110000						N	N	N	N	
240	BUTSD89A	SD-518	06-Jul-89	01	DRY	1222439	743071	5420	8-94296	MHT896	FD	0	0	3	584		7		1140		444	U	567						N	Y	N	N	
241	BUTSD89A	SD-518	06-Jul-89	01 +	SND	1222439	743071	5420	8-93796	MHT796	FD	0	0	3	131		9		224		209	J	2730	J					N	N	N	N	
242	BUTSD89A	SD-518	06-Jul-89	01 -	FNE	1222439	743071	5420	8-93797	MHT797	FD	0	0	3	743		13		1190		1240	J	3430	J					N	N	N	Y	
243	BUTSD89A	SD-518	06-Jul-89	04	DRY	1222439	743071	5420	8-78141		FD			3	2	BJ	506	J	0		25	UJ	0						N	N	N	N	

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measurement Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
244	BUTSD89A	SD-518	06-Jul-89	04	WSO	1222439	743071	5420	8-86760	MHS360	FD			3	9		330		82	J	0	UJ	25000						N	N	N	N	
245	BUTSD89A	SD-519	23-Jun-89	01	DRY	1222091	742614	5427	8-93607	MHN507	FD	0	0.1	3	466		5		805		485		2180						Y	Y	N	N	
246	BUTSD89A	SD-519	23-Jun-89	01	DRY	1222091	742614	5427	8-93607	MHN507	FD	0	0.1	3	459		12		1236		588		1589						Y	Y	N	Y	
247	BUTSD89A	SD-520	23-Jun-89	01	DRY	1222263	743226	5423	8-93608	MHN508	FD	0	0.1	3	124		1		96		63		318						Y	Y	N	N	
248	BUTSD89A	SD-520	23-Jun-89	01	DRY	1222263	743226	5423	8-93608	MHN508	FD	0	0.1	3	63	U	8		249	U	258	U	357						Y	Y	N	Y	
249	BUTSD89A	SD-521	06-Jul-89	01	DRY	1223746	742021	5425	8-93730	MHT730	FD	0	0.1	3	265		8	J	484	J	246	J	2290						N	Y	N	N	
250	BUTSD89A	SD-521	06-Jul-89	01	SRN	1223746	742021	5425	8-21687	MHS232	FD	0	0.1	3	1100	J	320	J	64000	J	130	J	110000						N	N	N	N	
251	BUTSD89A	SD-521	06-Jul-89	01	DRY	1223746	742021	5425	8-93730	MHT730	FD	0	0.1	3	309		9		1073		444	U	891						N	Y	N	N	
252	BUTSD89A	SD-521	06-Jul-89	01 +	SND	1223746	742021	5425	8-78384	MHN284	FD	0	0.1	3	309		17		277		242	J	5260	J					N	N	N	N	
253	BUTSD89A	SD-521	06-Jul-89	01 -	FNE	1223746	742021	5425	8-78385	MHN285	FD	0	0.1	3	1220		19		1090		1190	J	6040	J					N	N	N	Y	
254	BUTSD89A	SD-522	06-Jul-89	01	DRY	1223509	742396	5424	8-93731	MHT731	FD	0	0.1	3	579		3	J	1570	J	676	J	1730						N	Y	N	N	
255	BUTSD89A	SD-522	06-Jul-89	01	DRY	1223509	742396	5424	8-93731	MHT731	FD	0	0.1	3	904		7		1938		988		1672						N	Y	N	Y	
256	BUTSD89A	SD-523	06-Jul-89	01	DRY	1223265	742724	5426	8-93732	MHT732	FD	0	0.1	3	1320		29	J	2990	J	2240	J	10200						N	Y	N	N	
257	BUTSD89A	SD-523	06-Jul-89	01	DRY	1223265	742724	5426	8-93732	MHT732	FD	0	0.1	3	1703		45		5437		2552		13300						N	Y	N	Y	
258	BUTSD89A	SD-524	06-Jul-89	01	DRY	1222823	742638	5420	8-93733	MHT733	FD	0	0.1	3	771		5	J	417	J	394	J	1580						N	Y	N	N	
259	BUTSD89A	SD-524	06-Jul-89	01	SRN	1222823	742638	5420	8-21688	MHS233	FD	0	0.1	3	500	J	44	J	2500	J	79	J	30000						N	N	N	N	
260	BUTSD89A	SD-524	06-Jul-89	01	DRY	1222823	742638	5420	8-93733	MHT733	FD	0	0.1	3	1166		4		694		751		961						N	Y	N	N	
261	BUTSD89A	SD-524	06-Jul-89	01 +	SND	1222823	742638	5420	8-78386	MHN286	FD	0	0.1	3	798		10		387		284	J	3150	J					N	N	N	N	
262	BUTSD89A	SD-524	06-Jul-89	01 -	FNE	1222823	742638	5420	8-78387	MHN287	FD	0	0.1	3	2010		32		2570		1570	J	8920	J					N	N	N	Y	
263	BUTSD89A	SD-525	06-Jul-89	01	DRY	1222465	742637	5423	8-93734	MHT734	FD	0	0.1	3	627		1	J	443	J	712	J	842						N	Y	N	Y	
264	BUTSD89A	SD-525	06-Jul-89	01	DRY	1222465	742637	5423	8-93734	MHT734	FD	0	0.1	3	866		6		531		711		944						N	Y	N	N	
265	BUTSD89A	SD-526	06-Jul-89	01	DRY	1222683	742905	5421	8-93735	MHT735	FD	0	0.1	3	870		7	J	1910	J	708	J	2820						N	Y	N	N	
266	BUTSD89A	SD-526	06-Jul-89	01	DRY	1222683	742905	5421	8-93735	MHT735	FD	0	0.1	3	1163		18		2334		1116		2773						N	Y	N	Y	
267	BUTSD89A	SD-526	06-Jul-89	01	DRY	1222683	742905	5421	8-93736	MHT736	FD	0	0.1	3	893		8	J	1940	J	749	J	2870						N	Y	N	N	
268	BUTSD89A	SD-601	28-Jun-89	01	DRY	1236121	745213	5523			FD	0	0.1	3	63	U	9		683		258	U	431						Y	Y	N	Y	
269	BUTSD89A	SD-602	29-Jun-89	01	DRY	1235009	745419	5495			FD	0	0.1	3	270	U	6		1789		444	U	1048						Y	Y	N	Y	
270	BUTSD89A	SD-603	28-Jun-89	01	DRY	1235306	744815	5486			FD	0	0.1	3	63	U	2	U	515		258	U	433						Y	Y	N	Y	
271	BUTSD89A	SD-604	06-Jul-89	01	DRY	1235454	744586	5481			FD	0	0.1	3	63	U	10		611		258	U	387						Y	Y	N	Y	
272	BUTSD89A	SD-605	29-Jun-89	01	DRY	1234407	745589	5494			FD	0	0.1	3	63	U	7		646		258	U	330						Y	Y	N	Y	
273	BUTSD89A	SD-606	29-Jun-89	01	DRY	1234555	745254	5494			FD	0	0.1	3	63	U	5		728		258	U	384						Y	Y	N	Y	
274	BUTSD89A	SD-607	28-Jun-89	01	DRY	1234706	744749	5484			FD	0	0.1	3	63	U	7		356		258	U	240	U					Y	Y	N	Y	
275	BUTSD89A	SD-609	28-Jun-89	01	DRY	1234856	744280	5479			FD	0	0.1	3	63	U	11		348		258	U	385						Y	Y	N	Y	
276	BUTSD89A	SD-610	27-Jun-89	01	DRY	1233639	745164	5491			FD	0	0.1	3	63	U	2	U	249	U	258	U	240	U					Y	Y	N	Y	
277	BUTSD89A	SD-611	26-Jun-89	03	DRY	1233905	744842	5489	8-93609	MHN509	FD			3	79		0	U	315		85		36						N	N	N	N	
278	BUTSD89A	SD-611	26-Jun-89	18	DRY	1233905	744842	5489	8-93612	MHN512	FD			3	165		2		241		532		801						N	N	N	Y	
279	BUTSD89A	SD-611	26-Jun-89	18		1233905	744842	5489	8-78391	MHN291	FD			3	9	B	2	B	212		4		170						N	N	N	N	
280	BUTSD89A	SD-612	27-Jun-89	13	DRY	1234115	744496	5489	8-93610	MHN510	FD			3	617	J	0	UJ	1130	J	102		1190						N	N	N	Y	
281	BUTSD89A	SD-613	29-Jun-89	01	DRY	1234371	744366	5488			FD	0	0.1	3	63	U	4		249	U	258	U	262				IN PAVED AREA NEAR O		Y	Y	N	Y	
282	BUTSD89A	SD-614	28-Jun-89	01	DRY	1234490	744162	5475			FD	0	0.1	3	63	U	2	U	440		258	U	279						Y	Y	N	Y	
283	BUTSD89A	SD-614	28-Jun-89	10	DRY	1234490	744162	5475	8-93611	MHN511	FD			3	20		1	B	213		43		174						N	N	N	N	
284	BUTSD89A	SD-615	27-Jun-89	01	DRY	1234218	744222	5476			FD	0	0.1	3	63	U	6		266		258	U	446						Y	Y	N	Y	
285	BUTSD89A	SD-616	27-Jun-89	01	DRY	1233802	744666	5488			FD	0	0.1	3	63	U	5		293		258	U	240	U					Y	Y	N	Y	
286	BUTSD89A	SD-617	28-Jun-89	01	DRY	1233896	744167	5468			FD	0	0.1	3	63	U	6		249	U	258	U	240	U					Y	Y	N	Y	
287	BUTSD89A	SD-618	26-Jun-89	01	DRY	1233396	744738	5471			FD	0	0.1	3	63	U	7		309		306		373				IN PAVED AREA NEAR O		Y	Y	N	Y	
288	BUTSD89A	SD-619	27-Jun-89	01	DRY	1233541	744476	5470	8-94382	MHT832	DU	0	0.1	3	8		1	U	54		20		86						Y	Y	N	N	
289	BUTSD89A	SD-619	27-Jun-89	01	DRY	1233541	744476	5470	8-94381	MHT831	FD	0	0.1	3	8		1	U	50		23		212						Y	Y	N	N	
290	BUTSD89A	SD-619	27-Jun-89	01	DRY	1233541	744476	5470	8-94381	MHT831	FD	0	0.1	3	63	U	3		249	U	258	U	240	U					Y	Y	N	Y	
291	BUTSD89A	SD-620	26-Jun-89	01	DRY	1233489	744223	5466			FD	0	0.1	3	270	U	7		679		444	U	1073						Y	Y	N	Y	
292	BUTSD89A	SD-622	06-Jul-89	01	DRY	1233164	744103	5465	8-94385	MHT835	FD	0	0.1	3	136		3		754		649		1390						Y	Y	N	Y	
293	BUTSD89A	SD-622	06-Jul-89	01	DRY	1233164	744103	5465	8-94385	MHT835	FD	0	0.1	3	270	U	5		957		641		1752						Y	Y	N	N	
295	BUTSO87A	BF-003	23-Jun-87	A	DRY	1225810	753549	6055	MHH 213	MHH 213	FD	0	0.08	3	36	J	7		268		647		1340		5.85	"RR GRADE EXCELSIOR,			Y	Y	N	Y	
296	BUTSO87A	BF-004	23-Jun-87	A	DRY	1222754	747846	5687	MHH 210	MHH 210	FD	0	0.08	3	2	J	13		1100		518		1230		2.85	"BAP RAILROAD, Map:I	"DUPE ENTRY, SAME CO		Y	Y	N	Y	
297	BUTSO87A	BF-005	23-Jun-87	A	DRY	1226908	748828	5734	MHH 205	MHH 205	FD	0	0.08	3	33	J	18		143		2000		3000		7.2	"524 W. Granite, But			Y	Y	N	Y	
298	BUTSO87A	BF-006	23-Jun-87	A	DRY	1228242	751435	5958	MHH 207	MHH 207	FD	0	0.08	3	283	J	18		1200		1330		3500		6.66	"RR GRADE NEAR RUBY,	"SAME LOCATION AND C		N	Y	N	Y	
299	BUTSO87A	BF-007	24-Jun-87	A	DRY	1225778	751201	5877	MHH 250	MHH 250	FD	0	0.08	3	91		14		623		1720	J	2340	J	4.59	"826 Empire, Butte,			Y	Y	N	Y	
300	BUTSO87A	BF-008	25-Jun-87	A	DRY	1225124	749637	5776	MHH 279	MHH 279	FD	0	0.08	3	414		16		3170	J	909		4470	J	4.12	"COPR/HENRY RR GRADE	"SAME LOCATION AND C		Y	Y	N	Y	
301	BUTSO87A	BF-009	25-Jun-87	A	DRY	1230127	749123	5752	MHH 286	MHH 286	FD	0	0.08	3	31		15		1740	J	340		1610	J	4.05	"GRANITE AND ARIZONA			N	Y	N	N	
302	BUTSO87A	BF-009	25-Jun-87	A	DRY	1230127	749123	5752	MHH 301	MHH 301	DU	0	0.08	3	75	J	10		1080		425		1210		4.09	"GRANITE AND ARIZONA			N	Y	N	Y	
303	BUTSO87A	BF-010	23-Jul-87	A	DRY	1229926	749299	5759	MHR 052	MHR 052	FD	0	0.08	3	133	J	14		1260		2790		2940		2.87	"CAPRI MOTEL, Map:I-			N	Y	N	Y	
304	BUTSO87A	DR-001	08-Jul-87	A	DRY	1226568	753319	6026	MHJ 855	MHJ 855	FD	0	0.08	3	49		8		260		1480		3320		5.31	"MISSOULA GULCH, Map			N	Y	N	Y	
305	BUTSO87A	DR-002	08-Jul-87	A	DRY	1226508	755408	6148	MHJ 871	MHJ 871	FD	0	0.08	3	120	J	4		125		131		386		6.35	"BEEF STRAIGHT GULCH			Y	Y	N	Y	
306	BUTSO87A	DR-003	13-Jul-87	A	DRY	1224276	745682	5553	MHJ 975	MHJ 975	FD	0	0.08	3	42	J	2	U	173		123		213		6.97	"WESTSIDE SS OUTFALL			Y	Y	N	Y	
307	BUTSO87A	DR-004	03-Aug-87	A	DRY	1225351	745117	5528	MHR 222	MHR 222	FD	0	0.08	3	53		7		616		385		1719		4.74	"MISS. GL SS OUTFALL			Y	Y	N	Y	
308	BUTSO87A	DR-005	03-Aug-87	A	DRY	1227005	743898	5494	MHR 207	MHR 207	FD	0	0.08	3	141	J	2	U	195		216		346		5.62	"IDAHO SS OUTFALL, M			Y	Y	N	Y	
309	BUTSO87A	DR-006	03-Aug-87	A	DRY	1228558	742568	5454	MHR 209	MHR 209	FD	0	0.08	3	113	J	5		276		708		1930			"BUFFALO SS OUTFALL,	"SAME LOCATION AND C		Y	Y	N	Y	
310	BUTSO87A	DR-007	03-Aug-87	A	DRY	1233161	744035	5482	MHR 220	MHR 220	FD	0	0.08	3	217		8		1460		715		1968		5.62	"ANACONDA SS OUTFALL			Y	Y	N	Y	
311	BUTSO87A	DR-008	03-Aug-87	A	DRY	1233682	744179	5493	MHR 230	MHR 230	FD	0	0.08	3	76		9		984		421		1760		5.32	"WARREN SS OUTFALL,			Y	Y	N	Y	
312	BUTSO87A	DR-009	08-Jul-87	A	DRY	1230518	753772	6238	MHJ 863	MHJ 863	FD	0	0.08	3	65		16		386		2310		3050		4.64	"N.OF ONEILL ST., Ma			Y	Y	N	Y	
313	BUTSO87A	DR-010	13-Jul-87	A	DRY	1228893	751419	5932	MHJ 937	MHJ 937	FD	0	0.08	3	106		12		533		2100		4650		6.02	"RUBY ST (BUFF GLCH)			N	Y	N	Y	
314	BUTSO87A	DR-010	13-Jul-87	A	DRY	1228893	751419	5932	MHJ 943	MHJ 943	DU	0	0.08	3	78		11		406		1620		3870		5.94	"RUBY ST (BUFF GLCH)			N	Y	N	N	
315	BUTSO87A	DR-011	03-Aug-87	A	DRY	1230179	753314	6174	MHR 213	MHR 213	FD	0	0.08	3	138	J	7		302		1130		2370		4.42	"LAPLATA ST., Map:"			Y	Y	N	Y	
323	BUTSO87A	MS-007	25-Jun-87	A	DRY	1228812	753707	6148	MHH 292	MHH 292	FD	0	0.08	3	75	J	30		587		3780		11400		6.22	"LEXINGTON MILL, Map			N	Y	N	Y	
324	BUTSO87A	MS-008	25-Jun-87	A	DRY	1228624	753752	6142	MHH 271	MHH 271	FD	0	0.08	3	69		19		409	J	3060		4790	J	6	"LEXINGTON MILL, Map			N	Y	N	Y	
325	BUTSO87A	MS-009	25-Jun-87	A	DRY	1228684	753673	6140	MHH 273	MHH 273	FD	0	0.08	3	73		22		611	J	3670		6500	J	3.51	"LEXINGTON MILL, Map			N	Y	N	Y	
326	BUTSO87A	MS-010	25-Jun-87	A	DRY	1228806	753577	6130	MHH 274	MHH 274	FD	0	0.08	3	31		13		204	J	808		2910	J	7.71	"LEXINGTON MILL, Map			N	Y	N	Y	

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
327	BUTSO87A	MS-011	29-Jun-87	A	DRY	1227964	755297	6285	MHH 324	MHH 324	FD	0	0.08	3	75		29		303		3300		8960		4.78	"MOULTON MILL, Map:Q			N	Y	N	Y	
331	BUTSO87A	MS-015	30-Jun-87	A	DRY	1228294	749610	5816	MHH 347	MHH 347	FD	0	0.08	3	51		6	J	1550		520		1240		4.45	"COLORADO STAMP MILL			N	Y	N	Y	
332	BUTSO87A	MS-016	30-Jun-87	A	DRY	1228295	749629	5830	MHH 348	MHH 348	FD	0	0.08	3	111		3	UJ	219		101		331		3.11	"COLORADO STAMP MILL			N	Y	N	Y	
333	BUTSO87A	MS-017	30-Jun-87	A	DRY	1224225	741048	5468	MHH 336	MHH 336	FD	0	0.08	3	1380		29	J	1350		587		2040		6.01	"COLORADO SMELTER, M			N	Y	N	Y	
334	BUTSO87A	MS-018	30-Jun-87	A	DRY	1224260	740922	5450	MHH 339	MHH 339	FD	0	0.08	3	306		5	J	908		1840		854		2.47	"COLORADO SMELTER, M			N	Y	N	Y	
335	BUTSO87A	MS-019	30-Jun-87	A	DRY	1224125	741133	5472	MHH 361	MHH 361	FD	0	0.08	3	2530		26		6570		910		6880		2.35	"COLORADO SMELTER, M			N	Y	N	Y	
336	BUTSO87A	MS-020	01-Jul-87	A	DRY	1224093	740946	5481	MHH 388	MHH 388	FD	0	0.08	3	3560		39		2740		578		3410		6.08	"COLORADO SMELTER, M			N	Y	N	Y	
337	BUTSO87A	MS-021	07-Jul-87	A	DRY	1228447	741590	5463	MHJ 831	MHJ 831	FD	0	0.08	3	45		10		564		308		950		7.18	"EAST OF SUBSTATION,			Y	Y	N	Y	
338	BUTSO87A	MS-022	07-Jul-87	A	DRY	1228570	741643	5457	MHJ 851	MHJ 851	FD	0	0.08	3	479		12		436		254		2480		3.93	"EAST OF SUBSTATION,			N	Y	N	Y	
339	BUTSO87A	MS-023	01-Jul-87	A	DRY	1224992	743490	5454	MHH 384	MHH 384	FD	0	0.08	3	320		9		352		286		655		6.69	"MILL AT HUMANE SOC.			Y	Y	N	Y	
340	BUTSO87A	MS-024	01-Jul-87	A	DRY	1225004	743471	5448	MHH 386	MHH 386	FD	0	0.08	3	134		6		152		171		367		7.79	"MILL AT HUMANE SOC.			Y	Y	N	Y	
341	BUTSO87A	MS-026	01-Jul-87	A	DRY	1226777	744265	5519	MHH 378	MHH 378	FD	0	0.08	3	380		23		777		2710		7290		5.58	"WASHOE SAMPLING WOR			N	Y	N	Y	
342	BUTSO87A	MS-027	06-Jul-87	A	DRY	1226957	744349	5520	MHJ 820	MHJ 820	FD	0	0.08	3	3110		15		974		2440		372		2.96	"WASHOE SAMPLING WOR			N	Y	N	Y	
343	BUTSO87A	MS-028	06-Jul-87	A	DRY	1226538	744176	5505	MHJ 802	MHJ 802	FD	0	0.08	3	246		115		2060		10500		42800		5.91	"WASHOE SAMPLING WOR			N	Y	N	Y	
344	BUTSO87A	MS-029	01-Jul-87	A	DRY	1226314	745067	5551	MHH 387	MHH 387	FD	0	0.08	3	229		28		288		5970		8400		2.94	"DEXTER MILL, Map:A-			N	Y	N	Y	
345	BUTSO87A	MS-030	01-Jul-87	A	DRY	1226313	745135	5551	MHH 394	MHH 394	FD	0	0.08	3	228		75		1040		8610		24500		5.27	"DEXTER MILL, Map:A-			N	Y	N	Y	
346	BUTSO87A	MS-031	06-Jul-87	A	DRY	1227684	733923	5719	MHJ 806	MHJ 806	FD	0	0.08	3	204		294		690		632		5910		5.29	"TIMBER BUTTE MILL,			N	Y	N	Y	
347	BUTSO87A	MS-032	06-Jul-87	A	DRY	1227486	734006	5698	MHJ 807	MHJ 807	FD	0	0.08	3	257		12		301		362		1820		4.67	"TIMBER BUTTE MILL,			N	Y	N	Y	
348	BUTSO87A	MS-033	06-Jul-87	A	DRY	1227817	733952	5697	MHJ 801	MHJ 801	FD	0	0.08	3	317		34		707		1190		8960		4.49	"TIMBER BUTTE MILL,			N	Y	N	Y	
349	BUTSO87A	MS-034	06-Jul-87	A	DRY	1228087	734139	5685	MHJ 815	MHJ 815	FD	0	0.08	3	764		168		2710		58300		53300		4.74	"TIMBER BUTTE MILL,			Y	Y	N	Y	
350	BUTSO87A	MS-035	01-Jul-87	A	DRY	1226311	735853	5544	MHH 391	MHH 391	FD	0	0.08	3	934		17		314		1440		4640		4.11	"TIMBER BUTTE TAILIN			N	Y	N	Y	
351	BUTSO87A	MS-036	01-Jul-87	A	DRY	1226745	736788	5509	MHH 395	MHH 395	FD	0	0.08	3	200		4		761		545		1210		5.62	"TIMBER BUTTE TAILIN			N	Y	N	Y	
352	BUTSO87A	MS-037	06-Jul-87	A	DRY	1227612	734978	5587	MHJ 817	MHJ 817	FD	0	0.08	3	52		14		201		424		3250		5.85	"ERODED SLOPE, Map:S			Y	Y	N	N	
353	BUTSO87A	MS-037	06-Jul-87	A	DRY	1227612	734978	5587	MHJ 818	MHJ 818	DU	0	0.08	3	70		16		234		492		3630		5.81	"ERODED SLOPE, Map:S			Y	Y	N	Y	
354	BUTSO87A	MS-038	08-Jul-87	A	DRY	1227661	737006	5501	MHJ 880	MHJ 880	FD	0	0.08	3	142		11		1360		360		1640		7.53	"GROVE GULCH MILL, M			Y	Y	N	Y	
355	BUTSO87A	MS-039	08-Jul-87	A	DRY	1227155	736892	5507	MHJ 861	MHJ 861	FD	0	0.08	3	79		4		137		157		626		6.35	"GROVE GULCH MILL, M			Y	Y	N	Y	
356	BUTSO87A	MS-040	30-Jun-87	A	DRY	1230185	748751	5715	MHH 364	MHH 364	FD	0	0.08	3	133		15		625		4400		1070		7.27	"OLD LEXINGTON, Map:			Y	Y	N	Y	
357	BUTSO87A	MS-042	08-Jul-87	A	DRY	1230244	749103	5738	MHJ 860	MHJ 860	FD	0	0.08	3	101		19		3370		246		1750		5.69	"OLD LEXINGTON, Map:	"SAME COORDINATES AS		N	Y	N	Y	
358	BUTSO87A	MS-043	07-Jul-87	A	DRY	1230447	741947	5460	MHJ 841	MHJ 841	FD	0	0.08	3	69		16		899		1120		2350		6.75	"KAW & GEORGE ST., M			Y	Y	N	Y	
359	BUTSO87A	MS-044	08-Jul-87	A	DRY	1232134	742860	5462	MHJ 878	MHJ 878	FD	0	0.08	3	212		26		1730		1120		6790		7.13	"DRIGGS & OREGON ST.	OUTSIDE OPERABLE UNI		Y	Y	N	Y	
360	BUTSO87A	MS-045	30-Jun-87	A	DRY	1233740	745169	5501	MHH 346	MHH 346	FD	0	0.08	3	168		3	J	635		168		603		5.91	"PARROTT SMELTER, Ma			Y	Y	N	Y	
361	BUTSO87A	MS-046	30-Jun-87	A	DRY	1233753	745232	5502	MHH 344	MHH 344	FD	0	0.08	3	61		3	J	354		120		752		6.81	"PARROTT SMELTER, Ma			Y	Y	N	Y	
362	BUTSO87A	MS-047	30-Jun-87	A	DRY	1234165	745567	5511	MHH 367	MHH 367	FD	0	0.08	3	184		13		1140		389		977		3.56	"PARROTT SMELTER, Ma	"SAME COORDINATES AS		Y	Y	N	N	
363	BUTSO87A	MS-047	30-Jun-87	A	DRY	1234165	745567	5511	MHH 349	MHH 349	DU	0	0.08	3	158		3	J	735		612		633		5.24	"PARROTT SMELTER, Ma			Y	Y	N	Y	
364	BUTSO87A	MS-048	30-Jun-87	A	DRY	1233238	744673	5486	MHH 343	MHH 343	FD	0	0.08	3	1200		10	J	399		780		162		2.62	"PARROTT SMELTER, Ma	IN PAVED AREA NEAR O		Y	Y	N	Y	
365	BUTSO87A	MS-049	24-Jul-87	A	DRY	1230135	743656	5488	MHR 089	MHR 089	FD	0	0.08	3	146		25		2050		1080		4060		6.8	"BUTTE SAMPLING WORK	"SAME LOCATION & CON		N	Y	N	Y	
366	BUTSO87A	MS-050	24-Jul-87	A	DRY	1229766	744815	5545	MHR 079	MHR 079	FD	0	0.08	3	1190		16		8600		1540		4270		4.02	"ANAC. SAMPLING WORK			N	Y	N	Y	
369	BUTSO87A	MS-058	07-Jul-87	A	DRY	1235367	745331	5496	MHJ 836	MHJ 836	FD	0	0.08	3	212		17		3400		385		1980		5.24	"TRACK & DRAINAGES,	OUTSIDE OF OPERABLE		Y	Y	N	Y	
370	BUTSO87A	MS-059	07-Jul-87	A	DRY	1227865	734071	5685	MHJ 834	MHJ 834	FD	0	0.08	3	103		21		440		635		4300		5.16	"TIMBER BUTTE MILL,			Y	Y	N	Y	
371	BUTSO87A	MS-060	07-Jul-87	A	DRY	1228364	734098	5699	MHJ 833	MHJ 833	FD	0	0.08	3	1180		87		1840		19800		15000		2.73	"OLD RR E. OF TIM BT			N	Y	N	Y	
372	BUTSO87A	MS-061	08-Jul-87	A	DRY	1224706	743129	5463	MHJ 856	MHJ 856	FD	0	0.08	3	359		9		2710		160		127		2.77	"MILL AT HUMANE SOC,			Y	Y	N	Y	
373	BUTSO87A	MS-061	08-Jul-87	A	DRY	1224706	743129	5463	MHJ 867	MHJ 867	DU	0	0.08	3	384		8		2590		140		125		2.67	"MILL AT HUMANE SOC,			Y	Y	N	N	
374	BUTSO87A	MS-063	23-Jul-87	A	DRY	1228904	753782	6172	MHR 066	MHR 066	FD	0	0.08	3	199	J	38		694		5180		7860		8.46	"LEXINGTON MILL, Map			N	Y	N	Y	
375	BUTSO87A	MS-064	27-Jul-87	A	DRY	1230070	748984	5738	MHR 094	MHR 094	FD	0	0.08	3	91		8		530		31300		1630		7.55	"OLD LEXINGTON MILL,	"SAMECOORDINATES AS		Y	Y	N	Y	
376	BUTSO87A	MS-065	28-Jul-87	A	DRY	1233511	744722	5511	MHR 133	MHR 133	FD	0	0.08	3	380		2	U	225		490		218		4.73	"PARROTT SMELTER, Ma	"SAME COORDINATES AS		Y	Y	N	Y	
377	BUTSO87A	MS-067	31-Jul-87	A	DRY	1224196	741559	5458	MHR 186	MHR 186	FD	0	0.08	3	2630	J	19		1390		407		2400		5.19	"COLORADO, Map:*			N	Y	N	Y	
378	BUTSO87A	MS-068	04-Aug-87	A	DRY	1228386	754440	6150	MHR 233	MHR 233	FD	0	0.08	3	133		26		839		14500		21200		5.19	"STREET SAND PILE, M	Street Sand Pile nex		Y	Y	N	Y	
379	BUTSO87A	MS-504		C	DRY	1234165	745567	5511	MHH 358	MHH 358	FD			3	370		5		526		230		551		2.82	"PARROTT SMELTER, Ma			N	N	N	Y	
380	BUTSO87A	MS-538??		B	DRY	1228386	754440	6150	MHR 243	MHR 243	FD			3	187		16		1340		38900		39800		5.18	"STREET SAND PILE, M			N	N	N	Y	
381	BUTSO87A	PA-001	08-Jul-87	A	DRY	1228393	752783	6114	MHJ 862	MHJ 862	FD	0	0.08	3	221	J	17		127		1080		2800		4.64	"MISSOULA, Map:Q-19"			Y	Y	R	Y	Y
382	BUTSO87A	PA-002	23-Jun-87	A	DRY	1227192	752507	5963	MHH 235	MHH 235	FD	0	0.08	3	39		15		252		546		4770		6.14	"MISSOULA BALL FIELD			Y	Y	R	Y	Y
383	BUTSO87A	PA-003	09-Jul-87	A	DRY	1226468	753783	6061	MHJ 907	MHJ 907	FD	0	0.08	3	81		13		243		1410		4480		5.88	"EAST OF EVALINE DUM			N	Y	R	Y	Y
384	BUTSO87A	PA-004	09-Jul-87	A	DRY	1227492	754551	6128	MHJ 892	MHJ 892	FD	0	0.08	3	30		10	J	160	J	1240		2010	J		"Ice Rink-E. of 4th,			Y	Y	R	Y	Y
385	BUTSO87A	PA-006	14-Jul-87	A	DRY	1226373	747909	5673	MHR 001	MHR 001	FD	0	0.08	3	38		4		367		360		861		7.96	"STANISLAS PARK, Map			Y	Y	R	Y	Y
386	BUTSO87A	PA-007	09-Jul-87	A	DRY	1224022	748306	5765	MHJ 919	MHJ 919	FD	0	0.08	3	32		2	U	121		252		482		7.34	"MT TECH B.BALL FIEL			Y	Y	R	Y	Y
387	BUTSO87A	PA-009	23-Jun-87	A	DRY	1225178	747861	5672	MHH 234	MHH 234	FD	0	0.08	3	148		7		603		179		1140		4.13	"MERCURY & GIRARD, M			N	Y	R	Y	Y
388	BUTSO87A	PA-011	09-Jul-87	A	DRY	1225351	747432	5656	MHJ 916	MHJ 916	FD	0	0.08	3	20		3		118		269		485		7.6	"DIAMOND & GIRARD, M			Y	Y	R	Y	Y
389	BUTSO87A	PA-012	09-Jul-87	A	DRY	1227940	747675	5693	MHJ 908	MHJ 908	FD	0	0.08	3	59		6	J	289	J	819		1220	J	6.85	"IDAHO & MERCURY, Ma			N	Y	R	Y	Y
390	BUTSO87A	PA-013	16-Jul-87	A	DRY	1227237	747775	5719	MHR 013	MHR 013	FD	0	0.08	3	105		9		1600		1030		2490		6.55	"JACKSON & MERCURY,			Y	Y	R	Y	Y
391	BUTSO87A	PA-014	23-Jul-87	A	DRY	1226788	748816	5725	MHR 055	MHR 055	FD	0	0.08	3	16	J	2	U	121		175		347		7.43	"GRANITE & CRYSTAL,			Y	Y	R	Y	Y
392	BUTSO87A	PA-015	14-Jul-87	A	DRY	1226542	748959	5710	MHJ 972	MHJ 972	FD	0	0.08	3	101	J	15		440		1880		3250		6.6	"GRANITE & CLARK, Ma			Y	Y	R	Y	Y
393	BUTSO87A	PA-016	23-Jun-87	A	DRY	1225267	748881	5728	MHH 226	MHH 226	FD	0	0.08	3	121		8		992		762		1810		4	"BROADWAY & HENRY, M			Y	Y	R	Y	Y
394	BUTSO87A	PA-018	09-Jul-87	A	DRY	1226416	749757	5753	MHJ 899	MHJ 899	FD	0	0.08	3	96		15	J	881	J	464		4600	J	5.69	"CALEDONIA & ALABAMA			Y	Y	R	Y	Y
395	BUTSO87A	PA-019	09-Jul-87	A	DRY	1226910	749526	5766	MHJ 917	MHJ 917	FD	0	0.08	3	71		3		263		405		1080		6.95	"COPPER & FRANKLIN,			Y	Y	R	Y	Y
396	BUTSO87A	PA-020	09-Jul-87	A	DRY	1228213	750445	5874	MHJ 920	MHJ 920	FD	0	0.08	3	48		5		270		741		1480		6.6	"WOOLMAN & MONTANA,			Y	Y	R	N	Y
397	BUTSO87A	PA-020	09-Jul-87	A	DRY	1228213	750445	5874	MHJ 894	MHJ 894	DU	0	0.08	3	53		4	J	288	J	823		1710	J	6.75	"WOOLMAN & MONTANA,			Y	Y	R	Y	Y
398	BUTSO87A	PA-021	09-Jul-87	A	DRY	1228780	751327	5922	MHJ 914	MHJ 914	FD	0	0.08	3	157		14		673		5580		3990		4.12	"RUBY STREET, Map:I-			Y	Y	R	Y	Y
399	BUTSO87A	PA-022	23-Jun-87	A	DRY	1226047	750601	5847	MHH 232	MHH 232	FD	0	0.08	3	17		5		175		179		479		8.06	"NW ANSELMO B.FIELD,			Y	Y	R	Y	Y
400	BUTSO87A	PA-023	13-Jul-87	A	DRY	1225216	750202	5840	MHJ 940	MHJ 940	FD	0	0.08	3	16		2	U	126		162		336		4.85	"HENRY & ANTIMONY, M			Y	Y	R	Y	Y
401	BUTSO87A	PA-024	23-Jun-87	A	DRY	1224221	749585	5799	MHH 237	MHH 237	FD	0	0.08	3	30		5		65		217	J	381	J	8.48	"COPPER & WESTERN, M			Y	Y	R	Y	Y
402	BUTSO87A	PA-025	13-Jul-87	A	DRY	1224369	748885	5756	MHJ 955	MHJ 955	FD	0	0.08	3	413		5		1800		444		1730		6.02	"GRANITE & WESTERN,			Y	Y	R	Y	Y
403	BUTSO87A	PA-027	09-Jul-87	A	DRY	1227914	750017	5878	MHJ 905	MHJ 905	FD	0	0.08	3	217		10	J	748	J	953		3330	J	4.33	"NEAR NATIONAL MINE,			Y	Y	R	Y	Y
404	BUTSO87A	PA-030	23-Jul-87	A	DRY	1228520	743556	5482	MHR 062	MHR 062	FD	0	0.08	3	40	J	4		151		379		703		8.75	"SCHOOL AT MT & FRON			Y	Y	R	Y	Y
405	BUTSO87A	PA-031	09-Jul-87	A	DRY	1227694	745787	5568	MHJ 964	MHJ 964	FD	0	0.08	3	40	J	3		108		106		209		6.58	"ALUMINUM & WASH., M			Y	Y	R	Y	Y
406	BUTSO87A	PA-032	09-Jul-87	A	DRY	1227794	745829	5569	MHJ 906	MHJ 906	FD	0	0.08	3	24		2	UJ	152	J	213		357	J	8.67	"IDAHO & ALUMINUM, M			N	Y	R	Y	Y

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
407	BUTSO87A	PA-033	13-Jul-87	A	DRY	1230669	753116	6204	MHJ 961	MHJ 961	FD	0	0.08	3	62	J	10		364		956		1530		6.55	"CENTERVILLE(BENNETT			Y	Y	R	Y	Y
408	BUTSO87A	PA-034	13-Jul-87	A	DRY	1229463	752563	6067	MHJ 935	MHJ 935	FD	0	0.08	3	16		2	U	259		43		150		8.15	"MULLINS ST-ICERINK,			N	Y	R	Y	Y
409	BUTSO87A	PA-035	13-Jul-87	A	DRY	1229348	753613	6194	MHJ 956	MHJ 956	FD	0	0.08	3	59	J	27		715		3900		7030		3.38	"BLAINE CENTER PARK,			N	Y	R	Y	Y
410	BUTSO87A	PA-036	09-Jul-87	A	DRY	1229011	754512	6175	MHJ 932	MHJ 932	FD	0	0.08	3	40		20		219		2350		6940		5.52	"BB COURT-BLUE WING,			Y	Y	R	Y	Y
411	BUTSO87A	PA-037	13-Jul-87	A	DRY	1229784	754859	6216	MHJ 934	MHJ 934	FD	0	0.08	3	28		11		274		519		2500		6.25	"DUNN & E. DALY, Map			N	Y	R	Y	Y
412	BUTSO87A	PA-038	13-Jul-87	A	DRY	1229812	755342	6257	MHJ 962	MHJ 962	FD	0	0.08	3	39	J	5		139		588		2170		5.82	"MCINTYRE DUMP PARK,			Y	Y	R	Y	Y
413	BUTSO87A	PA-040	14-Jul-87	A	DRY	1228892	748382	5730	MHJ 974	MHJ 974	FD	0	0.08	3	32	J	2	U	480		50		164		7.74	"PARK ST. & COLORADO			Y	Y	R	N	Y
414	BUTSO87A	PA-040	14-Jul-87	A	DRY	1228892	748382	5730	MHJ 969	MHJ 969	DU	0	0.08	3	38	J	2	U	573		69		176		7.79	"PARK ST. & COLORADO			Y	Y	R	Y	Y
415	BUTSO87A	PA-041	13-Jul-87	A	DRY	1230711	747552	5631	MHJ 950	MHJ 950	FD	0	0.08	3	39		6		500		1010		2500		6.02	"OHIO ST & CURTIS, M			Y	Y	R	Y	Y
416	BUTSO87A	PA-043	13-Jul-87	A	DRY	1230041	750371	5840	MHJ 958	MHJ 958	FD	0	0.08	3	884	J	9		2480		1130		4490		4.7	"WYOMING & WOOLMAN,	"IN MANDEN PART - CO		Y	Y	R	Y	Y
417	BUTSO87A	PA-044	13-Jul-87	A	DRY	1230129	750375	5841	MHJ 986	MHJ 986	FD	0	0.08	3	110		5		1520		550		1730		8.48	"PA E. OF PA-043, Ma	"IN MANDEN PART - CO		Y	Y	R	Y	Y
418	BUTSO87A	PA-045	13-Jul-87	A	DRY	1229558	749987	5781	MHJ 941	MHJ 941	FD	0	0.08	3	82		12		2410		1720		3480		4.75	"GAGNON & WYOMING, M			Y	Y	R	Y	Y
419	BUTSO87A	PA-046	16-Jul-87	A	DRY	1229288	751785	5994	MHR 017	MHR 017	FD	0	0.08	3	44		12		392		984		3020		7.21	"LITTLE MINA ST., Ma			Y	Y	R	Y	Y
420	BUTSO87A	PA-047	14-Jul-87	A	DRY	1229820	751292	5930	MHJ 981	MHJ 981	FD	0	0.08	3	130		8		1140		1150		2710		4.47	"CLEAR GRIT ST. DRAI			N	Y	R	Y	Y
421	BUTSO87A	PA-049	26-Jun-87	A	DRY	1233953	745051	5495	MHH 310	MHH 310	FD	0	0.08	3	18	J	3	U	58		20		84			"PARROTT BALL FIELD,			Y	Y	R	Y	Y
422	BUTSO87A	PA-050	26-Jun-87	A	DRY	1233505	745034	5497	MHH 309	MHH 309	FD	0	0.08	3	9	J	3	U	52		16		91			"PARROTT BALL FIELD,			Y	Y	R	Y	Y
423	BUTSO87A	PA-051	14-Jul-87	A	DRY	1233036	745655	5518	MHJ 982	MHJ 982	FD	0	0.08	3	8		2		70		50		145		9.01	"FARRELL & GAYLORD,			Y	Y	R	Y	Y
424	BUTSO87A	PA-052	26-Jun-87	A	DRY	1231960	745645	5536	MHH 306	MHH 306	FD	0	0.08	3	45	J	5		452		480		967		7.79	"ATLANTIC & SECOND,			Y	Y	R	Y	Y
425	BUTSO87A	PA-053	26-Jun-87	A	DRY	1229810	744102	5507	MHH 308	MHH 308	FD	0	0.08	3	22	J	4		113		110		360		7.45	"FIRST & DELAWARE, M			Y	Y	R	Y	Y
426	BUTSO87A	PA-054	14-Jul-87	A	DRY	1230353	744895	5531	MHR 007	MHR 007	FD	0	0.08	3	22		3		138		358		948		8.24	"NEVADA & SECOND, Ma			Y	Y	R	Y	Y
428	BUTSO87A	PA-057	24-Jul-87	A	DRY	1231370	743695	5480	MHR 085	MHR 085	FD	0	0.08	3	86		11		779		7070		1380		7.5	"NEAR BN RR, Map:A-2	"SAME CONCS/LOCATION		Y	Y	R	Y	Y
429	BUTSO87A	PA-059	13-Jul-87	A	DRY	1235229	745000	5502	MHJ 938	MHJ 938	FD	0	0.08	3	117		3		1520		306		1230		7.67	"WALNUT & TEXAS, Map			Y	Y	R	Y	Y
430	BUTSO87A	PA-060	13-Jul-87	A	DRY	1235309	744946	5494	MHJ 951	MHJ 951	FD	0	0.08	3	33		5		877		162		996		6.15	"WALNUT & TEXAS, Map			Y	Y	R	Y	Y
431	BUTSO87A	PA-060	13-Jul-87	A	DRY	1235309	744946	5494	MHJ 949	MHJ 949	DU	0	0.08	3	36		2	U	909		162		818		5.96	"WALNUT & TEXAS, Map			Y	Y	R	Y	Y
432	BUTSO87A	PA-061	13-Jul-87	A	DRY	1229194	752995	6134	MHJ 966	MHJ 966	FD	0	0.08	3	38	J	4		169		452		689		7.22	"MAIN & CENTER, Map:			Y	Y	R	Y	Y
433	BUTSO87A	PA-062	23-Jul-87	A	DRY	1229407	746990	5624	MHR 053	MHR 053	FD	0	0.08	3	143	J	5		192		382		1270		6.59	"MAIN & SILVER, Map:			Y	Y	R	Y	Y
436	BUTSO87A	PA-064	14-Jul-87	A	DRY	1229196	745143	5541	MHJ 995	MHJ 995	FD	0	0.08	3	50		2		162		225		708		8.01	"IRON & MAIN, Map:"			Y	Y	R	Y	Y
437	BUTSO87A	PA-065	14-Jul-87	A	DRY	1228288	735680	5535	MHJ 988	MHJ 988	FD	0	0.08	3	135		2	U	165		130		396		6.7	"CLAY & DAKOTA, Map:			Y	Y	R	Y	Y
438	BUTSO87A	PA-066	23-Jul-87	A	DRY	1230213	746171	5588	MHR 051	MHR 051	FD	0	0.08	3	71	J	6		491		841		1180		8.27	"UTAH & ALUMINUM, Ma			Y	Y	R	Y	Y
439	BUTSO87A	RY-001	15-Jun-87	A	DRY	1225035	751442	5911	MHH 660	MHH 660	FD	0	0.08	3	70		5		349		93		315		6.29	"1020 Hornet, BUTTE,			Y	Y	R	Y	Y
440	BUTSO87A	RY-002	15-Jun-87	A	DRY	1224682	750277	5845	MHH 664	MHH 664	FD	0	0.08	3	48	J	7	J	244		801		680		6.08	"1111 W. Woolman, BU			Y	Y	R	Y	Y
441	BUTSO87A	RY-003	15-Jun-87	A	DRY	1228457	754558	6170	MHH 647	MHH 647	FD	0	0.08	3	38		9		190		1900		1900		6.49	"200 W. Daly, WALKER			Y	Y	R	Y	Y
442	BUTSO87A	RY-004	15-Jun-87	A	DRY	1224467	748890	5740	MHH 661	MHH 661	FD	0	0.08	3	228		7		1420		686		1070		6.2	"1117 Broadway, BUTT			Y	Y	R	Y	Y
443	BUTSO87A	RY-005	15-Jun-87	A	DRY	1224576	746729	5607	MHH 662	MHH 662	FD	0	0.08	3	31		4		165		253		318		7.64	"1114 West Gold, BUT			Y	Y	R	Y	Y
444	BUTSO87A	RY-006	16-Jun-87	A	DRY	1223474	746764	5643	MHH 696	MHH 696	FD	0	0.08	3	42		6		224		670		719		7.37	"1314 Gold, BUTTE, M			Y	Y	R	Y	Y
446	BUTSO87A	RY-008	16-Jun-87	A	DRY	1228486	746570	5586	MHH 698	MHH 698	FD	0	0.08	3	33		6		168		365		877		8.09	"533 S. Dakota, BUTT			Y	Y	R	Y	Y
448	BUTSO87A	RY-010	16-Jun-87	A	DRY	1225316	746760	5617	MHH 690	MHH 690	FD	0	0.08	3	47		6		224		463		796		7.07	"918 Gold, BUTTE, MT			Y	Y	R	Y	Y
450	BUTSO87A	RY-012	17-Jun-87	A	DRY	1231430	745411	5537	MHH 720	MHH 720	FD	0	0.08	3	94	J	12		1070		1240		2030		7.27	"814 Second, BUTTE,			Y	Y	R	Y	Y
451	BUTSO87A	RY-013	17-Jun-87	A	DRY	1230145	744546	5523	MHH 722	MHH 722	FD	0	0.08	3	34	J	9		506		741		1400		6.87	"1010 Maryland, BUTT			Y	Y	R	Y	Y
452	BUTSO87A	RY-014	17-Jun-87	A	DRY	1227236	740714	5474	MHH 716	MHH 716	FD	0	0.08	3	29	J	4		124		58		228		7.07	"1911 S. Washington,			Y	Y	R	Y	Y
458	BUTSO87A	RY-022	18-Jun-87	A	DRY	1229994	754624	6234	MHH 741	MHH 741	FD	0	0.08	3	57		17		847		2320		3800		7.47	"201 Tobaggan, BUTTE			Y	Y	R	Y	Y
461	BUTSO87A	RY-025	19-Jun-87	A	DRY	1228334	740618	5476	MHH 766	MHH 766	FD	0	0.08	3	71		8		369		220		563	J	6.45	"2222 Placer, BUTTE,			Y	Y	R	Y	Y
463	BUTSO87A	RY-027	19-Jun-87	A	DRY	1226865	754171	6096	MHH 748	MHH 748	FD	0	0.08	3	18	U	7		127		387		572		7.97	" 611 Transit, BUTTE			Y	Y	R	Y	Y
464	BUTSO87A	RY-028	19-Jun-87	A	DRY	1229494	753169	6145	MHH 749	MHH 749	FD	0	0.08	3	36		13		166		1980		2050		6.81	"19 La Platte, BUTTE			Y	Y	R	Y	Y
469	BUTSO87A	RY-033	22-Jun-87	A	DRY	1230326	754597	6251	MHH 202	MHH 202	FD	0	0.08	3	21	J	11		184		428		2050		6.07	"227 Tobaggan, WALKE			Y	Y	R	Y	Y
472	BUTSO87A	RY-038	23-Jun-87	A	DRY	1228584	756211	6250	MHH 222	MHH 222	FD	0	0.08	3	22		6		112		523		416		6.85	"205 Williams, WALKE			Y	Y	R	Y	Y
473	BUTSO87A	RY-039	23-Jun-87	A	DRY	1230716	754531	6254	MHH 215	MHH 215	FD	0	0.08	3	87	J	34		771		19300		8420		3.67	"247 Tobaggan, WALKE			Y	Y	R	Y	Y
474	BUTSO87A	RY-040	23-Jun-87	A	DRY	1230044	755014	6245	MHH 216	MHH 216	FD	0	0.08	3	63		14		206		1610		1860		5.56	"121 Capitol Hill, W			Y	Y	R	Y	Y
475	BUTSO87A	RY-040	23-Jun-87	A	DRY	1230044	755014	6245	MHH 219	MHH 219	DU	0	0.08	3	54		13		225		1230		1960		5.75	"121 Capitol Hill, W			Y	Y	R	N	Y
476	BUTSO87A	RY-041	25-Jun-87	A	DRY	1229685	754353	6215	MHH 296	MHH 296	FD	0	0.08	3	100	J	15		411		2540		2420		6.41	"11 Lexington, WALKE			Y	Y	R	Y	Y
477	BUTSO87A	RY-042	25-Jun-87	A	DRY	1226162	753466	6049	MHH 270	MHH 270	FD	0	0.08	3	39		3	U	124	J	383		631	J	6.36	"815 17th, BUTTE, MT			Y	Y	R	Y	Y
478	BUTSO87A	RY-044	25-Jun-87	A	DRY	1228109	735931	5518	MHH 280	MHH 280	FD	0	0.08	3	72		4		150	J	140		533	J	6.81	"3210 Placer, BUTTE,			Y	Y	R	Y	Y
479	BUTSO87A	RY-045	25-Jun-87	A	DRY	1229288	739072	5477	MHH 300	MHH 300	FD	0	0.08	3	35	J	3	U	186		116		229		7.38	"2525 Washoe, BUTTE,			Y	Y	R	Y	Y
481	BUTSO87A	RY-047	26-Jun-87	A	DRY	1229838	739839	5456	MHH 303	MHH 303	FD	0	0.08	3	38	J	3	U	288		100		257		6.79	"202 E. Greenwood, B			Y	Y	R	Y	Y
484	BUTSO87A	RY-050	26-Jun-87	A	DRY	1228993	746488	5596	MHH 304	MHH 304	FD	0	0.08	3	63	J	7		478		895		1520		7.13	"540 Colorado, BUTTE			Y	Y	R	Y	Y
485	BUTSO87A	RY-051	26-Jun-87	A	DRY	1230771	753403	6232	MHH 305	MHH 305	FD	0	0.08	3	55	J	6		642		1000		1280		6.7	"117 O'Neill, BUTTE,			Y	Y	R	Y	Y
486	BUTSO87A	RY-052	26-Jun-87	A	DRY	1229713	754953	6221	MHH 311	MHH 311	FD	0	0.08	3	57		8		391		1650		1790		6.75	"1600 Dunn, BUTTE, M			Y	Y	R	Y	Y
487	BUTSO87A	RY-053	29-Jun-87	A	DRY	1229250	745471	5556	MHH 318	MHH 318	FD	0	0.08	3	33		4		222		390		809		7.69	"735 S. Main, BUTTE,			Y	Y	R	Y	Y
488	BUTSO87A	RY-054	29-Jun-87	A	DRY	1228318	745424	5554	MHH 320	MHH 320	FD	0	0.08	3	44		6		255		808		969		6.62	"721 Placer, BUTTE,			Y	Y	R	Y	Y
496	BUTSO87A	RY-061	01-Jul-87	A	DRY	1225904	747718	5670	MHH 371	MHH 371	FD	0	0.08	3	114		9		279		1200		943		6.73	" 809 Silver, BUTTE,			Y	Y	R	Y	Y
499	BUTSO87A	RY-067	01-Jul-87	A	DRY	1230720	753315	6228	MHH 372	MHH 372	FD	0	0.08	3	109		11		297		743		1190		6.43	"116 O'Neill, BUTTE,			Y	Y	R	Y	Y
500	BUTSO87A	RY-068	01-Jul-87	A	DRY	1230670	753466	6222	MHH 374	MHH 374	FD	0	0.08	3	128		13		396		930		1400		6.75	"113 O'Neill, BUTTE,			Y	Y	R	Y	Y
501	BUTSO87A	RY-069	01-Jul-87	A	DRY	1230697	753415	6228	MHH 370	MHH 370	FD	0	0.08	3	115		12		264		578		856		6.39	"115 O'Neill, BUTTE,			Y	Y	R	Y	Y
502	BUTSO87A	RY-070	02-Jul-87	A	DRY	1227954	734154	5666	MHH 392	MHH 392	FD	0	0.08	3	347		27		955		2740		6150		5.26	"3600 S. Montana, BU			Y	Y	R	Y	Y
503	BUTSO87A	RY-071	06-Jul-87	A	DRY	1229156	752542	6032	MHJ 808	MHJ 808	FD	0	0.08	3	99		17		273		1900		3020		6.68	"7 Pacific, BUTTE, M			Y	Y	R	Y	Y
504	BUTSO87A	RY-072	06-Jul-87	A	DRY	1230057	754583	6240	MHJ 822	MHJ 822	FD	0	0.08	3	33		15		258		1030		2010		6.72	"205 Tobaggan, BUTTE			Y	Y	R	Y	Y
505	BUTSO87A	RY-073	06-Jul-87	A	DRY	1228604	752427	6102	MHJ 816	MHJ 816	FD	0	0.08	3	39		8		146		996		1400		7.33	"129 Pacific, BUTTE,			Y	Y	R	Y	Y
506	BUTSO87A	RY-074	06-Jul-87	A	DRY	1228317	749758	5808	MHJ 804	MHJ 804	FD	0	0.08	3	601		23		1600		1430		4140		6.22	"131 W. Copper, BUTT			N	Y	R	Y	Y
508	BUTSO87A	RY-076	07-Jul-87	A	DRY	1230488	753307	6177	MHJ 837	MHJ 837	FD	0	0.08	3	50		12		229		1170		1350		7.27	" 65 Bennett, BUTTE,			Y	Y	R	Y	Y
509	BUTSO87A	RY-077	07-Jul-87	A	DRY	1230668	753269	6190	MHJ 846	MHJ 846	FD	0	0.08	3	47		17		227		1090		2440		5.99	"77 Bennett, BUTTE,			Y	Y	R	Y	Y
510	BUTSO87A	RY-078	07-Jul-87	A	DRY	1230702	753249	6195	MHJ 835	MHJ 835	FD	0	0.08	3	62		18		256		3800		3050		5.69	"79 Bennett, BUTTE,			Y	Y	R	Y	Y
511	BUTSO87A	RY-079	07-Jul-87	A	DRY	1230719	753213	6198	MHJ 847	MHJ 847	FD	0	0.08	3	98		13		190		3130		1970		6.85	"81 Bennett, BUTTE,			N	Y	R	Y	Y
512	BUTSO87A	RY-080	07-Jul-87	A	DRY	1230470	752905	6181	MHJ 853	MHJ 853	FD	0	0.08	3	15		7		317		279		561		6.39	"123 E. Center, BUTT			Y	Y	R	N	Y
513	BUTSO87A	RY-080	07-Jul-87	A	DRY	1230470	752905	6181	MHJ 852	MHJ 852	DU	0	0.08	3	142	J	6		308		326		578		6.61	"123 E. Center, BUTT			Y	Y	R	Y	Y
514	BUTSO87A	RY-081	07-Jul-87	A	DRY	1230350	752939	6186	MHJ 840	MHJ 840	FD	0	0.08	3	59		16		501		3060		2250		5.93	"115 E. Center, BUTT			Y	Y	R	Y	Y

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
515	BUTSO87A	RY-082	07-Jul-87	A	DRY	1228842	752494	6099	MHJ 848	MHJ 848	FD	0	0.08	3	6	UJ	9		168		810		1240		6.37	"101 Pacific, BUTTE,			Y	Y	R	Y	Y
516	BUTSO87A	RY-083	07-Jul-87	A	DRY	1228647	752450	6102	MHJ 839	MHJ 839	FD	0	0.08	3	58		12		264		781		1640		6.04	"121 Pacific, BUTTE,			Y	Y	R	Y	Y
517	BUTSO87A	RY-084	07-Jul-87	A	DRY	1228305	752455	6089	MHJ 850	MHJ 850	FD	0	0.08	3	48		17		272		2320		3370		6.38	"167 W. Pacific, BUT			Y	Y	R	Y	Y
518	BUTSO87A	RY-085	08-Jul-87	A	DRY	1229539	751343	5947	MHJ 858	MHJ 858	FD	0	0.08	3	110		0	R	827		1800		3250		6.71	"107 Cleargrit, BUTT			Y	Y	R	Y	Y
519	BUTSO87A	RY-086	08-Jul-87	A	DRY	1229910	751220	5927	MHJ 857	MHJ 857	FD	0	0.08	3	78		13		546		1920		3610		5.48	"110 Belle St., BUTT			Y	Y	R	Y	Y
520	BUTSO87A	RY-087	08-Jul-87	A	DRY	1229923	751246	5931	MHJ 876	MHJ 876	FD	0	0.08	3	131		17		777		2030		4700		5.25	"112 Belle St., BUTT			Y	Y	R	Y	Y
521	BUTSO87A	RY-088	08-Jul-87	A	DRY	1229833	750719	5901	MHJ 881	MHJ 881	FD	0	0.08	3	70		13		1080		1420		2490		6.38	"709 N. Wyoming, BUT			Y	Y	R	Y	Y
522	BUTSO87A	RY-089	08-Jul-87	A	DRY	1228678	751366	5929	MHJ 859	MHJ 859	FD	0	0.08	3	84		20		434		1880		3650		5.97	"109 Ruby, BUTTE, MT			Y	Y	R	Y	Y
523	BUTSO87A	RY-090	08-Jul-87	A	DRY	1228657	751262	5923	MHJ 870	MHJ 870	FD	0	0.08	3	29		20		254		554		5020		6.4	"107 Ruby, BUTTE, MT			Y	Y	R	Y	Y
524	BUTSO87A	RY-091	08-Jul-87	A	DRY	1225499	749133	5761	MHJ 864	MHJ 864	FD	0	0.08	3	39		10		221		1250		2320		7.11	"917 Granite, BUTTE,			Y	Y	R	Y	Y
525	BUTSO87A	RY-092	08-Jul-87	A	DRY	1225399	750389	5854	MHJ 875	MHJ 875	FD	0	0.08	3	53		7		276		1370		1180		6.36	"918 Antimony, BUTTE			Y	Y	R	Y	Y
526	BUTSO87A	RY-093	08-Jul-87	A	DRY	1225502	750503	5858	MHJ 873	MHJ 873	FD	0	0.08	3	43		8		333		676		1150		6.59	"913 Antimony, BUTTE			Y	Y	R	Y	Y
527	BUTSO87A	RY-094	08-Jul-87	A	DRY	1225268	750609	5881	MHJ 879	MHJ 879	FD	0	0.08	3	24		6		191		183		456		6.53	"962 Lewisohn, BUTTE			Y	Y	R	Y	Y
528	BUTSO87A	RY-095	09-Jul-87	A	DRY	1228223	751341	5949	MHJ 909	MHJ 909	FD	0	0.08	3	343		15	J	356	J	1630		4540	J	4.33	"804 N. Montana, BUT			Y	Y	R	Y	Y
529	BUTSO87A	RY-096	09-Jul-87	A	DRY	1228210	751485	5970	MHJ 893	MHJ 893	FD	0	0.08	3	158		11	J	714	J	1060		4560	J	5.94	" 822 N. Montana, BU			Y	Y	R	Y	Y
530	BUTSO87A	RY-097	09-Jul-87	A	DRY	1228407	750895	5900	MHJ 911	MHJ 911	FD	0	0.08	3	87		12		523		6670		5050		5.77	"128 Pearl, BUTTE, M			Y	Y	R	Y	Y
531	BUTSO87A	RY-098	09-Jul-87	A	DRY	1228442	750770	5885	MHJ 900	MHJ 900	FD	0	0.08	3	70		8	J	352	J	1410		2840	J	6.02	"121 Boardman, BUTTE			Y	Y	R	Y	Y
532	BUTSO87A	RY-099	09-Jul-87	A	DRY	1227061	749733	5799	MHJ 895	MHJ 895	FD	0	0.08	3	146		10	J	427	J	1310		2420	J	3.54	"521 Copper, BUTTE,			Y	Y	R	Y	Y
533	BUTSO87A	RY-100	09-Jul-87	A	DRY	1227990	735725	5527	MHJ 931	MHJ 931	FD	0	0.08	3	192		5		309		857		1250		6.73	"3251 Placer, BUTTE,			Y	Y	R	Y	Y
534	BUTSO87A	RY-100	09-Jul-87	A	DRY	1227990	735725	5527	MHJ 921	MHJ 921	DU	0	0.08	3	167		4		293		817		1220		6.78	"3251 Placer, BUTTE,			Y	Y	R	N	Y
535	BUTSO87A	RY-101	09-Jul-87	A	DRY	1226604	750015	5778	MHJ 897	MHJ 897	FD	0	0.08	3	71		4	J	354	J	658		1580	J	7.36	" 527 Edison St., BU			Y	Y	R	Y	Y
536	BUTSO87A	RY-102	09-Jul-87	A	DRY	1227044	750237	5827	MHJ 898	MHJ 898	FD	0	0.08	3	51		4	J	233	J	637		1230	J	7.09	"550 Franklin, BUTTE			Y	Y	R	Y	Y
537	BUTSO87A	RY-103	09-Jul-87	A	DRY	1227052	750275	5831	MHJ 902	MHJ 902	FD	0	0.08	3	106		4	J	551	J	1050		1330	J	6.85	"552 Franklin, BUTTE			Y	Y	R	Y	Y
538	BUTSO87A	RY-104	09-Jul-87	A	DRY	1227057	750310	5835	MHJ 903	MHJ 903	FD	0	0.08	3	81		4	J	252	J	1210		1830	J	6.56	"554 Franklin, BUTTE			Y	Y	R	Y	Y
539	BUTSO87A	RY-105	13-Jul-87	A	DRY	1226629	745435	5581	MHJ 965	MHJ 965	FD	0	0.08	3	91	J	8		401		1270		1470		6.98	" 619 W. Iron, BUTTE			Y	Y	R	Y	Y
540	BUTSO87A	RY-106	13-Jul-87	A	DRY	1226662	745428	5580	MHJ 963	MHJ 963	FD	0	0.08	3	59	J	4		352		1310		1110		6.42	" 617 W. Iron, BUTTE			Y	Y	R	Y	Y
541	BUTSO87A	RY-107	13-Jul-87	A	DRY	1225480	750042	5830	MHJ 959	MHJ 959	FD	0	0.08	3	66	J	8		286		2570		2630		6.98	" 918 W. Woolman, BU			Y	Y	R	Y	Y
543	BUTSO87A	RY-109	13-Jul-87	A	DRY	1229514	750140	5804	MHJ 939	MHJ 939	FD	0	0.08	3	104		8		718		875		2060		6.5	"33 E. Gagnon, BUTTE			Y	Y	R	Y	Y
544	BUTSO87A	RY-110	13-Jul-87	A	DRY	1229417	750168	5811	MHJ 979	MHJ 979	FD	0	0.08	3	63		9		464		950		2860		7.43	"27 E. Gagnon, BUTTE			Y	Y	R	Y	Y
545	BUTSO87A	RY-111	13-Jul-87	A	DRY	1229565	750211	5800	MHJ 960	MHJ 960	FD	0	0.08	3	107	J	7		828		1220		2560		6.72	" 59 E. Gagnon, BUTT			Y	Y	R	Y	Y
546	BUTSO87A	RY-112	13-Jul-87	A	DRY	1226853	749728	5773	MHJ 952	MHJ 952	FD	0	0.08	3	122		18		652		1840		5920		3.68	"607 Copper, BUTTE,			Y	Y	R	Y	Y
547	BUTSO87A	RY-113	13-Jul-87	A	DRY	1227237	746443	5634	MHJ 957	MHJ 957	FD	0	0.08	3	39	J	4		290		563		821		6.87	"522 Jackson, BUTTE,			Y	Y	R	Y	Y
548	BUTSO87A	RY-114	13-Jul-87	A	DRY	1227019	747669	5713	MHJ 993	MHJ 993	FD	0	0.08	3	95		5		320		549		1710		7.94	"515 W. Silver, BUTT			Y	Y	R	Y	Y
549	BUTSO87A	RY-115	13-Jul-87	A	DRY	1224882	747732	5668	MHJ 968	MHJ 968	FD	0	0.08	3	23	J	4		236		537		952		6.79	"1017 Silver, BUTTE,			Y	Y	R	Y	Y
551	BUTSO87A	RY-117	14-Jul-87	A	DRY	1231052	747903	5651	MHR 005	MHR 005	FD	0	0.08	3	176		20		1710		1810		4440		5.72	"356 Mercury, BUTTE,			Y	Y	R	Y	Y
552	BUTSO87A	RY-118	14-Jul-87	A	DRY	1231162	747897	5646	MHR 006	MHR 006	FD	0	0.08	3	91		13		1010		3180		3570		6.85	"366 Mercury, BUTTE,			Y	Y	R	Y	Y
553	BUTSO87A	RY-119	14-Jul-87	A	DRY	1229747	749803	5784	MHR 010	MHR 010	FD	0	0.08	3	108		9		970		1070		1680		7.21	"401 Wyoming, BUTTE,			Y	Y	R	Y	Y
554	BUTSO87A	RY-120	14-Jul-87	A	DRY	1229734	750184	5843	MHJ 989	MHJ 989	FD	0	0.08	3	95		7		755		1670		2390		6.35	"519 N. Wyoming, BUT			Y	Y	R	Y	Y
555	BUTSO87A	RY-120	14-Jul-87	A	DRY	1229734	750184	5843	MHJ 999	MHJ 999	DU	0	0.08	3	152		6		872		1250		2200		6.44	"519 N. Wyoming, BUT			Y	Y	R	N	Y
556	BUTSO87A	RY-121	14-Jul-87	A	DRY	1228463	749508	5787	MHR 008	MHR 008	FD	0	0.08	3	92		11		578		1080		2220		6.49	"109 W. Quartz, BUTT			Y	Y	R	Y	Y
557	BUTSO87A	RY-122	14-Jul-87	A	DRY	1229067	752858	6148	MHR 014	MHR 014	FD	0	0.08	3	90		7		358		2540		1430		5.73	" 937 Sutter, BUTTE,			Y	Y	R	Y	Y
558	BUTSO87A	RY-123	14-Jul-87	A	DRY	1225450	750335	5849	MHR 009	MHR 009	FD	0	0.08	3	36		5		124		869		1080		7.07	"930 Antimony, BUTTE			Y	Y	R	Y	Y
559	BUTSO87A	RY-124	14-Jul-87	A	DRY	1225310	749686	5788	MHJ 948	MHJ 948	FD	0	0.08	3	62		2		633		320		1120		7.28	"939 W. Copper, BUTT			Y	Y	R	Y	Y
560	BUTSO87A	RY-125	16-Jul-87	A	DRY	1223373	741018	5510	MHR 034	MHR 034	FD	0	0.08	3	21		2	U	82		38		360		7.51	" Baden St., WILLIAM			Y	Y	R	Y	Y
561	BUTSO87A	RY-126	16-Jul-87	A	DRY	1222947	740796	5513	MHR 016	MHR 016	FD	0	0.08	3	43		4		110		54		145		7.63	" Baden St., WILLIAM			Y	Y	R	Y	Y
563	BUTSO87A	RY-128	16-Jul-87	A	DRY	1223797	740926	5494	MHR 029	MHR 029	FD	0	0.08	3	30		2	U	196		531		371		8.2	" Stutgartt St., WIL			Y	Y	R	Y	Y
564	BUTSO87A	RY-129	16-Jul-87	A	DRY	1223507	741354	5470	MHR 022	MHR 022	FD	0	0.08	3	160		3		197		70		307		8.17	" Near Weed Building			Y	Y	R	Y	Y
565	BUTSO87A	RY-130	16-Jul-87	A	DRY	1225006	749392	5758	MHR 018	MHR 018	FD	0	0.08	3	25	J	5		74		378		2130		7.25	"1031 W. Quartz, BUT			Y	Y	R	Y	Y
566	BUTSO87A	RY-131	30-Jul-87	A	DRY	1228294	743918	5499	MHR 174	MHR 174	FD	0	0.08	3	140	J	3		294		561		927		6.61	"1031 Placer, BUTTE,			Y	Y	R	Y	Y
567	BUTSO87A	RY-132	30-Jul-87	A	DRY	1226363	744581	5541	MHR 175	MHR 175	FD	0	0.08	3	121	J	6		587		1070		1620		6.35	" 611 Illinois, BUTT			Y	Y	R	Y	Y
568	BUTSO87A	RY-133	30-Jul-87	A	DRY	1226835	745166	5551	MHR 173	MHR 173	FD	0	0.08	3	55	J	5		398		999		1240		6.02	"812 Travonia, BUTTE			Y	Y	R	Y	Y
573	BUTSO87A	RY-139	30-Jul-87	A	DRY	1229213	744262	5521	MHR 183	MHR 183	FD	0	0.08	3	76	J	8		463		1250		2390		7.26	"941 S. Main, BUTTE,			Y	Y	R	Y	Y
574	BUTSO87A	RY-140	30-Jul-87	A	DRY	1229758	751295	5942	MHR 169	MHR 169	FD	0	0.08	3	77	J	6		591		1620		3790		6.45	"109 Belle, BUTTE, M			N	Y	R	Y	Y
575	BUTSO87A	RY-140	30-Jul-87	A	DRY	1229758	751295	5942	MHR 182	MHR 182	DU	0	0.08	3	71	J	8		475		1600		3500		6.41	" 109 Belle, BUTTE,			N	Y	R	N	Y
576	BUTSO87A	RY-141	29-Jul-87	A	DRY	1223380	740751	5525	MHR 167	MHR 167	FD	0	0.08	3	35	J	2	U	78		58		143		6.67	"4 Nassau, WILLIAMSB			Y	Y	R	Y	Y
577	BUTSO87A	RY-142	29-Jul-87	A	DRY	1223624	740668	5516	MHR 148	MHR 148	FD	0	0.08	3	82		4		276		107		249		5.52	"Nassau, WILLIAMSBUR			Y	Y	R	Y	Y
578	BUTSO87A	RY-143	29-Jul-87	A	DRY	1223419	740897	5504	MHR 146	MHR 146	FD	0	0.08	3	33		2	U	92		91		183		6.23	"Baden St., WILLIAMS			Y	Y	R	Y	Y
579	BUTSO87A	RY-144	29-Jul-87	A	DRY	1232936	745876	5524	MHR 162	MHR 162	FD	0	0.08	3	82	J	10		871		1020		1620		6.23	"1269 E. 2nd St., BU			Y	Y	R	Y	Y
580	BUTSO87A	RY-145	29-Jul-87	A	DRY	1225995	752635	5970	MHR 156	MHR 156	FD	0	0.08	3	35	J	4		258		425		1010		6.44	"825 9th St., BUTTE,			Y	Y	R	Y	Y
581	BUTSO87A	RY-146	29-Jul-87	A	DRY	1225438	750585	5869	MHR 158	MHR 158	FD	0	0.08	3	54	J	6		162		627		896		6.81	"916 Lewisohn, BUTTE			Y	Y	R	Y	Y
582	BUTSO87A	RY-147	29-Jul-87	A	DRY	1229943	750740	5910	MHR 153	MHR 153	FD	0	0.08	3	71	J	12		558		1710		3480		6.87	"712 N. Wyoming, BUT			Y	Y	R	Y	Y
583	BUTSO87A	RY-148	29-Jul-87	A	DRY	1229704	749859	5788	MHR 168	MHR 168	FD	0	0.08	3	51	J	13		544		756		1060		7.13	"423 N. Wyoming, BUT			Y	Y	R	Y	Y
584	BUTSO87A	RY-149	28-Jul-87	A	DRY	1230634	744939	5528	MHR 135	MHR 135	FD	0	0.08	3	96		6		853		1440		1670		6.75	"1001 S. Wyoming, BU			Y	Y	R	Y	Y
585	BUTSO87A	RY-150	28-Jul-87	A	DRY	1229932	746147	5587	MHR 134	MHR 134	FD	0	0.08	3	64		8		618		1180		3300		6.39	" 641 S. Wyoming, BU			Y	Y	R	Y	Y
586	BUTSO87A	RY-151	28-Jul-87	A	DRY	1225353	750195	5841	MHR 132	MHR 132	FD	0	0.08	3	77		6		316		1830		1390		5.78	"941 W. Woolman, BUT			Y	Y	R	Y	Y
587	BUTSO87A	RY-152	28-Jul-87	A	DRY	1226848	746015	5622	MHR 145	MHR 145	FD	0	0.08	3	92		8		282		1310		1320		5.75	"645 Travonia, BUTTE			Y	Y	R	Y	Y
588	BUTSO87A	RY-153	28-Jul-87	A	DRY	1227010	745148	5549	MHR 131	MHR 131	FD	0	0.08	3	82		3		419		1000		968		6.2	"827 S. Jackson, BUT			Y	Y	R	Y	Y
589	BUTSO87A	RY-154	28-Jul-87	A	DRY	1226013	744389	5513	MHR 125	MHR 125	FD	0	0.08	3	196		6		336		1980		2940		7.25	" 708 Alabama, BUTTE			Y	Y	R	Y	Y
590	BUTSO87A	RY-155	28-Jul-87	A	DRY	1226243	744283	5527	MHR 128	MHR 128	FD	0	0.08	3	119		9		779		1180		2170		6.91	"701 Indiana, BUTTE,			Y	Y	R	Y	Y
591	BUTSO87A	RY-156	27-Jul-87	A	DRY	1226975	745776	5592	MHR 111	MHR 111	FD	0	0.08	3	69		3		236		387		628		6.95	"523 W. Aluminum, BU			Y	Y	R	Y	Y
592	BUTSO87A	RY-157	27-Jul-87	A	DRY	1226829	745191	5555	MHR 108	MHR 108	FD	0	0.08	3	51		5		227		301		706		6.82	"810 Travonia, BUTTE			Y	Y	R	Y	Y
593	BUTSO87A	RY-158	16-Jul-87	A	DRY	1229637	751406	5944	MHR 039	MHR 039	FD	0	0.08	3	71		7		397		3620		2640		7.01	"115 Cleargrit, BUTT			Y	Y	R	Y	Y
594	BUTSO87A	RY-159	16-Jul-87	A	DRY	1228976	752582	6104	MHR 021	MHR 021	FD	0	0.08	3	56		14		383		6030		3490		5.51	"33 Missoula, BUTTE,			Y	Y	R	Y	Y
595	BUTSO87A	RY-160	16-Jul-87	A	DRY	1225478	749223	5772	MHR 020	MHR 020	FD	0	0.08	3	39		8		208		874		1450		6.68	"920 W. Quartz, BUTT			Y	Y	R	N	Y
596	BUTSO87A	RY-160	16-Jul-87	A	DRY	1225478	749223	5772	MHR 025	MHR 025	DU	0	0.08	3	39	J	7		261		1070		1630		6.81	"920 W. Quartz, BUTT			Y	Y	R	Y	Y

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measurement Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
597	BUTSO87A	RY-161	16-Jul-87	A	DRY	1225300	749417	5761	MHR 047	MHR 047	FD	0	0.08	3	35	J	3		406		404		825		7.42	"941 W. Quartz, BUTT			Y	Y	R	Y	Y
598	BUTSO87A	RY-162	16-Jul-87	A	DRY	1225391	749354	5779	MHR 024	MHR 024	FD	0	0.08	3	39	J	3		266		595		930		6.36	"927 W. Quartz, BUTT			Y	Y	R	Y	Y
599	BUTSO87A	RY-163	16-Jul-87	A	DRY	1225595	748974	5747	MHR 040	MHR 040	FD	0	0.08	3	57		6		529		1540		1370		6.41	"125 N. Excelsior, B			Y	Y	R	Y	Y
604	BUTSO87A	RY-169	14-Jul-87	A	DRY	1232368	746107	5548	MHJ 991	MHJ 991	FD	0	0.08	3	170		12		1560		1450		2600		7.24	"832 Emma, BUTTE, MT			Y	Y	R	Y	Y
605	BUTSO87A	RY-170	14-Jul-87	A	DRY	1226153	744281	5528	MHR 012	MHR 012	FD	0	0.08	3	39		5		162		258		480		8.25	"707 Indiana, BUTTE,			Y	Y	R	Y	Y
606	BUTSO87A	RY-171	14-Jul-87	A	DRY	1226569	749096	5753	MHR 003	MHR 003	FD	0	0.08	3	60		12		343		5650		2980		6.52	"647 W. Granite, BUT			Y	Y	R	Y	Y
607	BUTSO87A	RY-172	14-Jul-87	A	DRY	1232691	746131	5539	MHJ 996	MHJ 996	FD	0	0.08	3	105		10		935		1200		2390		7.64	"1246 1/2 Short, BUT			Y	Y	R	Y	Y
608	BUTSO87A	RY-173	14-Jul-87	A	DRY	1232566	745974	5539	MHR 011	MHR 011	FD	0	0.08	3	62		12		739		732		1610		7.05	"917 Ergo, BUTTE, MT			N	Y	R	Y	Y
609	BUTSO87A	RY-174	14-Jul-87	A	DRY	1232769	746017	5539	MHR 002	MHR 002	FD	0	0.08	3	65		8		776		210	J	1810		7.08	"922 Ergo, BUTTE, MT			N	Y	R	Y	Y
610	BUTSO87A	RY-175	14-Jul-87	A	DRY	1232089	746082	5556	MHJ 985	MHJ 985	FD	0	0.08	3	53		6		519		700		1560		7.05	"1121 E. Third, BUTT			N	Y	R	N	Y
611	BUTSO87A	RY-175	14-Jul-87	A	DRY	1232089	746082	5556	MHJ 971	MHJ 971	DU	0	0.08	3	61	J	7		641		812		1780		7.75	"1121 E. Third, BUTT			N	Y	R	Y	Y
612	BUTSO87A	RY-176	16-Jul-87	A	DRY	1232309	746207	5554	MHR 041	MHR 041	FD	0	0.08	3	67		7		672		779		1850		6.26	"817 Emma, BUTTE, MT			Y	Y	R	Y	Y
613	BUTSO87A	RY-177	16-Jul-87	A	DRY	1232251	746039	5545	MHR 035	MHR 035	FD	0	0.08	3	45		6		533		578		1160		7.18	"835 Emma, BUTTE, MT			Y	Y	R	Y	Y
614	BUTSO87A	RY-178	16-Jul-87	A	DRY	1232222	746101	5554	MHR 026	MHR 026	FD	0	0.08	3	89		11		934		881		2050		7.7	"815 Emma, BUTTE, MT			Y	Y	R	Y	Y
615	BUTSO87A	RY-179	16-Jul-87	A	DRY	1226293	746024	5627	MHR 031	MHR 031	FD	0	0.08	3	63		5		296		622		967		7.59	"643 Clark, BUTTE, M			Y	Y	R	Y	Y
616	BUTSO87A	RY-180	16-Jul-87	A	DRY	1226533	745899	5601	MHR 004	MHR 004	FD	0	0.08	3	99		7		411		485		631		7.56	"675 S. Chrystal, BU			Y	Y	R	Y	Y
617	BUTSO87A	RY-181	16-Jul-87	A	DRY	1229311	750149	5823	MHR 028	MHR 028	FD	0	0.08	3	129		10		630		1780		2240		8.35	"21 Gagnon, BUTTE, M			Y	Y	R	Y	Y
618	BUTSO87A	RY-182	16-Jul-87	A	DRY	1229360	750145	5820	MHR 042	MHR 042	FD	0	0.08	3	91		10		920		1910		2900		6.73	"23 Gagnon, BUTTE, M			Y	Y	R	Y	Y
619	BUTSO87A	RY-183	24-Jul-87	A	DRY	1228532	749738	5789	MHR 086	MHR 086	FD	0	0.08	3	92		10		1160		860		2080		6.62	"111 1/2 W. Copper,			Y	Y	R	Y	Y
620	BUTSO87A	RY-184	24-Jul-87	A	DRY	1228389	749615	5782	MHR 081	MHR 081	FD	0	0.08	3	189		13		1320		2680		2370		4.33	"118 W. Copper, BUTT	COLORADO STAMP MILL		N	Y	R	Y	Y
621	BUTSO87A	RY-185	24-Jul-87	A	DRY	1228422	749509	5788	MHR 095	MHR 095	FD	0	0.08	3	184		34		1390		3300		10500		6.45	"111 W. Quartz, BUTT			Y	Y	R	Y	Y
622	BUTSO87A	RY-186	24-Jul-87	A	DRY	1228505	749505	5785	MHR 090	MHR 090	FD	0	0.08	3	202		8		829		1240		1920		5.26	"107 W. Quartz, BUTT			Y	Y	R	Y	Y
623	BUTSO87A	RY-187	24-Jul-87	A	DRY	1230402	749067	5732	MHR 087	MHR 087	FD	0	0.08	3	71		10		570		1880		1920		7.39	"243 E. Broadway, BU			Y	Y	R	Y	Y
624	BUTSO87A	RY-188	24-Jul-87	A	DRY	1231090	748738	5694	MHR 076	MHR 076	FD	0	0.08	3	58		6		773		774		1070		5.98	"405 E. Park, BUTTE,			Y	Y	R	Y	Y
625	BUTSO87A	RY-189	24-Jul-87	A	DRY	1231254	747896	5644	MHR 098	MHR 098	FD	0	0.08	3	209		13		2510		1400		3510		6.76	"406 E. Mercury, BUT			Y	Y	R	Y	Y
626	BUTSO87A	RY-190	24-Jul-87	A	DRY	1225863	748973	5748	MHR 077	MHR 077	FD	0	0.08	3	155		11		393		2930		2080		7.17	"830 W. Granite, BUT			Y	Y	R	Y	Y
627	BUTSO87A	RY-191	27-Jul-87	A	DRY	1232026	748119	5634	MHR 101	MHR 101	FD	0	0.08	3	87		6		822		619		1420		6.91	"527 E. Mercury, BUT			Y	Y	R	Y	Y
628	BUTSO87A	RY-192	27-Jul-87	A	DRY	1230983	748362	5669	MHR 110	MHR 110	FD	0	0.08	3	69		4		403		745		894		6.75	"341 E. Galena, BUTT			Y	Y	R	Y	Y
629	BUTSO87A	RY-193	27-Jul-87	A	DRY	1226824	745447	5562	MHR 109	MHR 109	FD	0	0.08	3	67		3		306		692		779		7.17	"503 W. Iron, BUTTE,			Y	Y	R	Y	Y
630	BUTSO87A	RY-194	27-Jul-87	A	DRY	1226865	746167	5633	MHR 112	MHR 112	FD	0	0.08	3	63		2	U	273		436		598		6.66	"629 Travonia, BUTTE			Y	Y	R	Y	Y
631	BUTSO87A	RY-195	29-Jul-87	A	DRY	1233186	745848	5521	MHR 155	MHR 155	FD	0	0.08	3	93	J	9		1300		1150		1830		6.76	"1317 E.2nd St., BUT			Y	Y	R	Y	Y
636	BUTSO87A	VG-001	15-Jun-87	A	DRY	1228470	754527	6167	MHH 665	MHH 665	FD	0	0.5	3	48	J	7	J	155		633		1140		7.37	"200 W. Daly St., Wa	"0-6"" SAMPLE FROM V		Y	Y	R	Y	Y
642	BUTSO87A	VG-007	23-Jun-87	A	DRY	1228574	756224	6249	MHH 227	MHH 227	FD	0	0.5	3	58		8		239		575		711		7.14	"205 Williams, Walke			Y	Y	R	Y	Y
646	BUTSO87A	VG-011	06-Jul-87	A	DRY	1228341	749746	5805	MHJ 813	MHJ 813	FD	0	0.5	3	137		11		632		276		997		3.48	"131 W. Copper, Butt			Y	Y	R	Y	Y
647	BUTSO87A	VG-012	08-Jul-87	A	DRY	1225502	749103	5759	MHJ 882	MHJ 882	FD	0	0.5	3	38		5		166		101		453		7.37	"917 Granite, Butte,	"0-6"" SAMPLE FROM V		Y	Y	R	Y	Y
648	BUTSO87A	VG-013	09-Jul-87	A	DRY	1227092	750245	5825	MHJ 929	MHJ 929	FD	0	0.5	3	16		2	U	134		215		718		7.47	"550 Franklin, Butte	"0-6"" SAMPLE FROM V		Y	Y	R	Y	Y
649	BUTSO87A	VG-014	13-Jul-87	A	DRY	1224872	747700	5666	MHJ 980	MHJ 980	FD	0	0.5	3	28		2	U	128		308		378		6.51	"1017 Silver, Butte,	"0-6"" SAMPLE FROM V		Y	Y	R	N	Y
650	BUTSO87A	VG-014	13-Jul-87	A	DRY	1224872	747700	5666	MHJ 990	MHJ 990	DU	0	0.5	3	35		2	U	144		320		435		6.71	"1017 Silver, Butte,			Y	Y	R	Y	Y
651	BUTSO87A	VG-015	16-Jul-87	A	DRY	1232191	746154	5554	MHR 044	MHR 044	FD	0	0.5	3	56		8		727		809		1610		6.71	" 815 Emma, Butte, M	"0-6"" SAMPLE FROM V		N	Y	R	Y	Y
653	BUTSO87A	VG-017	27-Jul-87	A	DRY	1230936	748400	5670	MHR 113	MHR 113	FD	0	0.5	3	56		6		515		662		1260		6.83	"341 E. Galena, Butt	"0-6"" SAMPLE FROM V		Y	Y	R	Y	Y
654	BUTSO87A	VG-018	27-Jul-87	A	DRY	1232525	746069	5539	MHR 114	MHR 114	FD	0	0.5	3	117		6		936		588		1320		6.59	"1232 Short St., But	"0-6"" SAMPLE FROM V		N	Y	R	Y	Y
655	BUTSO87A	VG-019	28-Jul-87	A	DRY	1226212	744307	5531	MHR 137	MHR 137	FD	0	0.5	3	86		3		509		504		1130		5.44	" 701 Indiana, Butte	"0-6"" SAMPLE FROM V		Y	Y	R	Y	Y
656	BUTSO87A	VG-020	31-Jul-87	A	DRY	1229650	751419	5936	MHR 198	MHR 198	FD	0	0.5	3	139	J	5		409		1610		1870		6.82	"115 Cleargrit, Butt	"0-6"" SAMPLE FROM V		Y	Y	R	Y	Y
657	BUTSO87A	VG-021	31-Jul-87	A	DRY	1230552	753265	6182	MHR 197	MHR 197	FD	0	0.5	3	95	J	6		182		643		1320		7.59	"67 Bennet, Butte, M	"0-6"" SAMPLE FROM V		Y	Y	R	Y	Y
658	BUTSO87A	VG-022	31-Jul-87	A	DRY	1229206	750202	5850	MHR 191	MHR 191	FD	0	0.5	3	24	J	2	U	97		100		193		7.12	"10 E. Woolman, Butt	"0-6"" SAMPLE FROM V		Y	Y	R	Y	Y
659	BUTSO87A	VG-023	04-Aug-87	A	DRY	1226099	753381	6040	MHR 240	MHR 240	FD	0	0.5	3	41		3		209		126		399		6.34	" 825 16th St., Butt	"0-6"" SAMPLE FROM V		Y	Y	R	Y	Y
660	BUTSO87A	VG-533		B	DRY	1228574	756224	6249	MHH 220	MHH 220	FD			3	42		9		281		885		973		7.27	"205 Williams, Walke			N	N	N	Y	
661	BUTSO87A	VG-533		C	DRY	1228574	756224	6249	MHH 218	MHH 218	FD			3	25		17		113		390		438		7.34	"205 Williams, Walke			N	N	N	N	
669	BUTSO87A	WD-013	25-Jun-87	A	DRY	1228644	752761	6145	MHH 287	MHH 287	FD	0	0.08	3	43		21		265	J	14800		762	J	6.28	"OLD GLORY WEST, Map			Y	Y	N	Y	
670	BUTSO87A	WD-014	25-Jun-87	A	DRY	1228658	752735	6133	MHH 275	MHH 275	FD	0	0.08	3	28		20		579	J	1170		9630	J	5.9	"OLD GLORY WEST, Map			Y	Y	N	Y	
671	BUTSO87A	WD-015	16-Jun-87	A	DRY	1228033	752565	6049	MHH 680	MHH 680	FD	0	0.08	3	39	J	13	J	128		796		2660		5.53	"RAVIN, Map:Q-19"			Y	Y	N	Y	
672	BUTSO87A	WD-016	16-Jun-87	A	DRY	1228056	752569	6054	MHH 670	MHH 670	FD	0	0.08	3	67	J	14	J	166		1560		3770		4.59	"RAVIN, Map:Q-19"			Y	Y	N	Y	
673	BUTSO87A	WD-017	16-Jun-87	A	DRY	1228726	753318	6140	MHH 668	MHH 668	FD	0	0.08	3	222	J	43	J	607		12700		11100		2.87	"LAPLATA, Map:Q-19"			N	Y	N	Y	
674	BUTSO87A	WD-018	16-Jun-87	A	DRY	1227360	753143	6000	MHH 674	MHH 674	FD	0	0.08	3	67	J	14	J	146		2080		3190		5.61	"MISSOULA MINES, Map			N	Y	N	Y	
675	BUTSO87A	WD-019	16-Jun-87	A	DRY	1227415	753062	5997	MHH 672	MHH 672	FD	0	0.08	3	63	J	13	J	128		430		2720		7.12	"MISSOULA MINES, Map			N	Y	N	Y	
676	BUTSO87A	WD-020	17-Jun-87	A	DRY	1226259	753837	6093	MHH 712	MHH 712	FD	0	0.08	3	121		23	J	290		1860		6120		5.48	"EVALINE DUMP, Map:Q			N	Y	N	Y	
677	BUTSO87A	WD-021	17-Jun-87	A	DRY	1226253	753774	6087	MHH 709	MHH 709	FD	0	0.08	3	68		21	J	287		3690		6090		3.59	"EVALINE DUMP, Map:Q			N	Y	N	Y	
678	BUTSO87A	WD-022	07-Jul-87	A	DRY	1227817	753194	6027	MHJ 845	MHJ 845	FD	0	0.08	3	474		33		518		1150		3100		5.96	"MISSOULA NW PROJECT			Y	Y	R	Y	Y
679	BUTSO87A	WD-023	17-Jun-87	A	DRY	1226623	754205	6088	MHH 707	MHH 707	FD	0	0.08	3	75		18	J	159		2290		4320		6.33	"VENUS CLAIM, Map:Q-			N	Y	N	Y	
680	BUTSO87A	WD-024	17-Jun-87	A	DRY	1226806	754983	6206	MHH 711	MHH 711	FD	0	0.08	3	145		15	J	222		5090		3060		3.19	"RISING STAR, Map:Q-			N	Y	N	Y	
681	BUTSO87A	WD-025	17-Jun-87	A	DRY	1228262	754777	6169	MHH 713	MHH 713	FD	0	0.08	3	60		31	J	315		5690		6560		3.48	"PAYMASTER, Map:Q-19			N	Y	N	Y	
683	BUTSO87A	WD-027	17-Jun-87	A	DRY	1227303	755598	6214	MHH 706	MHH 706	FD	0	0.08	3	64		18	J	215		2380		6540		4.81	"AMY, Map:Q-19"			N	Y	N	Y	
684	BUTSO87A	WD-028	18-Jun-87	A	DRY	1228037	755582	6348	MHH 729	MHH 729	FD	0	0.08	3	8	J	4		53		46		165		6.62	"ALICE DUMP, Map:Q-1			N	Y	N	N	
685	BUTSO87A	WD-028	18-Jun-87	A	DRY	1228037	755582	6348	MHH 728	MHH 728	DU	0	0.08	3	13	J	5		63		55		201		6.82	"ALICE DUMP, Map:Q-1			N	Y	N	Y	
686	BUTSO87A	WD-029	18-Jun-87	A	DRY	1228436	756594	6293	MHH 730	MHH 730	FD	0	0.08	3	25	J	5		103		33		152		6.48	"MINNIE IRVINE, Map:			Y	Y	N	Y	
689	BUTSO87A	WD-032	18-Jun-87	A	DRY	1228746	747411	5643	MHH 737	MHH 737	FD	0	0.08	3	39		7		996		454		994		6.73	"EMMA, Map:I-19"			N	Y	N	Y	
690	BUTSO87A	WD-033	19-Jun-87	A	DRY	1228742	747344	5637	MHH 754	MHH 754	FD	0	0.08	3	29		6		1190		204		591		7.62	"EMMA, Map:I-19"			N	Y	N	Y	
694	BUTSO87A	WD-037	19-Jun-87	A	DRY	1225292	749273	5756	MHH 755	MHH 755	FD	0	0.08	3	42		16		132		1700		4950		6.93	"HENRY & QUARTZ ST.,			N	Y	N	Y	
695	BUTSO87A	WD-038	19-Jun-87	A	DRY	1226694	749539	5745	MHH 769	MHH 769	FD	0	0.08	3	69		14		413		1780		3190	J	5.41	"ROBERT EMMETT, Map:			Y	Y	N	Y	
696	BUTSO87A	WD-039	22-Jun-87	A	DRY	1228070	750060	5869	MHH 795	MHH 795	FD	0	0.08	3	37	J	7		607		104		713		5.52	"NATIONAL, Map:I-19"			N	Y	N	Y	
697	BUTSO87A	WD-040	22-Jun-87	A	DRY	1228102	749985	5858	MHH 796	MHH 796	FD	0	0.08	3	28	J	4		322		48		230		8.48	"NATIONAL, Map:I-19"			N	Y	N	Y	
698	BUTSO87A	WD-041	19-Jun-87	A	DRY	1228299	749990	5826	MHH 775	MHH 775	FD	0	0.08	3	27		4		190		529		678	J		"GAGNON, Map:I-19"			N	Y	N	Y	
699	BUTSO87A	WD-042	22-Jun-87	A	DRY	1228373	749977	5818	MHH 793	MHH 793	FD	0	0.08	3	17		4		60		54		328		8.12	"GAGNON, Map:I-19"			N	Y	N	Y	
700	BUTSO87A	WD-043	19-Jun-87	A	DRY	1228747	749975	5813	MHH 760	MHH 760	FD	0	0.08	3	145		12		2530		512		2950	J		"ORIGINAL, Map:I-19"			N	Y	N	Y	
701	BUTSO87A	WD-044	22-Jun-87	A	DRY	1228750	749899	5801	MHH 776	MHH 776	FD	0	0.08	3	18		5		87		73		228		7.68	"ORIGINAL, Map:I-19"			N	Y	N	Y	

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
702	BUTSO87A	WD-045	10-Jun-87	A	DRY	1227444	750150	5827	MHH 606	MHH 606	FD	0	0.08	3	36		9		337		207		1020		7.26	"WEST GAGNON, Map:I-			N	Y	N	Y	
703	BUTSO87A	WD-046	10-Jun-87	A	DRY	1227471	750148	5824	MHH 607	MHH 607	FD	0	0.08	3	19		4		245		50		151		7.63	"WEST GAGNON, Map:I-			N	Y	N	Y	
704	BUTSO87A	WD-047	11-Jun-87	A	DRY	1228872	750887	5898	MHH 621	MHH 621	FD	0	0.08	3	128		21		876		2540		5590		3.79	"LATE AQUISITION, Ma			N	Y	N	Y	
705	BUTSO87A	WD-048	11-Jun-87	A	DRY	1226926	751016	5859	MHH 624	MHH 624	FD	0	0.08	3	50		5		498		19	J	126	R	6.79	"NEW ERA, Map:I-19"			N	Y	N	Y	
706	BUTSO87A	WD-049	11-Jun-87	A	DRY	1227890	750952	5906	MHH 616	MHH 616	FD	0	0.08	3	128		15		560		1460		3560		6.49	"DOWNEY-1(NEW ERA),			N	Y	N	Y	
707	BUTSO87A	WD-050	11-Jun-87	A	DRY	1227874	750863	5895	MHH 620	MHH 620	FD	0	0.08	3	32		21		130		1160		4950		8.51	"DOWNEY-1(NEW ERA),			N	Y	N	Y	
708	BUTSO87A	WD-051	12-Jun-87	A	DRY	1226335	750027	5794	MHH 632	MHH 632	FD	0	0.08	3	91	U	5		277		37	J	220	R	7.32	"ANSELMO-RECLAIMED,			N	Y	N	Y	
709	BUTSO87A	WD-052	17-Jun-87	A	DRY	1226155	750394	5832	MHH 702	MHH 702	FD	0	0.08	3	1400		32		1580		6730		4400		3.6	"ANSELMO-UNRECLAIMED			Y	Y	N	Y	
710	BUTSO87A	WD-053	12-Jun-87	A	DRY	1226970	752056	5919	MHH 639	MHH 639	FD	0	0.08	3	243		14		776		1620	J	4080	R	4.2	"WASTE N. OF SYN. PI			N	Y	N	Y	
711	BUTSO87A	WD-054	12-Jun-87	A	DRY	1228607	752121	6047	MHH 644	MHH 644	FD	0	0.08	3	32		5		280		156	J	257	R	7.15	"TOM GRAY AND WEST,			N	Y	N	Y	
712	BUTSO87A	WD-055	12-Jun-87	A	DRY	1228604	752078	6038	MHH 631	MHH 631	FD	0	0.08	3	42		5		249		68	J	203	R	7.22	"TOM GRAY, Map:I-19"			N	Y	N	Y	
713	BUTSO87A	WD-056	15-Jun-87	A	DRY	1224956	744178	5500	MHH 651	MHH 651	FD	0	0.08	3	474		25		2320		2180		7320		7.03	"N. OF BREWER CLAIM,			N	Y	N	Y	
714	BUTSO87A	WD-057	15-Jun-87	A	DRY	1225035	745571	5553	MHH 646	MHH 646	FD	0	0.08	3	170		4		349		184		377		6.73	"BONANZA, Map:A-19"			N	Y	N	Y	
715	BUTSO87A	WD-058	15-Jun-87	A	DRY	1226419	745634	5597	MHH 655	MHH 655	FD	0	0.08	3	294	U	6		129		500		1020		6.47	"TRAVONA, Map:A-19"			N	Y	N	Y	
716	BUTSO87A	WD-059	15-Jun-87	A	DRY	1226594	745531	5582	MHH 657	MHH 657	FD	0	0.08	3	175		7		567		547		1020		5.81	"TRAVONA, Map:A-19"			N	Y	N	Y	
717	BUTSO87A	WD-060	16-Jun-87	A	DRY	1225917	745832	5595	MHH 679	MHH 679	FD	0	0.08	3	800	J	8	J	313		420		1090		5.53	"TRAVONA, Map:A-19"			N	Y	N	Y	
718	BUTSO87A	WD-061	16-Jun-87	A	DRY	1228623	744897	5539	MHH 675	MHH 675	FD	0	0.08	3	244	J	27	J	606		3380		9540		6.03	"OPHIR, Map:A-19"			N	Y	N	Y	
719	BUTSO87A	WD-062	16-Jun-87	A	DRY	1229041	752652	6092	MHH 691	MHH 691	FD	0	0.08	3	89		29		417		7800		7260		4.27	"OLD GLORY INCLINE,			N	Y	N	Y	
720	BUTSO87A	WD-063	16-Jun-87	A	DRY	1229369	754008	6221	MHH 681	MHH 681	FD	0	0.08	3	139	J	16	J	910		2460		4340		4.5	"LEXINGTON DUMP, Map			Y	Y	R	Y	Y
721	BUTSO87A	WD-064	16-Jun-87	A	DRY	1229271	753750	6193	MHH 685	MHH 685	FD	0	0.08	3	246	U	28		534		2070		7600		4.33	"LEXINGTON DUMP, Map			N	Y	N	Y	
722	BUTSO87A	WD-065	16-Jun-87	A	DRY	1229408	754170	6213	MHH 686	MHH 686	FD	0	0.08	3	144		35		1060		6530		9240		4.22	"LEXINGTON DUMP, Map			Y	Y	N	Y	
723	BUTSO87A	WD-066	17-Jun-87	A	DRY	1230367	755532	6282	MHH 705	MHH 705	FD	0	0.08	3	58		19	J	184		1320		5500		5.32	"MAGNA CARTA, Map:Q-			N	Y	N	Y	
724	BUTSO87A	WD-066	17-Jun-87	A	DRY	1230367	755532	6282	MHH 703	MHH 703	DU	0	0.08	3	49		17	J	146		1050		4640		5.48	"MAGNA CARTA, Map:Q-			N	Y	N	N	
725	BUTSO87A	WD-067	18-Jun-87	A	DRY	1231427	753595	6269	MHH 738	MHH 738	FD	0	0.08	3	367		22		1720		3690		5090		2.72	"SILVER QUEEN, Map:Q			Y	Y	N	Y	
726	BUTSO87A	WD-068	29-Jun-87	A	DRY	1231084	753200	6238	MHH 314	MHH 314	FD	0	0.08	3	63		11		517		1360		2650		3.18	"WEST GRAY ROCK, Map			N	Y	N	Y	
727	BUTSO87A	WD-069	18-Jun-87	A	DRY	1231787	753408	6236	MHH 731	MHH 731	FD	0	0.08	3	505	J	12		2290		1960		2260		2.51	"PENROSE, Map:Q-27"			Y	Y	N	Y	
728	BUTSO87A	WD-070	18-Jun-87	A	DRY	1231738	753071	6239	MHH 726	MHH 726	FD	0	0.08	3	205	J	7		954		902		796		2.43	"EAST GRAY ROCK, Map	ACTIVE MINING AREA (		Y	Y	N	Y	
729	BUTSO87A	WD-071	17-Jun-87	A	DRY	1231330	753923	6311	MHH 701	MHH 701	FD	0	0.08	3	124		23		1050		5510		4930		2.82	"ROCK ISLAND, Map:Q-			Y	Y	N	Y	
730	BUTSO87A	WD-072	17-Jun-87	A	DRY	1231645	753791	6271	MHH 704	MHH 704	FD	0	0.08	3	190		21	J	679		5970		4280		2.88	"CORRA, Map:Q-27"			Y	Y	N	Y	
731	BUTSO87A	WD-073	17-Jun-87	A	DRY	1231101	754441	6315	MHH 700	MHH 700	FD	0	0.08	3	72		76		1520		8930		18200		2.79	"CORRA-2, Map:Q-27"	IN RECLAIMED AREA EA		N	Y	N	Y	
732	BUTSO87A	WD-074	18-Jun-87	A	DRY	1231421	753542	6261	MHH 740	MHH 740	FD	0	0.08	3	397		16		1440		2630		3610		2.07	"SILVER QUEEN, Map:Q			Y	Y	N	Y	
733	BUTSO87A	WD-075	10-Jun-87	A	DRY	1231329	755148	6373	MHH 610	MHH 610	FD	0	0.08	3	128		42		314		2210		10000		5.35	"MOOSE, Map:Q-27"			Y	Y	N	Y	
734	BUTSO87A	WD-076	10-Jun-87	A	DRY	1231374	755215	6377	MHH 611	MHH 611	FD	0	0.08	3	108		36		360		3200		7220		5.85	"MOOSE, Map:Q-27"			Y	Y	N	Y	
736	BUTSO87A	WD-078	11-Jun-87	A	DRY	1232811	746036	5529	MHH 625	MHH 625	FD	0	0.08	3	814		22		1120		2980	J	5070	R	2.57	"HEANEY, Map:I-27"			N	Y	N	Y	
737	BUTSO87A	WD-079	13-Jul-87	A	DRY	1232468	745976	5541	MHJ 933	MHJ 933	FD	0	0.08	3	133		60		757		2040		4460		5.38	"ALLIANCE, Map:I-27"			N	Y	N	Y	
738	BUTSO87A	WD-080	12-Jun-87	A	DRY	1232228	745953	5542	MHH 635	MHH 635	FD	0	0.08	3	381		16		1220		1630	J	2490	R	2.82	"GREEN COPPER DISK,			N	Y	N	Y	
739	BUTSO87A	WD-081	12-Jun-87	A	DRY	1231965	745941	5545	MHH 633	MHH 633	FD	0	0.08	3	276		100		5680		695	J	2890	R	4.87	"CHIDE HAROLD, Map:I			N	Y	N	Y	
742	BUTSO87A	WD-083	18-Jun-87	A	DRY	1230444	748330	5679	MHH 727	MHH 727	FD	0	0.08	3	2430	J	30		3580		818		9390			"COLORADO, Map:I-27"			Y	Y	N	Y	
743	BUTSO87A	WD-084	18-Jun-87	A	DRY	1230470	748175	5673	MHH 725	MHH 725	FD	0	0.08	3	445	J	23		6210		1280		8860			"COLORADO, Map:I-27"			Y	Y	N	Y	
744	BUTSO87A	WD-085	19-Jun-87	A	DRY	1229418	751086	5915	MHH 771	MHH 771	FD	0	0.08	3	62		10		629		1170		2480	J		"CLEAR GRIT, Map:I-2			N	Y	N	Y	
745	BUTSO87A	WD-086	19-Jun-87	A	DRY	1229421	751150	5921	MHH 764	MHH 764	FD	0	0.08	3	3		3		277		24		117	J		"CLEAR GRIT, Map:I-2			N	Y	N	Y	
746	BUTSO87A	WD-087	22-Jun-87	A	DRY	1230156	749813	5810	MHH 777	MHH 777	FD	0	0.08	3	101		12		2640		271		1110		3.99	"PARROTT (WEST SIDE)	ACTIVE MINING AREA (		N	Y	N	Y	
747	BUTSO87A	WD-088	22-Jun-87	A	DRY	1231078	749714	5830	MHH 782	MHH 782	FD	0	0.08	3	342		10		1720		403		771		3.07	"PARROTT(EAST SIDE),	ACTIVE MINING AREA (		Y	Y	N	Y	
748	BUTSO87A	WD-089	23-Jun-87	A	DRY	1229483	750480	5860	MHH 238	MHH 238	FD	0	0.08	3	47		10		500		1150	J	1330	J	4.39	"STEWARD, Map:I-27"			Y	Y	N	Y	
749	BUTSO87A	WD-090	23-Jun-87	A	DRY	1229851	751506	5976	MHH 211	MHH 211	FD	0	0.08	3	383	J	18		606		5130		3620		3	"LITTLE MINA, Map:I-			N	Y	N	Y	
750	BUTSO87A	WD-091	29-Jun-87	A	DRY	1230711	751415	6034	MHH 317	MHH 317	FD	0	0.08	3	167		7		4210		530		2280		4.55	"COLORADO LEONARD, M	ACTIVE MINING AREA (		Y	Y	N	Y	
751	BUTSO87A	WD-092	23-Jun-87	A	DRY	1229656	752043	6044	MHH 224	MHH 224	FD	0	0.08	3	212		18		732		2560		5070		6.17	"MOUNTAIN CON-2, Map	ACTIVE MINING AREA (		N	Y	N	Y	
752	BUTSO87A	WD-093	29-Jun-87	A	DRY	1230209	752149	6097	MHH 327	MHH 327	FD	0	0.08	3	319		6		2940		587		1220		2.8	"MOUNTAIN CON-1, Map	ACTIVE MINING AREA (		Y	Y	N	Y	
753	BUTSO87A	WD-094	23-Jun-87	A	DRY	1231870	751595	6079	MHH 236	MHH 236	FD	0	0.08	3	212		8		812		705	J	796	J	2.54	"KELLEY, Map:I-27"	ACTIVE MINING AREA (		Y	Y	N	Y	
754	BUTSO87A	WD-095	22-Jun-87	A	DRY	1230962	750287	5873	MHH 778	MHH 778	FD	0	0.08	3	212		15		2490		643		2180		4.26	"ODEN, Map:I-27"	ACTIVE MINING AREA (		Y	Y	N	Y	
756	BUTSO87A	WD-097	01-Jul-87	A	DRY	1229937	754115	6250	MHH 398	MHH 398	FD	0	0.08	3	136		98		2140		19500		23700		5.42	"ATLANTIC, Map:Q-27"			N	Y	N	Y	
757	BUTSO87A	WD-098	29-Jun-87	A	DRY	1231004	752108	6100	MHH 313	MHH 313	FD	0	0.08	3	76		3		318		101		227		2.74	"EAST OF MT CON, Map	ACTIVE MINING AREA (		Y	Y	N	Y	
758	BUTSO87A	WD-099	14-Jul-87	A	DRY	1226223	754860	6177	MHJ 967	MHJ 967	FD	0	0.08	3	146	J	31		328		15200		10500		2.58	"NW OF WALKERVILLE,			N	Y	N	Y	
759	BUTSO87A	WD-100	23-Jul-87	A	DRY	1232619	746432	5533	MHR 060	MHR 060	FD	0	0.08	3	253	J	10		660		1290		2690		6.07	"TENSION, Map:I-27"			N	Y	N	Y	
760	BUTSO87A	WD-101	23-Jul-87	A	DRY	1232509	746361	5541	MHR 050	MHR 050	FD	0	0.08	3	250	J	13		670		3500		3410		3.51	"TENSION, Map:I-27"			N	Y	N	Y	
761	BUTSO87A	WD-102	04-Aug-87	A	DRY	1223112	741290	5502	MHR 225	MHR 225	FD	0	0.08	3	718		7		137		346		818		2.27	"WILLIAMSBURG, Map:"			Y	Y	N	Y	
762	BUTSO87A	WD-102	04-Aug-87	A	DRY	1223112	741290	5502	MHR 227	MHR 227	DU	0	0.08	3	1120		3		138		333		657		2.3	"WILLIAMSBURG, Map:"			Y	Y	N	N	
763	BUTSO93A	93AMY01-0	01-Jul-93	8-37951	DRY	1228191	755233	6240			FD	0	0.17	4	9		2		63		284		856		6.71	Alice Dump-SE side		U	N	Y	N	Y	
764	BUTSO93A	93AMY02-0	01-Jul-93	8-37952	DRY	1227607	755182	6199			FD	0	0.17	4	26		2		93		973		999		3.65	Alice Dump-SW side		U	N	Y	N	Y	
765	BUTSO93A	93AMY03-0	01-Jul-93	8-37953	DRY	1226503	750871	5923			FD	0	0.17	4	2230		7		6160		651		2420		4.28	Anselmo Mine Yard-NW		U	Y	Y	N	Y	
766	BUTSO93A	93AMY04-0	01-Jul-93	8-37954	DRY	1226815	750859	5937			FD	0	0.17	4	287		5		1300		622		2530		3.72	"Anselmo Mine Yard-N		U	Y	Y	N	Y	
767	BUTSO93A	93AMY05-0	01-Jul-93	8-37955	DRY	1226192	750146	5836			FD	0	0.17	4	104		10		510		551		3040		7.62	Anselmo Mine Yard-St		U	Y	Y	R	Y	Y
768	BUTSO93A	93AMY06-0	01-Jul-93	8-37958	DRY	1226361	750381	5864			FD	0	0.17	4	508		18		1030		1270		5500		5.98	Anselmo Mine Yard-Ma		U	Y	Y	N	Y	
769	BUTSO93A	93AMY07-0	01-Jul-93	8-37959	DRY	1226386	750745	5904			FD	0	0.17	4	384		10		1110		1900		4070		2.98	Anselmo Mine Yard-Mo		U	Y	Y	N	Y	
770	BUTSO93A	93AMY08-0	01-Jul-93	8-37960	DRY	1226195	742878	5467			FD	0	0.17	4	124		5		766		5070		6670		6	"Anselmo Mine Yard-L		U	N	Y	N	Y	
771	BUTSO93A	93AMY08-0	01-Jul-93	8-37961	DRY	1226247	742835	5463			FD	0	0.17	4	132		5		946		3190		6260		5.53	"Anselmo Mine Yard-L		U	N	Y	N	N	
772	BUTSO93A	93AMY08-0	01-Jul-93	8-37962	DRY	1226247	742835	5463			FD	0	0.17	4	132		6		1020		3220		6440		5.54	"Anselmo Mine Yard-L		U	N	Y	N	N	
773	BUTSO93A	93AMY08-0	01-Jul-93	8-37963	DRY	1226381	742779	5457			DU	0	0.17	4	115		5		899		4810		6060		5.61	"Anselmo Mine Yard-L		U	N	Y	N	N	
774	BUTSO93A	93AMY08-0	01-Jul-93	8-37964	DRY	1226482	742704	5454			FD	0	0.17	4	161		6		821		3100		5850		5.38	"Anselmo Mine Yard-L		U	N	Y	N	N	
775	BUTSO93A	PSERA9301	01-Jan-90	1990	DRY	1229916	756583	6386			FD	0	0.25	4	781		0		0		530		0		2.61	Waste Dump #25-NE Wa	"SAME COORDINATES AS	U	Y	Y	N	Y	
776	BUTSO93A	PSERA9301	01-Apr-93	PSERA9301	DRY	1229916	756583	6386			FD	0	0.25	4	127		3		164		394		81		4.17	Waste Dump #25-NE Wa	"SAME COORDINATES AS	U	Y	Y	N	N	
777	BUTSO93A	PSERA9302	01-Apr-93	PSERA9302	DRY	1230809	754510	6285			FD	0	0.17	4	27		38		414		10700		13		4.4	Waste Dump #5-E Walk		U	N	Y	N	Y	
778	BUTSO93A	PSERA9303	01-Apr-93	PSERA9303	DRY	1230262	754423	6266			FD	0	0.17	4	47		3		261		2020		1020		4.52	"Site #4, E Walkervi		U	Y	Y	N	Y	
779	BUTSO93A	PSERA9304	01-Apr-93	PSERA9304	DRY	1229737	755546	6330			FD	0	0.17	4	52		2		32		672		302		4.64	Clark Street Dump-Si		U	Y	Y	N	Y	
780	BUTSO93A	PSERA9307	01-Apr-93	PSERA9307	DRY	1227934	751558	5979			FD	0	0.25	4	190		5		825		555		1490		4.99	"Site #18, near Mosc		U	Y	Y	N	Y	

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
781	BUTSO93A	PSERA9308	01-Apr-93	PSERA9308	DRY	1229576	751821	6009			FD	0	0.17	4	144		2		386		6660		3290		4.58	Site #13-near Little		U	N	Y	N	Y	
782	BUTSO93A	PSERA9309	01-Apr-93	PSERA9309	DRY	1229828	751312	5955			FD	0	0.17	4	84		5		262		497		885		4.43	Site #13-near Little		U	N	Y	N	Y	
783	BUTSO93A	PSERA9310	01-Apr-93	PSERA9310	DRY	1229911	751157	5942			FD	0	0.17	4	43		2		326		280		635		5.34	Area SE of house-bel		U	Y	Y	N	Y	
784	BUTSO93A	PSERA9311	01-Apr-93	PSERA9311	DRY	1228356	750662	5873			FD	0	0.17	4	139		4		464		3630		1200		3.8	Site #20-S of Sutter		U	N	Y	N	Y	
785	BUTSO93A	PSERA9312	01-Apr-93	PSERA9312	DRY	1228314	749629	5774			FD	0	0.17	4	50		2		260		2020		700		3.45	Site #26-Old Colorad	COLORADO STAMP MILL	U	N	Y	N	Y	
786	BUTSO93A	PSERA9313	01-Apr-93	PSERA9313	DRY	1226633	754536	6139			FD	0	0.17	4	35		3		53		1060		980		5.75	Harrison & 6th-Walke		U	N	Y	N	Y	
787	BUTSO93A	PSERA9314	01-Apr-93	PSERA9314	DRY	1226318	754317	6121			FD	0	0.17	4	2		0		6		0		36		7.23	West Walkerville		U	Y	Y	N	Y	
788	BUTSO93A	PSERA9315	01-Apr-93	PSERA9315	DRY	1228009	754532	6198			FD	0	0.25	4	94		6		645		10600		9750		6.15	Jangula yard-Walkerv		U	Y	Y	R	Y	Y
789	BUTSO93A	PSERA9316	01-Apr-93	PSERA9316	DRY	1228067	754445	6198			FD	0	0.25	4	37		0		700		17100		3200		4.59	Jangula Alley-Walker		U	Y	Y	R	Y	Y
790	BUTSO93A	PSERA9317	01-Apr-93	PSERA9317	DRY	1231444	746193	5547			FD	0	0.17	4	200		13		2820		670		1820		6.99	818 S. Arizona		U	Y	Y	N	Y	
792	BUTSO89A	BF-003	23-Jun-87	BF-003	WET	1225811	753579	0			FD			2	36	J	7		268		647		1340			"RR GRADE MATERIALS		A	N	N	N	Y	
793	BUTSO89A	BF-004	23-Jun-87	BF-004	WET	1222754	747846	0			FD			2	2	J	13		1100		518		1230			B.A. & P. RR - NEAR		A	N	N	N	Y	
794	BUTSO89A	BF-006	23-Jun-87	BF-006	WET	1228242	751435	0			FD			2	283	J	18		1200		1330		3500			B.A. & P. RR - MONTA		A	N	N	N	Y	
795	BUTSO89A	BF-008	25-Jun-87	BF-008	WET	1225070	749671	0			FD			2	414		16		3170	J	909		4470	J		B.A. & P. RR - COPPE		A	N	N	N	Y	
796	BUTSO89A	DR-006	03-Aug-87	DR-006	WET	1228320	742358	0			FD			2	113	J	5		276		708		1910			NEAR MONTANA AVE - J		A	N	N	N	Y	
797	BUTSO89A	MS-049	24-Jul-87	MS-049	WET	1230135	743656	0			FD			2	146		25		2050		1080		4060			OLD BUTTE SAMPLING W		A	N	N	N	Y	
798	BUTSO89A	PA-057	24-Jul-87	PA-057	WET	1231367	743775	0			FD			2	86		11		779		7070		1380			NEAR BN RR - BY MONT		A	N	N	N	Y	
799	BUTSO90A	CO TAIL R	13-Jun-90	CTR-1		1222700	742135	0			FD			2	175	J	0		0		1336	J	0		4.03	SEE FIG. 1-30		R	N	N	N	N	
800	BUTSO90A	CO TAIL R	13-Jun-90	CTR-10		1222700	742135	0			FD			2	262	J	0		0		78	J	0		4.03	SEE FIG. 1-30		R	N	N	N	N	
801	BUTSO90A	CO TAIL R	13-Jun-90	CTR-11		1222700	742135	0			FD			2	474	J	0		0		104	J	0		4.03	SEE FIG. 1-30		R	N	N	N	N	
802	BUTSO90A	CO TAIL R	13-Jun-90	CTR-12		1222700	742135	0			FD			2	85	J	0		0		105	J	0		4.03	SEE FIG. 1-30		R	N	N	N	N	
803	BUTSO90A	CO TAIL R	13-Jun-90	CTR-13		1222700	742135	0			FD			2	244	J	0		0		1575	J	0		4.03	SEE FIG. 1-30		R	N	N	N	N	
804	BUTSO90A	CO TAIL R	13-Jun-90	CTR-14		1222700	742135	0			FD			2	351	J	0		0		1542	J	0		4.03	SEE FIG. 1-30		R	N	N	N	N	
805	BUTSO90A	CO TAIL R	13-Jun-90	CTR-15		1222700	742135	0			FD			2	455	J	0		0		72	J	0		4.03	SEE FIG. 1-30		R	N	N	N	N	
806	BUTSO90A	CO TAIL R	13-Jun-90	CTR-16		1222700	742135	0			FD			2	307	J	0		0		80	J	0		4.03	SEE FIG. 1-30		R	N	N	N	N	
807	BUTSO90A	CO TAIL R	13-Jun-90	CTR-17		1222700	742135	0			FD			2	17	J	0		0		2	UJ	0		4.03	SEE FIG. 1-30		R	N	N	N	N	
808	BUTSO90A	CO TAIL R	13-Jun-90	CTR-18		1222700	742135	0			FD			2	28	J	0		0		3	J	0		4.03	SEE FIG. 1-30		R	N	N	N	N	
809	BUTSO90A	CO TAIL R	13-Jun-90	CTR-19		1222700	742135	0			FD			2	339	J	0		0		146	J	0		4.03	SEE FIG. 1-30		R	N	N	N	N	
810	BUTSO90A	CO TAIL R	13-Jun-90	CTR-2		1222700	742135	0			FD			2	345	J	0		0		824	J	0		4.03	SEE FIG. 1-30		R	N	N	N	N	
811	BUTSO90A	CO TAIL R	13-Jun-90	CTR-3		1222700	742135	0			FD			2	95	J	0		0		91	J	0		4.03	SEE FIG. 1-30		R	N	N	N	N	
812	BUTSO90A	CO TAIL R	13-Jun-90	CTR-4		1222700	742135	0			FD			2	26	J	0		0		3	J	0		4.03	SEE FIG. 1-30		R	N	N	N	N	
813	BUTSO90A	CO TAIL R	13-Jun-90	CTR-5		1222700	742135	0			FD			2	220	J	0		0		2801	J	0		4.03	SEE FIG. 1-30		R	N	N	N	Y	
814	BUTSO90A	CO TAIL R	13-Jun-90	CTR-6		1222700	742135	0			FD			2	597	J	0		0		76	J	0		4.03	SEE FIG. 1-30		R	N	N	N	N	
815	BUTSO90A	CO TAIL R	13-Jun-90	CTR-7		1222700	742135	0			FD			2	537	J	0		0		144	J	0		4.03	SEE FIG. 1-30		R	N	N	N	N	
816	BUTSO90A	CO TAIL R	13-Jun-90	CTR-8		1222700	742135	0			FD			2	1370	J	0		0		194	J	0		4.03	SEE FIG. 1-30		R	N	N	N	N	
817	BUTSO90A	CO TAIL R	13-Jun-90	CTR-9		1222700	742135	0			FD			2	359	J	0		0		302	J	0		4.03	SEE FIG. 1-30		R	N	N	N	N	
818	BUTSO90B	TB-SO-01	06-Mar-90	TB-SO-01	DRY	1226416	754742	0			FD	0	0.17	2	57		7		142		2140		2300		4.2	RISING STAR - TOP TI	"SAME COORDINATES AS	B	Y	Y	N	Y	
819	BUTSO90B	TB-SO-02	06-Mar-90	TB-SO-02	DRY	1226416	754742	0			FD	0	0.17	2	100		11		193		3880		3780		3.5	RISING STAR - TOP TI	"SAME COORDINATES AS	B	Y	Y	N	Y	
820	BUTSO90B	TB-SO-03	06-Mar-90	TB-SO-03	DRY	1226416	754742	0			FD	0	0.17	2	138		9		174		5410		2890		3.1	RISING STAR - TOP TI	"SAME COORDINATES AS	B	Y	Y	N	Y	
821	BUTSO90B	TB-SO-04	06-Mar-90	TB-SO-04	DRY	1226850	754727	0			FD	0	0.17	2	133		6		301		7150		1260		4.4	RISING STAR - BEHIND		B	Y	Y	N	Y	
822	BUTSO90B	TB-SO-05	06-Mar-90	TB-SO-05	DRY	1227495	754738	0			FD	0	0.17	2	73		4		137		1190		815		4.6	RISING STAR - EAST S		B	Y	Y	N	Y	
823	BUTSO90B	TB-SO-06	06-Mar-90	TB-SO-06	DRY	1227246	755457	0			FD	0	0.17	2	112		18		306		4650		5440		5.1	AMY		B	N	Y	N	Y	
824	BUTSO90B	TB-SO-07	06-Mar-90	TB-SO-07	DRY	1230141	755463	0			FD	0	0.17	2	78		5		44		989		2500		3	MAGNA CARTA - YELLOW	"SAME COORDINATES AS	B	Y	Y	R	Y	Y
825	BUTSO90B	TB-SO-08	06-Mar-90	TB-SO-08	DRY	1230141	755463	0			FD	0	0.17	2	25		6		126		303		4190		4.9	MAGNA CARTA - GRAY/B	"SAME COORDINATES AS	B	Y	Y	R	Y	Y
826	BUTSO90B	TB-SO-09	06-Mar-90	TB-SO-09	DRY	1230141	755463	0			FD	0	0.17	2	13		6		93		823		1070		5.5	MAGNA CARTA - VEGETA	"SAME COORDINATES AS	B	Y	Y	R	Y	Y
827	BUTSO90B	TB-SO-10	06-Mar-90	TB-SO-10	DRY	1230648	754155	0			FD	0	0.17	2	124		7		800		1070		1900		4.6	INACTIVE RAILBED AND		B	N	Y	N	Y	
828	BUTSO90B	TB-SO-11	06-Mar-90	TB-SO-11	DRY	1230222	754294	0			FD	0	0.17	2	53		13		549		12700		2500		4.8	ATLANTIC 1		B	N	Y	N	Y	
829	BUTSO90B	TB-SO-12	06-Mar-90	TB-SO-12	DRY	1230186	753083	0			FD	0	0.17	2	66		37		350		4280		9770		3.8	SOUTHWEST OF LOWERYS		B	Y	Y	R	Y	Y
830	BUTSO90B	TB-SO-13	06-Mar-90	TB-SO-13	DRY	1229075	751314	0			FD	0	0.17	2	362		5		1310		601		1850		5.4	UPPER SET OF RAIL TR		B	Y	Y	N	Y	
831	BUTSO90B	TB-SO-14	06-Mar-90	TB-SO-14	DRY	1228953	750887	0			FD	0	0.17	2	233		1		1470		142		810		3.8	LOWER HILLSIDE	"SAME COORDINATES AS	B	Y	Y	N	Y	
832	BUTSO90B	TB-SO-15	06-Mar-90	TB-SO-15	DRY	1228953	750887	0			FD	0	0.17	2	353		5		1660		727		1960		4.4	LOWER SET OF RAIL TR	"SAME COORDINATES AS	B	Y	Y	N	Y	
833	BUTSO90B	TB-SO-16	06-Mar-90	TB-SO-16	DRY	1228738	750666	0			FD	0	0.17	2	522		4		1300		1860		1280		3.6	HILLSIDE BELOW LOWER		B	N	Y	N	Y	
834	BUTSO90B	TB-SO-17	06-Mar-90	TB-SO-17	DRY	1229429	750385	0			FD	0	0.17	2	176		3		2950		226		1150		4.2	BLACK DIRT ON WOOLMA		B	N	Y	N	Y	
835	BUTSO90B	TB-SO-18	06-Mar-90	TB-SO-18	DRY	1229061	751459	0			FD	0	0.17	2	86		11		215		2040		3550		5.8	UPPER DRAINAGE	"SAME COORDINATES AS	B	Y	Y	N	Y	
836	BUTSO90B	TB-SO-19	06-Mar-90	TB-SO-19	DRY	1229061	751459	0			FD	0	0.17	2	56		19		190		1710		6910		4.9	LOWER DRAINAGE	"SAME COORDINATES AS	B	Y	Y	N	Y	
837	BUTSO90B	TB-SO-20	06-Mar-90	TB-SO-20	DRY	1229061	751459	0			FD	0	0.17	2	348		10		2360		979		3710		4.4	SOUTHSIDE OF RAILBED	"SAME COORDINATES AS	B	Y	Y	N	Y	
838	BUTSO90B	TB-SO-21	06-Mar-90	TB-SO-21	DRY	1227696	750395	0			FD	0	0.17	2	511		11		775		989		2510		3.1	JASPER PILE	"SAME COORDINATES AS	B	Y	Y	N	Y	
839	BUTSO90B	TB-SO-22	06-Mar-90	TB-SO-22	DRY	1227696	750395	0			FD	0	0.17	2	374		10		1880		959		3890		3.8	RAILBED NEAR JASPER	"SAME COORDINATES AS	B	Y	Y	N	Y	
840	BUTSO90B	TB-SO-23	06-Mar-90	TB-SO-23	DRY	1226266	753579	0			FD	0	0.17	2	71		30		236		1650		8800		5.8	DUMP ON WALKERVILLE		B	N	Y	N	Y	
841	BUTSO90B	TB-SO-24	06-Mar-90	TB-SO-24	DRY	1226411	753384	0			FD	0	0.17	2	81		5		231		2140		1550		4.5	DRAINAGE KITTY CORNE		B	N	Y	N	Y	
842	BUTSO90B	TB-SO-25	06-Mar-90	TB-SO-25	DRY	1225946	753654	0			FD	0	0.17	2	132		4		342		522		1180		3.3	JENNE DELL		B	N	Y	N	Y	
843	BUTSO90B	TB-SO-26	06-Mar-90	TB-SO-26	DRY	1225070	749671	0			FD	0	0.17	2	600		9		2760		728		3600		4.1	RAILBED AT COPPER AN		B	Y	Y	N	Y	
844	BUTSO90B	TB-SO-27	06-Mar-90	TB-SO-27	DRY	1224235	748334	0			FD	0	0.17	2	144		1		377		203		443		6.4	RAILBED S END OF MON		B	Y	Y	N	Y	
845	BUTSO90B	TB-SO-28	06-Mar-90	TB-SO-28	DRY	1223884	748446	0			FD	0	0.17	2	586		7		2990		485		2240		3.6	RAILBED S END OF MON		B	Y	Y	N	Y	
846	BUTSO90B	TB-SO-29	06-Mar-90	TB-SO-29	DRY	1223581	748227	0			FD	0	0.17	2	739		10		2760		1190		3810		3.5	RAILBED S END OF MON		B	Y	Y	N	Y	
847	BUTSO90B	TB-SO-30	07-Mar-90	TB-SO-30	DRY	1228609	744735	0			FD	0	0.17	2	1150		26		5480		1140		8660		4.3	RAILBED MAIN AND FRE	RAILROAD SAMPLE	B	N	Y	N	Y	
848	BUTSO90B	TB-SO-31	07-Mar-90	TB-SO-31	DRY	1228984	744870	0			FD	0	0.17	2	1420		15		4130		1610		5470		3.8	RAILBED MAIN AND FRE		B	Y	Y	N	Y	
849	BUTSO90B	TB-SO-32	07-Mar-90	TB-SO-32	DRY	1229293	745050	0			FD	0	0.17	2	1960		15		6770		1270		5540		4	RAILBED MAIN AND FRE	RAILROAD SAMPLE	B	Y	Y	N	Y	
850	BUTSO90B	TB-SO-33	07-Mar-90	TB-SO-33	DRY	1229606	748447	0			FD	0	0.17	2	178		34		2560		896		9010		6.9	COLORADO FIELD		B	Y	Y	N	Y	
851	BUTSO90B	TB-SO-34	07-Mar-90	TB-SO-34	DRY	1229268	750882	0			FD	0	0.17	2	477		5		576		1300		1190		3.3	HILL ABOVE TB-SO-13	"SAME COORDINATES AS	B	N	Y	N	Y	
852	BUTSO90B	TB-SO-35	07-Mar-90	TB-SO-35	DRY	1229268	750882	0			FD	0	0.17	2	379		4		2400		365		1600		3.2	PILE TO EAST OF TB-S	"SAME COORDINATES AS	B	N	Y	N	Y	
853	BUTSO91A	BGM001-00	08-May-91	BGM001-MI	DRY	1221864	743803	5455		BGM001-MIX	FD	0	0.17	2	1580		12		5060		1010		10000			Railroad grade		B	Y	Y	N	Y	
854	BUTSO91A	BGM002-00	08-May-91	BGM002-MI	DRY	1223057	743887	5470		BGM002-MIX	FD	0	0.17	2	374		16		4360		620		3600			Railroad grade		B	Y	Y	N	Y	
855	BUTSO91A	BGM003-00	08-May-91	BGM003-MI	DRY	1224158	743727	5480		BGM003-MIX	FD	0	0.17	2	1350		30		34500		2220		7590			Railroad grade		B	Y	Y	N	Y	
856	BUTSO91A	BGM004-00	08-May-91	BGM004-MI	DRY	1225772	743926	5490		BGM004-MIX	FD	0	0.17	2	1150	J	22		4790		1430		10000			Railroad grade		B	Y	Y	N	Y	

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
857	BUTSO91A	BGM004-00	08-May-91	BGM004-MI	DRY	1225772	743926	5490		BGM004-006	DU	0	0.17	2	1360	J	24		4440		1430		9750			Railroad grade		B	Y	Y	N	Y	
858	BUTSO91A	BGM005-00	09-May-91	BGM005-MI	DRY	1226610	744131	0		BGM005-MIX	FD	0	0.17	2	2480	J	73		9600		1930		17200			Railroad grade		B	Y	Y	N	Y	
859	BUTSO91A	BGM006-00	09-May-91	BGM006-MI	DRY	1230111	745316	5530		BGM006-MIX	FD	0	0.17	2	440	J	6		3250		665		2260			Railroad grade		B	Y	Y	N	Y	
860	BUTSO91A	BGM2-023O	08-May-91	BGM002-02	DRY	1223030	743911	5470		BGM002-023OP	FD	0	0.17	2	358		2		2000		389		1680			Railroad grade		B	Y	Y	N	Y	
861	BUTSO91A	BGM3-023O	08-May-91	BGM003-02	DRY	1223932	743735	5490		BGM003-023OP	FD	0	0.17	2	1900		30		4680		1860		13100			Railroad grade		B	Y	Y	N	Y	
862	BUTSO91A	BGM3-045O	08-May-91	BGM003-04	DRY	1224610	743802	5480		BGM003-045OP	FD	0	0.17	2	5370		203		217000		9740		59700			Railroad grade		B	Y	Y	N	Y	
863	BUTSO91A	BGM4-023O	08-May-91	BGM004-02	DRY	1225637	743940	5490		BGM004-023OP	FD	0	0.17	2	403		1	U	2650	J	108		140			Railroad grade		B	Y	Y	N	Y	
864	BUTSO91A	BGM4-034O	08-May-91	BGM004-03	DRY	1225815	743970	5495		BGM004-034OP	FD	0	0.17	2	179		3		1710	J	542		1400			Railroad grade		B	Y	Y	N	Y	
865	BUTSO91A	BGM5-023O	09-May-91	BGM005-02	DRY	1226794	744253	5505		BGM005-023OP	FD	0	0.17	2	243	J	4		516		355		1280			Railroad grade		B	N	Y	N	Y	
866	BUTSO91A	BHP001-00	13-May-91	BHP001-MI	DRY	1224049	748078	5730		BHP001-MIX	FD	0	0.17	2	615		8		3330		472		2830			Railroad grade		B	Y	Y	N	Y	
867	BUTSO91A	BHP002-00	14-May-91	BHP002-MI	DRY	1224692	749512	5760		BHP002-MIX	FD	0	0.17	2	625	J	9		2520		766		1620			Railroad grade		B	Y	Y	N	Y	
868	BUTSO91A	BHP003-00	14-May-91	BHP003-MI	DRY	1226005	750246	5795		BHP003-MIX	FD	0	0.17	2	346	J	12		1820		1140		3620			Railroad grade		B	Y	Y	N	N	
869	BUTSO91A	BHP003-00	14-May-91	BHP003-MI	DRY	1226005	750246	5795		BHP003-006	DU	0	0.17	2	396	J	20		2310		3520		6090			Railroad grade		B	Y	Y	N	Y	
870	BUTSO91A	BHP004-00	14-May-91	BHP004-MI	DRY	1226938	750759	5830		BHP004-MIX	FD	0	0.17	2	175	J	6		830		682		2100			Railroad grade		B	Y	Y	N	Y	
871	BUTSO91A	BHP005-00	14-May-91	BHP005-MI	DRY	1228170	750527	5865		BHP005-MIX	FD	0	0.17	2	105	J	4		494		691		1150			Railroad grade		B	Y	Y	N	Y	
872	BUTSO91A	BHP006-00	14-May-91	BHP006-MI	DRY	1229544	750960	5890		BHP006-MIX	FD	0	0.17	2	355	J	9		3220		757		2890			Railroad grade		B	Y	Y	N	Y	
873	BUTSO91A	BHP6-023O	14-May-91	BHP006-02	DRY	1229426	750912	5890		BHP006-023OP	FD	0	0.17	2	10	J	2		315		168		522			Railroad grade		B	Y	Y	N	Y	
874	BUTSO91A	BHPSRM-1-	14-May-91	BHP-SRM-1	DRY	1228927	750936	0		BHP-SRM-1-01	FD	0	0.17	2	174	J	10		392		7980		3690			Railroad grade		B	N	Y	N	Y	
875	BUTSO91A	BHPSRM-2-	14-May-91	BHP-SRM-1	DRY	1228925	750865	0		BHP-SRM-1-01	FD	0	0.17	2	54		14		325		859		7110			Railroad grade		B	Y	Y	N	Y	
876	BUTSO91A	BN001-003	06-May-91	BN001-MIX	DRY	1226360	740641	5450		BN001-MIX	FD	0	0.17	2	54		1	U	287	J	71		198			Railroad grade		B	Y	Y	N	Y	
877	BUTSO91A	BN001-003	06-May-91	BN001-MIX	DRY	1226360	740641	5450		BN001-006	DU	0	0.17	2	51		1	U	356	J	67		177			Railroad grade		B	Y	Y	N	N	
878	BUTSO91A	BN002-003	07-May-91	BN002-MIX	DRY	1227783	740213	5460		BN002-MIX	FD	0	0.17	2	185		6		430	J	285		1990			Railroad grade		B	Y	Y	R	Y	Y
879	BUTSO91A	BN003-003	07-May-91	BN003-MIX	DRY	1228897	738892	5470		BN003-MIX	FD	0	0.17	2	54		3		319	J	186		722			Railroad grade		B	Y	Y	R	Y	Y
882	BUTSO91A	BN1-034OP	06-May-91	BN001-034	DRY	1226548	740587	5450		BN001-034OP	FD	0	0.17	2	366		9	U	1080	J	115		199			Railroad grade		B	Y	Y	N	Y	
883	BUTSO91A	BN3-045OP	07-May-91	BN003-045	DRY	1229168	738435	5465		BN003-045OP	FD	0	0.17	2	502		1	U	2680	J	21		243			Railroad grade		B	Y	Y	R	Y	Y
885	BUTSO91A	CON001-00	15-May-91	CON001-MI	DRY	1227680	751721	5965		CON001-MIX	FD	0	0.17	2	261	J	14		1130		851		4480			Railroad grade		B	Y	Y	N	Y	
886	BUTSO91A	CON002-00	15-May-91	CON002-MI	DRY	1228801	751890	5990		CON002-MIX	FD	0	0.17	2	297	J	11		1900		1040		3620			Railroad grade		B	Y	Y	N	Y	
887	BUTSO91A	CON003-00	15-May-91	CON003-MI	DRY	1228062	751457	5955		CON003-MIX	FD	0	0.17	2	92		4		579	J	294		1370	J		Railroad grade		B	Y	Y	N	Y	
888	BUTSO91A	CON004-00	15-May-91	CON004-MI	DRY	1229603	751194	5915		CON004-MIX	FD	0	0.17	2	90		6		588	J	504		2680	J		Railroad grade		B	Y	Y	N	Y	
889	BUTSO91A	CON3-023O	15-May-91	CON003-02	DRY	1228181	751428	5950		CON003-023OP	FD	0	0.17	2	105	J	5		643		1360		1100			Railroad grade		B	N	Y	N	Y	
890	BUTSO91A	MTW001-00	09-May-91	MTW001-MI	DRY	1231173	745805	5540		MTW001-MIX	FD	0	0.17	2	1130	J	30		23700		1840		5770			Railroad grade		B	Y	Y	N	Y	
891	BUTSO91A	MTW002-00	09-May-91	MTW002-MI	DRY	1232524	746558	5530		MTW002-MIX	FD	0	0.17	2	467		26		3240		735		5490			Railroad grade		B	Y	Y	N	Y	
892	BUTSO91A	MTW003-00	09-May-91	MTW003-MI	DRY	1233049	746470	5520		MTW003-MIX	FD	0	0.17	2	394		287		17000		3880		62800			Railroad grade		B	Y	Y	N	Y	
893	BUTSO91A	MTW004-00	10-May-91	MTW004-MI	DRY	1233249	747022	5540		MTW004-MIX	FD	0	0.17	2	487		20		3070		914		1780			Railroad grade		B	Y	Y	N	Y	
894	BUTSO91A	MTW005-00	10-May-91	MTW005-MI	DRY	1231341	746659	5565		MTW005-MIX	FD	0	0.17	2	182		15		1210		1430		4460			Railroad grade		B	Y	Y	N	Y	
895	BUTSO91A	MTW006-00	10-May-91	MTW006-MI	DRY	1232862	747601	5580		MTW006-MIX	FD	0	0.17	2	161		7		1170		554		2180			Railroad grade		B	Y	Y	N	Y	
896	BUTSO91A	MTW007-00	13-May-91	MTW007-MI	DRY	1231747	747302	5580		MTW007-MIX	FD	0	0.17	2	285		17		3130		1250		3560			Railroad grade		B	Y	Y	N	Y	
897	BUTSO91A	MTW008-00	13-May-91	MTW008-MI	DRY	1230905	746997	5585		MTW008-MIX	FD	0	0.17	2	116		9		988		916		2390			Railroad grade		B	Y	Y	N	Y	
898	BUTSO91A	MTW009-00	13-May-91	MTW009-MI	DRY	1232331	747625	5580		MTW009-MIX	FD	0	0.17	2	277		11		2970		910		3230			Railroad grade		B	Y	Y	N	Y	
899	BUTSO91A	MTW010-1O	16-May-91	MTW010-00	DRY	1225887	740036	5460		MTW010-001OP	FD	0	0.17	2	428		5		297	J	1090		1840	J		Railroad grade		B	Y	Y	N	Y	
900	BUTSO91A	MTW010-2O	16-May-91	MTW010-00	DRY	1226036	738411	5495		MTW010-002OP	FD	0	0.17	2	71		2		132	J	144		656	J		Railroad grade		B	Y	Y	N	Y	
901	BUTSO91A	MTW010-3O	16-May-91	MTW010-00	DRY	1226631	737554	5510		MTW010-003OP	FD	0	0.17	2	98		3		89	J	256		1010	J		Railroad grade		B	Y	Y	N	Y	
902	BUTSO91A	MTW010-4O	16-May-91	MTW010-00	DRY	1226898	737152	5505		MTW010-004OP	FD	0	0.17	2	250		9		1710	J	551		2660	J		Railroad grade		B	Y	Y	N	Y	
903	BUTSO91A	MTW010-5O	16-May-91	MTW010-00	DRY	1227070	736667	5500		MTW010-005OP	FD	0	0.17	2	154		5		359	J	318		1660	J		Railroad grade		B	Y	Y	N	Y	
904	BUTSO91A	MTW010-6O	16-May-91	MTW010-00	DRY	1227616	736311	5500		MTW010-006OP	FD	0	0.17	2	188		4		314	J	304		1030	J		Railroad grade		B	Y	Y	N	Y	
905	BUTSO91A	MTW010-7O	16-May-91	MTW010-00	DRY	1228393	736791	5490		MTW010-007OP	FD	0	0.17	2	25		1		55	J	48		136	J		Railroad grade	OUTSIDE OPERABLE UNI	B	N	N	N	Y	
908	BUTSO91A	MTW1-045O	09-May-91	MTW001-04	DRY	1231509	745848	5530		MTW001-045OP	FD	0	0.17	2	73	J	4		427		387		925			Railroad grade		B	Y	Y	N	Y	
910	BUTSO91A	MTW2-034O	09-May-91	MTW002-03	DRY	1232569	746605	5530		MTW002-034OP	FD	0	0.17	2	2070	J	56100		92600		3300		13800			Railroad grade		B	Y	Y	N	Y	
911	BUTSO91A	MTW5-023O	10-May-91	MTW005-02	DRY	1231222	746467	5560		MTW005-023OP	FD	0	0.17	2	200		2		460		2870		1540			Railroad grade		B	Y	Y	N	Y	
912	BUTSO91A	MTW6-045O	10-May-91	MTW006-04	DRY	1233095	747610	5570		MTW006-045OP	FD	0	0.17	2	24		1		1220		88		534			Railroad grade		B	Y	Y	N	Y	
913	BUTSO91A	MTW9-023O	13-May-91	MTW009-02	DRY	1232185	747697	5590		MTW009-023OP	FD	0	0.17	2	180		9		771		1600		4020			Railroad grade		B	N	Y	N	Y	
914	CFUSO83A	ALICE	10-Jun-82	ALICE		1227877	755042	0			FD	0	1	2	88		2		0		482		0		3.3			R	N	N	N	Y	
915	CFUSO83A	ALICE	10-Jun-82	ALICE		1227877	755042	0			FD	0	1	2	0		0		3		0		33		3.3			R	N	N	N	N	
916	CFUSO83A	EMMA	10-Jun-82	EMMA		1228454	747608	0			FD	0	1	2	222		6		0		560		0		2.5			R	N	N	N	Y	
917	CFUSO83A	EMMA	10-Jun-82	EMMA		1228454	747608	0			FD	0	1	2	1		1		177		0		235		2.5			R	N	N	N	N	
918	CFUSO83A	TRAVONA	10-Jun-82	TRAVONA		1226496	745735	0			FD	0	1	2	78		3		0		80		0		7.3			R	N	N	N	Y	
919	CFUSO83A	TRAVONA	10-Jun-82	TRAVONA		1226496	745735	0			FD	0	1	2	0	U	0	U	0	U	0		0	U	7.3			R	N	N	N	N	
920	CFUSO88A	RVM-106	01-Jan-90	90S-106	DRY	1228631	755597	0			FD	0	0.5	2	1		0		5		4		4		7.4	UPPER WALKERVILLE RE		B	N	N	N	Y	
921	CFUSO88A	RVM-108	01-Jan-90	90S-108/1	DRY	1229064	755334	0			FD	0	0.5	2	0		0		7		4		3		7.5	UPPER WALKERVILLE RE		B	N	N	N	Y	
922	CFUSO88A	RVM-109	01-Jan-90	90S-109	DRY	1229281	755336	0			FD	0	0.5	2	1		0		5		3		2		7.7	UPPER WALKERVILLE RE		B	N	N	N	Y	
923	CFUSO88A	RVM-110	01-Jan-89	89S-028	DRY	1229260	754992	0			FD	0	0.5	2	10		0		4		6		20		6.6	UPPER WALKERVILLE RE		B	N	N	N	Y	
924	CFUSO88A	RVM-110	01-Jan-90	90S-110	DRY	1229260	754992	0			FD	0	0.5	2	1		0		2		2		10		6.6	UPPER WALKERVILLE RE		B	N	N	N	N	
925	CFUSO88A	RVM-111	01-Jan-90	90S-111	DRY	1229143	754916	0			FD	0	0.5	2	0		0		1		1		3		6.8	UPPER WALKERVILLE RE		B	N	N	N	Y	
926	CFUSO88A	RVM-112	01-Jan-90	90S-112	DRY	1229032	755040	0			FD	0	0.5	2	1		0		5		3		3		6.4	UPPER WALKERVILLE RE		B	N	N	N	Y	
927	CFUSO88A	RVM-113	01-Jan-90	90S-113	DRY	1228784	754971	0			FD	0	0.5	2	1		0		7		7		20		7.7	UPPER WALKERVILLE RE		B	N	N	N	Y	
928	CFUSO88A	RVM-114	01-Jan-89	89S-029	DRY	1228475	754971	0			FD	0	0.5	2	13		0		6		4		8		7.7	UPPER WALKERVILLE RE		B	N	N	N	Y	
929	CFUSO88A	RVM-114	01-Jan-90	90S-114	DRY	1228475	754971	0			FD	0	0.5	2	1		0		7		3		4		7.7	UPPER WALKERVILLE RE		B	N	N	N	N	
930	CFUSO88A	RVM-115	01-Jan-90	90S-115	DRY	1228140	754915	0			FD	0	0.5	2	1		0		1		0		2		7.6	UPPER WALKERVILLE RE		B	N	N	N	Y	
931	CFUSO88A	RVM-116	01-Jan-90	90S-116	DRY	1228904	753782	0			FD	0	0.5	2	1		0		6		1		2		7.6	LOWER WALKERVILLE RE		B	N	N	N	Y	
932	CFUSO88A	RVM-117	01-Jan-89	89S-030	DRY	1228907	753401	0			FD	0	0.5	2	14		0		11		4		9		7.5	LOWER WALKERVILLE RE		B	N	N	N	Y	
933	CFUSO88A	RVM-117	01-Jan-90	90S-117/1	DRY	1228907	753401	0			FD	0	0.5	2	1		0		10		3		7		7.5	LOWER WALKERVILLE RE		B	N	N	N	N	
934	CFUSO88A	RVM-118	01-Jan-90	90S-118	DRY	1228349	753656	0			FD	0	0.5	2	0		0		9		4		5		7	LOWER WALKERVILLE RE		B	N	N	N	Y	
935	CFUSO88A	RVM-119	01-Jan-90	90S-119	DRY	1228349	753352	0			FD	0	0.5	2	1		0		7		3		5		7.7	LOWER WALKERVILLE RE		B	N	N	N	Y	
936	CFUSO88A	RVM-120	01-Jan-90	90S-120	DRY	1228618	753387	0			FD	0	0.5	2	1		0		7		2		4		7.5	LOWER WALKERVILLE RE		B	N	N	N	Y	
937	CFUSO88A	RVM-121	01-Jan-90	90S-121	DRY	1228073	752093	0			FD	0	0.5	2	0		0		8		9		14		7	BUFFALO SITE RECLAIM		B	N	N	N	Y	

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
938	CFUSO88A	RVM-122	01-Jan-89	89S-031	DRY	1228135	751838	0			FD	0	0.5	2	60		1		25		64		128		7.5	BUFFALO SITE RECLAIM		B	N	N	N	Y	
939	CFUSO88A	RVM-122	01-Jan-90	90S-122	DRY	1228135	751838	0			FD	0	0.5	2	1		0		14		10		13		7.6	BUFFALO SITE RECLAIM		B	N	N	N	N	
940	CFUSO88A	RVM-123	01-Jan-90	90S-123	DRY	1228356	751859	0			FD	0	0.5	2	4		1		28		95		216		7.7	BUFFALO SITE RECLAIM		B	N	N	N	Y	
941	CFUSO88A	RVM-124	01-Jan-90	90S-124/1	DRY	1228604	752093	0			FD	0	0.5	2	2		0		14		10		12		7.8	BUFFALO SITE RECLAIM		B	N	N	N	Y	
942	CFUSO88A	RVM-125	01-Jan-89	89S-032/0	DRY	1228804	752258	0			FD	0	0.5	2	40		0		39		18		19		6.5	BUFFALO SITE RECLAIM		B	N	N	N	Y	
943	CFUSO88A	RVM-125	01-Jan-90	90S-125	DRY	1228804	752258	0			FD	0	0.5	2	1		0		6		4		7		7.2	BUFFALO SITE RECLAIM		B	N	N	N	N	
944	CFUSO88A	RVM-126	01-Jan-90	90S-126	DRY	1228846	751975	0			FD	0	0.5	2	1		0		10		1		7		6.1	BUFFALO SITE RECLAIM		B	N	N	N	Y	
945	CFUSO88A	RVM-127	01-Jan-90	90S-127	DRY	1229024	752106	0			FD	0	0.5	2	1		0		6		1		3		6.9	BUFFALO SITE RECLAIM		B	N	N	N	Y	
946	CFUSO88A	RVM-128	01-Jan-90	90S-128	DRY	1228741	751755	0			FD	0	0.5	2	1		0		22		7		41		7.3	BUFFALO SITE RECLAIM		B	N	N	N	Y	
947	CFUSO88A	RVM-129	01-Jan-90	90S-129	DRY	1228858	751707	0			FD	0	0.5	2	1		0		11		2		3		7.4	BUFFALO SITE RECLAIM		B	N	N	N	Y	
948	CFUSO88A	RVM-130	01-Jan-89	89S-033	DRY	1228968	751838	0			FD	0	0.5	2	46		1		25		52		82		7.5	BUFFALO SITE RECLAIM		B	N	N	N	Y	
949	CFUSO88A	RVM-130	01-Jan-90	90S-130	DRY	1228968	751838	0			FD	0	0.5	2	0		0		10		3		3		7.8	BUFFALO SITE RECLAIM		B	N	N	N	N	
950	CFUSO88A	RVM-131	01-Jan-89	89S-034	DRY	1227515	751742	0			FD	0	0.5	2	10		0		10		5		4		7.5	UPPER ANSELMO RECLAI		B	N	N	N	N	
951	CFUSO88A	RVM-131	01-Jan-90	90S-131	DRY	1227515	751742	0			FD	0	0.5	2	1		0		11		7		2		7.8	UPPER ANSELMO RECLAI		B	N	N	N	Y	
952	CFUSO88A	RVM-132	01-Jan-90	90S-132	DRY	1227377	751707	0			FD	0	0.5	2	0		0		7		1		2		7.6	UPPER ANSELMO RECLAI		B	N	N	N	Y	
953	CFUSO88A	RVM-133	01-Jan-89	89S-035	DRY	1227350	751383	0			FD	0	0.5	2	13		0		10		2		5		7.7	UPPER ANSELMO RECLAI		B	N	N	N	Y	
954	CFUSO88A	RVM-133	01-Jan-90	90S-133/1	DRY	1227350	751383	0			FD	0	0.5	2	0		0		7		1		3		7.5	UPPER ANSELMO RECLAI		B	N	N	N	N	
955	CFUSO88A	RVM-134	01-Jan-90	90S-134	DRY	1227515	751383	0			FD	0	0.5	2	0		0		6		1		2		7.2	UPPER ANSELMO RECLAI		B	N	N	N	Y	
956	CFUSO88A	RVM-135	01-Jan-90	90S-135	DRY	1227715	751321	0			FD	0	0.5	2	0		0		20		1		1		7.6	UPPER ANSELMO RECLAI		B	N	N	N	Y	
957	CFUSO88A	RVM-136	01-Jan-90	90S-136	DRY	1227196	750653	0			FD	0	0.5	2	1		0		16		2		3		6.5	MIDDLE ANSELMO RECLA		B	N	N	N	Y	
958	CFUSO88A	RVM-137	01-Jan-90	90S-137	DRY	1227153	750804	0			FD	0	0.5	2	0		0		9		1		2		6.6	MIDDLE ANSELMO RECLA		B	N	N	N	Y	
959	CFUSO88A	RVM-138	01-Jan-89	89S-036/0	DRY	1227060	750873	0			FD	0	0.5	2	29		0		32		9		13		7.2	MIDDLE ANSELMO RECLA		B	N	N	N	Y	
960	CFUSO88A	RVM-138	01-Jan-90	90S-138/1	DRY	1227060	750873	0			FD	0	0.5	2	0		0		13		1		2		6.8	MIDDLE ANSELMO RECLA		B	N	N	N	N	
961	CFUSO88A	RVM-139	01-Jan-90	90S-139	DRY	1227101	750983	0			FD	0	0.5	2	0		0		18		1		3		7.1	MIDDLE ANSELMO RECLA		B	N	N	N	Y	
962	CFUSO88A	RVM-140	01-Jan-90	90S-140	DRY	1226829	751125	0			FD	0	0.5	2	0		0		21		1		2		7.1	MIDDLE ANSELMO RECLA		B	N	N	N	Y	
963	CFUSO88A	RVM-141	01-Jan-90	90S-141	DRY	1226812	750354	0			FD	0	0.5	2	0		0		9		2		6		7.6	LOWER ANSELMO RECLAI		B	N	N	N	Y	
964	CFUSO88A	RVM-142	01-Jan-89	89S-037	DRY	1226453	750261	0			FD	0	0.5	2	26		0		15		6		28		7.6	LOWER ANSELMO RECLAI		B	N	N	N	Y	
965	CFUSO88A	RVM-142	01-Jan-90	90S-142/1	DRY	1226453	750261	0			FD	0	0.5	2	0		0		11		1		5		7.4	LOWER ANSELMO RECLAI		B	N	N	N	N	
966	CFUSO88A	RVM-143	01-Jan-90	90S-143	DRY	1226332	749947	0			FD	0	0.5	2	0		0		10		2		4		7.4	LOWER ANSELMO RECLAI		B	N	N	N	Y	
967	CFUSO88A	RVM-144	01-Jan-90	90S-144	DRY	1226041	749943	0			FD	0	0.5	2	1		0		12		1		4		7.4	LOWER ANSELMO RECLAI		B	N	N	N	Y	
968	CFUSO88A	RVM-145	01-Jan-90	90S-145	DRY	1225831	749979	0			FD	0	0.5	2	1		0		19		3		16		7.2	LOWER ANSELMO RECLAI		B	N	N	N	Y	
969	CFUSO88A	RVM-146	01-Jan-90	90S-146	DRY	1228750	749899	0			FD	0	0.5	2	0		0		14		3		11		7.6	ORIGINAL SITE RECLAI		B	N	N	N	Y	
970	CFUSO88A	RVM-147	01-Jan-89	89S-038	DRY	1228637	749907	0			FD	0	0.5	2	4		1		80		2		173		7.2	ORIGINAL SITE RECLAI		B	N	N	N	N	
971	CFUSO88A	RVM-147	01-Jan-90	90S-147/1	DRY	1228637	749907	0			FD	0	0.5	2	3		0		13		3		93		7.3	ORIGINAL SITE RECLAI		B	N	N	N	Y	
972	CFUSO88A	RVM-148	01-Jan-90	90S-148	DRY	1228532	749839	0			FD	0	0.5	2	0		0		4		2		2		7.4	ORIGINAL SITE RECLAI		B	N	N	N	Y	
973	CFUSO88A	RVM-149	01-Jan-90	90S-149	DRY	1228411	749884	0			FD	0	0.5	2	0		0		25		46		6		7.5	ORIGINAL SITE RECLAI		B	N	N	N	Y	
974	CFUSO88A	RVM-150	01-Jan-90	90S-150	DRY	1228294	749892	0			FD	0	0.5	2	0		0		9		2		9		7.4	ORIGINAL SITE RECLAI		B	N	N	N	Y	
975	CFUSO88A	RVM-151	01-Jan-90	90S-151	DRY	1228536	749960	0			FD	0	0.5	2	0		0		10		3		8		7.7	ORIGINAL SITE RECLAI		B	N	N	N	Y	
976	CFUSO88A	RVM-152	01-Jan-89	89S-039/0	DRY	1228435	750005	0			FD	0	0.5	2	15		0		6		2		5		7.8	ORIGINAL SITE RECLAI		B	N	N	N	Y	
977	CFUSO88A	RVM-152	01-Jan-90	90S-152	DRY	1228435	750005	0			FD	0	0.5	2	0		0		9		1		5		7	ORIGINAL SITE RECLAI		B	N	N	N	N	
978	CFUSO88A	RVM-153	01-Jan-90	90S-153	DRY	1228217	750025	0			FD	0	0.5	2	1		0		11		60		15		7.7	ORIGINAL SITE RECLAI		B	N	N	N	Y	
979	CFUSO88A	RVM-154	01-Jan-90	90S-154	DRY	1228366	750166	0			FD	0	0.5	2	0		0		4		3		9		7.7	ORIGINAL SITE RECLAI		B	N	N	N	Y	
980	CFUSO88A	RVM-155	01-Jan-90	90S-155	DRY	1228169	750117	0			FD	0	0.5	2	0		0		5		2		7		7.5	ORIGINAL SITE RECLAI		B	N	N	N	Y	
981	CFUSO88A	RVM-156	01-Jan-90	90S-156	DRY	1228651	734247	0			FD	0	0.5	2	0		0		3		1		1		8	TIMBER BUTTE REPOSIT		B	N	N	N	Y	
982	CFUSO88A	RVM-157	01-Jan-90	90S-157	DRY	1228645	734365	0			FD	0	0.5	2	0		0		3		1		2		7.9	TIMBER BUTTE REPOSIT		B	N	N	N	Y	
983	CFUSO88A	RVM-158	01-Jan-90	90S-158	DRY	1228514	734241	0			FD	0	0.5	2	0		0		2		1		1		7.9	TIMBER BUTTE REPOSIT		B	N	N	N	Y	
984	CFUSO88A	RVM-159	01-Jan-90	90S-159/1	DRY	1228501	734378	0			FD	0	0.5	2	0		0		2		1		0		8	TIMBER BUTTE REPOSIT		B	N	N	N	Y	
985	CFUSO88A	RVM-160	01-Jan-90	90S-160	DRY	1228113	734035	0			FD	0	0.5	2	1		0		10		2		3		7.9	MILL SITE RECLAIMED		B	N	N	N	Y	
986	CFUSO88A	RVM-161	01-Jan-90	90S-161	DRY	1227749	733610	0			FD	0	0.5	2	0		0		5		1		2		7.7	MILL SITE RECLAIMED		B	N	N	N	Y	
987	CFUSO88A	RVM-162	01-Jan-90	90S-162	DRY	1227619	733707	0			FD	0	0.5	2	1		0		14		9		15		7.9	MILL SITE RECLAIMED		B	N	N	N	Y	
988	CFUSO88A	RVM-163	01-Jan-90	90S-163	DRY	1227801	733714	0			FD	0	0.5	2	1		0		5		3		6		7.7	MILL SITE RECLAIMED		B	N	N	N	Y	
989	CFUSO88A	RVM-164	01-Jan-90	90S-164/1	DRY	1227599	733825	0			FD	0	0.5	2	2		0		21		7		14		7.4	MILL SITE RECLAIMED		B	N	N	N	Y	
990	CFUSO88A	RVM-165	01-Jan-90	90S-165	DRY	1227801	733857	0			FD	0	0.5	2	1		0		5		1		2		7.9	MILL SITE RECLAIMED		B	N	N	N	Y	
991	MTPMM90A	SD-001	13-Nov-90	SD-001-11	DRY	1225917	742008	0			FD	0	0	3	344	S	6	E	3110	S	647	S	2020	S					N	N	N	Y	
992	MTPMM90A	SD-002	13-Nov-90	SD-002-11	DRY	1224402	741996	0			FD	0	0	3	70	S	4	E	656	S	362	S	1360	S					N	N	N	Y	
993	MTPMM90A	SD-005	13-Nov-90	SD-005-11	DRY	1225009	741819	0			FD	0	0	3	842	S	22	E	5210	S	714	S	6220	S					N	N	N	Y	
1004	BUTSO92C	AMY-SO1	16-Sep-92	AMY-SO-1	DRY	1226111	750347	0	49539		FD	0	0.17	0	566		0		0		1320		0					U	Y	Y	N	Y	
1005	BUTSO92C	AMY-SO2	16-Sep-92	AMY-SO-2	DRY	1226090	750362	0	49540		FD	0	0.17	0	366		0		0		1340		0					U	N	Y	N	Y	
1006	BUTSO92C	AMY-SO3	16-Sep-92	AMY-SO-3	DRY	1226174	750449	0	49541		FD	0	0.17	0	403		0		0		2630		0					U	Y	Y	N	Y	
1007	BUTSO92C	AMY-SO4	16-Sep-92	AMY-SO-4	DRY	1226292	750550	0	49542		FD	0	0.17	0	547		0		0		3080		0					U	Y	Y	N	Y	
1008	BUTSO92C	AMY-SO5	16-Sep-92	AMY-SO-5	DRY	1226545	750845	0	46543		FD	0	0.17	0	621		0		0		1520		0					U	Y	Y	N	Y	
1009	BUTSO92C	AMY-SO6	16-Sep-92	AMY-SO-6	DRY	1226296	750713	0	49544		FD	0	0.17	0	134		0		0		625		0					U	Y	Y	N	Y	
1010	BUTSO92C	LASH-SO1	16-Sep-92	L-SO-1	DRY	1228788	751245	0	49545		FD	0	0.17	0	206		0		0		2640		0					U	N	Y	N	Y	
1011	BUTSO92C	LASH-SO2	16-Sep-92	L-SO-2	DRY	1228842	751416	0	49546		FD	0	0.17	0	89		0		0		4200		0					U	N	Y	N	Y	
1012	BUTSO93A	93AMY01-0	01-Jul-93	8-37951	DRY	1228191	755233	6240			FD	0	0.17	4	9		2		63		284		856		6.71	Alice Dump-SE side		U	N	N	N	Y	
1013	BUTSO93A	93AMY02-0	01-Jul-93	8-37952	DRY	1227607	755182	6199			FD	0	0.17	4	26		2		93		973		999		3.65	Alice Dump-SW side		U	N	N	N	Y	
1014	BUTSO93A	93AMY03-0	01-Jul-93	8-37953	DRY	1226503	750871	5923			FD	0	0.17	4	2230		7		6160		651		2420		4.28	Anselmo Mine Yard-NW		U	N	N	N	Y	
1015	BUTSO93A	93AMY04-0	01-Jul-93	8-37954	DRY	1226815	750859	5937			FD	0	0.17	4	287		5		1300		622		2530		3.72	*Anselmo Mine Yard-N		U	N	N	N	Y	
1016	BUTSO93A	93AMY05-0	01-Jul-93	8-37955	DRY	1226192	750146	5836			FD	0	0.17	4	104		10		510		551		3040		7.62	Anselmo Mine Yard-St		U	N	N	N	Y	
1017	BUTSO93A	93AMY06-0	01-Jul-93	8-37958	DRY	1226361	750381	5864			FD	0	0.17	4	508		18		1030		1270		5500		5.98	Anselmo Mine Yard-Ma		U	N	N	N	Y	
1018	BUTSO93A	93AMY07-0	01-Jul-93	8-37959	DRY	1226386	750745	5904			FD	0	0.17	4	384		10		1110		1900		4070		2.98	Anselmo Mine Yard-Mo		U	N	N	N	Y	
1019	BUTSO93A	93AMY08-0	01-Jul-93	8-37960	DRY	1226195	742878	5467			FD	0	0.17	4	124		5		766		5070		6670		6	*Anselmo Mine Yard-L		U	N	N	N	Y	
1020	BUTSO93A	93AMY08-0	01-Jul-93	8-37961	DRY	1226247	742835	5463			FD	0	0.17	4	132		5		946		3190		6260		5.53	*Anselmo Mine Yard-L	FIELD REPLICATE	U	N	N	N	N	
1021	BUTSO93A	93AMY08-0	01-Jul-93	8-37962	DRY	1226247	742835	5463			FD	0	0.17	4	132		6		1020		3220		6440		5.54	*Anselmo Mine Yard-L	FIELD REPLICATE	U	N	N	N	N	
1022	BUTSO93A	93AMY08-0	01-Jul-93	8-37963	DRY	1226381	742779	5457			DU	0	0.17	4	115		5		899		4810		6060		5.61	*Anselmo Mine Yard-L		U	N	N	N	N	

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measurement Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
1023	BUTSO93A	93AMY08-0	01-Jul-93	8-37964	DRY	1226482	742704	5454			FD	0	0.17	4	161		6		821		3100		5850		5.38	*Anselmo Mine Yard-L		U	N	N	N	N	
1024	BUTSO94A	038WA01-0	10-Nov-94	038-WA-01	DRY	1230079	754929	6306	038-WA-0	038-WA-01-01	FD	0	0.17	4	122		1		59		899		709		3.87	Capitol Hill waste r			Y	Y	N	Y	
1025	BUTSO94A	038WA02-0	09-Nov-94	038-WA-02	DRY	1229704	754091	6226	038-WA-0	038-WA-02-01	FD	0	0.17	4	48		6		461		2730		1860		5.17	Waste material at th			N	Y	N	N	
1026	BUTSO94A	038WA02-0	09-Nov-94	038-WA-02	DRY	1229951	754097	6231	038-WA-0	038-WA-02-02	FD	0	0.17	4	57		11		388		2080		2550		4.85	Waste material at th			N	Y	N	N	
1027	BUTSO94A	038WA02-0	09-Nov-94	038-WA-02	DRY	1230151	754155	6242	038-WA-0	038-WA-02-03	FD	0	0.17	4	24		17		327		4160		4740		4.43	Waste material at th			N	Y	N	Y	
1028	BUTSO94A	038WA02-0	09-Nov-94	038-WA-02	DRY	1230534	754259	6258	038-WA-0	038-WA-02-05	DU	0	0.17	4	145		3		537		496		1050		3.59	Waste material at th			N	Y	N	N	
1029	BUTSO94A	038WA02-0	09-Nov-94	038-WA-02	DRY	1230534	754259	6258	038-WA-0	038-WA-02-04	FD	0	0.17	4	95		3		548		523		918		3.57	Waste material at th			N	Y	N	N	
1030	BUTSO94A	038WA04-0	10-Nov-94	038-WA-04	DRY	1227120	754584	6141	038-WA-0	038-WA-04-01	FD	0	0.17	4	90		20		360		2220		2880		6.39	Waste material north			N	Y	N	Y	
1031	BUTSO94A	038WA05-0	10-Nov-94	038-WA-05	DRY	1227405	753513	6017	038-WA-0	038-WA-05-01	FD	0	0.17	4	34		6		106		1025		1840		6.82	Wappello Dump (#27)			Y	Y	N	Y	
1032	BUTSO94A	038WA06-0	10-Nov-94	038-WA-06	DRY	1227756	752413	6026	038-WA-0	038-WA-06-01	FD	0	0.17	4	49		30		260		2350		8900		4.04	Waste material south			Y	Y	N	Y	
1033	BUTSO94A	038WA06-0	10-Nov-94	038-WA-06	DRY	1227482	752225	6005	038-WA-0	038-WA-06-02	FD	0	0.17	4	404		4		1480		1197		2940		4.05	Waste material south			N	Y	N	N	
1034	BUTSO94A	038WA07-0	10-Nov-94	038-WA-07	DRY	1226676	752000	5995	038-WA-0	038-WA-07-01	FD	0	0.17	4	141		3		1350		1010		1260		2.94	Waste material in Mi			N	Y	N	Y	
1035	BUTSO94A	038WA08-0	10-Nov-94	038-WA-08	DRY	1228209	751580	5966	038-WA-0	038-WA-08-01	FD	0	0.17	4	127		3		1350		643		1420		3.9	Waste material north			Y	Y	N	Y	
1036	BUTSO94A	038WA08-0	10-Nov-94	038-WA-08	DRY	1228386	751136	5925	038-WA-0	038-WA-08-02	FD	0	0.17	4	144		0	U	687		184		436		3.29	Waste material south			Y	Y	N	N	
1037	BUTSO94A	038WA09-0	10-Nov-94	038-WA-09	DRY	1229253	751425	5950	038-WA-0	038-WA-09-01	FD	0	0.17	4	258		37		688		3350		6590		3.61	Waste material along			Y	Y	N	Y	
1038	BUTSO94A	038WA10-0	10-Nov-94	038-WA-10	DRY	1229547	751240	5945	038-WA-1	038-WA-10-01	FD	0	0.17	4	1210		51		1920		835		14500		3.59	Waste material north			Y	Y	N	Y	
1039	BUTSO94A	038WA11-0	10-Nov-94	038-WA-11	DRY	1229867	749957	5808	038-WA-1	038-WA-11-01	FD	0	0.17	4	54		1		733		351		708		3.96	Waste material in va	ACTIVE MINING AREA (		Y	Y	N	Y	
1040	BUTSO94A	038WA12-0	10-Nov-94	038-WA-12	DRY	1229505	749599	5771	038-WA-1	038-WA-12-01	FD	0	0.17	4	69		4		433		1550		1730		3.72	East Soudan-Gold Hil			N	Y	N	Y	
1041	BUTSO94A	038WA14-0	11-Nov-94	038-WA-14	DRY	1228410	748897	5713	038-WA-1	038-WA-14-01	FD	0	0.17	4	88		12		505		1420		3860		3.87	Waste material west			Y	Y	N	Y	
1042	BUTSO94A	038WA15-0	11-Nov-94	038-WA-15	DRY	1228202	749843	5794	038-WA-1	038-WA-15-01	FD	0	0.17	4	168		12		521		1250		5170		4.13	Waste material on ea			Y	Y	N	Y	
1043	BUTSO94A	038WA16-0	11-Nov-94	038-WA-16	DRY	1227667	750056	5834	038-WA-1	038-WA-16-01	FD	0	0.17	4	211		14		417		1140		5010		4.37	Vacant lot west of N			Y	Y	N	N	
1044	BUTSO94A	038WA16-0	11-Nov-94	038-WA-16	DRY	1227583	749988	5829	038-WA-1	038-WA-16-02	FD	0	0.17	4	55		28		588		1190		8560		4.06	Waste dump south of			Y	Y	R	Y	Y
1045	BUTSO94A	038WA17-0	11-Nov-94	038-WA-17	DRY	1226595	749955	5823	038-WA-1	038-WA-17-01	FD	0	0.17	4	158		7		751		732		2300		4.43	South east side of A			N	Y	N	Y	
1046	BUTSO94A	038WA18-0	11-Nov-94	038-WA-18	DRY	1224309	748956	5729	038-WA-1	038-WA-18-01	FD	0	0.17	4	1090		5		3950		520		2070		3.53	Railroad grade east			Y	Y	N	Y	
1047	BUTSO94A	038WA19-0	11-Nov-94	038-WA-19	DRY	1231510	748130	5591	038-WA-1	038-WA-19-01	FD	0	0.17	4	43		3		430		494		1080		3.59	South of Hoy Hickey			Y	Y	N	Y	
1048	BUTSO94A	038WA19-0	11-Nov-94	038-WA-19	DRY	1231720	748146	5590	038-WA-1	038-WA-19-02	FD	0	0.17	4	12		1		416		76		422		4.23	South of Hoy Hickey			N	Y	N	N	
1049	BUTSO94A	038WA20-0	11-Nov-94	038-WA-20	DRY	1231315	747918	5590	038-WA-2	038-WA-20-01	FD	0	0.17	4	350		7		1770		174		2640		4.04	Northwest of Butte/N			Y	Y	N	N	
1050	BUTSO94A	038WA20-0	11-Nov-94	038-WA-20	DRY	1231252	747863	5589	038-WA-2	038-WA-20-02	FD	0	0.17	4	101		3		635		507		1120		3.7	*West of Butte/New E			Y	Y	R	N	Y
1051	BUTSO94A	038WA20-0	11-Nov-94	038-WA-20	DRY	1231252	747863	5589	038-WA-2	038-WA-20-03	DU	0	0.17	4	90		3		744		659		1230		3.69	*West of Butte/New E			Y	Y	R	Y	Y
1052	BUTSO94A	038WA22-0	11-Nov-94	038-WA-22	DRY	1230245	745352	5533	038-WA-2	038-WA-22-01	FD	0	0.17	4	350		3		1980		721		1050		2.98	Waste material on so			Y	Y	N	Y	
1053	BUTSO94A	038WA23-0	11-Nov-94	038-WA-23	DRY	1228575	744900	5531	038-WA-2	038-WA-23-01	FD	0	0.17	4	10		0	U	2120		51		240		7.69	Fill material used a			N	Y	N	Y	
1054	BUTSO94A	038WA24-0	14-Nov-94	038-WA-24	DRY	1222471	741503	5529	038-WA-2	038-WA-24-01	FD	0	0.17	4	103		0	U	69		82		273		4.18	Unnamed dump (#148)			Y	Y	N	Y	
1056	BUTSO94A	038WA26-0	14-Nov-94	038-WA-26	DRY	1227919	737421	5555	038-WA-2	038-WA-26-01	FD	0	0.17	4	200		5		363		626		1680		5.6	property adjacent to			Y	Y	N	Y	
1057	BUTSO94B	01	12-Jan-94	038-MG-01	DRY	1225001	744522	0	38MG0101	8-37966	FD	0	0.17	0	130		3		272		172		259		8.13			U	Y	Y	N	Y	
1058	BUTSO94B	02	12-Jan-94	038-MG-02	DRY	1224970	744658	0	38MG0201	8-37967	FD	0	0.17	0	79		2		229		92		161		7.41			U	Y	Y	N	Y	
1059	BUTSO94B	03	12-Jan-94	038-MG-03	DRY	1224921	744735	0	38MG0301	8-37968	FD	0	0.17	0	59		2		194		141		437		7.58			U	N	Y	N	Y	
1060	BUTSO94B	04	12-Jan-94	038-MG-04	DRY	1224861	744855	0	38MG0401	8-37969	FD	0	0.17	0	62		3		263		267		426		6.33			U	N	Y	N	Y	
1061	BUTSO94B	05	12-Jan-94	038-MG-05	DRY	1225126	744920	0	38MG0501	8-37970	FD	0	0.17	0	93		5		244		1850		1140		7.31			U	N	Y	N	Y	
1062	BUTSO94B	06	12-Jan-94	038-MG-06	DRY	1225094	744794	0	38MG0601	8-37971	FD	0	0.17	0	38		2		127		141		331		9.13			U	N	Y	N	Y	
1063	BUTSO94B	07	12-Jan-94	038-MG-07	DRY	1225136	744723	0	38MG0701	8-37972	FD	0	0.17	0	13		0		22		70		134		7.86			U	N	Y	N	Y	
1064	BUTSO94B	07	12-Jan-94	038-MG-07	DRY	1225136	744723	0	38MG0702	8-37973	DU	0	0.17	0	10		0		21		52		121		8.31			U	N	Y	N	N	
1065	BUTSO94B	08	12-Jan-94	038-MG-08	DRY	1225192	744654	0	38MG0801	8-37974	FD	0	0.17	0	46		1		77		129		328		8.33			U	N	Y	N	Y	
1066	BUTSO94B	10	12-Jan-94	038-MG-10	DRY	1225197	744558	0	38MG1001	8-37977	FD	0	0.17	0	30		0		57		117		282		7.74			U	N	Y	N	Y	
1067	BUTSO94B	11	12-Jan-94	038-MG-11	DRY	1225232	744386	0	38MG1101	8-37978	FD	0	0.17	0	16		0		31		82		263		7.9			U	N	Y	N	N	
1068	BUTSO94B	12	12-Jan-94	038-MG-12	DRY	1225052	744359	0	38MG1201	8-37979	FD	0	0.17	0	68		26		135		5750		7840		6.93			U	N	Y	N	Y	
1069	BUTSO94B	13	12-Jan-94	038-MG-13	DRY	1225109	744489	0	38MG1301	8-37980	FD	0	0.17	0	118		20		155		1920		8690		7.24			U	N	Y	N	N	
1070	BUTSO94B	14	12-Jan-94	038-MG-14	DRY	1225077	744414	0	38MG1401	8-37981	FD	0	0.17	0	70		16		124		2480		6330		7.59			U	N	Y	N	Y	
1071	BUTSO94C	01-01	19-Apr-94	038-SA-01	DRY	1230402	748874	0	38SA0101	08-03993	FD	0	0.17	0	16		1		223		74		254		8	Old East Lexington M		U	Y	Y	N	Y	
1072	BUTSO94C	01-02	19-Apr-94	038-SA-01	DRY	1230436	748692	0	38SA0102	08-03840	FD	0	0.17	0	286		5		2295		267		576		4.48	Old East Lexington M		U	Y	Y	N	Y	
1073	BUTSO94C	01-03	19-Apr-94	038-SA-01	DRY	1230069	748682	0	38SA0103	08-03994	FD	0	0.17	0	13		3		31		284		710		8.24	Old East Lexington M		U	Y	Y	N	Y	
1074	BUTSO94C	02-01	19-Apr-94	038-SA-02	DRY	1230139	748994	0	38SA0201	08-03842	FD	0	0.17	0	46		8		350		4100		852		7.77	Baltic Dump; SW slop		U	N	Y	N	Y	
1075	BUTSO94C	02-01	19-Apr-94	038-SA-02	DRY	1230139	748994	0	38SA0204	0861997	DU	0	0.17	0	45		6		297		3790		645		7.86	Baltic Dump; SW slop		U	N	Y	N	N	
1076	BUTSO94C	02-02	19-Apr-94	038-SA-02	DRY	1230341	749000	0	38SA0202	08-03843	FD	0	0.17	0	61		2		982		332		741		5.06	Baltic Dump; Drainag		U	Y	Y	N	Y	
1077	BUTSO94C	02-03	19-Apr-94	038-SA-02	DRY	1230327	749340	0	38SA0203	08-03844	FD	0	0.17	0	84		7		1340		993		2125		5.44	Baltic Dump; Waste r	ACTIVE MINING AREA (	U	Y	Y	N	Y	
1078	BUTSO94C	04-01	19-Apr-94	038-SA-04	DRY	1229631	751937	0	38SA0401	08-03845	FD	0	0.17	0	286		7		1480		768		2160		4.19	Mountain Con-2; Drai		U	N	Y	N	Y	
1079	BUTSO94C	05-01	19-Apr-94	038-SA-05	DRY	1228212	755249	0	38SA0501	08-03839	FD	0	0.17	0	28		2		61		436		744		4.82	Moulton Mill; Remove		U	N	Y	N	Y	
1080	BUTSO94C	06-01	19-Apr-94	038-SA-06	DRY	1226583	754176	0	38SA0601	08-03847	FD	0	0.17	0	41		8		119		2180		2790		3.91	Venus Dump; Recontou		U	N	Y	N	N	
1081	BUTSO94C	06-01	19-Apr-94	038-SA-06	DRY	1226583	754176	0	38SA0602	08-03991	DU	0	0.17	0	63		10		168		4660		3150		3.9	Venus Dump; Recontou		U	N	Y	N	Y	
1082	BUTSO94C	07-01	18-Apr-94	038-SA-07	DRY	1226455	753449	0	38SA0701	08-03837	FD	0	0.17	0	61		8		277		1300		2730		4.37	Del Monte; Bank mate		U	N	Y	N	Y	
1083	BUTSO94C	07-02	18-Apr-94	038-SA-07	DRY	1226551	753341	0	38SA0702	08-03838	FD	0	0.17	0	36		2		149		2160		1270		6.37	Del Monte; Drainage		U	N	Y	N	Y	
1084	BUTSO94C	08-01	18-Apr-94	038-SA-08	DRY	1227152	753316	0	38SA0801	08-03831	FD	0	0.17	0	150		3		270		441		461		3.82	Missoula Mine; West	IN MOSCOW RECLAIMED	U	N	Y	N	Y	
1085	BUTSO94C	08-02	18-Apr-94	038-SA-08	DRY	1227235	753170	0	38SA0802	08-03832	FD	0	0.17	0	39		4		206		1740		1850		4.13	Missoula Mine; East	IN MOSCOW RECLAIMED	U	N	Y	N	Y	
1086	BUTSO94C	08-03	18-Apr-94	038-SA-08	DRY	1227284	752933	0	38SA0803	08-03834	FD	0	0.17	0	44		2		122		771		979		6.12	Missoula Mine; Slope		U	N	Y	N	Y	
1087	BUTSO94C	08-04	18-Apr-94	038-SA-08	DRY	1227422	752932	0	38SA0804	08-03833	FD	0	0.17	0	35		6		258		1320		1780		6.61	Missoula Mine; Slope		U	N	Y	N	Y	
1088	BUTSO94C	08-05	18-Apr-94	038-SA-08	DRY	1227586	753072	0	38SA0805	08-03835	FD	0	0.17	0	33		4		324		651		1210		4.28	Missoula Mine; Bank		U	Y	Y	N	Y	
1089	BUTSO94C	08-06	18-Apr-94	038-SA-08	DRY	1227505	752809	0	38SA0806	08-03836	FD	0	0.17	0	73		6		157		1820		2260		3.4	Missoula Mine; Waste		U	N	Y	N	Y	
1090	BUTSO94C	09-01	19-Apr-94	038-SA-09	DRY	1226791	749551	0	38SA0901	08-03848	FD	0	0.17	0	115		6		291		6140		2620		4.57	Robert Emmette Dumps		U	Y	Y	N	Y	
1091	BUTSO94C	09-02	19-Apr-94	038-SA-09	DRY	1227055	749553	0	38SA0902	08-03849	FD	0	0.17	0	48		7		175		334		2010		5.43	Robert Emmette Dumps		U	Y	Y	N	Y	
1092	BUTSO94C	09-03	19-Apr-94	038-SA-09	DRY	1227088	749744	0	38SA0903	08-61993	FD	0	0.17	0	227		4		98		2480		1230		2.78	Robert Emmette Dumps		U	Y	Y	R	Y	Y
1093	BUTSO94C	10-01	19-Apr-94	038-SA-10	DRY	1228311	749632	0	38SA1001	08-61998	FD	0	0.17	0	59		2		415		841		666		3.26	Colorado Stamp Mill;		U	N	Y	N	Y	
1094	BUTSO94C	10-02	19-Apr-94	038-SA-10	DRY	1228364	749620	0	38SA1002	08-61996	FD	0	0.17	0	83		3		397		1620		951		3.09	Colorado Stamp Mill;		U	N	Y	N	Y	
1095	BUTSO94C	11-01	19-Apr-94	038-SA-11	DRY	1229451	749671	0	38SA1101	08-61995	FD	0	0.17	0	73		10		1130		1740		3248		4.89	Soudan-Gold Hill; Du		U	N	Y	N	Y	
1096	BUTSO94C	12-01	19-Apr-94	038-SA-12	DRY	1229770	755586	0	38SA1201	08-03850	FD	0	0.17	0	115		5		196		2530		1810		5.01	Clark Street Dump; W		U	Y	Y	N	Y	
1097	BUTSO94C	12-02	19-Apr-94	038-SA-12	DRY	1229766	755730	0	38SA1202	08-03990	FD	0	0.17	0	93		3		139		1000		944		4.83	Clark Street Dump; D		U	N	Y	N	Y	
1098	BUTSO94C	13-01	19-Apr-94	038-SA-13	DRY	1225065	743975	0	38SA1301	08-03998	FD	0	0.17	0	93		11		221		2060		4250		5.81	Emma Dump; SW bank o		U	N	Y	N	Y	

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
1099	BUTSO94C	13-02	19-Apr-94	038-SA-13	DRY	1225222	744060	0	38SA1302	08-03997	FD	0	0.17	0	110		32		345		4230		1160		5.55	Emma Dump; SE bank o		U	N	Y	N	Y	
1101	BUTSO93B	RRLY020	09-Jun-93	LY0020	DRY	1230736	743572	1686	LY-56	S41489	FD	1.5	1.5	1	165		0		0		356		0					U	N	N	N	Y	
1103	BUTSO93B	RRLY010	07-Jun-93	LY0010	DRY	1231050	743963	1685	LY-23	LY:23	FD	1.5	1.5	1	97		0		920		670		860					U	N	N	N	Y	
1104	BUTSO93B	RRLY011	07-Jun-93	LY0011	DRY	1231065	743898	1685	LY-24	S41476	FD	1.5	1.5	1	394		0		0		567		0					U	N	N	N	Y	
1105	BUTSO93B	RRLY018	09-Jun-93	LY0018	DRY	1231330	743777	1686	LY-47	LY:47	FD	1.5	1.5	1	20		0		110		397		560					U	N	N	N	Y	
1107	BUTSO93B	RRLY015	09-Jun-93	LY0015	DRY	1231638	743956	1685	LY-45	LY:45	FD	1.5	1.5	1	31		0		220		781		1000					U	N	N	N	Y	
1108	BUTSO93B	RRLY016	09-Jun-93	LY0016	DRY	1231562	744065	1685	LY-42	S41482	FD	1.5	1.5	1	173		0		0		622		0					U	N	N	N	Y	
1110	BUTSO93B	RRLY009	07-Jun-93	LY0009	DRY	1231472	744222	1684	LY-20	S41475	FD	1.5	1.5	1	51		0		0		533		0					U	N	N	N	Y	
1111	BUTSO93B	RRLY013	09-Jun-93	LY0013	DRY	1231863	744306	1683	LY-30	S41478	FD	1.5	1.5	1	83		0		0		754		0					U	N	N	N	Y	
1112	BUTSO93B	RRLY012	09-Jun-93	LY0012	DRY	1232066	744491	1682	LY-27	S41477	FD	1.5	1.5	1	652		0		0		934		0					U	N	N	N	Y	
1113	BUTSO93B	RRMLE10	07-Jun-93	MLE010	DRY	1232536	744983	1680	MLE-19	S41451	FD	1.5	1.5	1	186		0		0		425		0					U	N	N	N	Y	
1114	BUTSO93B	RRMLE11	07-Jun-93	MLE011	DRY	1232620	744788	1679	MLE-22	S41452	FD	1.5	1.5	1	601		0		0		788		0					U	N	N	N	Y	
1115	BUTSO93B	RRMLE09	07-Jun-93	MLE009	DRY	1232980	744976	1678	MLE-18	MLE:18	FD	1.5	1.5	1	335		0		610		905		280					U	N	N	N	Y	
1116	BUTSO93B	RRMLE08	07-Jun-93	MLE008	DRY	1233058	745043	1679	MLE-17	MLE:17	FD	1.5	1.5	1	357		0		570		471		300					U	N	N	N	Y	
1127	BUTSO93B	RRMLW09	02-Jun-93	MLW009	DRY	1222730	742292	1670	MLW-17	MLW:17	FD	1.5	1.5	1	583		0		410		298		510					U	N	N	N	Y	
1130	BUTSO93B	RRMLW12	03-Jun-93	MLW012	DRY	1223259	742016	1665	MLW-28	MLW:28	FD	1.5	1.5	1	1153		0		400		434		560					U	N	N	N	Y	
1131	BUTSO93B	RRMLW13	08-Jun-93	MLW013	DRY	1223625	741860	1664	MLW-55	MLW:55	FD	1.5	1.5	1	695		0		780		372		990					U	N	N	N	Y	
1133	BUTSO93B	RRMLW15	03-Jun-93	MLW015	DRY	1224575	741685	1660	MLW-32	MLW:32	FD	1.5	1.5	1	620		0		2100		508		1600					U	N	N	N	Y	
1134	BUTSO93B	RRMLW16	08-Jun-93	MLW016	DRY	1225068	741750	1659	MLW-58	S41418	FD	1.5	1.5	1	187		0		0		50		0					U	N	N	N	Y	
1135	BUTSO93B	RRLY001	07-Jun-93	LY0001	DRY	1228882	742608	1675	LY-1	S41470	FD	1.5	1.5	1	31		0		0		618		0					U	N	N	N	Y	
1136	BUTSO93B	RRLY002	07-Jun-93	LY0002	DRY	1228910	742692	1677	LY-3	S41471	FD	1.5	1.5	1	110		0		0		710		0					U	N	N	N	Y	
1137	BUTSO93B	RRLY003	07-Jun-93	LY0003	DRY	1229046	742706	1677	LY-6	LY:6	FD	1.5	1.5	1	107		0		2800		409		970					U	N	N	N	Y	
1138	BUTSO93B	RRLY008	07-Jun-93	LY0008	DRY	1229788	743154	1686	LY-19	LY:19	FD	1.5	1.5	1	21		0		160		583		1000					U	N	N	N	Y	
1139	BUTSO93B	RRLY007	07-Jun-93	LY0007	DRY	1230201	743593	1686	LY-15	S41474	FD	1.5	1.5	1	179		0		0		2650		0					U	N	N	N	Y	
1140	BUTSO93B	RRLY006	07-Jun-93	LY0006	DRY	1230271	743499	1686	LY-11	S41473	FD	1.5	1.5	1	33		0		0		1160		0					U	N	N	N	Y	
1141	BUTSO93B	RRLY005	07-Jun-93	LY0005	DRY	1230299	743462	1686	LY-10	LY:10	FD	1.5	1.5	1	27		0		160		732		890					U	N	N	N	Y	
1142	BUTSO93B	RRLY004	07-Jun-93	LY0004	DRY	1230324	743421	1686	LY-7	S41472	FD	1.5	1.5	1	621		0		0		611		0					U	N	N	N	Y	
1144	BUTSO93B	RRNB007	04-Jun-93	NB0007	DRY	1227672	740242	1679	NB-14	NB:14	FD	1.5	1.5	1	198		0		720		794		2800					U	N	N	R	Y	Y
1145	BUTSO93B	RRNB006	04-Jun-93	NB0006	DRY	1226573	740581	1669	NB-13	S41429	FD	1.5	1.5	1	532		0		0		192		0					U	N	N	N	Y	
1147	BUTSO93B	RRNB005	04-Jun-93	NB0005	DRY	1225784	741022	1664	NB-11	S41428	FD	1.5	1.5	1	87		0		0		88		0					U	N	N	N	Y	
1148	BUTSO93B	RRNB004	04-Jun-93	NB0004	DRY	1225689	741246	1662	NB-10	NB:10	FD	1.5	1.5	1	21		0		94		30		120					U	N	N	N	Y	
1152	BUTSO93B	RRNB001	17-Oct-94	NB0001	DRY	1225644	741544	1660	94-015-N	S72807	FD	0	0.1	1	528		0		0		136		0					U	N	N	N	Y	
1153	BUTSO93B	RRNB002	03-Jun-93	NB0002	DRY	1225671	741542	1660	NB-4	S41422	FD	0.42	0.42	1	976		0		0		624		0					U	Y	Y	N	Y	
1155	BUTSO93B	RRMLW17	03-Jun-93	MLW017	DRY	1225557	741792	1659	MLW-34	MLW:34	FD	1.5	1.5	1	434		0		1500		397		2500					U	N	N	N	Y	
1156	BUTSO93B	RRMLW18	02-Jun-93	MLW018	DRY	1226045	741855	1659	MLW-35	S41410	FD	1.5	1.5	1	257		0		0		225		0					U	N	N	N	Y	
1157	BUTSO93B	RRMLW19	03-Jun-93	MLW019	DRY	1226535	741898	1660	MLW-37	MLW:37	FD	1.5	1.5	1	12	U	0		30		11		45					U	N	N	N	Y	
1158	BUTSO93B	RRMLW20	02-Jun-93	MLW020	DRY	1226739	741915	1662	MLW-38	S41411	FD	1.5	1.5	1	11		0		0		13		0					U	N	N	N	Y	
1159	BUTSO93B	RRMLW21	02-Jun-93	MLW021	DRY	1227034	741943	1665	MLW-40	S41412	FD	1.5	1.5	1	3		0		0		9		0					U	N	N	N	Y	
1160	BUTSO93B	RRMLW22	02-Jun-93	MLW022	DRY	1227512	742015	1669	MLW-41	S41415	FD	1.5	1.5	1	9		0		0		21		0					U	N	N	N	Y	
1161	BUTSO93B	RRMLW24	02-Jun-93	MLW024	DRY	1227828	742094	1671	MLW-42	S41416	FD	1.5	1.5	1	20		0		0		74		0					U	N	N	N	Y	
1162	BUTSO93B	RRMLW23	08-Jun-93	MLW023	DRY	1227629	742041	1671	MLW-69	MLW:69	FD	1.5	1.5	1	12	U	0		17		10		36					U	N	N	N	Y	
1163	BUTSO93B	RRMY021	06-Jun-93	MY0021	DRY	1231092	745786	1689	MY-44	MY:44	FD	1.5	1.5	1	93		0		530		1240		1300					U	N	N	N	Y	
1164	BUTSO93B	RRMY020	06-Jun-93	MY0020	DRY	1231153	745788	1689	MY-43	MY:43	FD	1.5	1.5	1	79		0		570		880		2200					U	N	N	N	Y	
1165	BUTSO93B	RRMY019	06-Jun-93	MY0019	DRY	1231233	745828	1689	MY-42	MY:42	FD	1.5	1.5	1	124		0		1200		1166		2100					U	N	N	N	Y	
1166	BUTSO93B	RRMY018	06-Jun-93	MY0018	DRY	1231275	745938	1690	MY-39	S41466	FD	1.5	1.5	1	368		0		0		892		0					U	N	N	N	Y	
1168	BUTSO93B	RRMY016	06-Jun-93	MY0016	DRY	1231586	746049	1690	MY-36	MY:36	FD	1.5	1.5	1	198		0		740		1364		1300					U	N	N	N	Y	
1169	BUTSO93B	RRMY015	06-Jun-93	MY0015	DRY	1231598	746083	1690	MY-35	MY:35	FD	1.5	1.5	1	446		0		1700		806		2700					U	N	N	N	Y	
1170	BUTSO93B	RRMY012	05-Jun-93	MY0012	DRY	1231560	746167	1691	MY-32	MY:32	FD	1.5	1.5	1	27		0		550		924		4600					U	N	N	N	Y	
1173	BUTSO93B	RRMY014	06-Jun-93	MY0014	DRY	1232002	746261	1690	MY-34	MY:34	FD	1.5	1.5	1	471		0		2400		2232		2700	J				U	N	N	N	Y	
1176	BUTSO93B	RRMY025	11-Jun-93	MY0025	DRY	1231797	746482	1692	MY-56	S41468	FD	1.5	1.5	1	845		0		0		551		0					U	N	N	N	Y	
1177	BUTSO93B	RRMY024	11-Jun-93	MY0024	DRY	1231677	746396	1692	MY-55	MY:55	FD	0.58	0.58	1	12	U	0		46		56		1900					U	N	N	N	Y	
1178	BUTSO93B	RRMY022	11-Jun-93	MY0022	DRY	1231328	746223	1692	MY-51	S41467	FD	1.5	1.5	1	215		0		0		675		0					U	N	N	N	Y	
1179	BUTSO93B	RRMY023	11-Jun-93	MY0023	DRY	1231177	746107	1690	MY-54	MY:54	FD	0.33	0.33	1	794		0		350		1004		660					U	Y	Y	N	Y	
1180	BUTSO93B	RRMY013	06-Jun-93	MY0013	DRY	1232750	746687	1690	MY-33	MY:33	FD	1.5	1.5	1	3968		0		9200		1066		630					U	N	N	N	Y	
1181	BUTSO93B	RRMY002	05-Jun-93	MY0002	DRY	1232880	746825	1691	MY-4	S41454	FD	1.5	1.5	1	249		0		0		591		0					U	N	N	N	Y	
1182	BUTSO93B	RRMY001	05-Jun-93	MY0001	DRY	1233493	747235	1693	MY-1	S41453	FD	1.5	1.5	1	536		0		0		327		0					U	N	N	N	Y	
1183	BUTSO93B	RRMY007	05-Jun-93	MY0007	DRY	1233032	746602	1690	MY-17	MY:17	FD	1.5	1.5	1	595		0		280		136		75					U	N	N	N	Y	
1185	BUTSO93B	RRMY005	05-Jun-93	MY0005	DRY	1233049	746518	1689	MY-14	MY:14	FD	1.5	1.5	1	5208		0		13200		1364		320					U	N	N	N	Y	
1187	BUTSO93B	RRMY003	05-Jun-93	MY0003	DRY	1233182	746360	1688	MY-7	S41455	FD	1.5	1.5	1	175		0		0		347		0					U	N	N	N	Y	
1188	BUTSO93B	RRUY001	11-Jun-93	UY0001	DRY	1233092	747521	1696	UY-1	UY:1	FD	0.17	0.17	1	236		0		1100		335		590					U	N	Y	N	Y	
1190	BUTSO93B	RRUY003	11-Jun-93	UY0003	DRY	1232545	747609	1698	UY-7	UY:7	FD	0.58	0.58	1	12	U	0		170		620		8800					U	N	N	N	Y	
1191	BUTSO93B	RRUY005	11-Jun-93	UY0005	DRY	1232036	747628	1700	UY-15	S41496	FD	1.5	1.5	1	134		0		0		465		0					U	N	N	N	Y	
1193	BUTSO93B	RRUY006	11-Jun-93	UY0006	DRY	1231638	747473	1699	UY-18	UY:18	FD	1.5	1.5	1	260		0		1400		583		710					U	N	N	N	Y	
1195	BUTSO93B	RRUY011	11-Jun-93	UY0011	DRY	1231725	747034	1697	UY-30	S41500	FD	1.5	1.5	1	34		0		0		359		0					U	N	N	N	Y	
1196	BUTSO93B	RRUY012	11-Jun-93	UY0012	DRY	1231664	746949	1696	UY-33	UY:33	FD	1.5	1.5	1	236		0		500		3596		3700					U	N	N	N	Y	
1197	BUTSO93B	RRUY013	11-Jun-93	UY0013	DRY	1231388	746677	1694	UY-34	S41501	FD	1.5	1.5	1	236		0		0		553		0					U	N	N	N	Y	
1198	BUTSO93B	RRUY014	11-Jun-93	UY0014	DRY	1231381	746692	1695	UY-37	S41504	FD	1.5	1.5	1	349		0		0		2700		0					U	N	N	N	Y	
1199	BUTSO93B	RRUY015	11-Jun-93	UY0015	DRY	1231043	746491	1693	UY-41	UY:41	FD	1.5	1.5	1	36		0		200		682		1000					U	N	N	N	Y	
1200	BUTSO93B	RRUY009	11-Jun-93	UY0009	DRY	1230629	746822	1696	UY-23	S41498	FD	1.5	1.5	1	63		0		0		449		0					U	N	N	N	Y	
1201	BUTSO93B	RRUY008	11-Jun-93	UY0008	DRY	1230941	747035	1697	UY-22	UY:22	FD	0.08	0.08	1	471		0		620		3596		2900					U	Y	Y	N	Y	
1202	BUTSO93B	RRUY007	11-Jun-93	UY0007	DRY	1231040	747065	1698	UY-19	S41497	FD	1.5	1.5	1	360		0		0		1250		0					U	N	N	N	Y	
1203	BUTSO93B	RRMLE06	07-Jun-93	MLE006	DRY	1233586	745490	1681	MLE-13	S41450	FD	1.5	1.5	1	443		0		0		253		0					U	N	N	N	Y	
1204	BUTSO93B	RRMLE05	07-Jun-93	MLE005	DRY	1233611	745410	1681	MLE-9	S41449	FD	1.5	1.5	1	853		0		0		448		0					U	N	N	N	Y	
1205	BUTSO93B	RRMLE07	07-Jun-93	MLE007	DRY	1233630	745357	1681	MLE-16	MLE:16	FD	1.5	1.5	1	2108		0		10000		583		1300					U	N	N	N	Y	
1206	BUTSO93B	RRMLE03	07-Jun-93	MLE003	DRY	1234141	745659	1682	MLE-5	S41448	FD	1.5	1.5	1	96		0		0		258		0					U	N	N	N	Y	

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
1207	BUTSO93B	RRMLE04	07-Jun-93	MLE004	DRY	1234145	745625	1682	MLE-8	MLE:8	FD	1.5	1.5	1	285		0		1800		570		5200					U	N	N	N	Y	
1208	BUTSO93B	RRMLE01	07-Jun-93	MLE001	DRY	1234583	745669	1682	MLE-1	MLE:1	FD	1.5	1.5	1	285		0		1800		335		3000					U	N	N	N	Y	
1209	BUTSO93B	RRMLE02	07-Jun-93	MLE002	DRY	1234575	745631	1682	MLE-2	S41447	FD	1.5	1.5	1	243		0		0		387		0					U	N	N	N	Y	
1212	BUTSO93B	RRNB010	04-Jun-93	NB0010	DRY	1229160	738477	1686	NB-22	S41440	FD	1.5	1.5	1	437		0		0		145		0					U	N	N	R	Y	Y
1214	BUTSO93B	RRNB015	04-Jun-93	NB0015	DRY	1226916	737106	1693	NB-47	NB:47	FD	1.5	1.5	1	12	U	0		28		21		98					U	N	N	N	Y	
1215	BUTSO93B	RRNB014	04-Jun-93	NB0014	DRY	1226966	736955	1695	NB-30	NB:30	FD	1.5	1.5	1	149		0		380		50		140					U	N	N	N	Y	
1217	BUTSO93B	RRNB012	10-Jun-93	NB0012	DRY	1227246	736389	1698	NB-54	NB:54	FD	1.5	1.5	1	16		0		27		27		100					U	N	N	N	Y	
1335	BUTSO92B	BU-A2-01-	14-Nov-91	BU-A2-01-		1229364	749803	0			FD	0	0.16	2	30	U	5	U	234		288		601			31 E. COPPER		B	Y	Y	R	Y	Y
1336	BUTSO92B	BU-A2-02-	14-Nov-91	BU-A2-02-		1225346	749701	0			FD	0	0.16	2	40		7		290		363		870			937 W. COPPER		B	Y	Y	R	Y	Y
1337	BUTSO92B	BU-A2-03-	14-Nov-91	BU-A2-03-		1225375	749692	0			FD	0	0.16	2	53		5	U	322		388		587			935 W. COPPER		B	Y	Y	R	Y	Y
1338	BUTSO92B	BU-A2-04-	14-Nov-91	BU-A2-04-		1227737	749714	0			FD	0	0.16	2	46		21		257		1820		1340			305 & 305.5 COPPER		B	Y	Y	R	Y	Y
1339	BUTSO92B	BU-A2-05-	14-Nov-91	BU-A2-05-		1227881	750202	0			FD	0	0.16	2	83		5	U	382		1200		965			208 W. WOOLMAN		B	Y	Y	R	Y	Y
1340	BUTSO92B	BU-A2-06-	15-Nov-91	BU-A2-06-		1230130	753015	0			FD	0	0.16	2	55		18		399		1710		2430			61 E. CENTER		B	Y	Y	R	Y	Y
1341	BUTSO92B	BU-A2-07-	15-Nov-91	BU-A2-07-		1229652	752879	0			FD	0	0.16	2	47		6		200		841		763			24 E. CENTER		B	Y	Y	R	Y	Y
1342	BUTSO92B	BU-A2-08-	15-Nov-91	BU-A2-08-		1232067	745704	0			FD	0	0.16	2	100		13		612		793		1210			1106 E. SECOND ST		B	Y	Y	R	Y	Y
1343	BUTSO92B	BU-A2-09-	15-Nov-91	BU-A2-09-		1225252	750477	0			FD	0	0.16	2	40		5	U	132		1140		425			LOT W. OF 951 W. ANT		B	Y	Y	R	Y	Y
1344	BUTSO92B	BU-A2-10-	15-Nov-91	BU-A2-10-		1225283	750528	0			FD	0	0.16	2	97		6		211		4100		560			951 W. ANTIMONY		B	Y	Y	R	Y	Y
1345	BUTSO92B	BU-A2-11-	15-Nov-91	BU-A2-11-		1227709	749904	0			FD	0	0.16	2	31		8		374		886		1370			454 N. IDAHO		B	Y	Y	R	Y	Y
1346	BUTSO92B	BU-A2-12-	15-Nov-91	BU-A2-12-		1227708	749875	0			FD	0	0.16	2	53		5		744		1510		1080			452 N. IDAHO		B	Y	Y	R	Y	Y
1347	BUTSO92B	BU-A2-13-	15-Nov-91	BU-A2-13-		1227854	750271	0			FD	0	0.16	2	61		8		225		956		1240			210 W. WOOLMAN		B	N	Y	R	Y	Y
1348	BUTSO92B	BU-A2-14-	15-Nov-91	BU-A2-14-		1227624	750581	0			FD	0	0.16	2	183		36		355		2410		5110			330 W. BOARDMAN		B	N	Y	R	Y	Y
1349	BUTSO92B	BU-A2-15-	15-Nov-91	BU-A2-15-		1227594	750579	0			FD	0	0.16	2	212		35		326		2530		6020			332 W. BOARDMAN		B	N	Y	R	Y	Y
1350	BUTSO92B	BU-A2-17-	19-Nov-91	BU-A2-17-		1225422	750034	0			FD	0	0.16	2	29	U	5	U	160		707		623			932 W. WOOLMAN		B	Y	Y	R	Y	Y
1351	BUTSO92B	BU-A2-18-	19-Nov-91	BU-A2-18-		1227571	750569	0			FD	0	0.16	2	218		24		366		9310		4870			336 BOARDMAN		B	N	Y	R	Y	Y
1352	BUTSO92B	BU-A2-19-	19-Nov-91	BU-A2-19-		1227782	750765	0			FD	0	0.16	2	43		5	U	670		730		895			229 W. BOARDMAN		B	Y	Y	R	Y	Y
1353	BUTSO92B	BU-A2-20-	19-Nov-91	BU-A2-20-		1223867	744232	0			FD	0	0.16	2	29	U	5	U	134		270		723			307 GRANITE MOUNTAIN		B	Y	Y	R	Y	Y
1354	BUTSO92B	BU-A2-21-	19-Nov-91	BU-A2-21-		1223957	744308	0			FD	0	0.16	2	77		5	U	317		153		415			507 ORPHAN GIRL		B	Y	Y	R	Y	Y
1355	BUTSO92B	BU-A2-22-	19-Nov-91	BU-A2-22-		1229803	753199	0			FD	0	0.16	2	29	U	5	U	229		1680		2870			29 E. LAPLATTA		B	Y	Y	R	Y	Y
1356	BUTSO92B	BU-A2-23-	20-Nov-91	BU-A2-23-		1229834	753221	0			FD	0	0.16	2	29	U	5	U	119		690		999			35 E. LAPLATTA		B	Y	Y	R	Y	Y
1357	BUTSO92B	BU-A2-24-	20-Nov-91	BU-A2-24-		1230634	752840	0			FD	0	0.16	2	54		5	U	258		848		947			133 E. CENTER		B	Y	Y	R	Y	Y
1358	BUTSO92B	BU-A2-25-	20-Nov-91	BU-A2-25-		1226736	754221	0			FD	0	0.16	2	29	U	5	U	97		303		575			618 W. DALY		B	Y	Y	R	Y	Y
1359	BUTSO92B	BU-A2-26-	20-Nov-91	BU-A2-26-		1229925	755163	0			DU	0	0.16	2	71		5	U	250		811		862			119 E. DALY		B	Y	Y	R	N	Y
1360	BUTSO92B	BU-A2-26-	20-Nov-91	BU-A2-26-		1229925	755163	0			FD	0	0.16	2	64		5		261		852		892			119 E. DALY		B	Y	Y	R	Y	Y
1361	BUTSO92B	BU-A2-27-	20-Nov-91	BU-A2-27-		1229967	755209	0			FD	0	0.16	2	59		5		224		1150		822			121 E. DALY		B	Y	Y	R	Y	Y
1362	BUTSO92B	BU-A2-28-	20-Nov-91	BU-A2-28-		1229145	752388	0			FD	0	0.16	2	51		11		1640		1830		2270			905 N. MAIN		B	Y	Y	R	Y	Y
1363	BUTSO92B	BU-A2-29-	21-Nov-91	BU-A2-29-		1229151	752448	0			FD	0	0.16	2	58		10		332		2040		1920			921 N. MAIN		B	Y	Y	R	Y	Y
1364	BUTSO92B	BU-A2-30-	21-Nov-91	BU-A2-30-		1229350	755099	0			FD	0	0.16	2	62		10		228		1090		1870			1619 N. MAIN		B	N	Y	R	Y	Y
1365	BUTSO92B	BU-A2-31-	21-Nov-91	BU-A2-31-		1229949	756414	0			FD	0	0.16	2	39		5	U	195		1400		737			11 N. SUNVIEW TERRAC		B	Y	Y	R	Y	Y
1366	BUTSO92B	BU-A2-32-	21-Nov-91	BU-A2-32-		1228902	752803	0			FD	0	0.16	2	29	U	5	U	151		1110		596			31 MISSOULA		B	N	Y	R	Y	Y
1367	BUTSO92B	BU-A2-33-	21-Nov-91	BU-A2-33-		1225330	749767	0			FD	0	0.16	2	177		6		1690		429		1910			RR R/W BEHIND 935 &		B	Y	Y	R	Y	Y
1368	BUTSO92B	BU-A2-34-	21-Nov-91	BU-A2-34-		1228848	750381	0			FD	0	0.16	2	44		9		460		707		2560			23 & 23.5 W. WOOLMAN		B	Y	Y	R	Y	Y
1369	BUTSO92B	BU-A2-35-	21-Nov-91	BU-A2-35-		1227304	750568	0			FD	0	0.16	2	159		14		334		2400		3350			*LOT 13, BLK 2, MT M		B	Y	Y	R	Y	Y
1370	BUTSO92B	BU-A2-36-	21-Nov-91	BU-A2-36-		1227559	750556	0			FD	0	0.16	2	115		32		374		2620		6350			*LOT 14, BLK 2, MT M		B	N	Y	R	Y	Y
1371	BUTSO92B	BU-A2-37-	21-Nov-91	BU-A2-37-		1227536	750557	0			DU	0	0.16	2	211		32		417		13100		7010			*LOT 16, BLK 2, MT M		B	N	Y	R	N	Y
1372	BUTSO92B	BU-A2-37-	21-Nov-91	BU-A2-37-		1227536	750557	0			FD	0	0.16	2	182		35		443		13200		7000			*LOT 16, BLK 2, MT M		B	N	Y	R	Y	Y
1373	BUTSO92B	BUA209-CL	15-Nov-91	BUA209-CL		1225252	750477	0			FD	0	0.16	2	42		0	U	114		1200		431			LOT W. OF 951 W. ANT		B	Y	Y	R	Y	Y
1374	BUTSO92B	BUA209-CT	15-Nov-91	BUA209-CT		1225252	750477	0			DU	0	0.16	2	47		5	U	134		1130		420			LOT W. OF 951 W. ANT		B	Y	Y	R	Y	Y
1375	BUTSO92B	BUA209-CT	15-Nov-91	BUA209-CT		1225252	750477	0			FD	0	0.16	2	40		5	U	131		1100		407			LOT W. OF 951 W. ANT		B	Y	Y	R	N	Y
1376	BUTSO92B	BUA209-CT	15-Nov-91	BUA209-CT		1225252	750477	0			FD	0	0.16	2	33		5	U	109		1040		353			LOT W. OF 951 W. ANT		B	Y	Y	R	N	Y
1377	BUTSO92B	BUA216-CC	19-Nov-91	BUA216-CC		1229552	752871	0			FD	0	0.16	2	38		12		172		1820		2270			*16 E. CENTER, CENTE		B	Y	Y	R	Y	Y
1378	BUTSO92B	BUA216-CE	19-Nov-91	BUA216-CE		1229567	752871	0			FD	0	0.16	2	47		8		134		1350		1600			*16 E. CENTER, EAST		B	Y	Y	R	Y	Y
1379	BUTSO92B	BUA216-CW	19-Nov-91	BUA216-CW		1229536	752870	0			FD	0	0.16	2	29	U	15		98		1610		1880			*16 E. CENTER, WEST		B	Y	Y	R	Y	Y
1380	BUTSO92B	BUA226-CW	20-Nov-91	BUA226-CW		1229903	755138	0			FD	0	0.16	2	37		5	U	155		789		1120			LOT W. OF 119 E. DAL		B	Y	Y	R	Y	Y
1381	BUTSO92B	BUA230-CL	21-Nov-91	BUA230-CL		1229350	755099	0			FD	0	0.16	2	48		4		179		953		2128			1619 N. MAIN		B	N	Y	R	Y	Y
1382	BUTSO92B	BUA230-CT	21-Nov-91	BUA230-CT		1229350	755099	0			FD	0	0.16	2	36		12		226		1330		2050			1619 N. MAIN		B	N	Y	R	Y	Y
1383	BUTSO92B	BUA230-CT	21-Nov-91	BUA230-CT		1229350	755099	0			FD	0	0.16	2	59		10		298		1050		1830			1619 N. MAIN		B	N	Y	R	N	Y
1501	BUTSO95A	FSUA-1	20-Oct-95	119712030	DRY	1225922	751958	0			DU	0	0.17	4	224		0		858		2450		2210		2.22	830 Lexington (Dupli		U	N	Y	R	Y	Y
1502	BUTSO95A	FSUA-1	20-Oct-95	119712030	DRY	1225922	751958	0			FD	0	0.17	4	220		0		839		2430		1940		2.19	830 Lexington (31724		U	N	Y	R	N	Y
1503	BUTSO95A	FSUA-3	20-Oct-95	119712030	DRY	1226110	751426	0			FD	0	0.17	4	106		0		237		11500		3620		3.6	corner of Alabama &		U	N	Y	N	Y	
1504	BUTSO95A	FSUA-4	20-Oct-95	119712030	DRY	1226516	751191	0			FD	0	0.17	4	77		0		602		1350		4350		3.14	*Empire St. road bed		U	N	Y	N	Y	
1505	BUTSO95A	FSUA-5	20-Oct-95	119712030	DRY	1226289	750840	0			FD	0	0.17	4	174		0		768		1090		8040		3.31	North of Anselmo Min		U	Y	Y	N	Y	
1506	BUTSO95A	FSUA-6	20-Oct-95	119701040	DRY	1229935	756784	0			FD	0	0.17	4	23		0		65		369		2810		5.29	North of Sunview Ter		U	Y	Y	N	Y	
1507	BUTSO95A	FSUA-7	20-Oct-95	119712010	DRY	1230078	754679	0			FD	0	0.17	4	67		0		244		3780		2970		3.63	*Dump #158, 205 Tobo		U	N	Y	N	Y	
1508	BUTSO95A	FSUA-8	23-Oct-95	119712010	DRY	1230467	755125	0			FD	0	0.17	4	37		0		229		407		140		1.95	*Source Area #22, Ca		U	Y	Y	N	Y	
1509	BUTSO95A	FSUA-8	23-Oct-95	119712010	DRY	1230467	755125	0			DU	0	0.17	4	46		0		220		370		130		2.16	*Source Area #22, Ca		U	Y	Y	N	N	
1510	BUTSO95A	FSUA-10	23-Oct-95	119712040	DRY	1230776	753546	0			FD	0	0.17	4	35		0		495		3220		1630		3.78	North of 117 O'Neil		U	Y	Y	N	Y	
1512	BUTSO95A	FSUA-12	23-Oct-95	119712040	DRY	1228654	752756	0			FD	0	0.17	4	39		0		518		1580		4270		3.95	Missoula Street (B-3		U	Y	Y	N	Y	
1513	BUTSO95A	FSUA-13	23-Oct-95	119712040	DRY	1229094	751378	0			FD	0	0.17	4	24		0		558		111		637		4.45	4 Ruby Street (43820		U	Y	Y	N	Y	
1514	BUTSO95A	FSUA-14	23-Oct-95	119712040	DRY	1229746	751715	0			FD	0	0.17	4	104		0		1190		581		5220		4.68	*33 Summit, 122 Mina		U	N	Y	N	Y	
1515	BUTSO95A	FSUA-15	23-Oct-95	119713020	DRY	1227256	750593	0			FD	0	0.17	4	50		0		564		572		2810		3.91	413 Boardman (29904/		U	Y	Y	N	Y	
1516	BUTSO95A	FSUA-16	27-Oct-95	119712040	DRY	1229191	751687	0			FD	0	0.17	4	300		0		1060		2050		7560		3.88	(45212)		U	Y	Y	N	N	
1517	BUTSO95A	FSUA-16	27-Oct-95	119712040	DRY	1229191	751687	0			DU	0	0.17	4	308		0		1120		2060		8780		3.87	(Duplicate)		U	Y	Y	N	Y	
1518	BUTSO95A	FSUA-18	27-Oct-95	119713020	DRY	1228039	750141	0			FD	0	0.17	4	506		0		734		1670		2980		3.8	513 W. James (27006)		U	Y	Y	N	Y	
1519	BUTSO95A	FSUA-19	27-Oct-95	119713020	DRY	1227495	750527	0			FD	0	0.17	4	92		0		156		6190		2230		4.84	403 Virginia (27927)		U	N	Y	R	Y	Y
1520	BUTSO95A	FSUA-20	27-Oct-95	119713010	DRY	1228808	750480	0			FD	0	0.17	4	443		0		908		2070		3900		2.76	North of Woolman (15		U	Y	Y	N	Y	

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
1521	BUTSO95A	FSUA-21	27-Oct-95	119713010	DRY	1230001	749421	0			FD	0	0.17	4	68		0		870		740		4760		3.8	East end of Capri Mo		U	Y	Y	N	Y	
1522	BUTSO95A	FSUA-22	27-Oct-95	119714040	DRY	1225149	747873	0			FD	0	0.17	4	197		0		421		350		830		2.59	Corner of Mercury an		U	N	Y	N	Y	
1523	BUTSO95A	FSUA-23	27-Oct-95	119714040	DRY	1225167	747684	0			FD	0	0.17	4	426		0		1230		2630		2010		2.26	Corner of Silvew and		U	N	Y	N	Y	
1524	BUTSO95A	FSUA-24	16-Nov-95	119712041	DRY	1228354	751185	0			DU	0	0.17	4	127		0		584		438		1310		3.62	South of Ruby (42218		U	Y	Y	N	Y	
1525	BUTSO95A	FSUA-24	16-Nov-95	119712041	DRY	1228354	751185	0			FD	0	0.17	4	123		0		593		407		1290		3.63	South of Ruby (42218		U	Y	Y	N	N	
1526	BUTSO95A	FSUA-26	16-Nov-95	119713010	DRY	1230957	749228	0			FD	0	0.17	4	312		0		1270		3560		1460		2.37	corner of Granite &		U	N	Y	N	Y	
1527	BUTSO95A	FSUA-27	16-Nov-95	119713010	DRY	1230813	749214	0			FD	0	0.17	4	262		0		1130		1130		409		2.08	South of Granite (12		U	Y	Y	N	Y	
1528	BUTSO95A	FSUA-28	16-Nov-95	119713010	DRY	1230762	749043	0			FD	0	0.17	4	211		0		934		2520		1050		2.81	East of 231 East Bro		U	N	Y	R	Y	Y
1529	BUTSO95A	FSUA-29	16-Nov-95	119713010	DRY	1230624	749215	0			FD	0	0.17	4	142		0		664		391		927		2.96	326 & 308 East Grani		U	Y	Y	N	Y	
1530	BUTSO95A	FSUA-30	17-Nov-95	119713010	DRY	1228926	749319	0			FD	0	0.17	4	130		0		593		2230		2680		3.02	West of 221 Quartx (		U	N	Y	N	N	
1531	BUTSO95A	FSUA-30	17-Nov-95	119713010	DRY	1228926	749319	0			DU	0	0.17	4	119		0		571		2300		2540		3.08	West of 221 Quartx (		U	N	Y	N	Y	
1532	BUTSO95A	FSUA-32	17-Nov-95	119713011	DRY	1230888	748926	0			FD	0	0.17	4	26		0		1510		135		942		4.78	South of Broadway (1		U	Y	Y	N	Y	
1533	BUTSO95A	FSUA-33	17-Nov-95	119713011	DRY	1230645	748924	0			FD	0	0.17	4	85		0		564		167		1510		3.78	South of Broadway (1		U	Y	Y	N	Y	
1534	BUTSO95A	FSUA-34	17-Nov-95	119713011	DRY	1230843	748763	0			FD	0	0.17	4	60		0		2040		174		1770		3.67	corner of Park & Cou		U	Y	Y	N	Y	
1535	BUTSO95A	FSUA-35	17-Nov-95	119713011	DRY	1229391	748089	0			FD	0	0.17	4	789		0		2280		1710		5860		3.3	back of Royal Garage		U	Y	Y	N	Y	
1536	BUTSO95A	FSUA-36	17-Nov-95	119713011	DRY	1230423	748465	0			FD	0	0.17	4	61		0		723		457		1000		2.91	building to West of		U	Y	Y	N	Y	
1537	BUTSO95A	FSUA-37	20-Nov-95	119713030	DRY	1227834	747729	0			FD	0	0.17	4	26		0		142		2410		1630		7.45	Northeast of Idaho-S		U	Y	Y	N	Y	
1538	BUTSO95A	FSUA-38	20-Nov-95	119713030	DRY	1227904	747647	0			DU	0	0.17	4	25		0		136		2310		1590		7.34	Northeast of Idaho-S		U	N	Y	N	Y	
1539	BUTSO95A	FSUA-39	20-Nov-95	119714040	DRY	1225208	747242	0			FD	0	0.17	4	112		0		234		2460		1910		3.26	Southwest corner of		U	N	Y	N	Y	
1540	BUTSO95A	FSUA-40	20-Nov-95	119714040	DRY	1222657	745399	0			FD	0	0.17	4	457		0		52		1490		1830		7.26	*Source Area #118, 1		U	Y	Y	N	Y	
1541	BUTSO95A	FSUA-41	20-Nov-95	119818020	DRY	1231511	748371	0			FD	0	0.17	4	113		0		1320		1620		2710		3.33	417 East Galena (215		U	Y	Y	N	Y	
1542	BUTSO95A	FSUA-42	20-Nov-95	119818020	DRY	1231554	747945	0			FD	0	0.17	4	262		0		745		4350		1830		2.01	East side of 344 Eas		U	N	Y	N	Y	
1543	BUTSO95A	FSUA-43	20-Nov-95	119818020	DRY	1231428	747933	0			FD	0	0.17	4	32		0		762		274		622		4.3	West of 340 East Mer		U	N	Y	N	Y	
1544	BUTSO95A	FSUA-44	21-Nov-95	119818020	DRY	1232166	748406	0			FD	0	0.17	4	33		0		836		174		575		3.82	corner of Continenta		U	Y	Y	N	Y	
1545	BUTSO95A	FSUA-45	21-Nov-95	119818030	DRY	1231022	747686	0			FD	0	0.17	4	103		0		446		2600		4410		2.23	East end of Curtis S		U	Y	Y	N	N	
1546	BUTSO95A	FSUA-45	21-Nov-95	119818030	DRY	1231022	747686	0			DU	0	0.17	4	107		0		434		2750		4390		2.2	East end of Curtis S		U	Y	Y	N	Y	
1547	BUTSO95A	FSUA-47	21-Nov-95	119723010	DRY	1225388	745744	0			FD	0	0.17	4	398		0		2250		930		4830		3.78	SE of West Junior Hi		U	Y	Y	N	Y	
1548	BUTSO95A	FSUA-48	21-Nov-95	119819030	DRY	1231640	742456	0			FD	0	0.17	4	84		0		665		2030		4430		8.37	*South side of Georg		U	Y	Y	N	Y	
1549	BUTSO95A	FSUA-49	21-Nov-95	119723010	DRY	1223719	745259	0			FD	0	0.17	4	117		0		52		251		563		6.31	*North side of Iron		U	N	Y	N	Y	
1550	BUTSO95A	FSUA-50	21-Nov-95	119723010	DRY	1223578	745311	0			FD	0	0.17	4	126		0		97		671		628		4.88	*North side of Iron		U	N	Y	N	Y	
1551	BUTSO95A	FSUA-51	21-Nov-95	119723010	DRY	1223231	745340	0			FD	0	0.17	4	149		0		114		380		576		6.42	*North side of Iron		U	N	Y	N	Y	
1552	BUTSO95A	FSUA-52	11-Dec-95	11981803R	DRY	1231745	746485	0			FD	0	0.17	4	322		0		2060		1070		4640		6.18	Middle RR Yard		U	Y	Y	N	Y	
1553	BUTSO95A	FSUA-53	11-Dec-95	11972401R	DRY	1230882	743835	0			FD	0	0.17	4	137		0		2500		1030		4350		5.92	Lower RR Yard		U	Y	Y	N	Y	
1554	BUTSO95A	FSUA-54	12-Dec-95	11981803R	DRY	1231846	746417	0			FD	0	0.17	4	528		0		6290		1440		12300		5.38	Middle RR Yard		U	Y	Y	N	Y	
1555	BUTSO95A	FSUA-55	12-Dec-95	11981902R	DRY	1231630	744229	0			FD	0	0.17	4	605		0		52700		2060		7650		6.56	Lower RR Yard		U	Y	Y	N	Y	
1556	BUTSO95A	FSUA-56	11-Dec-95	11981902R	DRY	1231493	743814	0			FD	0	0.17	4	143		0		772		2860		1960		2.79	Lower RR Yard		U	Y	Y	N	Y	
1557	BUTSO95A	FSUA-57	11-Dec-95	11972401R	DRY	1230290	743382	0			FD	0	0.17	4	228		0		12800		1190		6250		7.2	Lower RR Yard		U	Y	Y	N	Y	
1558	BUTSO95A	FSUA-58	12-Dec-95	11981902R	DRY	1231708	744152	0			FD	0	0.17	4	257		0		12100		2030		6880		6.69	Lower RR Yard		U	Y	Y	N	Y	
1559	BUTSO95A	FSUA-59	11-Dec-95	11972401R	DRY	1230018	743341	0			FD	0	0.17	4	121		0		2370		533		1870		6.62	Lower RR Yard		U	Y	Y	N	Y	
1560	BUTSO95A	FSUA-60	11-Dec-95	11981902R	DRY	1231471	743736	0			FD	0	0.17	4	211		0		3230		3150		1820		7.57	Lower RR Yard		U	Y	Y	N	Y	
1561	BUTSO95A	FSUA-61	14-Dec-95	11971401R	DRY	1224380	749293	0			FD	0	0.17	4	523		0		850		1360		1240		2.55	*Quartz & Granite, N		U	Y	Y	N	Y	
1562	BUTSO95A	FSUA-62	13-Dec-95	11972303R	DRY	1221964	742643	0			FD	0	0.17	4	126		0		149		1560		1990		2.36			U	Y	Y	N	Y	
1563	BUTSO95A	FSUA-63	13-Dec-95	11972303R	DRY	1223446	741919	0			FD	0	0.17	4	233		0		298		220		642		4.1	tailings		U	Y	Y	N	Y	
1564	BUTSO95A	FSUA-64	14-Dec-95	11971204R	DRY	1229897	750942	0			FD	0	0.17	4	523		0		6010		626		2740		3.95	Mina & Cleargrit		U	N	Y	N	Y	
1565	BUTSO95A	FSUA-65	14-Dec-95	11971204R	DRY	1228663	750670	0			FD	0	0.17	4	696		0		2320		1840		4050		3.06	Sutter & Pearl		U	Y	Y	N	Y	
1566	BUTSO95A	FSUA-66	14-Dec-95	11971204R	DRY	1229392	751286	0			FD	0	0.17	4	94		0		687		361		1170		3.96	Mina & Cleargrit		U	N	Y	N	Y	
1567	BUTSO95A	FSUA-67	13-Dec-95	11972404R	DRY	1229030	742681	0			FD	0	0.17	4	190		0		3910		219		460		3.08	waste rock		U	Y	Y	N	Y	
1568	BUTSO95A	FSUA-68	13-Dec-95	11972403R	DRY	1227059	741970	0			FD	0	0.17	4	1560		0		163		148		238		5.47			U	N	Y	N	Y	
1569	BUTSO95A	FSUA-69	13-Dec-95	11972404R	DRY	1229183	742759	0			FD	0	0.17	4	259		0		5320		267		766		3.69	waste rock		U	Y	Y	N	Y	
1570	BUTSO95A	FSUA-70	13-Dec-95	11972404R	DRY	1229097	742823	0			FD	0	0.17	4	208		0		2000		503		1170		3.34	cinder-like		U	Y	Y	N	Y	
1571	BUTSO95A	FSUA-71	12-Dec-95	11981803R	DRY	1232279	747288	0			FD	0	0.17	4	1600		0		4520		1940		4770		3.09			U	Y	Y	N	Y	
1572	BUTSO95A	FSUA-72	12-Dec-95	11981803R	DRY	1232615	746628	0			FD	0	0.17	4	1170		0		65100		2260		24200		6.55			U	Y	Y	N	Y	
1573	BUTSO95A	FSUA-73	13-Dec-95	11972402R	DRY	1226994	744299	0			FD	0	0.17	4	1830		0		10800		2110		12400		5.14			U	Y	Y	N	Y	
1574	BUTSO95A	FSUA-74	13-Dec-95	11972402R	DRY	1227137	744206	0			FD	0	0.17	4	133		0		171		47		203		8.22			U	Y	Y	N	Y	
1575	BUTSO95A	FSUA-75	13-Dec-95	11972402R	DRY	1227481	744314	0			FD	0	0.17	4	427		0		1930		531		4760		7.46			U	Y	Y	N	Y	
1576	BUTSO95A	FSUA-76	12-Dec-95	11981902R	DRY	1232928	744936	0			FD	0	0.17	4	47		0		939		127		520		4.52			U	Y	Y	N	Y	
1577	BUTSO95A	FSUA-77	14-Dec-95	11981803R	DRY	1232887	746949	0			FD	0	0.17	4	508		0		3740		1760		5760		5.21	*Iron Street, East o		U	Y	Y	N	Y	
1578	BUTSO95A	FSUA-78	14-Dec-95	11981803R	DRY	1232640	746825	0			FD	0	0.17	4	171		0		1050		1350		2070		4.44	*Iron Street, East o		U	Y	Y	N	Y	
1579	BUTSO95A	FSUA-79	13-Dec-95	11971404R	DRY	1223423	747553	0			FD	0	0.17	4	577		0		967		1230		1170		2.06			U	Y	Y	N	Y	
1580	BUTSO95A	FSUA-80	13-Dec-95	11971403R	DRY	1222360	747788	0			FD	0	0.17	4	529		0		2430		582		2720		4.28			U	Y	Y	N	Y	
1581	BUTSO95A	FSUA-81	13-Dec-95	11971403R	DRY	1221923	747289	0			FD	0	0.17	4	745		0		3750		704		3690		2.77			U	Y	Y	N	Y	
1582	BUTSO95A	FSUA-82	13-Dec-95	11971403R	DRY	1223023	747770	0			FD	0	0.17	4	893		0		1770		762		1980		2.57			U	Y	Y	N	Y	
1583	BUTSO95A	FSUA-83	13-Dec-95	11972402R	DRY	1226915	744221	0			FD	0	0.17	4	2750		0		9320		1820		17100		6.08			U	Y	Y	N	Y	
1584	BUTSO95A	FSUA-84	13-Dec-95	11972402R	DRY	1226984	744176	0			FD	0	0.17	4	2140		0		7920		1950		15600		6.32			U	Y	Y	N	Y	
1585	BUTSO95A	FSUA-85	14-Dec-95	11981804R	DRY	1234435	744870	0			FD	0	0.17	4	316		0		1130		668		1800		4.83	MWRR Main Line East		U	Y	Y	N	Y	
1586	BUTSO95A	FSUA-86	14-Dec-95	11981804R	DRY	1234200	745638	0			FD	0	0.17	4	329		0		952		771		1130		2.07	Texas & Continental		U	Y	Y	N	Y	
1587	BUTSO95A	FSUA-87	14-Dec-95	11981901R	DRY	1234814	744924	0			FD	0	0.17	4	166		0		3190		580		2340		5.13			U	Y	Y	N	Y	
1588	BUTSO95A	FSUA-88	14-Dec-95	11981803R	DRY	1232003	746737	0			FD	0	0.17	4	70		0		439		798		920		2.09	*Iron Street, East o		U	Y	Y	N	Y	
1589	BUTSO95A	FSUA-89	14-Dec-95	11981803R	DRY	1232907	746876	0			FD	0	0.17	4	591		0		4410		1980		7730		5.3	*Iron Street, East o		U	Y	Y	N	Y	
1590	BUTSO95A	FSUA-90	14-Dec-95	11981803R	DRY	1232587	746730	0			FD	0	0.17	4	342		0		1720		1900		5220		3.51	*Iron Street, East o		U	Y	Y	N	Y	
1591	BUTSO95A	FSUA-91	13-Dec-95	11972404R	DRY	1228477	742351	0			FD	0	0.17	4	510		0		1250		557		711		6.31	tailings-like		U	Y	Y	N	Y	
1592	BUTSO95A	FSUA-92	13-Dec-95	11972403R	DRY	1227265	741993	0			FD	0	0.17	4	41		0		193		112		343		6.64			U	N	Y	N	Y	
1593	BUTSO95A	FSUA-93	13-Dec-95	11972404R	DRY	1228861	742620	0			FD	0	0.17	4	279		0		2750		349		742		3.63	waste rock		U	Y	Y	N	Y	
1594	BUTSO95A	FSUA-94	14-Dec-95	11981804R	DRY	1234199	745104	0			FD	0	0.17	4	1040		0		18800		718		7560		4.82	MWRR Main Line East		U	Y	Y	N	Y	
1595	BUTSO95A	FSUA-95	14-Dec-95	11981804R	DRY	1235644	745422	0			FD	0	0.17	4	46		0		488		201		450		2.57	Texas & Continental	OUTSIDE OPERABLE UNI	U	Y	Y	N	Y	

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
1596	BUTSO95A	FSUA-96	13-Dec-95	11972403R	DRY	1227026	741887	0			FD	0	0.17	4	165		0		924		185		511		3.36			U	N	Y	N	Y	
1597	BUTSO95A	FSUA-97	12-Dec-95	11981803R	DRY	1232804	747632	0			FD	0	0.17	4	206		0		784		193		423		2.52	along bank of expose		U	N	Y	N	Y	
1598	BUTSO95A	FSUA-98	12-Dec-95	11981803R	DRY	1231817	746111	0			FD	0	0.17	4	739		0		12700		3690		11600		5.11			U	Y	Y	N	Y	
1599	BUTSO95A	FSUA-99	12-Dec-95	11971304R	DRY	1230115	745288	0			FD	0	0.17	4	591		0		3670		1540		5250		6.26			U	Y	Y	N	Y	
1600	BUTSO95A	FSUA-100	14-Dec-95	11981804R	DRY	1233551	745521	0			FD	0	0.17	4	726		0		12200		1200		2630		4.91	MWRR Main Line East		U	Y	Y	N	Y	
1601	BUTSO95A	FSUA-101	12-Dec-95	11981803R	DRY	1232052	747119	0			FD	0	0.17	4	4530		0		9200		3480		4760		4.16			U	Y	Y	N	Y	
1602	BUTSO95A	FSUA-102	12-Dec-95	11981803R	DRY	1231822	747224	0			FD	0	0.17	4	243		0		2120		942		3210		5.07			U	Y	Y	N	Y	
1603	BUTSO95A	FSUA-103	14-Dec-95	11972504R	DRY	1228650	734960	0			FD	0	0.17	4	319		0		166		857		971		3.6	base of Timber Butte		U	Y	Y	N	Y	
1604	BUTSO95A	FSUA-104	14-Dec-95	11972503R	DRY	1227486	735932	0			FD	0	0.17	4	404		0		203		914		2000		4.53	North of Timber Butt		U	Y	Y	N	Y	
1605	BUTSO95A	FSUA-105	14-Dec-95	11972502R	DRY	1226409	737925	0			FD	0	0.17	4	164		0		207		324		881		6	along abandoned RR g		U	Y	Y	N	Y	
1606	BUTSO95A	FSUA-106	14-Dec-95	11981901R	DRY	1235100	744960	0			FD	0	0.17	4	187		0		684		380		559		6.19	Texas & Continental		U	Y	Y	N	Y	
1607	BUTSO95A	FSUA-107	14-Dec-95	11981804R	DRY	1235638	745285	0			FD	0	0.17	4	73		0		355		210		430		3.03	between Continental	OUTSIDE OPERABLE UNI	U	Y	Y	N	Y	
1608	BUTSO95A	FSUA-108	19-Jun-96	119712041	DRY	1230103	750823	0			FD	0	0.17	4	136		0		615		794		966		2.46			U	N	Y	N	Y	
1609	BUTSO95A	FSUA-109	20-Jun-96	119712041	DRY	1227952	751690	0			FD	0	0.17	4	380		0		2220		1600		5600		4.97			U	Y	Y	N	Y	
1610	BUTSO95A	FSUA-110	20-Jun-96	119712041	DRY	1227859	750776	0			FD	0	0.17	4	137		0		811		2950		1810		3.77			U	N	Y	N	Y	
1611	BUTSO95A	FSUA-111	20-Jun-96	119713020	DRY	1227977	749619	0			FD	0	0.17	4	69		0		317		1370		2550		4.36			U	Y	Y	N	Y	
1612	BUTSO95A	FSUA-112	19-Jun-96	119713011	DRY	1228272	749810	0			FD	0	0.17	4	392		0		1670		2050		6630		5.68			U	N	Y	N	Y	
1613	BUTSO95A	FSUA-113	19-Jun-96	119807030	DRY	1231280	751757	0			FD	0	0.17	4	609		0		2010		417		486		1.97			U	Y	Y	N	Y	
1614	BUTSO95A	FSUA-114	19-Jun-96	119807030	DRY	1231288	752178	0			FD	0	0.17	4	336		0		894		1620		911		2.39			U	Y	Y	N	Y	
1615	BUTSO95A	FSUA-115	19-Jun-96	119807030	DRY	1231651	752365	0			FD	0	0.17	4	407		0		965		3350		1010		2.21			U	Y	Y	N	Y	
1617	BUTSO95A	FSUA-117	21-Jun-96	119712020	DRY	1226962	755490	0			FD	0	0.17	4	27		0		217		2680		2680		3.42			U	Y	Y	N	Y	
1618	BUTSO95A	FSUA-118	20-Jun-96	119712020	DRY	1225569	753548	0			FD	0	0.17	4	69		0		386		446		1680		3.17			U	Y	Y	N	Y	
1619	BUTSO95A	FSUA-119	20-Jun-96	119712020	DRY	1226667	754679	0			DU	0	0.17	4	90		0		170		1250		1300		6.04			U	N	Y	N	Y	
1620	BUTSO95A	FSUA-119	20-Jun-96	119712020	DRY	1226667	754679	0			DU	0	0.17	4	85		0		180		1130		1160		6.16			U	N	Y	N	N	
1621	BUTSO95A	FSUA-121	20-Jun-96	119713030	DRY	1227818	745377	0			FD	0	0.17	4	77		0		118		465		379		8.21			U	Y	Y	N	Y	
1622	BUTSO95A	FSUA-122	20-Jun-96	119713011	DRY	1228767	750560	0			FD	0	0.17	4	301		0		902		2860		2740		4.44			U	Y	Y	N	Y	
1623	BUTSO95A	FSUA-123	20-Jun-96	119713040	DRY	1229832	745811	0			FD	0	0.17	4	156		0		852		2860		5800		3.08			U	Y	Y	N	Y	
1624	BUTSO95A	FSUA-124	21-Jun-96	119713040	DRY	1230905	747096	0			FD	0	0.17	4	84		0		841		2280		4810		2.46			U	Y	Y	N	Y	
1625	BUTSO95A	FSUA-125	21-Jun-96	119714030	DRY	1222764	746885	0			FD	0	0.17	4	207		0		68		3560		6870		4.76			U	N	Y	N	Y	
1626	BUTSO95A	FSUA-126	20-Jun-96	119819010	DRY	1233696	744772	0			FD	0	0.17	4	59		0		745		137		416		6.29			U	Y	Y	N	Y	
1627	BUTSO95A	FSUA-127	20-Jun-96	119819010	DRY	1233594	744726	0			FD	0	0.17	4	598		0		362		612		1310		5.4			U	Y	Y	N	Y	
1628	BUTSO95A	FSUA-128	20-Jun-96	119819020	DRY	1230925	743358	0			FD	0	0.17	4	21		0		121		286		651		7.89			U	Y	Y	N	Y	
1629	BUTSO95A	FSUA-129	20-Jun-96	119819020	DRY	1231683	742709	0			FD	0	0.17	4	396		0		2380		602		2010		4.63			U	Y	Y	N	Y	
1630	BUTSO95A	FSUA-130	20-Jun-96	119819020	DRY	1232305	743306	0			FD	0	0.17	4	232		0		1520		335		5130		4.4			U	Y	Y	N	Y	
1631	BUTSO95A	FSUA-131	21-Jun-96	119723010	DRY	1224422	743523	0			FD	0	0.17	4	234		0		41		115		103		3.58			U	Y	Y	N	Y	
1632	BUTSO95A	FSUA-132	21-Jun-96	119723020	DRY	1222048	743960	0			FD	0	0.17	4	155		0		78		626		1000		6.5			U	Y	Y	N	Y	
1633	BUTSO95A	FSUA-133	21-Jun-96	119724020	DRY	1227510	744797	0			FD	0	0.17	4	156		0		1250		865		9330		3.98			U	Y	Y	N	Y	
1634	BUTSO95A	FSUA-134	21-Jun-96	119724040	DRY	1228279	742166	0			FD	0	0.17	4	157		0		3020		371		2340		4.45			U	Y	Y	N	Y	
1635	BUTSO95A	FSUA-135	20-Jun-96	119724040	DRY	1229174	741556	0			FD	0	0.17	4	181		0		1340		418		2190		4.04			U	Y	Y	N	N	
1636	BUTSO95A	FSUA-135	20-Jun-96	119724040	DRY	1229174	741556	0			DU	0	0.17	4	164		0		1360		422		2300		4.07			U	Y	Y	N	Y	
1637	BUTSO95A	FSUA-137	21-Jun-96	119725010	DRY	1228632	737735	0			FD	0	0.17	4	540		0		996		1990		4290		5.76			U	Y	Y	N	Y	
1638	BUTSO95A	FSUA-138	20-Jun-96	119713011	DRY	1228763	750050	0			FD	0	0.17	4	355		0		1280		414		2000		2.64			U	Y	Y	N	Y	
1639	BUTSO95A	FSUA-139	20-Jun-96	119713011	DRY	1228923	750006	0			FD	0	0.17	4	191		0		6910		313		1850		4.02			U	Y	Y	N	Y	
1640	BUTSO95A	FSUA-140	20-Jun-96	119713011	DRY	1229156	750468	0			FD	0	0.17	4	69		0		893		226		612		4.23			U	N	Y	N	Y	
1641	BUTSO95A	FSUA-141	20-Jun-96	119713012	DRY	1229330	750663	0			FD	0	0.17	4	221		0		597		3730		1690		2.58			U	N	Y	N	Y	
1642	BUTSO95A	FSUA-142	19-Jun-96	119713012	DRY	1230370	750291	0			FD	0	0.17	4	687		0		1640		3200		1800		2.11			U	Y	Y	N	Y	
1643	BUTSO95A	FSUA-143	19-Jun-96	119713012	DRY	1230356	750838	0			FD	0	0.17	4	665		0		2890		2000		2810		3.2			U	Y	Y	N	Y	
1644	BUTSO95A	FSUA-144	19-Jun-96	119713012	DRY	1230877	750586	0			FD	0	0.17	4	306		0		1540		1220		5040		2.29			U	Y	Y	N	Y	
1645	BUTSO95A	FSUA-145	19-Jun-96	119713012	DRY	1230127	749811	0			FD	0	0.17	4	97		0		1180		1040		2610		2.93			U	N	Y	N	Y	
1646	BUTSO95A	FSUA-146	16-Jun-96	119713012	DRY	1230682	749687	0			FD	0	0.17	4	334		0		1050		744		731		2.22			U	Y	Y	N	Y	
1647	BUTSO95A	FSUA-147	19-Jun-96	119712041	DRY	1230542	752577	0			FD	0	0.17	4	32		0		365		293		1350		3.11			U	Y	Y	N	Y	
1648	BUTSO95A	FSUA-148	19-Jun-96	119712042	DRY	1230631	752406	0			FD	0	0.17	4	433		0		360		875		1030		2.82			U	Y	Y	N	Y	
1649	BUTSO95A	FSUA-149	19-Jun-96	119712042	DRY	1230481	752491	0			FD	0	0.17	4	373		0		1370		1360		798		1.56			U	Y	Y	N	Y	
1650	BUTSO95A	FSUA-150	19-Jun-96	119712042	DRY	1229977	752404	0			FD	0	0.17	4	484		0		1450		2730		1210		2.14			U	Y	Y	N	Y	
1651	BUTSO95A	FSUA-151	19-Jun-96	119712042	DRY	1230015	752230	0			FD	0	0.17	4	435		0		2220		567		1560		3.85			U	Y	Y	N	Y	
1652	BUTSO95A	FSUA-152	20-Jun-96	119712042	DRY	1230512	751728	0			FD	0	0.17	4	493		0		970		640		805		2.89			U	Y	Y	N	Y	
1653	BUTSO95A	FSUA-153	20-Jun-96	119712042	DRY	1230350	752005	0			FD	0	0.17	4	35		0		549		189		1160		4.07			U	Y	Y	N	Y	
1654	BUTSO95A	FSUA-154	20-Jun-96	119713030	DRY	1227681	745435	0			FD	0	0.17	4	67		0		281		421		1350		8.04			U	Y	Y	N	Y	
1655	BUTSO95A	FSUA-155	20-Jun-96	119713040	DRY	1229940	745630	0			FD	0	0.17	4	125		0		141		230		593		3.13			U	Y	Y	N	Y	
1656	BUTSO95A	FSUA-156	21-Jun-96	119713040	DRY	1229790	745375	0			FD	0	0.17	4	117		0		907		2460		5890		2.97			U	N	Y	N	Y	
1657	BUTSO95A	FSUA-157	20-Jun-96	119819010	DRY	1234696	744532	0			FD	0	0.17	4	973		0		837		461		615		4.39			U	Y	Y	N	Y	
1658	BUTSO95A	FSUA-158	21-Jun-96	119724020	DRY	1227180	743011	0			FD	0	0.17	4	281		0		1100		369		1020		6.76			U	N	Y	N	Y	
1659	BUTSO95A	FSUA-159	20-Jun-96	119819010	DRY	1234300	744184	0			FD	0	0.17	4	1160		0		8400		1190		1900		4.35			U	Y	Y	N	Y	
1660	BUTSO95A	FSUA-160	06-Nov-95	119712040	DRY	1229634	751847	0			FD	0	0.17	4	133		0		1130		743		2190		4.24			U	N	Y	N	N	
1661	BUTSO95A	FSUA-161	06-Nov-95	119712041	DRY	1229663	751762	0			FD	0	0.17	4	58		0		734		1810		2610		6.6			U	N	Y	N	Y	
1662	BUTSO95A	FSUA-162	06-Nov-95	119712041	DRY	1229739	751698	0			FD	0	0.17	4	45		0		836		1070		1610		6.17			U	Y	Y	N	Y	
1663	BUTSO95A	FSUA-163	20-Jun-96	119713030	DRY	1227778	745631	0			FD	0	0.17	4	335		0		168		420		607		3.43			U	Y	Y	R	Y	Y
1664	BUTSO95A	FSUA-143	19-Jun-96	119713012	DRY	1230356	750838	0			DU	0	0.17	4	622		0		3270		1810		3190		3.08			U	Y	Y	N	N	
1665	BUTSO95A	FSUA-160	06-Nov-95	119712041	DRY	1229634	751847	0			DU	0	0.17	4	116		0		1010		819		2030		4.27			U	N	Y	N	Y	
1102a	BUTSO93B	RRLY019	09-Jun-93	LY0019	DRY	1231230	743623	1687	LY-48	S41483	FD	0.08	0.08	1	18		0		0		143		0					U	Y	Y	N	N	
1102b	BUTSO93B	RRLY019	09-Jun-93	LY0019	DRY	1231230	743623	1687	LY-49	S41484	FD	0.5	0.5	1	14		0		0		102		0					U	Y	Y	N	N	
1102c	BUTSO93B	RRLY019	09-Jun-93	LY0019	DRY	1231230	743623	1687	LY-50	S41485	FD	1	1	1	19		0		0		150	J	0					U	N	N	N	N	
1102d	BUTSO93B	RRLY019	09-Jun-93	LY0019	DRY	1231230	743623	1687	LY-51	S41486	DU	1	1	1	16		0		0		273	J	0					U	N	N	N	Y	
1102e	BUTSO93B	RRLY019	09-Jun-93	LY0019	DRY	1231230	743623	1687	LY-52	S41487	FD	1.5	1.5	1	21		0		0		215		0					U	N	N	N	N	
1102f	BUTSO93B	RRLY019	09-Jun-93	LY0019	DRY	1231230	743623	1687	LY-55	S41488	FD	2	2	1	19		0		0		163		0					U	N	N	N	N	

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
1106a	BUTSO93B	RRLY017	09-Jun-93	LY0017	DRY	1231512	743844	1686	LY-46	LY:46	FD	0.58	0.58	1	81		0		730		3844		1200					U	N	N	N	Y	
1106b	BUTSO93B	RRLY017	09-Jun-93	LY0017	DRY	1231512	743844	1686	LY-38	S41479	FD	1.5	1.5	1	29		0		0		803		0					U	N	N	N	N	
1106c	BUTSO93B	RRLY017	09-Jun-93	LY0017	DRY	1231512	743844	1686	LY-38	E41526	FD	1.5	1.5	1	0	U	0		0		0		1					U	N	N	N	N	
1109a	BUTSO93B	RRLY014	09-Jun-93	LY0014	DRY	1231694	744216	1684	LY-33	LY:33	FD	0.08	0.08	1	744		0		18400		4712		7800					U	Y	Y	N	Y	
1109b	BUTSO93B	RRLY014	09-Jun-93	LY0014	DRY	1231694	744216	1684	LY-34	LY:34	FD	0.5	0.5	1	558		0		2300		818		1500					U	Y	Y	N	N	
1109c	BUTSO93B	RRLY014	09-Jun-93	LY0014	DRY	1231694	744216	1684	LY-35	LY:35	FD	1	1	1	422		0		2700		533		570					U	N	N	N	N	
1109d	BUTSO93B	RRLY014	09-Jun-93	LY0014	DRY	1231694	744216	1684	LY-36	LY:36	FD	1.5	1.5	1	22		0		500		682		820					U	N	N	N	N	
1109e	BUTSO93B	RRLY014	09-Jun-93	LY0014	DRY	1231694	744216	1684	LY-37	LY:37	FD	2	2	1	53		0		520		930		1500					U	N	N	N	N	
1126a	BUTSO93B	RRMLW08	02-Jun-93	MLW008	DRY	1222292	742519	1675	MLW-12	S41399	FD	0.08	0.08	1	97		0		0		151		0					U	Y	Y	N	Y	
1126b	BUTSO93B	RRMLW08	02-Jun-93	MLW008	DRY	1222292	742519	1675	MLW-13	S41400	FD	0.5	0.5	1	165		0		0		149		0					U	Y	Y	N	N	
1126c	BUTSO93B	RRMLW08	02-Jun-93	MLW008	DRY	1222292	742519	1675	MLW-14	S41401	FD	1	1	1	191		0		0		144		0					U	N	N	N	N	
1126d	BUTSO93B	RRMLW08	02-Jun-93	MLW008	DRY	1222292	742519	1675	MLW-15	S41402	FD	1.5	1.5	1	158		0		0		119		0					U	N	N	N	N	
1126e	BUTSO93B	RRMLW08	02-Jun-93	MLW008	DRY	1222292	742519	1675	MLW-16	S41403	FD	2	2	1	139		0		0		116		0					U	N	N	N	N	
1128a	BUTSO93B	RRMLW10	08-Jun-93	MLW010	DRY	1222926	742237	1667	MLW-51	S41417	FD	1.5	1.5	1	494		0		0		300		0					U	N	N	N	Y	
1128b	BUTSO93B	RRMLW10	08-Jun-93	MLW010	DRY	1222926	742237	1667	MLW-51	E41519	FD	1.5	1.5	1	1		0		0		0		1					U	N	N	N	N	
1129a	BUTSO93B	RRMLW11	02-Jun-93	MLW011	DRY	1222905	742200	1668	MLW-20	S41404	FD	0.17	0.17	1	333		0		0		314		0					U	Y	Y	N	Y	
1129b	BUTSO93B	RRMLW11	02-Jun-93	MLW011	DRY	1222905	742200	1668	MLW-21	S41405	FD	0.5	0.5	1	4		0		0		243		0					U	Y	Y	N	N	
1129c	BUTSO93B	RRMLW11	02-Jun-93	MLW011	DRY	1222905	742200	1668	MLW-22	S41406	FD	1	1	1	545		0		0		278		0					U	N	N	N	N	
1129d	BUTSO93B	RRMLW11	02-Jun-93	MLW011	DRY	1222905	742200	1668	MLW-23	S41407	FD	1.5	1.5	1	360		0		0		195		0					U	N	N	N	N	
1129e	BUTSO93B	RRMLW11	02-Jun-93	MLW011	DRY	1222905	742200	1668	MLW-24	S41408	FD	2	2	1	435		0		0		215		0					U	N	N	N	N	
1129f	BUTSO93B	RRMLW11	02-Jun-93	MLW011	DRY	1222905	742200	1668	MLW-72	S41419	DU	2	2	1	356		0		0		170		0					U	N	N	N	N	
1132a	BUTSO93B	RRMLW14	02-Jun-93	MLW014	DRY	1224088	741701	1661	MLW-30	S41409	FD	1.5	1.5	1	943		0		0		389		0					U	N	N	N	Y	
1132b	BUTSO93B	RRMLW14	02-Jun-93	MLW014	DRY	1224088	741701	1661	MLW-30	E41518	DU	1.5	1.5	1	0		0		0		0		2					U	N	N	N	N	
1132c	BUTSO93B	RRMLW14	02-Jun-93	MLW014	DRY	1224088	741701	1661	MLW-73	S41419	DU	1.5	1.5	1	731		0		0		283		0					U	N	N	N	N	
1143a	BUTSO93B	RRNB008	04-Jun-93	NB0008	DRY	1228278	739931	1681	NB-15	E41521	FD	1.5	1.5	1	0		0		0		0	U	1					U	N	N	R	N	Y
1143b	BUTSO93B	RRNB008	04-Jun-93	NB0008	DRY	1228278	739931	1681	NB-15	S41430	FD	1.5	1.5	1	76		0		0		61		0					U	N	N	R	Y	Y
1146a	BUTSO94D	RRNB018	17-Oct-94	NB0018	DRY	1226353	740645	1668	94-012-N	S72804	FD	0	0.2	1	163		0		0		220		0					U	N	N	N	N	
1146b	BUTSO94D	RRNB018	17-Oct-94	NB0018	DRY	1226353	740645	1668	94-013-N	S72805	FD	1	1.3	1	514		0		0		346		0					U	N	N	N	Y	
1146c	BUTSO94D	RRNB018	17-Oct-94	NB0018	DRY	1226353	740645	1668	94-014-N	S72806	FD	2.2	2.5	1	209		0		0		6		0					U	N	N	N	N	
1149a	BUTSO94D	RRNB017	17-Oct-94	NB0017	DRY	1225639	741278	1662	94-009-N	S72801	FD	0	0.2	1	310		0		0		226		0					U	N	N	N	N	
1149b	BUTSO94D	RRNB017	17-Oct-94	NB0017	DRY	1225639	741278	1662	94-010-N	S72802	FD	0.8	1	1	360		0		0		798		0					U	N	N	N	Y	
1149c	BUTSO94D	RRNB017	17-Oct-94	NB0017	DRY	1225639	741278	1662	94-011-N	S72803	FD	2.5	2.5	1	212		0		0		8		0					U	N	N	N	N	
1151a	BUTSO94D	RRNB016	17-Oct-94	NB0016	DRY	1225628	741524	1660	94-006-N	S72798	FD	0	0.2	1	340		0		0		131		0					U	N	N	N	N	
1151b	BUTSO94D	RRNB016	17-Oct-94	NB0016	DRY	1225628	741524	1660	94-007-N	S72799	FD	1	1.5	1	485		0		0		351		0					U	N	N	N	Y	
1151c	BUTSO94D	RRNB016	17-Oct-94	NB0016	DRY	1225628	741524	1660	94-008-N	S72800	FD	2.8	2.8	1	346		0		0		13		0					U	N	N	N	N	
1152a	BUTSO93B	RRNB001	03-Jun-93	NB0001	DRY	1225644	741544	1660	NB-1	E41520	FD	1.5	1.5	1	0	U	0		6		0	U	2					U	N	N	N	N	
1152b	BUTSO93B	RRNB001	03-Jun-93	NB0001	DRY	1225644	741544	1660	NB-1	S41421	FD	1.5	1.5	1	13		0		0		15		0					U	N	N	N	N	
1154a	BUTSO93B	RRNB003	03-Jun-93	NB0003	DRY	1225713	741539	1660	NB-5	S41423	FD	0.08	0.08	1	72		0		0		210		0					U	Y	Y	N	N	
1154b	BUTSO93B	RRNB003	03-Jun-93	NB0003	DRY	1225713	741539	1660	NB-6	S41424	FD	0.5	0.5	1	118		0		0		609		0					U	Y	Y	N	Y	
1154c	BUTSO93B	RRNB003	03-Jun-93	NB0003	DRY	1225713	741539	1660	NB-7	S41425	FD	1	1	1	76		0		0		88		0					U	N	N	N	N	
1154d	BUTSO93B	RRNB003	03-Jun-93	NB0003	DRY	1225713	741539	1660	NB-8	S41426	FD	1.5	1.5	1	146		0		0		121		0					U	N	N	N	N	
1154e	BUTSO93B	RRNB003	03-Jun-93	NB0003	DRY	1225713	741539	1660	NB-9	S41427	FD	2	2	1	419		0		0		271		0					U	N	N	N	N	
1167a	BUTSO93B	RRMY017	06-Jun-93	MY0017	DRY	1231301	745887	1689	MY-37	S41465	FD	1.5	1.5	1	448		0		0		592		0					U	N	N	N	Y	
1167b	BUTSO93B	RRMY017	06-Jun-93	MY0017	DRY	1231301	745887	1689	MY-37	E41525	FD	1.5	1.5	1	0	U	0		4		0	U	2					U	N	N	N	N	
1171a	BUTSO93B	RRMY011	05-Jun-93	MY0011	DRY	1231804	746232	1691	MY-27	MY:27	FD	0.08	0.08	1	1364		0		7700		4216		15300					U	Y	Y	N	Y	
1171b	BUTSO93B	RRMY011	05-Jun-93	MY0011	DRY	1231804	746232	1691	MY-28	MY:28	FD	0.5	0.5	1	670		0		1300		2232		3200					U	Y	Y	N	N	
1171c	BUTSO93B	RRMY011	05-Jun-93	MY0011	DRY	1231804	746232	1691	MY-29	MY:29	FD	1	1	1	347		0		1400		1488		2500					U	N	N	N	N	
1171d	BUTSO93B	RRMY011	05-Jun-93	MY0011	DRY	1231804	746232	1691	MY-30	MY:30	FD	1.5	1.5	1	769		0		2500		694		2700					U	N	N	N	N	
1171e	BUTSO93B	RRMY011	05-Jun-93	MY0011	DRY	1231804	746232	1691	MY-31	MY:31	FD	2	2	1	1166		0		1400		1364		2500					U	N	N	N	N	
1172a	BUTSO93B	RRMY010	05-Jun-93	MY0010	DRY	1231826	746207	1691	MY-26	S41532	FD	0.08	0.08	1	2400		83		198000		24500		22200					U	Y	Y	N	Y	
1172b	BUTSO93B	RRMY010	05-Jun-93	MY0010	DRY	1231826	746207	1691	MY-26	E41524	FD	0.08	0.08	1	0	U	0		193		0		89					U	N	N	N	N	
1174a	BUTSO93B	RRMY009	05-Jun-93	MY0009	DRY	1232179	746468	1691	MY-21	S41460	FD	0.08	0.08	1	550		0		0		2940		0					U	Y	Y	N	Y	
1174b	BUTSO93B	RRMY009	05-Jun-93	MY0009	DRY	1232179	746468	1691	MY-22	S41461	FD	0.5	0.5	1	2710		0		0		2200		0					U	Y	Y	N	N	
1174c	BUTSO93B	RRMY009	05-Jun-93	MY0009	DRY	1232179	746468	1691	MY-23	S41462	FD	1	1	1	1180		0		0		1320		0					U	N	N	N	N	
1174d	BUTSO93B	RRMY009	05-Jun-93	MY0009	DRY	1232179	746468	1691	MY-24	S41463	FD	1.5	1.5	1	1340		0		0		859		0					U	N	N	N	N	
1174e	BUTSO93B	RRMY009	05-Jun-93	MY0009	DRY	1232179	746468	1691	MY-25	S41464	FD	2	2	1	1210		0		0		398		0					U	N	N	N	N	
1175a	BUTSO93B	RRMY008	05-Jun-93	MY0008	DRY	1232352	746502	1691	MY-18	S41457	FD	1.5	1.5	1	208		0		0		599		0					U	N	N	N	Y	
1175b	BUTSO93B	RRMY008	05-Jun-93	MY0008	DRY	1232352	746502	1691	MY-18	E41523	FD	1.5	1.5	1	0	U	0		38		0	U	10					U	N	N	N	N	
1184a	BUTSO93B	RRMY006	05-Jun-93	MY0006	DRY	1233011	746565	1689	MY-15	S41530	FD	0.08	0.08	1	175		0	U	431	J	227		79					U	Y	Y	N	N	
1184b	BUTSO93B	RRMY006	05-Jun-93	MY0006	DRY	1233011	746565	1689	MY-16	S41531	DU	0.08	0.08	1	209		0	U	473		230		76					U	Y	Y	N	Y	
1186a	BUTSO93B	RRMY004	05-Jun-93	MY0004	DRY	1233172	746353	1688	MY-11	S41456	FD	1.5	1.5	1	51		0		0		100		0					U	N	N	N	N	
1186b	BUTSO93B	RRMY004	05-Jun-93	MY0004	DRY	1233172	746353	1688	MY-59	S41469	DU	1.5	1.5	1	60		0		0		158		0					U	N	N	N	Y	
1189a	BUTSO93B	RRUY002	11-Jun-93	UY0002	DRY	1232850	747620	1697	UY-6	UY:6	FD	0.25	0.25	1	1091		0		1100		583		420					U	N	Y	N	N	
1189b	BUTSO93B	RRUY002	11-Jun-93	UY0002	DRY	1232850	747620	1697	UY-2	S41490	FD	1.5	1.5	1	197		0		0		690		0					U	N	N	N	Y	
1192a	BUTSO93B	RRUY004	11-Jun-93	UY0004	DRY	1232081	747456	1698	UY-8	S41491	FD	0.08	0.08	1	186		0		0		844		0					U	Y	Y	N	Y	
1192b	BUTSO93B	RRUY004	11-Jun-93	UY0004	DRY	1232081	747456	1698	UY-9	S41492	FD	0.5	0.5	1	150		0		0		757		0					U	Y	Y	N	N	
1192c	BUTSO93B	RRUY004	11-Jun-93	UY0004	DRY	1232081	747456	1698	UY-10	S41493	FD	1	1	1	91		0		0		538		0					U	N	N	N	N	
1192d	BUTSO93B	RRUY004	11-Jun-93	UY0004	DRY	1232081	747456	1698	UY-42	S41505	DU	1	1	1	9435		0		0		480		0					U	N	N	N	N	
1192e	BUTSO93B	RRUY004	11-Jun-93	UY0004	DRY	1232081	747456	1698	UY-11	S41494	FD	1.5	1.5	1	65		0		0		420		0					U	N	N	N	N	
1192f	BUTSO93B	RRUY004	11-Jun-93	UY0004	DRY	1232081	747456	1698	UY-12	S41495	FD	2	2	1	9		0		0		667		0					U	N	N	N	N	
1194a	BUTSO93B	RRUY010	11-Jun-93	UY0010	DRY	1231564	747159	1698	UY-26	E41527	FD	1.5	1.5	1	0	U	0		0		0	U	0					U	N	N	N	N	
1194b	BUTSO93B	RRUY010	11-Jun-93	UY0010	DRY	1231564	747159	1698	UY-26	S41499	FD	1.5	1.5	1	213		0		0		724		0					U	N	N	N	Y	
1211a	BUTSO93B	RRNB009	04-Jun-93	NB0009	DRY	1229087	738592	1685	NB-17	S41431	FD	0.08	0.08	1	85		0		0		257		0					U	Y	Y	R	Y	Y
1211b	BUTSO93B	RRNB009	04-Jun-93	NB0009	DRY	1229087	738592	1685	NB-18	S41432	FD	0.5	0.5	1	68		0		0		160		0					U	Y	Y	R	N	Y
1211c	BUTSO93B	RRNB009	04-Jun-93	NB0009	DRY	1229087	738592	1685	NB-19	S41435	FD	1	1	1	36		0		0		62		0					U	N	N	R	N	Y

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
1211d	BUTSO93B	RRNB009	04-Jun-93	NB0009	DRY	1229087	738592	1685	NB-20	S41438	FD	1.5	1.5	1	17	J	0		0		23	J	0					U	N	N	R	N	Y
1211e	BUTSO93B	RRNB009	04-Jun-93	NB0009	DRY	1229087	738592	1685	NB-21	S41439	FD	2	2	1	18		0		0		19		0					U	N	N	R	N	Y
1216a	BUTSO93B	RRNB013	04-Jun-93	NB0013	DRY	1227061	736689	1696	NB-25	S41442	FD	0.08	0.08	1	208		0		0		462		0					U	Y	Y	N	Y	
1216b	BUTSO93B	RRNB013	04-Jun-93	NB0013	DRY	1227061	736689	1696	NB-26	S41443	FD	0.5	0.5	1	77		0		0		168		0					U	Y	Y	N	N	
1216c	BUTSO93B	RRNB013	04-Jun-93	NB0013	DRY	1227061	736689	1696	NB-27	S41444	FD	1	1	1	14		0		0		23		0					U	N	N	N	N	
1216d	BUTSO93B	RRNB013	04-Jun-93	NB0013	DRY	1227061	736689	1696	NB-28	S41445	FD	1.5	1.5	1	8		0		0		15		0					U	N	N	N	N	
1216e	BUTSO93B	RRNB013	04-Jun-93	NB0013	DRY	1227061	736689	1696	NB-29	S41446	FD	2	2	1	26		0		0		51		0					U	N	N	N	N	
1218a	BUTSO93B	RRNB011	04-Jun-93	NB0011	DRY	1227620	736314	1699	NB-23	E41522	FD	1.5	1.5	1	0	U	0		0		0	U	0					U	N	N	N	N	
1218b	BUTSO93B	RRNB011	04-Jun-93	NB0011	DRY	1227620	736314	1699	NB-23	S41441	FD	1.5	1.5	1	47		0		0		71		0					U	Y	Y	N	Y	
1384	BUTSO91D	BU-3	06-Dec-89	BU-3-5-1		1228637	756304	0			FD	0	0.17	2	25		0		86		262		374	J				B	Y	Y	R	Y	Y
1385	BUTSO91D	BU-4	27-Nov-89	BU-4-3-1		1230008	755268	0			FD	0	0.17	2	54	J	0		148	J	904		593					B	Y	Y	R	N	Y
1387	BUTSO91D	BU-4	22-Nov-89	BU-4-17-1		1230642	754556	0			FD	0	0.17	2	103		0		259	J	1720		2680					B	Y	Y	R	N	Y
1388	BUTSO91D	BU-4	21-Nov-89	BU-4-20-1		1230242	755536	0			FD	0	0.17	2	77		0		302		1110		1880	J				B	Y	Y	R	N	Y
1389	BUTSO91D	BU-4	29-Nov-89	BU-4-22-1		1229038	754002	0			FD	0	0.17	2	39		0		266		840		1580	J				B	Y	Y	R	N	Y
1390	BUTSO91D	BU-4	27-Nov-89	BU-4-34-1		1229990	754634	0			FD	0	0.17	2	37		0		139		521		1620	J				B	Y	Y	R	N	Y
1391	BUTSO91D	BU-4	22-Nov-89	BU-4-35-1		1230156	754692	0			FD	0	0.17	2	32	J	0		187	J	478		2030					B	Y	Y	R	N	Y
1392	BUTSO91D	BU-4	27-Nov-89	BU-4-37-1		1228992	754713	0			FD	0	0.17	2	12	J	0		24	J	14		57					B	Y	Y	R	N	Y
1393	BUTSO91D	BU-4	29-Nov-89	BU-4-52-1		1227455	753771	0			FD	0	0.17	2	47		0		134		528		3050	J				B	Y	Y	R	N	Y
1394	BUTSO91D	BU-4	22-Nov-89	BU-4-66-1		1228900	754843	0			FD	0	0.17	2	67		0		261		1860		2280	J				B	Y	Y	R	Y	Y
1395	BUTSO91D	BU-4	22-Nov-89	BU-4-66-2		1228954	754763	0			FD	0	0.17	2	15	J	0		80	J	369	J	734					B	Y	Y	R	N	Y
1396	BUTSO91D	BU-4	22-Nov-89	BU-4-68-1		1228799	754819	0			FD	0	0.17	2	67	J	0		264	J	1680	J	1470					B	Y	Y	R	N	Y
1397	BUTSO91D	BU-4	25-Nov-89	BU-4-73-1		1228341	754741	0			FD	0	0.17	2	2	J	0		12	J	15	J	62					B	Y	Y	R	N	Y
1398	BUTSO91D	BU-4	25-Nov-89	BU-4-74-1		1228180	754709	0			FD	0	0.17	2	12	J	0		23	J	14	J	57					B	Y	Y	R	N	Y
1399	BUTSO91D	BU-4	27-Nov-89	BU-4-80-1		1227888	754643	0			FD	0	0.17	2	15	J	0		79	J	221	J	614					B	Y	Y	R	N	Y
1400	BUTSO91D	BU-4	27-Nov-89	BU-4-82-1		1227745	754406	0			FD	0	0.17	2	28		0		150		297		805	J				B	Y	Y	R	N	Y
1401	BUTSO91D	BU-5	20-Nov-89	BU-5-2-1		1229985	753155	0			FD	0	0.17	2	37	J	0		168	J	992		1590					B	Y	Y	R	N	Y
1402	BUTSO91D	BU-5	21-Nov-89	BU-5-7-1		1230497	752880	0			FD	0	0.17	2	29	J	0		133	J	468		553					B	Y	Y	R	N	Y
1403	BUTSO91D	BU-5	21-Nov-89	BU-5-9-2		1229981	753032	0			FD	0	0.17	2	22	J	0		89	J	461		1060					B	Y	Y	R	N	Y
1404	BUTSO91D	BU-5	20-Nov-89	BU-5-37-1		1230524	752960	0			FD	0	0.17	2	68	J	0		507	J	1270		1750					B	Y	Y	R	N	Y
1405	BUTSO91D	BU-5	28-Nov-89	BU-5-51-1		1229808	753221	0			FD	0	0.17	2	24	J	0		119	J	1680		2830					B	Y	Y	R	Y	Y
1406	BUTSO91D	BU-5	21-Nov-89	BU-5-63-1		1229714	753056	0			FD	0	0.17	2	42	J	0		140	J	605	J	890					B	Y	Y	R	N	Y
1407	BUTSO91D	BU-5	21-Nov-89	BU-5-71-1		1229802	753063	0			FD	0	0.17	2	28	J	0		124	J	765	J	2120					B	Y	Y	R	N	Y
1408	BUTSO91D	BU-7	07-Dec-89	BU-7-1-1		1225901	752459	0			FD	0	0.17	2	45		0		130		236		420	J				B	Y	Y	R	Y	Y
1409	BUTSO91D	BU-7	20-Dec-89	BU-7-14-1		1228610	753172	0			FD	0	0.17	2	16		0		170		218		459	J				B	Y	Y	R	N	Y
1410	BUTSO91D	BU-10	09-Dec-89	BU-10-13-		1228398	751401	0			FD	0	0.17	2	20		0		118		99		350	J				A	Y	Y	R	Y	Y
1411	BUTSO91D	BU-11	07-Dec-89	BU-11-3-1		1228064	750979	0			FD	0	0.17	2	138		0		294		943		1350	J				B	Y	Y	R	Y	Y
1412	BUTSO91D	BU-20	06-Dec-89	BU-20-1-1		1229508	749710	0			FD	0	0.17	2	70		0		393		463		527	J				B	Y	Y	R	Y	Y
1413	BUTSO91D	BU-12	01-Dec-89	BU-12-1-1		1226098	751972	0			FD	0	0.17	2	27		0		113		95		286	J				B	Y	Y	R	N	Y
1414	BUTSO91D	BU-12	02-Dec-89	BU-12-21-		1226013	751676	0			FD	0	0.17	2	29		0		169		164		411	J				B	Y	Y	R	N	Y
1415	BUTSO91D	BU-12	01-Dec-89	BU-12-34-		1226046	751041	0			FD	0	0.17	2	32		0		98		385		479	J				B	Y	Y	R	Y	Y
1416	BUTSO91D	BU-13	09-Dec-89	BU-13-1-1		1225465	750456	0			FD	0	0.17	2	45		0		124		191		471	J				B	Y	Y	R	N	Y
1417	BUTSO91D	BU-13	09-Dec-89	BU-13-16-		1225576	750302	0			FD	0	0.17	2	47		0		603		483		751	J				B	Y	Y	R	Y	Y
1418	BUTSO91D	BU-15	12-Dec-89	BU-15-15-		1225319	749691	0			FD	0	0.17	2	12		0		130		87		148	J				B	Y	Y	R	N	Y
1419	BUTSO91D	BU-15	12-Dec-89	BU-15-21-		1225426	749788	0			FD	0	0.17	2	45		0		129		192		278	J				B	Y	Y	R	Y	Y
1420	BUTSO91D	BU-17	04-Dec-89	BU-17-30-		1227879	749839	0			FD	0	0.17	2	47		0		288		1210		911	J				B	Y	Y	R	Y	Y
1421	BUTSO91D	BU-17	04-Dec-89	BU-17-40-		1226994	749816	0			FD	0	0.17	2	131		0		654		676		956	J				B	Y	Y	R	N	Y
1422	BUTSO91D	BU-17	04-Dec-89	BU-17-49-		1226622	749658	0			FD	0	0.17	2	59		0		573		245		2270	J				B	Y	Y	R	N	Y
1423	BUTSO91D	BU-29	12-Dec-89	BU-29-20-		1233166	745862	0			FD	0	0.17	2	68		0		887		553		1630	J				B	Y	Y	R	Y	Y
1424	BUTSO91D	BU-23	07-Dec-89	BU-23-8-1		1228671	746285	0			FD	0	0.17	2	27		0		157		50		114	J				B	Y	Y	R	Y	Y
1425	BUTSO91D	BU-26	08-Dec-89	BU-26-5-1		1222938	747514	0			FD	0	0.17	2	110		0		350	UJ	450	U	925	U				B	Y	Y	R	Y	Y
1426	BUTSO91D	BU-26	08-Dec-89	BU-26-6-1		1223833	747644	0			FD	0	0.17	2	27		0		141		267		342	J				B	Y	Y	R	N	Y
1427	BUTSO91D	BU-28	08-Dec-89	BU-28-1-1		1226320	746012	0			FD	0	0.17	2	33		0		124		233		500	J				B	Y	Y	R	Y	Y
1428	BUTSO91D	BU-31	05-Dec-89	BU-31-19-		1230066	744754	0			FD	0	0.17	2	39		0		439		363		848	J				B	Y	Y	R	Y	Y
1429	BUTSO91D	BU-36	06-Dec-89	BU-36-2-1		1227713	736237	0			FD	0	0.17	2	63		0		181		228		824	J				B	Y	Y	R	Y	Y
1430	BUTSO87C	BC-1	12-Jan-87	SO-501	WET	1226390	753387	0			FD	0	0.08	2	18		1	U	116		68		197			"ARAPAHO PARK AT WAL		B	N	Y	R	N	Y
1431	BUTSO87C	BC-1	12-Jan-87	SO-502	WET	1226390	753387	0			DU	0	0.08	2	60		11		189		1160		4350			"ARAPAHO PARK AT WAL		B	N	Y	R	Y	Y
1432	BUTSO87C	BC-2	12-Jan-87	SO-503	WET	1224755	751353	0			FD	0	0.08	2	66		1		141		151		528			"JFK SCHOOL, EMPIRE		B	Y	Y	R	Y	Y
1433	BUTSO87C	BC-3	12-Jan-87	SO-504	WET	1224234	749601	0			FD	0	0.08	2	14		1	U	44		105		198			I.C. ICE RINK AT COP		B	Y	Y	R	Y	Y
1434	BUTSO87C	BC-4	12-Jan-87	SO-505	WET	1224648	749709	0			FD	0	0.08	2	6		1	U	25		20		86			"PARK AT COPPER & EM		B	Y	Y	R	Y	Y
1435	BUTSO87C	BC-5	12-Jan-87	SO-506	WET	1221729	747505	0			FD	0	0.08	2	102		3		178		277		1060			"WORLD MUSEUM OF MIN		B	N	N	R	Y	Y
1436	BUTSO87C	BC-6	12-Jan-87	SO-507	WET	1225234	748582	0			FD	0	0.08	2	10		1	U	64		36		185			"MCKINLEY SCHOOL, HE		B	Y	Y	R	Y	Y
1437	BUTSO87C	BC-7	12-Jan-87	SO-508	WET	1225213	748969	0			FD	0	0.08	2	8		1	U	35		20		106			"TOT LOT 2 PARK AT H		B	Y	Y	R	Y	Y
1438	BUTSO87C	BC-8	12-Jan-87	SO-511	WET	1226176	746958	0			FD	0	0.08	2	29		2		61		167		551			"CHESTER STEELE MEMO		B	Y	Y	R	Y	Y
1439	BUTSO87C	BC-9	12-Jan-87	SO-512	WET	1226304	747896	0			FD	0	0.08	2	22		1		119		296		475			BALLFIELD NEAR CHEST		B	Y	Y	R	Y	Y
1440	BUTSO87C	BC-10	12-Jan-87	SO-513	WET	1225141	747854	0			FD	0	0.08	2	16		1	U	138		82		176			TOT LOT 5 PARK AT ME		B	N	Y	R	Y	Y
1441	BUTSO87C	BC-11	12-Jan-87	SO-514	WET	1224756	746773	0			FD	0	0.08	2	10		1	U	73		89		152			"TOT LOT 1 PARK, GOL		B	Y	Y	R	Y	Y
1442	BUTSO87C	BC-12	12-Jan-87	SO-515	WET	1226689	748529	0			FD	0	0.08	2	36		1		76		224		332			"BLACKFOOT PARK, PAR		B	Y	Y	R	Y	Y
1443	BUTSO87C	BC-13	13-Jan-87	SO-516	WET	1226367	749083	0			FD	0	0.08	2	63		1	U	129		63		151			GRANITE CLARK PARK A		B	Y	Y	R	Y	Y
1444	BUTSO87C	BC-14	13-Jan-87	SO-517	WET	1226940	749486	0			FD	0	0.08	2	42		4		205		392		1030			CHEROKEE PARK AT GRA		B	Y	Y	R	Y	Y
1445	BUTSO87C	BC-15	13-Jan-87	SO-518	WET	1228146	750390	0			FD	0	0.08	2	41		3		149		590		1380			"SIOUX PARK AT MONTA		B	Y	Y	R	Y	Y
1446	BUTSO87C	BC-16	13-Jan-87	SO-519	WET	1229916	750435	0			FD	0	0.08	2	85		3		849		342		936			"MANDAN PARK, WYOMIN		B	Y	Y	R	Y	Y
1447	BUTSO87C	BC-17	13-Jan-87	SO-520	WET	1229190	753026	0			FD	0	0.08	2	49		3		141		895		1300			"FORMER PARK, OFF MA		B	Y	Y	R	Y	Y
1448	BUTSO87C	BC-18	13-Jan-87	SO-521	WET	1229399	752541	0			FD	0	0.08	2	15		1	U	387		15		140			"CENTERVILLE ICE RIN		B	N	Y	R	Y	Y
1449	BUTSO87C	BC-19	13-Jan-87	SO-522	WET	1227187	752438	0			FD	0	0.08	2	25		7		107		948		3100			"MISSOULA GULCH BALL		B	Y	Y	R	Y	Y
1450	BUTSO87C	BC-20	13-Jan-87	SO-523	WET	1226016	750608	0			FD	0	0.08	2	15		1	U	87		113		320			BALLFIELD SE OF ANSE		B	Y	Y	R	Y	Y

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
1451	BUTSO87C	BC-21	13-Jan-87	SO-524	WET	1226384	749731	0			FD	0	0.08	2	34		8		648		276		2780			BALLFIELD NW OF ANSE		B	Y	Y	R	Y	Y
1452	BUTSO87C	BC-22	13-Jan-87	SO-525	WET	1226753	748791	0			FD	0	0.08	2	46		5		124		1690		1840			HOOPS AREA E OF LOD		B	Y	Y	R	Y	Y
1453	BUTSO87C	BC-23	13-Jan-87	SO-529	WET	1229817	748458	0			FD	0	0.08	2	12		1	U	51		19		156			EDNA LACASS MEMORIAL		B	Y	Y	R	Y	Y
1454	BUTSO87C	BC-24	13-Jan-87	SO-530	WET	1228829	748396	0			FD	0	0.08	2	41		1	U	658		84		210			"PARK/BUS STOP, PARK		B	Y	Y	R	Y	Y
1455	BUTSO87C	BC-25	13-Jan-87	SO-533	WET	1233818	746690	0			FD	0	0.08	2	9		1	U	77		21		77			PARK AT CONTINENTAL		B	Y	Y	R	Y	Y
1456	BUTSO87C	BC-26	13-Jan-87	SO-534	WET	1231905	745616	0			FD	0	0.08	2	70		4		374		840		1030			HEBGEN FIELD ON SECO		B	Y	Y	R	Y	Y
1457	BUTSO87C	BC-27	13-Jan-87	SO-535	WET	1231722	745280	0			FD	0	0.08	2	60		5		272		1390		1650			"HEBGEN PARK 1ST ST.		B	Y	Y	R	Y	Y
1458	BUTSO87C	BC-28	13-Jan-87	SO-536	WET	1231405	745131	0			FD	0	0.08	2	12		2		71		183		1080			"MONROE SCHOOL, ARIZ		B	Y	Y	R	Y	Y
1459	BUTSO87C	BC-29	13-Jan-87	SO-537	WET	1229700	744273	0			FD	0	0.08	2	39		1	U	99		49		195			"CHARLEY JIPP MEMORI		B	Y	Y	R	Y	Y
1460	BUTSO87C	BC-30	13-Jan-87	SO-538	WET	1227684	745790	0			FD	0	0.08	2	27		2		161		363		455			"SEMINOLE PARK AT AL		B	Y	Y	R	Y	Y
1461	BUTSO87C	BC-31	13-Jan-87	SO-539	WET	1228392	743380	0			FD	0	0.08	2	15		1	U	39		27		102			"WEBSTER-GARFIELD SC		B	Y	Y	R	Y	Y
1462	BUTSO87C	BC-32	13-Jan-87	SO-540	WET	1228712	743376	0			FD	0	0.08	2	7		1	U	33		80		171			"COMMUNITY DAY CARE		B	Y	Y	R	Y	Y
1463	BUTSO87C	BC-33	14-Jan-87	SO-541	WET	1229357	747059	0			FD	0	0.08	2	39		7		141		481		4590			"BUTTE HIGH SCHOOL,		B	Y	Y	R	Y	Y
1464	BUTSO87C	BC-34	14-Jan-87	SO-542	WET	1227761	748305	0			FD	0	0.08	2	14		1	U	60		83		191			"CENTRAL HICH SCHOOL		B	Y	Y	R	Y	Y
1465	BUTSO87C	BC-35	14-Jan-87	SO-543	WET	1224743	746198	0			FD	0	0.08	2	10		1	U	33		110		165			"WEST JR. HIGH, EMMI		B	Y	Y	R	Y	Y
1466	BUTSO87C	BC-36	14-Jan-87	SO-544	WET	1226226	737372	0			FD	0	0.08	2	66		1		124		64		236			"MOTOCROSS AREA, N O		B	N	N	R	Y	Y
1467	BUTSO87C	BC-37	14-Jan-87	SO-545	WET	1230338	741914	0			FD	0	0.08	2	8		1	U	61		48		133			"HOCKEY RINKOF KAW A		B	Y	Y	R	Y	Y
1484	BUTSO87C	BC-52	15-Jan-87	SO-568	WET	1228681	740276	0			FD	0	0.08	2	35		1	U	101		44		200			"OLD MADISON SCHOOL,		B	Y	Y	R	Y	Y
1486	BUTSO87C	BC-54	15-Jan-87	SO-570	WET	1224038	748419	0			FD	0	0.08	2	27		1	U	76		73		271			"MONTANA TECH FIELD		B	Y	Y	R	Y	Y
1487	BUTSO87C	BC-55	15-Jan-87	SO-571	WET	1233932	745184	0			FD	0	0.08	2	3		1	U	27		9		56			"CIVIC CENTER FIELDS		B	Y	Y	R	Y	Y
1488	BUTSD89A	SD-129	16-Jun-89	01		1231300	742400	0	8-93631	MHN528		0	1.3	0	569		8		2010		546		3120						Y	Y	N	Y	
1489	BUTSD89A	SD-129	16-Jun-89	01		1231300	742400	0				0	1.3	0	450		11		2448		510		3027						Y	Y	N	N	
1490	BUTSD89A	SD-133	16-Jun-89	01		1234000	744100	0				0	1.08	0	327		6		2221		444	U	1562						Y	Y	N	Y	
1491	BUTSD89A	SD-152	22-Jun-89	01		1226600	743100	0				0	1.3	0	1328		20		1912		1662		2075						N	Y	N	Y	
1494	BUTSD89A	SD-512	22-Jun-89	02		1224833	742046	0				0.1	1.5	0	615		21		6050		965		5774						N	Y	N	Y	
1495	BUTSD89A	SD-513	22-Jun-89	02		1224948	742432	0				0.1	1.5	0	301		57		6084		1538		17120						N	Y	N	Y	
1496	BUTSD89A	SD-515	23-Jun-89	01		1224225	741768	0	8-94280	MHT880		0.1	1.5	0	62		4		937		147		1120	J					N	Y	N	N	
1497	BUTSD89A	SD-515	23-Jun-89	01		1224225	741768	0				0.1	1.5	0	270	U	13		904		444	U	1386						N	Y	N	Y	
1498	BUTSD89A	SD-601	28-Jun-89	01		1236121	745213	0				0	0.1	0	63	U	9		683		258	U	431						Y	Y	N	Y	
1499	BUTSD89A	SD-603	28-Jun-89	01		1235306	744815	0				0	0.1	0	63	U	2	U	515		258	U	433						Y	Y	N	Y	
1500	BUTSD89A	SD-611	26-Jun-89	02A		1233905	744842	0				0.1	1.3	0	63	U	4		329		258	U	294						Y	Y	N	N	
1668	BUTSO97A	SO-GG-C	03-Nov-97	BPSOU-119	DRY	1227001	736950	0		7-2513	FD	0	0.167	0	348		6	J	1620		458		2190			Grove Gulch		A	Y	Y	N	Y	
1669	BUTSO97A	SO-GG-C	03-Nov-97	BPSOU-119	DRY	1227001	736950	0		7-2514	DU	0	0.167	0	331		4	U	1440		452		1940			Grove Gulch		A	Y	Y	N	N	
1670	BUTSO97A	SO-GG-E	03-Nov-97	BPSOU-119	DRY	1228018	737527	0		7-2516	FD	0	0.167	0	16		4	U	72	J	58		200			Grove Gulch		A	Y	Y	N	Y	
1671	BUTSO97A	SO-GG-F	03-Nov-97	BPSOU-119	DRY	1228270	737753	0		7-2517	FD	0	0.167	0	26		4	U	90	J	91		574			Grove Gulch		A	Y	Y	N	Y	
1672	BUTSO97A	SO-GG-G	03-Nov-97	BPSOU-119	DRY	1228712	738008	0		7-2518	FD	0	0.167	0	161		4	U	288		361		1000			Grove Gulch		A	Y	Y	N	Y	
1673	BUTSO97A	SO-GG-H	03-Nov-97	BPSOU-119	DRY	1228890	738191	0		7-2519	FD	0	0.167	0	8	J	4	U	44	J	23		93			Grove Gulch		A	Y	Y	N	Y	
1674	BUTSO97A	SO-GG-I	03-Nov-97	BPSOU-119	DRY	1229147	738501	0		7-2520	FD	0	0.167	0	668		4	U	1510		95		560			Grove Gulch		A	Y	Y	R	Y	Y
1675	BUTSO97A	SO-GG-J	03-Nov-97	BPSOU-119	DRY	1230496	739320	0		7-2521	FD	0	0.167	0	41		4	U	142		141		685			Grove Gulch		A	Y	Y	N	Y	
1676	BUTSO97A	SO-GG-L	03-Nov-97	BPSOU-119	DRY	1230529	740492	0		7-2523	FD	0	0.167	0	15		4	U	104	J	46		153			Grove Gulch		A	Y	Y	N	Y	
1677	BUTSO91B	HCA-07	07-Dec-91	HCA-07-00		1223100	742343	0			FD	0	1	0	29	U	0		31		23	U	62						N	Y	N	Y	
1678	BUTSO91B	HCA-32	21-Oct-91	HCA-32-00		1226891	742938	0			FD	0	1	0	785		0		1770		1270		2770						N	Y	N	Y	
1679	BUTSO91B	S-1	15-Nov-91	S-1		1226862	742114	0			FD	0	0	0	941		0		887		4440		8040						N	Y	N	Y	
1680	BUTSO91B	S-2	15-Nov-91	S-2		1227106	742084	0			FD	0	0	0	11900		0		1950		746		1410						N	Y	N	Y	
1681	BUTSO91B	S-3	15-Nov-91	S-3		1227439	742110	0			FD	0	0	0	3380		0		478		1640		2910						N	Y	N	Y	
1682		EPRY01	01-May-92	EPRY01		1227343	754123	0	EPRY01	2E16-6	FD	0	0.08	0	19		4		198		968		1820			1501 4th Street	"CDM, 1992. Buffalo		Y	Y	N	Y	Y
1683		EPRY02	01-May-92	EPRY02		1229896	753427	0	EPRY02	2E16-7	FD	0	0.08	0	20		5		157		1010		1480			24 O'Neill Street	"CDM, 1992. Buffalo		Y	Y	N	Y	Y
1684		EPRY03	01-May-92	EPRY03		1229765	745869	0	EPRY03	2E16-8	FD	0	0.08	0	199		18		1300		1860		6020			721 Nevada	"CDM, 1992. Buffalo		Y	Y	R	Y	Y
1685		EPRY04	01-May-92	EPRY04		1228116	737407	0	EPRY04	2E16-9	FD	0	0.08	0	182		6		377		521		1730			2800 Hanson	"CDM, 1992. Buffalo		Y	Y	N	Y	Y
1687	BUTSO91E	9 N SUNV	21-Aug-90	Perimeter		1229923	756445	0				0	0.2	0	61		0		0		877		0			9 N SUNVIEW TERRACE			Y	Y	R	Y	Y
1688	BUTSO91E	9 N SUNV	21-Aug-90	Bare Area		1229923	756445	0				0	0.2	0	44		0		0		447		0			9 N SUNVIEW TERRACE			Y	Y	R	N	Y
1689	BUTSO91E	11 N SUN	24-Aug-90	Perimeter		1229977	756434	0				0	0.2	0	48		0		0		2174		0			11 N SUNVIEW TERRAC			Y	Y	R	Y	Y
1690	BUTSO91E	11 N SUN	24-Aug-90	Play Area		1229977	756434	0				0	0.2	0	41		0		0		1133		0			11 N SUNVIEW TERRAC			Y	Y	R	N	Y
1691	BUTSO91E	11 N SUN	24-Aug-90	Bare Area		1229977	756434	0				0	0.2	0	49		0		0		1598		0			11 N SUNVIEW TERRAC			Y	Y	R	N	Y
1692	BUTSO91E	935 W CO	14-Aug-90	Perimeter		1225374	749686	0				0	0.2	0	103		0		0		3387		0			935 W COPPER			Y	Y	R	Y	Y
1693	BUTSO91E	935 W CO	14-Aug-90	Play Area		1225374	749686	0				0	0.2	0	55		0		0		1273		0			935 W COPPER			Y	Y	R	N	Y
1694	BUTSO91E	935 W CO	14-Aug-90	Bare Area		1225374	749686	0				0	0.2	0	80		0		0		2984		0			935 W COPPER			Y	Y	R	N	Y
1695	BUTSO91E	1233 W C	13-Aug-90	Perimeter		1224033	749741	0				0	0.2	0	47		0		0		394		0			1233 W COPPER			Y	Y	R	Y	Y
1696	BUTSO91E	1233 W C	13-Aug-90	Play Area		1224033	749741	0				0	0.2	0	27		0		0		127		0			1233 W COPPER			Y	Y	R	N	Y
1697	BUTSO91E	1233 W C	13-Aug-90	Garden		1224033	749741	0				0	0.2	0	34		0		0		124		0			1233 W COPPER			Y	Y	R	N	Y
1698	BUTSO91E	951 ANTI	31-Aug-90	Perimeter		1225292	750515	0				0	0.2	0	105		0		0		3158		0			951 ANTIMONY ST			Y	Y	R	N	Y
1699	BUTSO91E	951 ANTI	31-Aug-90	Play Area		1225292	750515	0				0	0.2	0	84		0		0		3243		0			951 ANTIMONY ST			Y	Y	R	Y	Y
1700	BUTSO91E	951 ANTI	31-Aug-90	Bare Area		1225292	750515	0				0	0.2	0	82		0		0		2756		0			951 ANTIMONY ST			Y	Y	R	N	Y
1701	BUTSO91E	954 CALE	25-Aug-90	Perimeter		1225203	749806	0				0	0.2	0	42		0		0		648		0			954 CALEDONIA			Y	Y	R	N	Y
1702	BUTSO91E	954 CALE	25-Aug-90	Garden		1225203	749806	0				0	0.2	0	61		0		0		729		0			954 CALEDONIA			Y	Y	R	Y	Y
1703	BUTSO91E	1026 CAL	29-Aug-90	Perimeter		1224941	749816	0				0	0.2	0	87		0		0		1770		0			1026 CALEDONIA			Y	Y	R	Y	Y
1704	BUTSO91E	1026 CAL	29-Aug-90	Garden		1224941	749816	0				0	0.2	0	66		0		0		1061		0			1026 CALEDONIA			Y	Y	R	N	Y
1705	BUTSO91E	1026 CAL	29-Aug-90	Bare Area		1224941	749816	0				0	0.2	0	60		0		0		765		0			1026 CALEDONIA			Y	Y	R	N	Y
1706	BUTSO91E	1034 CAL	23-Aug-90	Perimeter		1224834	749770	0				0	0.2	0	76		0		0		1363		0			1034 CALEDONIA			Y	Y	R	Y	Y
1707	BUTSO91E	1034 CAL	23-Aug-90	Play Area		1224834	749770	0				0	0.2	0	18		0		0		123		0			1034 CALEDONIA			Y	Y	R	N	Y
1708	BUTSO91E	1034 CAL	23-Aug-90	Bare Area		1224834	749770	0				0	0.2	0	151		0		0		1300		0			1034 CALEDONIA			Y	Y	R	N	Y
1709	BUTSO91E	1304 CAL	31-Aug-90	Perimeter		1223625	749889	0				0	0.2	0	36		0		0		63		0			1304 CALEDONIA			Y	Y	R	Y	Y
1710	BUTSO91E	1304 CAL	31-Aug-90	Play Area		1223625	749889	0				0	0.2	0	17		0		0		31		0			1304 CALEDONIA			Y	Y	R	N	Y
1711	BUTSO91E	1304 CAL	31-Aug-90	Bare Area		1223625	749889	0				0	0.2	0	27		0		0		56		0			1304 CALEDONIA			Y	Y	R	N	Y
1712	BUTSO91E	1251 CAL	22-Aug-90	Perimeter		1224057	750013	0				0	0.2	0	38		0		0		2773		0			1251 CALEDONIA			Y	Y	R	Y	Y

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
1713	BUTSO91E	1251 CAL	22-Aug-90	Play Area		1224057	750013	0				0	0.2	0	6		0		0		93		0			1251 CALEDONIA			Y	Y	R	N	Y
1714	BUTSO91E	1251 CAL	22-Aug-90	Garden		1224057	750013	0				0	0.2	0	38		0		0		891		0			1251 CALEDONIA			Y	Y	R	N	Y
1715	BUTSO91E	1251 CAL	22-Aug-90	Bare Area		1224057	750013	0				0	0.2	0	36		0		0		1388		0			1251 CALEDONIA			Y	Y	R	N	Y
1716	BUTSO91E	1139 CAL	15-Aug-90	Perimeter		1224397	749999	0				0	0.2	0	28		0		0		433		0			1139 CALEDONIA			Y	Y	R	Y	Y
1717	BUTSO91E	1139 CAL	15-Aug-90	Play Area		1224397	749999	0				0	0.2	0	13		0		0		107		0			1139 CALEDONIA			Y	Y	R	N	Y
1718	BUTSO91E	1133 CAL	14-Aug-90	Perimeter		1224507	750018	0				0	0.2	0	36		0		0		729		0			1133 CALEDONIA			Y	Y	R	N	Y
1719	BUTSO91E	1133 CAL	14-Aug-90	Play Area		1224507	750018	0				0	0.2	0	40		0		0		1048		0			1133 CALEDONIA			Y	Y	R	Y	Y
1720	BUTSO91E	1133 CAL	14-Aug-90	Bare Area		1224507	750018	0				0	0.2	0	33		0		0		408		0			1133 CALEDONIA			Y	Y	R	N	Y
1721	BUTSO91E	1123 CAL	15-Aug-90	Perimeter		1224597	749990	0				0	0.2	0	32		0		0		530		0			1123 CALEDONIA			Y	Y	R	N	Y
1722	BUTSO91E	1123 CAL	15-Aug-90	Play Area		1224597	749990	0				0	0.2	0	29		0		0		416		0			1123 CALEDONIA			Y	Y	R	N	Y
1723	BUTSO91E	1123 CAL	15-Aug-90	Bare Area		1224597	749990	0				0	0.2	0	30		0		0		585		0			1123 CALEDONIA			Y	Y	R	Y	Y
1724	BUTSO91E	943 CALE	01-Sep-90	Perimeter		1225323	749961	0				0	0.2	0	61		0		0		1238		0			943 CALEDONIA			Y	Y	R	N	Y
1725	BUTSO91E	943 CALE	01-Sep-90	Garden		1225323	749961	0				0	0.2	0	69		0		0		1306		0			943 CALEDONIA			Y	Y	R	N	Y
1726	BUTSO91E	943 CALE	01-Sep-90	Bare Area		1225323	749961	0				0	0.2	0	92		0		0		1394		0			943 CALEDONIA			Y	Y	R	Y	Y
1727	BUTSO91E	926 W WO	30-Aug-90	Perimeter		1225447	750073	0				0	0.2	0	69		0		0		2018		0			926 W WOOLMAN			Y	Y	R	Y	Y
1728	BUTSO91E	926 W WO	30-Aug-90	Play Area		1225447	750073	0				0	0.2	0	16		0		0		112		0			926 W WOOLMAN			Y	Y	R	N	Y
1729	BUTSO91E	926 W WO	30-Aug-90	Garden		1225447	750073	0				0	0.2	0	49		0		0		799		0			926 W WOOLMAN			Y	Y	R	N	Y
1730	BUTSO91E	926 W WO	30-Aug-90	Bare Area		1225447	750073	0				0	0.2	0	46		0		0		1208		0			926 W WOOLMAN			Y	Y	R	N	Y
1731	BUTSO91E	1134 W W	13-Aug-90	Perimeter		1224470	750113	0				0	0.2	0	22		0		0		342		0			1134 W WOOLMAN			Y	Y	R	Y	Y
1732	BUTSO91E	1134 W W	13-Aug-90	Play Area		1224470	750113	0				0	0.2	0	3		0		0		11		0			1134 W WOOLMAN			Y	Y	R	N	Y
1733	BUTSO91E	1134 W W	13-Aug-90	Bare Area		1224470	750113	0				0	0.2	0	14		0		0		204		0			1134 W WOOLMAN			Y	Y	R	N	Y
1734	BUTSO91E	1148 W W	16-Aug-90	Perimeter		1224434	750114	0				0	0.2	0	30		0		0		213		0			1148 W WOOLMAN			Y	Y	R	N	Y
1735	BUTSO91E	1148 W W	16-Aug-90	Play Area		1224434	750114	0				0	0.2	0	73		0		0		358		0			1148 W WOOLMAN			Y	Y	R	Y	Y
1736	BUTSO91E	1148 W W	16-Aug-90	Garden		1224434	750114	0				0	0.2	0	22		0		0		214		0			1148 W WOOLMAN			Y	Y	R	N	Y
1737	BUTSO91E	1148 W W	16-Aug-90	Bare Area		1224434	750114	0				0	0.2	0	53		0		0		250		0			1148 W WOOLMAN			Y	Y	R	N	Y
1738	BUTSO91E	1164 W W	14-Aug-90	Perimeter		1224363	750117	0				0	0.2	0	15		0		0		192		0			1164 W WOOLMAN			Y	Y	R	N	Y
1739	BUTSO91E	1164 W W	14-Aug-90	Play Area		1224363	750117	0				0	0.2	0	18		0		0		266		0			1164 W WOOLMAN			Y	Y	R	Y	Y
1740	BUTSO91E	1164 W W	14-Aug-90	Bare Area		1224363	750117	0				0	0.2	0	24		0		0		212		0			1164 W WOOLMAN			Y	Y	R	N	Y
1741	BUTSO91E	1221 W W	23-Aug-90	Perimeter		1223980	750326	0				0	0.2	0	31		0		0		171		0			1221 W WOOLMAN			Y	Y	R	N	Y
1742	BUTSO91E	1221 W W	23-Aug-90	Play Area		1223980	750326	0				0	0.2	0	17		0		0		284		0			1221 W WOOLMAN			Y	Y	R	Y	Y
1743	BUTSO91E	1221 W W	23-Aug-90	Garden		1223980	750326	0				0	0.2	0	19		0		0		73		0			1221 W WOOLMAN			Y	Y	R	N	Y
1744	BUTSO91E	1115 W W		Perimeter		1224649	750263	0				0	0.2	0	30		0		0		546		0			1115 W WOOLMAN			Y	Y	R	Y	Y
1745	BUTSO91E	1115 W W		Bare Area		1224649	750263	0				0	0.2	0	31		0		0		335		0			1115 W WOOLMAN			Y	Y	R	N	Y
1746	BUTSO91E	517 N EX	06-Sep-90	Perimeter		1225597	750046	0				0	0.2	0	58		0		0		912		0			517 N EXCELSIOR AV			Y	Y	R	N	Y
1747	BUTSO91E	517 N EX	06-Sep-90	Play Area		1225597	750046	0				0	0.2	0	45		0		0		98		0			517 N EXCELSIOR AV			Y	Y	R	N	Y
1748	BUTSO91E	517 N EX	06-Sep-90	Garden		1225597	750046	0				0	0.2	0	60		0		0		1129		0			517 N EXCELSIOR AV			Y	Y	R	N	Y
1749	BUTSO91E	517 N EX	06-Sep-90	Bare Area		1225597	750046	0				0	0.2	0	70		0		0		1137		0			517 N EXCELSIOR AV			Y	Y	R	Y	Y
1750	BUTSO91E	1016 LEW	13-Aug-90	Perimeter		1225048	750638	0				0	0.2	0	47		0		0		674		0			1016 LEWISHON ST			Y	Y	R	N	Y
1751	BUTSO91E	1016 LEW	13-Aug-90	Play Area		1225048	750638	0				0	0.2	0	50		0		0		154		0			1016 LEWISHON ST			Y	Y	R	N	Y
1752	BUTSO91E	1016 LEW	13-Aug-90	Bare Area		1225048	750638	0				0	0.2	0	59		0		0		917		0			1016 LEWISHON ST			Y	Y	R	Y	Y
1753	BUTSO91E	515 HENR	28-Aug-90	Perimeter		1225074	750051	0				0	0.2	0	89		0		0		1432		0			515 HENRY AV			Y	Y	R	Y	Y
1754	BUTSO91E	515 HENR	28-Aug-90	Garden		1225074	750051	0				0	0.2	0	26		0		0		476		0			515 HENRY AV			Y	Y	R	N	Y
1755	BUTSO91E	515 HENR	28-Aug-90	Bare Area		1225074	750051	0				0	0.2	0	63		0		0		541		0			515 HENRY AV			Y	Y	R	N	Y
1756	BUTSO91E	514 N EM	15-Aug-90	Perimeter		1224887	750066	0				0	0.2	0	73		0		0		901		0			514 N EMMET AV			Y	Y	R	N	Y
1757	BUTSO91E	514 N EM	15-Aug-90	Play Area		1224887	750066	0				0	0.2	0	47		0		0		602		0			514 N EMMET AV			Y	Y	R	N	Y
1758	BUTSO91E	514 N EM	15-Aug-90	Garden		1224887	750066	0				0	0.2	0	51		0		0		975		0			514 N EMMET AV			Y	Y	R	Y	Y
1759	BUTSO91E	514 N EM	15-Aug-90	Bare Area		1224887	750066	0				0	0.2	0	56		0		0		630		0			514 N EMMET AV			Y	Y	R	N	Y
1760	BUTSO91E	518 N EM	17-Aug-90	Perimeter		1224888	750118	0				0	0.2	0	31		0		0		691		0			518 N EMMET AV			Y	Y	R	N	Y
1761	BUTSO91E	518 N EM	17-Aug-90	Play Area		1224888	750118	0				0	0.2	0	12		0		0		113		0			518 N EMMET AV			Y	Y	R	N	Y
1762	BUTSO91E	518 N EM	17-Aug-90	Bare Area		1224888	750118	0				0	0.2	0	27		0		0		188		0			518 N EMMET AV			Y	Y	R	N	Y
1763	BUTSO91E	518 N EM	22-Aug-90	Perimeter		1224888	750118	0				0	0.2	0	36		0		0		1138		0			518 N EMMET AV			Y	Y	R	Y	Y
1764	BUTSO91E	518 N EM	22-Aug-90	Play Area		1224888	750118	0				0	0.2	0	33		0		0		375		0			518 N EMMET AV			Y	Y	R	N	Y
1765	BUTSO91E	518 N EM	22-Aug-90	Bare Area		1224888	750118	0				0	0.2	0	22		0		0		202		0			518 N EMMET AV			Y	Y	R	N	Y
1766	BUTSO91E	1149 ANT	27-Aug-90	Perimeter		1224441	750550	0				0	0.2	0	27		0		0		217		0			1149 ANTIMONY ST			Y	Y	R	N	Y
1767	BUTSO91E	1149 ANT	27-Aug-90	Play Area		1224441	750550	0				0	0.2	0	20		0		0		106		0			1149 ANTIMONY ST			Y	Y	R	N	Y
1768	BUTSO91E	1149 ANT	27-Aug-90	Garden		1224441	750550	0				0	0.2	0	43		0		0		475		0			1149 ANTIMONY ST			Y	Y	R	Y	Y
1769	BUTSO91E	1149 ANT	27-Aug-90	Bare Area		1224441	750550	0				0	0.2	0	18		0		0		102		0			1149 ANTIMONY ST			Y	Y	R	N	Y
1770	BUTSO91E	913 LEWI	21-Aug-90	Perimeter		1225589	750788	0				0	0.2	0	83		0		0		1449		0			913 LEWISHON ST			Y	Y	R	Y	Y
1771	BUTSO91E	913 LEWI	21-Aug-90	Bare Area		1225589	750788	0				0	0.2	0	64		0		0		1064		0			913 LEWISHON ST			Y	Y	R	N	Y
1772	BUTSO91E	917 LEWI		Perimeter		1225485	750792	0				0	0.2	0	56		0		0		497		0			917 LEWISHON ST			Y	Y	R	N	Y
1773	BUTSO91E	917 LEWI		Play Area		1225485	750792	0				0	0.2	0	60		0		0		625		0			917 LEWISHON ST			Y	Y	R	Y	Y
1774	BUTSO91E	910 WAUK	29-Aug-90	Perimeter		1225562	750895	0				0	0.2	0	43		0		0		513		0			910 WAUKESHA ST			Y	Y	R	Y	Y
1775	BUTSO91E	910 WAUK	29-Aug-90	Play Area		1225562	750895	0				0	0.2	0	36		0		0		373		0			910 WAUKESHA ST			Y	Y	R	N	Y
1776	BUTSO91E	910 WAUK	29-Aug-90	Bare Area		1225562	750895	0				0	0.2	0	49		0		0		307		0			910 WAUKESHA ST			Y	Y	R	N	Y
1777	BUTSO91E	1018 WAU	13-Aug-90	Perimeter		1225022	750921	0				0	0.2	0	69		0		0		558		0			1018 WAUKESHA ST			Y	Y	R	Y	Y
1778	BUTSO91E	1018 WAU	13-Aug-90	Play Area		1225022	750921	0				0	0.2	0	64		0		0		488		0			1018 WAUKESHA ST			Y	Y	R	N	Y
1779	BUTSO91E	1018 WAU	13-Aug-90	Bare Area		1225022	750921	0				0	0.2	0	75		0		0		423		0			1018 WAUKESHA ST			Y	Y	R	N	Y
1780	BUTSO91E	807 WAUK	20-Aug-90	Perimeter		1226111	751033	0				0	0.2	0	47		0		0		946		0			807 WAUKESHA ST			Y	Y	R	Y	Y
1781	BUTSO91E	807 WAUK	20-Aug-90	Play Area		1226111	751033	0				0	0.2	0	47		0		0		297		0			807 WAUKESHA ST			Y	Y	R	N	Y
1782	BUTSO91E	807 WAUK	20-Aug-90	Garden		1226111	751033	0				0	0.2	0	49		0		0		303		0			807 WAUKESHA ST			Y	Y	R	N	Y
1783	BUTSO91E	807 WAUK	20-Aug-90	Bare Area		1226111	751033	0				0	0.2	0	29		0		0		185		0			807 WAUKESHA ST			Y	Y	R	N	Y
1784	BUTSO91E	949 WAUK	23-Aug-90	Perimeter		1225311	751063	0				0	0.2	0	39		0		0		383		0			949 WAUKESHA ST			Y	Y	R	N	Y
1785	BUTSO91E	949 WAUK	23-Aug-90	Play Area		1225311	751063	0				0	0.2	0	44		0		0		285		0			949 WAUKESHA ST			Y	Y	R	N	Y
1786	BUTSO91E	949 WAUK	23-Aug-90	Garden		1225311	751063	0				0	0.2	0	44		0		0		301		0			949 WAUKESHA ST			Y	Y	R	N	Y
1787	BUTSO91E	949 WAUK	23-Aug-90	Bare Area		1225311	751063	0				0	0.2	0	60		0		0		479		0			949 WAUKESHA ST			Y	Y	R	Y	Y

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
1788	BUTSO91E	1001 WAU	14-Aug-90	Perimeter		1225155	751052	0				0	0.2	0	53		0		0		371		0			1001 WAUKESHA ST			Y	Y	R	Y	Y
1789	BUTSO91E	715 N EM	16-Aug-90	Perimeter		1224759	750622	0				0	0.2	0	30		0		0		611		0			715 N EMMET AV			Y	Y	R	N	Y
1790	BUTSO91E	715 N EM	16-Aug-90	Garden		1224759	750622	0				0	0.2	0	33		0		0		972		0			715 N EMMET AV			Y	Y	R	Y	Y
1791	BUTSO91E	715 N EM	16-Aug-90	Bare Area		1224759	750622	0				0	0.2	0	42		0		0		404		0			715 N EMMET AV			Y	Y	R	N	Y
1792	BUTSO91E	911 HENR	13-Aug-90	Perimeter		1225156	751097	0				0	0.2	0	49		0		0		682		0			911 HENRY AV			Y	Y	R	N	Y
1793	BUTSO91E	911 HENR	13-Aug-90	Play Area		1225156	751097	0				0	0.2	0	30		0		0		99		0			911 HENRY AV			Y	Y	R	N	Y
1794	BUTSO91E	911 HENR	13-Aug-90	Bare Area		1225156	751097	0				0	0.2	0	70		0		0		789		0			911 HENRY AV			Y	Y	R	Y	Y
1795	BUTSO91E	818 HENR		Perimeter		1225276	750868	0				0	0.2	0	44		0		0		882		0			818 HENRY AV			Y	Y	R	Y	Y
1796	BUTSO91E	818 HENR		Play Area		1225276	750868	0				0	0.2	0	42		0		0		450		0			818 HENRY AV			Y	Y	R	N	Y
1797	BUTSO91E	818 HENR		Bare Area		1225276	750868	0				0	0.2	0	50		0		0		530		0			818 HENRY AV			Y	Y	R	N	Y
1798	BUTSO91E	801 N EX	29-Aug-90	Perimeter		1225642	750768	0				0	0.2	0	37		0		0		629		0			801 N EXCELSIOR AV			Y	Y	R	Y	Y
1799	BUTSO91E	801 N EX	29-Aug-90	Play Area		1225642	750768	0				0	0.2	0	35		0		0		381		0			801 N EXCELSIOR AV			Y	Y	R	N	Y
1800	BUTSO91E	801 N EX	29-Aug-90	Bare Area		1225642	750768	0				0	0.2	0	44		0		0		486		0			801 N EXCELSIOR AV			Y	Y	R	N	Y
1801	BUTSO91E	826 N EX	28-Aug-90	Perimeter		1225755	750885	0				0	0.2	0	30		0		0		423		0			826 N EXCELSIOR AV			Y	Y	R	N	Y
1802	BUTSO91E	826 N EX	28-Aug-90	Play Area		1225755	750885	0				0	0.2	0	20		0		0		257		0			826 N EXCELSIOR AV			Y	Y	R	N	Y
1803	BUTSO91E	826 N EX	28-Aug-90	Garden		1225755	750885	0				0	0.2	0	30		0		0		423		0			826 N EXCELSIOR AV			Y	Y	R	N	Y
1804	BUTSO91E	826 N EX	28-Aug-90	Bare Area		1225755	750885	0				0	0.2	0	41		0		0		622		0			826 N EXCELSIOR AV			Y	Y	R	Y	Y
1805	BUTSO91E	825 14TH	17-Aug-90	Perimeter		1225944	753170	0				0	0.2	0	40		0		0		341		0			825 14TH STREET			Y	Y	R	N	Y
1806	BUTSO91E	825 14TH	17-Aug-90	Play Area		1225944	753170	0				0	0.2	0	40		0		0		354		0			825 14TH STREET			Y	Y	R	Y	Y
1807	BUTSO91E	825 14TH	17-Aug-90	Garden		1225944	753170	0				0	0.2	0	32		0		0		52		0			825 14TH STREET			Y	Y	R	N	Y
1808	BUTSO91E	825 14TH	17-Aug-90	Bare Area		1225944	753170	0				0	0.2	0	50		0		0		351		0			825 14TH STREET			Y	Y	R	N	Y
1809	BUTSO91E	945 15TH	20-Aug-90	Perimeter		1225431	753267	0				0	0.2	0	37		0		0		53		0			945 15TH STREET			Y	Y	R	N	Y
1810	BUTSO91E	945 15TH	20-Aug-90	Play Area		1225431	753267	0				0	0.2	0	28		0		0		29		0			945 15TH STREET			Y	Y	R	N	Y
1811	BUTSO91E	945 15TH	20-Aug-90	Garden		1225431	753267	0				0	0.2	0	56		0		0		86		0			945 15TH STREET			Y	Y	R	Y	Y
1812	BUTSO91E	845 16TH	06-Sep-90	Perimeter		1225936	753387	0				0	0.2	0	31		0		0		268		0			845 16TH STREET			Y	Y	R	N	Y
1813	BUTSO91E	845 16TH	06-Sep-90	Play Area		1225936	753387	0				0	0.2	0	23		0		0		62		0			845 16TH STREET			Y	Y	R	N	Y
1814	BUTSO91E	845 16TH	06-Sep-90	Bare Area		1225936	753387	0				0	0.2	0	38		0		0		802		0			845 16TH STREET			Y	Y	R	Y	Y
1815	BUTSO91E	735 6TH	13-Aug-90	Perimeter		1226306	752289	0				0	0.2	0	53		0		0		700		0			735 6TH STREET			Y	Y	R	N	Y
1816	BUTSO91E	735 6TH	13-Aug-90	Garden		1226306	752289	0				0	0.2	0	40		0		0		828		0			735 6TH STREET			Y	Y	R	Y	Y
1817	BUTSO91E	725 10TH	07-Sep-90	Perimeter		1226271	752960	0				0	0.2	0	29		0		0		414		0			725 10TH STREET			Y	Y	R	Y	Y
1818	BUTSO91E	725 10TH	07-Sep-90	Play Area		1226271	752960	0				0	0.2	0	31		0		0		191		0			725 10TH STREET			Y	Y	R	N	Y
1819	BUTSO91E	725 10TH	07-Sep-90	Bare Area		1226271	752960	0				0	0.2	0	26		0		0		244		0			725 10TH STREET			Y	Y	R	N	Y
1820	BUTSO91E	815 10TH	14-Aug-90	Perimeter		1226052	752780	0				0	0.2	0	66		0		0		415		0			815 10TH STREET			Y	Y	R	Y	Y
1821	BUTSO91E	815 10TH	14-Aug-90	Play Area		1226052	752780	0				0	0.2	0	36		0		0		160		0			815 10TH STREET			Y	Y	R	N	Y
1822	BUTSO91E	815 10TH	14-Aug-90	Garden		1226052	752780	0				0	0.2	0	39		0		0		225		0			815 10TH STREET			Y	Y	R	N	Y
1823	BUTSO91E	801 11TH	29-Aug-90	Perimeter		1226077	752889	0				0	0.2	0	53		0		0		159		0			801 11TH STREET			Y	Y	R	N	Y
1824	BUTSO91E	801 11TH	29-Aug-90	Play Area		1226077	752889	0				0	0.2	0	33		0		0		211		0			801 11TH STREET			Y	Y	R	Y	Y
1825	BUTSO91E	801 11TH	29-Aug-90	Garden		1226077	752889	0				0	0.2	0	42		0		0		79		0			801 11TH STREET			Y	Y	R	N	Y
1826	BUTSO91E	801 11TH	29-Aug-90	Bare Area		1226077	752889	0				0	0.2	0	43		0		0		205		0			801 11TH STREET			Y	Y	R	N	Y
1827	BUTSO91E	825 13TH	13-Aug-90	Perimeter		1225916	753070	0				0	0.2	0	35		0		0		558		0			825 13TH STREET			Y	Y	R	N	Y
1828	BUTSO91E	825 13TH	13-Aug-90	Play Area		1225916	753070	0				0	0.2	0	29		0		0		712		0			825 13TH STREET			Y	Y	R	Y	Y
1829	BUTSO91E	825 13TH	13-Aug-90	Garden		1225916	753070	0				0	0.2	0	21		0		0		454		0			825 13TH STREET			Y	Y	R	N	Y
1830	BUTSO91E	825 13TH	13-Aug-90	Bare Area		1225916	753070	0				0	0.2	0	37		0		0		705		0			825 13TH STREET			Y	Y	R	N	Y
1831	BUTSO91E	845 LEXI	31-Aug-90	Perimeter		1225802	752145	0				0	0.2	0	29		0		0		270		0			845 LEXINGTON			Y	Y	R	N	Y
1832	BUTSO91E	845 LEXI	31-Aug-90	Play Area		1225802	752145	0				0	0.2	0	5		0		0		22		0			845 LEXINGTON			Y	Y	R	N	Y
1833	BUTSO91E	845 LEXI	31-Aug-90	Garden		1225802	752145	0				0	0.2	0	47		0		0		174		0			845 LEXINGTON			Y	Y	R	N	Y
1834	BUTSO91E	845 LEXI	31-Aug-90	Bare Area		1225802	752145	0				0	0.2	0	66		0		0		374		0			845 LEXINGTON			Y	Y	R	Y	Y
1835	BUTSO91E	922 LEXI	13-Aug-90	Perimeter		1225579	752005	0				0	0.2	0	46		0		0		430		0			922 LEXINGTON			Y	Y	R	Y	Y
1836	BUTSO91E	922 LEXI	13-Aug-90	Play Area		1225579	752005	0				0	0.2	0	3		0		0		12		0			922 LEXINGTON			Y	Y	R	N	Y
1837	BUTSO91E	922 LEXI	13-Aug-90	Garden		1225579	752005	0				0	0.2	0	55		0		0		182		0			922 LEXINGTON			Y	Y	R	N	Y
1838	BUTSO91E	922 LEXI	13-Aug-90	Bare Area		1225579	752005	0				0	0.2	0	45		0		0		147		0			922 LEXINGTON			Y	Y	R	N	Y
1839	BUTSO91E	831 ZARE	21-Aug-90	Perimeter		1225948	751868	0				0	0.2	0	79		0		0		1291		0			831 ZARELDA			Y	Y	R	Y	Y
1840	BUTSO91E	831 ZARE	21-Aug-90	Play Area		1225948	751868	0				0	0.2	0	14		0		0		101		0			831 ZARELDA			Y	Y	R	N	Y
1841	BUTSO91E	831 ZARE	21-Aug-90	Bare Area		1225948	751868	0				0	0.2	0	17		0		0		168		0			831 ZARELDA			Y	Y	R	N	Y
1842	BUTSO91E	835 ZARE	24-Aug-90	Perimeter		1225883	751873	0				0	0.2	0	47		0		0		1289		0			835 ZARELDA			Y	Y	R	Y	Y
1843	BUTSO91E	835 ZARE	24-Aug-90	Play Area		1225883	751873	0				0	0.2	0	43		0		0		1070		0			835 ZARELDA			Y	Y	R	N	Y
1844	BUTSO91E	835 ZARE	24-Aug-90	Bare Area		1225883	751873	0				0	0.2	0	62		0		0		844		0			835 ZARELDA			Y	Y	R	N	Y
1845	BUTSO91E	935 ZARE		Perimeter		1225371	751896	0				0	0.2	0	81		0		0		683		0			935 ZARELDA			Y	Y	R	Y	Y
1846	BUTSO91E	935 ZARE		Garden		1225371	751896	0				0	0.2	0	78		0		0		336		0			935 ZARELDA			Y	Y	R	N	Y
1847	BUTSO91E	720 ZARE	23-Aug-90	Perimeter		1226403	751693	0				0	0.2	0	49		0		0		516		0			720 ZARELDA			Y	Y	R	Y	Y
1848	BUTSO91E	720 ZARE	23-Aug-90	Play Area		1226403	751693	0				0	0.2	0	45		0		0		237		0			720 ZARELDA			Y	Y	R	N	Y
1849	BUTSO91E	720 ZARE	23-Aug-90	Bare Area		1226403	751693	0				0	0.2	0	52		0		0		207		0			720 ZARELDA			Y	Y	R	N	Y
1850	BUTSO91E	830 ZARE	15-Aug-90	Perimeter		1225970	751709	0				0	0.2	0	46		0		0		316		0			830 ZARELDA			Y	Y	R	Y	Y
1851	BUTSO91E	830 ZARE	15-Aug-90	Play Area		1225970	751709	0				0	0.2	0	18		0		0		60		0			830 ZARELDA			Y	Y	R	N	Y
1852	BUTSO91E	830 ZARE	15-Aug-90	Garden		1225970	751709	0				0	0.2	0	46		0		0		200		0			830 ZARELDA			Y	Y	R	N	Y
1853	BUTSO91E	830 ZARE	15-Aug-90	Bare Area		1225970	751709	0				0	0.2	0	46		0		0		316		0			830 ZARELDA			Y	Y	R	Y	Y
1854	BUTSO91E	934 HORN	28-Aug-90	Perimeter		1225501	751451	0				0	0.2	0	57		0		0		728		0			934 HORNET			Y	Y	R	Y	Y
1855	BUTSO91E	934 HORN	28-Aug-90	Play Area		1225501	751451	0				0	0.2	0	128		0		0		135		0			934 HORNET			Y	Y	R	N	Y
1856	BUTSO91E	934 HORN	28-Aug-90	Bare Area		1225501	751451	0				0	0.2	0	71		0		0		299		0			934 HORNET			Y	Y	R	N	Y
1857	BUTSO91E	823 EMPI	04-Sep-90	Perimeter		1225851	751320	0				0	0.2	0	87		0		0		1570		0			823 EMPIRE ST			Y	Y	R	Y	Y
1858	BUTSO91E	823 EMPI	04-Sep-90	Play Area		1225851	751320	0				0	0.2	0	11		0		0		54		0			823 EMPIRE ST			Y	Y	R	N	Y
1859	BUTSO91E	823 EMPI	04-Sep-90	Garden		1225851	751320	0				0	0.2	0	43		0		0		472		0			823 EMPIRE ST			Y	Y	R	N	Y
1860	BUTSO91E	823 EMPI	04-Sep-90	Bare Area		1225851	751320	0				0	0.2	0	46		0		0		729		0			823 EMPIRE ST			Y	Y	R	N	Y
1861	BUTSO91E	935 EMPI	30-Aug-90	Perimeter		1225454	751339	0				0	0.2	0	68		0		0		253		0			935 EMPIRE ST			Y	Y	R	N	Y
1862	BUTSO91E	935 EMPI	30-Aug-90	Play Area		1225454	751339	0				0	0.2	0	59		0		0		412		0			935 EMPIRE ST			Y	Y	R	Y	Y

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
1863	BUTSO91E	935 EMPI	30-Aug-90	Garden		1225454	751339	0				0	0.2	0	68		0		0		258		0			935 EMPIRE ST			Y	Y	R	N	Y
1864	BUTSO91E	935 EMPI	30-Aug-90	Bare Area		1225454	751339	0				0	0.2	0	65		0		0		313		0			935 EMPIRE ST			Y	Y	R	N	Y
1865	BUTSO91E	1201 N A	21-Aug-90	Perimeter		1226149	751863	0				0	0.2	0	77		0		0		789		0			1201 N ALABAMA			Y	Y	R	Y	Y
1866	BUTSO91E	1201 N A	21-Aug-90	Play Area		1226149	751863	0				0	0.2	0	74		0		0		278		0			1201 N ALABAMA			Y	Y	R	N	Y
1867	BUTSO91E	1201 N A	21-Aug-90	Garden		1226149	751863	0				0	0.2	0	64		0		0		373		0			1201 N ALABAMA			Y	Y	R	N	Y
1868	BUTSO91E	1201 N A	21-Aug-90	Bare Area		1226149	751863	0				0	0.2	0	50		0		0		357		0			1201 N ALABAMA			Y	Y	R	N	Y
1869	BUTSO91E	1214 N E	14-Aug-90	Perimeter		1225810	751961	0				0	0.2	0	33		0		0		591		0			1214 N EXCELSIOR AV			Y	Y	R	Y	Y
1870	BUTSO91E	1214 N E	14-Aug-90	Garden		1225810	751961	0				0	0.2	0	44		0		0		530		0			1214 N EXCELSIOR AV			Y	Y	R	N	Y
1871	BUTSO91E	1214 N E	14-Aug-90	Bare Area		1225810	751961	0				0	0.2	0	40		0		0		434		0			1214 N EXCELSIOR AV			Y	Y	R	N	Y
1872	BUTSO91E	305 W CO	04-Sep-90	Perimeter		1227829	749765	0				0	0.2	0	78		0		0		2677		0			305 W COPPER			Y	Y	R	N	Y
1873	BUTSO91E	305 W CO	04-Sep-90	Play Area		1227829	749765	0				0	0.2	0	10		0		0		2808		0			305 W COPPER			Y	Y	R	N	Y
1874	BUTSO91E	305 W CO	04-Sep-90	Bare Area		1227829	749765	0				0	0.2	0	80		0		0		3165		0			305 W COPPER			Y	Y	R	Y	Y
1875	BUTSO91E	409 W CO	06-Sep-90	Perimeter		1227388	749715	0				0	0.2	0	28		0		0		696		0			409 W COPPER			Y	Y	R	N	Y
1876	BUTSO91E	409 W CO	06-Sep-90	Play Area		1227388	749715	0				0	0.2	0	24		0		0		479		0			409 W COPPER			Y	Y	R	N	Y
1877	BUTSO91E	409 W CO	06-Sep-90	Garden		1227388	749715	0				0	0.2	0	25		0		0		722		0			409 W COPPER			Y	Y	R	Y	Y
1878	BUTSO91E	409 W CO	06-Sep-90	Bare Area		1227388	749715	0				0	0.2	0	23		0		0		330		0			409 W COPPER			Y	Y	R	N	Y
1879	BUTSO91E	607 W CO	24-Aug-90	Perimeter		1226846	749726	0				0	0.2	0	107		0		0		990		0			607 W COPPER			Y	Y	R	Y	Y
1880	BUTSO91E	607 W CO	24-Aug-90	Play Area		1226846	749726	0				0	0.2	0	57		0		0		104		0			607 W COPPER			Y	Y	R	N	Y
1881	BUTSO91E	607 W CO	24-Aug-90	Bare Area		1226846	749726	0				0	0.2	0	81		0		0		549		0			607 W COPPER			Y	Y	R	N	Y
1882	BUTSO91E	454 N ID	16-Aug-90	Perimeter		1227727	749904	0				0	0.2	0	89		0		0		1263		0			454 N IDAHO ST			Y	Y	R	N	Y
1883	BUTSO91E	454 N ID	16-Aug-90	Play Area		1227727	749904	0				0	0.2	0	81		0		0		944		0			454 N IDAHO ST			Y	Y	R	N	Y
1884	BUTSO91E	454 N ID	16-Aug-90	Bare Area		1227727	749904	0				0	0.2	0	215		0		0		2173		0			454 N IDAHO ST			Y	Y	R	Y	Y
1885	BUTSO91E	210 W WO	21-Aug-90	Perimeter		1227853	750245	0				0	0.2	0	97		0		0		2253		0			210 W WOOLMAN			N	Y	R	N	Y
1886	BUTSO91E	210 W WO	21-Aug-90	Play Area		1227853	750245	0				0	0.2	0	72		0		0		1188		0			210 W WOOLMAN			N	Y	R	N	Y
1887	BUTSO91E	210 W WO	21-Aug-90	Bare Area		1227853	750245	0				0	0.2	0	91		0		0		2452		0			210 W WOOLMAN			N	Y	R	Y	Y
1888	BUTSO91E	419 N JA		Perimeter		1227178	749793	0				0	0.2	0	99		0		0		1169		0			419 N JACKSON ST			Y	Y	R	Y	Y
1889	BUTSO91E	419 N JA		Play Area		1227178	749793	0				0	0.2	0	66		0		0		889		0			419 N JACKSON ST			Y	Y	R	N	Y
1890	BUTSO91E	419 N JA		Bare Area		1227178	749793	0				0	0.2	0	67		0		0		703		0			419 N JACKSON ST			Y	Y	R	N	Y
1891	BUTSO91E	504 W WO	20-Aug-90	Perimeter		1227168	750223	0				0	0.2	0	67		0		0		779		0			504 W WOOLMAN			Y	Y	R	Y	Y
1892	BUTSO91E	504 W WO	20-Aug-90	Bare Area		1227168	750223	0				0	0.2	0	68		0		0		695		0			504 W WOOLMAN			Y	Y	R	N	Y
1893	BUTSO91E	513 CALE	24-Aug-90	Perimeter		1227133	749954	0				0	0.2	0	64		0		0		612		0			513 CALEDONIA			Y	Y	R	Y	Y
1894	BUTSO91E	513 CALE	24-Aug-90	Play Area		1227133	749954	0				0	0.2	0	38		0		0		462		0			513 CALEDONIA			Y	Y	R	N	Y
1895	BUTSO91E	513 CALE	24-Aug-90	Bare Area		1227133	749954	0				0	0.2	0	46		0		0		425		0			513 CALEDONIA			Y	Y	R	N	Y
1896	BUTSO91E	527 N FR	30-Aug-90	Perimeter		1226886	749962	0				0	0.2	0	72		0		0		813		0			527 N FRANKLIN ST			Y	Y	R	Y	Y
1897	BUTSO91E	527 N FR	30-Aug-90	Play Area		1226886	749962	0				0	0.2	0	72		0		0		334		0			527 N FRANKLIN ST			Y	Y	R	N	Y
1898	BUTSO91E	527 N FR	30-Aug-90	Bare Area		1226886	749962	0				0	0.2	0	48		0		0		560		0			527 N FRANKLIN ST			Y	Y	R	N	Y
1899	BUTSO91E	524 EDIS	22-Aug-90	Perimeter		1226746	749960	0				0	0.2	0	25		0		0		470		0			524 EDISON			Y	Y	R	N	Y
1900	BUTSO91E	524 EDIS	22-Aug-90	Garden		1226746	749960	0				0	0.2	0	63		0		0		1336		0			524 EDISON			Y	Y	R	Y	Y
1901	BUTSO91E	524 EDIS	22-Aug-90	Bare Area		1226746	749960	0				0	0.2	0	16		0		0		206		0			524 EDISON			Y	Y	R	N	Y
1902	BUTSO91E	540 EDIS	16-Aug-90	Perimeter		1226750	750195	0				0	0.2	0	76		0		0		685		0			540 EDISON			Y	Y	R	N	Y
1903	BUTSO91E	540 EDIS	16-Aug-90	Play Area		1226750	750195	0				0	0.2	0	48		0		0		751		0			540 EDISON			Y	Y	R	Y	Y
1904	BUTSO91E	540 EDIS	16-Aug-90	Garden		1226750	750195	0				0	0.2	0	37		0		0		307		0			540 EDISON			Y	Y	R	N	Y
1905	BUTSO91E	540 EDIS	16-Aug-90	Bare Area		1226750	750195	0				0	0.2	0	46		0		0		329		0			540 EDISON			Y	Y	R	N	Y
1906	BUTSO91E	31 E COP	16-Aug-90	Perimeter		1229470	749830	0				0	0.2	0	56		0		0		983		0			31 E COPPER			Y	Y	R	N	Y
1907	BUTSO91E	31 E COP	16-Aug-90	Play Area		1229470	749830	0				0	0.2	0	64		0		0		239		0			31 E COPPER			Y	Y	R	N	Y
1908	BUTSO91E	31 E COP	16-Aug-90	Garden		1229470	749830	0				0	0.2	0	54		0		0		527		0			31 E COPPER			Y	Y	R	N	Y
1909	BUTSO91E	31 E COP	16-Aug-90	Bare Area		1229470	749830	0				0	0.2	0	71		0		0		2140		0			31 E COPPER			Y	Y	R	Y	Y
1910	BUTSO91E	401 N MA	27-Aug-90	Perimeter		1228988	749768	0				0	0.2	0	76		0		0		1076		0			401 N MAIN			Y	Y	R	N	Y
1911	BUTSO91E	401 N MA	27-Aug-90	Play Area		1228988	749768	0				0	0.2	0	67		0		0		625		0			401 N MAIN			Y	Y	R	N	Y
1912	BUTSO91E	401 N MA	27-Aug-90	Bare Area		1228988	749768	0				0	0.2	0	81		0		0		1311		0			401 N MAIN			Y	Y	R	Y	Y
1913	BUTSO91E	518 N MA	20-Aug-90	Perimeter		1229112	750234	0				0	0.2	0	69		0		0		1011		0			518 N MAIN			Y	Y	R	N	Y
1914	BUTSO91E	518 N MA	20-Aug-90	Play Area		1229112	750234	0				0	0.2	0	3		0		0		18		0			518 N MAIN			Y	Y	R	N	Y
1915	BUTSO91E	518 N MA	20-Aug-90	Garden		1229112	750234	0				0	0.2	0	77		0		0		1060		0			518 N MAIN			Y	Y	R	N	Y
1916	BUTSO91E	518 N MA	20-Aug-90	Bare Area		1229112	750234	0				0	0.2	0	71		0		0		1079		0			518 N MAIN			Y	Y	R	Y	Y
1917	BUTSO91E	229 W BO	14-Aug-90	Perimeter		1227807	750777	0				0	0.2	0	64		0		0		813		0			229 W BOARDMAN			Y	Y	R	N	Y
1918	BUTSO91E	229 W BO	14-Aug-90	Play Area		1227807	750777	0				0	0.2	0	415		0		0		1735		0			229 W BOARDMAN			Y	Y	R	N	Y
1919	BUTSO91E	229 W BO	14-Aug-90	Bare Area		1227807	750777	0				0	0.2	0	57		0		0		1859		0			229 W BOARDMAN			Y	Y	R	Y	Y
1920	BUTSO91E	209 W BO	20-Aug-90	Perimeter		1227958	750857	0				0	0.2	0	51		0		0		756		0			209 W BOARDMAN			Y	Y	R	N	Y
1921	BUTSO91E	209 W BO	20-Aug-90	Garden		1227958	750857	0				0	0.2	0	54		0		0		638		0			209 W BOARDMAN			Y	Y	R	N	Y
1922	BUTSO91E	209 W BO	20-Aug-90	Bare Area		1227958	750857	0				0	0.2	0	59		0		0		805		0			209 W BOARDMAN			Y	Y	R	Y	Y
1923	BUTSO91E	103 SUTT	15-Aug-90	Perimeter		1228746	750881	0				0	0.2	0	55		0		0		1149		0			103 SUTTER			Y	Y	R	Y	Y
1924	BUTSO91E	103 SUTT	15-Aug-90	Bare Area		1228746	750881	0				0	0.2	0	26		0		0		696		0			103 SUTTER			Y	Y	R	N	Y
1925	BUTSO91E	305 VIRG	31-Aug-90	Perimeter		1227732	750534	0				0	0.2	0	73		0		0		1194		0			305 VIRGINIA			N	Y	R	Y	Y
1926	BUTSO91E	305 VIRG	31-Aug-90	Play Area		1227732	750534	0				0	0.2	0	65		0		0		266		0			305 VIRGINIA			N	Y	R	N	Y
1927	BUTSO91E	305 VIRG	31-Aug-90	Bare Area		1227732	750534	0				0	0.2	0	45		0		0		517		0			305 VIRGINIA			N	Y	R	N	Y
1928	BUTSO91E	519 N MO	14-Aug-90	Perimeter		1228004	750331	0				0	0.2	0	50		0		0		554		0			519 N MONTANA			Y	Y	R	N	Y
1929	BUTSO91E	519 N MO	14-Aug-90	Garden		1228004	750331	0				0	0.2	0	61		0		0		874		0			519 N MONTANA			Y	Y	R	Y	Y
1930	BUTSO91E	519 N MO	14-Aug-90	Bare Area		1228004	750331	0				0	0.2	0	67		0		0		627		0			519 N MONTANA			Y	Y	R	N	Y
1931	BUTSO91E	521 N MO	15-Aug-90	Perimeter		1228002	750361	0				0	0.2	0	93		0		0		1084		0			521 N MONTANA			Y	Y	R	Y	Y
1932	BUTSO91E	521 N MO	15-Aug-90	Play Area		1228002	750361	0				0	0.2	0	68		0		0		894		0			521 N MONTANA			Y	Y	R	N	Y
1933	BUTSO91E	521 N MO	15-Aug-90	Bare Area		1228002	750361	0				0	0.2	0	54		0		0		659		0			521 N MONTANA			Y	Y	R	N	Y
1934	BUTSO91E	617 N AL	07-Sep-90	Perimeter		1228470	750496	0				0	0.2	0	45		0		0		681		0			617 N ALASKA ST			Y	Y	R	Y	Y
1935	BUTSO91E	617 N AL	07-Sep-90	Play Area		1228470	750496	0				0	0.2	0	35		0		0		201		0			617 N ALASKA ST			Y	Y	R	N	Y
1936	BUTSO91E	617 N AL	07-Sep-90	Bare Area		1228470	750496	0				0	0.2	0	36		0		0		228		0			617 N ALASKA ST			Y	Y	R	N	Y
1937	BUTSO91E	610 N AL	17-Aug-90	Perimeter		1228635	750423	0				0	0.2	0	72		0		0		661		0			610 N ALASKA ST			Y	Y	R	Y	Y

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
1938	BUTSO91E	610 N AL	17-Aug-90	Play Area		1228635	750423	0				0	0.2	0	87		0		0		468		0			610 N ALASKA ST			Y	Y	R	N	Y
1939	BUTSO91E	610 N AL	17-Aug-90	Bare Area		1228635	750423	0				0	0.2	0	50		0		0		395		0			610 N ALASKA ST			Y	Y	R	N	Y
1940	BUTSO91E	23 W WOOL	24-Aug-90	Perimeter		1228734	750417	0				0	0.2	0	158		0		0		2028		0			23 W WOOLMAN			Y	Y	R	N	Y
1941	BUTSO91E	23 W WOOL	24-Aug-90	Play Area		1228734	750417	0				0	0.2	0	110		0		0		2156		0			23 W WOOLMAN			Y	Y	R	Y	Y
1942	BUTSO91E	23 W WOOL	24-Aug-90	Bare Area		1228734	750417	0				0	0.2	0	46		0		0		720		0			23 W WOOLMAN			Y	Y	R	N	Y
1943	BUTSO91E	708 N WY	29-Aug-90	Perimeter		1229918	750657	0				0	0.2	0	57		0		0		1218		0			708 N WYOMING			Y	Y	R	N	Y
1944	BUTSO91E	708 N WY	29-Aug-90	Play Area		1229918	750657	0				0	0.2	0	64		0		0		1516		0			708 N WYOMING			Y	Y	R	Y	Y
1945	BUTSO91E	708 N WY	29-Aug-90	Bare Area		1229918	750657	0				0	0.2	0	80		0		0		936		0			708 N WYOMING			Y	Y	R	N	Y
1946	BUTSO91E	724 N WY	22-Aug-90	Perimeter		1229987	750891	0				0	0.2	0	181		0		0		835		0			724 N WYOMING			Y	Y	R	N	Y
1947	BUTSO91E	724 N WY	22-Aug-90	Bare Area		1229987	750891	0				0	0.2	0	108		0		0		854		0			724 N WYOMING			Y	Y	R	Y	Y
1948	BUTSO91E	34 E SUM	28-Aug-90	Perimeter		1229524	751627	0				0	0.2	0	52		0		0		1228		0			34 E SUMMIT ST			Y	Y	R	Y	Y
1949	BUTSO91E	34 E SUM	28-Aug-90	Play Area		1229524	751627	0				0	0.2	0	71		0		0		1192		0			34 E SUMMIT ST			Y	Y	R	N	Y
1950	BUTSO91E	34 E SUM	28-Aug-90	Bare Area		1229524	751627	0				0	0.2	0	41		0		0		583		0			34 E SUMMIT ST			Y	Y	R	N	Y
1951	BUTSO91E	123 MINA	13-Aug-90	Perimeter		1229469	751601	0				0	0.2	0	51		0		0		735		0			123 MINAH			Y	Y	R	N	Y
1952	BUTSO91E	123 MINA	13-Aug-90	Play Area		1229469	751601	0				0	0.2	0	53		0		0		671		0			123 MINAH			Y	Y	R	N	Y
1953	BUTSO91E	123 MINA	13-Aug-90	Garden		1229469	751601	0				0	0.2	0	64		0		0		854		0			123 MINAH			Y	Y	R	Y	Y
1954	BUTSO91E	123 MINA	13-Aug-90	Bare Area		1229469	751601	0				0	0.2	0	54		0		0		788		0			123 MINAH			Y	Y	R	N	Y
1955	BUTSO91E	108 MINA	20-Aug-90	Perimeter		1229512	751443	0				0	0.2	0	155		0		0		1098		0			108 MINAH			Y	Y	R	N	Y
1956	BUTSO91E	108 MINA	20-Aug-90	Play Area		1229512	751443	0				0	0.2	0	52		0		0		1698		0			108 MINAH			Y	Y	R	Y	Y
1957	BUTSO91E	108 MINA	20-Aug-90	Bare Area		1229512	751443	0				0	0.2	0	40		0		0		110		0			108 MINAH			Y	Y	R	N	Y
1958	BUTSO91E	100 MINA	28-Aug-90	Perimeter		1229481	751418	0				0	0.2	0	63		0		0		1747		0			100 MINAH			Y	Y	R	Y	Y
1959	BUTSO91E	100 MINA	28-Aug-90	Bare Area		1229481	751418	0				0	0.2	0	59		0		0		1260		0			100 MINAH			Y	Y	R	N	Y
1960	BUTSO91E	147 MISS		Perimeter		1227636	752665	0				0	0.2	0	41		0		0		903		0			147 MISSOULA			Y	Y	R	N	Y
1961	BUTSO91E	147 MISS		Play Area		1227636	752665	0				0	0.2	0	39		0		0		1061		0			147 MISSOULA			Y	Y	R	Y	Y
1962	BUTSO91E	147 MISS		Bare Area		1227636	752665	0				0	0.2	0	48		0		0		967		0			147 MISSOULA			Y	Y	R	N	Y
1963	BUTSO91E	31 MISSO		Perimeter		1228895	752791	0				0	0.2	0	56		0		0		3646		0			31 MISSOULA			N	Y	R	Y	Y
1964	BUTSO91E	31 MISSO		Play Area		1228895	752791	0				0	0.2	0	59		0		0		1156		0			31 MISSOULA			N	Y	R	N	Y
1965	BUTSO91E	31 MISSO		Bare Area		1228895	752791	0				0	0.2	0	41		0		0		3351		0			31 MISSOULA			N	Y	R	N	Y
1966	BUTSO91E	909 N MA	14-Aug-90	Perimeter		1229175	752426	0				0	0.2	0	76		0		0		1803		0			909 N MAIN			Y	Y	R	N	Y
1967	BUTSO91E	909 N MA	14-Aug-90	Play Area		1229175	752426	0				0	0.2	0	111		0		0		4272		0			909 N MAIN			Y	Y	R	Y	Y
1968	BUTSO91E	909 N MA	14-Aug-90	Bare Area		1229175	752426	0				0	0.2	0	101		0		0		3295		0			909 N MAIN			Y	Y	R	N	Y
1969	BUTSO91E	205 W PA	22-Aug-90	Perimeter		1228219	752446	0				0	0.2	0	60		0		0		1838		0			205 W PACIFIC ST			Y	Y	R	Y	Y
1970	BUTSO91E	205 W PA	22-Aug-90	Play Area		1228219	752446	0				0	0.2	0	42		0		0		893		0			205 W PACIFIC ST			Y	Y	R	N	Y
1971	BUTSO91E	205 W PA	22-Aug-90	Garden		1228219	752446	0				0	0.2	0	57		0		0		852		0			205 W PACIFIC ST			Y	Y	R	N	Y
1972	BUTSO91E	205 W PA	22-Aug-90	Bare Area		1228219	752446	0				0	0.2	0	64		0		0		946		0			205 W PACIFIC ST			Y	Y	R	N	Y
1973	BUTSO91E	15 W CEN	23-Aug-90	Perimeter		1229008	753047	0				0	0.2	0	52		0		0		1764		0			15 W CENTER			Y	Y	R	Y	Y
1974	BUTSO91E	15 W CEN	23-Aug-90	Play Area		1229008	753047	0				0	0.2	0	72		0		0		1682		0			15 W CENTER			Y	Y	R	N	Y
1975	BUTSO91E	15 W CEN	23-Aug-90	Bare Area		1229008	753047	0				0	0.2	0	85		0		0		1108		0			15 W CENTER			Y	Y	R	N	Y
1976	BUTSO91E	133 E CE	17-Aug-90	Perimeter		1230673	752840	0				0	0.2	0	108		0		0		2137		0			133 E CENTER			Y	Y	R	Y	Y
1977	BUTSO91E	133 E CE	17-Aug-90	Bare Area		1230673	752840	0				0	0.2	0	81		0		0		1382		0			133 E CENTER			Y	Y	R	N	Y
1978	BUTSO91E	35 E LA	15-Aug-90	Perimeter		1229840	753201	0				0	0.2	0	71		0		0		1596		0			35 E LA PLATTE			Y	Y	R	N	Y
1979	BUTSO91E	35 E LA	15-Aug-90	Garden		1229840	753201	0				0	0.2	0	75		0		0		1851		0			35 E LA PLATTE			Y	Y	R	N	Y
1980	BUTSO91E	35 E LA	15-Aug-90	Bare Area		1229840	753201	0				0	0.2	0	78		0		0		2193		0			35 E LA PLATTE			Y	Y	R	Y	Y
1981	BUTSO91E	43 W LA	23-Aug-90	Perimeter		1228629	753167	0				0	0.2	0	61		0		0		1644		0			43 W LA PLATTE			Y	Y	R	Y	Y
1982	BUTSO91E	43 W LA	23-Aug-90	Play Area		1228629	753167	0				0	0.2	0	66		0		0		1293		0			43 W LA PLATTE			Y	Y	R	N	Y
1983	BUTSO91E	103 W CE	22-Aug-90	Perimeter		1228242	753148	0				0	0.2	0	54		0		0		827		0			103 W CENTER			Y	Y	R	N	Y
1984	BUTSO91E	103 W CE	22-Aug-90	Play Area		1228242	753148	0				0	0.2	0	32		0		0		661		0			103 W CENTER			Y	Y	R	N	Y
1985	BUTSO91E	103 W CE	22-Aug-90	Bare Area		1228242	753148	0				0	0.2	0	41		0		0		1033		0			103 W CENTER			Y	Y	R	Y	Y
1986	BUTSO91E	4 O NEIL	04-Sep-90	Perimeter		1229505	753462	0				0	0.2	0	75		0		0		702		0			4 O NEIL			Y	Y	R	N	Y
1987	BUTSO91E	4 O NEIL	04-Sep-90	Play Area		1229505	753462	0				0	0.2	0	71		0		0		751		0			4 O NEIL			Y	Y	R	Y	Y
1988	BUTSO91E	19 O NEI	16-Aug-90	Perimeter		1229811	753554	0				0	0.2	0	50		0		0		1897		0			19 O NEIL			Y	Y	R	Y	Y
1989	BUTSO91E	19 O NEI	16-Aug-90	Garden		1229811	753554	0				0	0.2	0	62		0		0		1117		0			19 O NEIL			Y	Y	R	N	Y
1990	BUTSO91E	32 E LA	16-Aug-90	Perimeter		1229757	753052	0				0	0.2	0	89		0		0		1648		0			32 E LA PLATTE			Y	Y	R	Y	Y
1991	BUTSO91E	32 E LA	16-Aug-90	Bare Area		1229757	753052	0				0	0.2	0	85		0		0		1518		0			32 E LA PLATTE			Y	Y	R	N	Y
1992	BUTSO91E	4 BENNET	22-Aug-90	Perimeter		1229404	753297	0				0	0.2	0	40		0		0		1500		0			4 BENNET ST			N	Y	R	N	Y
1993	BUTSO91E	4 BENNET	22-Aug-90	Play Area		1229404	753297	0				0	0.2	0	7		0		0		207		0			4 BENNET ST			N	Y	R	N	Y
1994	BUTSO91E	4 BENNET	22-Aug-90	Garden		1229404	753297	0				0	0.2	0	49		0		0		1865		0			4 BENNET ST			N	Y	R	Y	Y
1995	BUTSO91E	4 BENNET	22-Aug-90	Bare Area		1229404	753297	0				0	0.2	0	74		0		0		1743		0			4 BENNET ST			N	Y	R	N	Y
1996	BUTSO91E	8 BENNET	15-Aug-90	Perimeter		1229495	753287	0				0	0.2	0	70		0		0		5644		0			8 BENNET ST			N	Y	R	N	Y
1997	BUTSO91E	8 BENNET	15-Aug-90	Bare Area		1229495	753287	0				0	0.2	0	68		0		0		8411		0			8 BENNET ST			N	Y	R	Y	Y
1998	BUTSO91E	61 E CEN	25-Aug-90	Perimeter		1230141	752999	0				0	0.2	0	73		0		0		2356		0			61 E CENTER			Y	Y	R	Y	Y
1999	BUTSO91E	61 E CEN	25-Aug-90	Bare Area		1230141	752999	0				0	0.2	0	74		0		0		2254		0			61 E CENTER			Y	Y	R	N	Y
2000	BUTSO91E	141 W DA		Perimeter		1228469	754716	0				0	0.2	0	76		0		0		1814		0			141 W DALY			Y	Y	R	N	Y
2001	BUTSO91E	141 W DA		Bare Area		1228469	754716	0				0	0.2	0	73		0		0		2183		0			141 W DALY			Y	Y	R	Y	Y
2002	BUTSO91E	605 W DA	31-Aug-90	Perimeter		1226884	754454	0				0	0.2	0	49		0		0		638		0			605 W DALY			Y	Y	R	N	Y
2003	BUTSO91E	605 W DA	31-Aug-90	Bare Area		1226884	754454	0				0	0.2	0	42		0		0		659		0			605 W DALY			Y	Y	R	Y	Y
2004	BUTSO91E	613 W DA	13-Aug-90	Perimeter		1226779	754434	0				0	0.2	0	62		0		0		671		0			613 W DALY			Y	Y	R	Y	Y
2005	BUTSO91E	613 W DA	13-Aug-90	Play Area		1226779	754434	0				0	0.2	0	50		0		0		294		0			613 W DALY			Y	Y	R	N	Y
2006	BUTSO91E	613 W DA	13-Aug-90	Bare Area		1226779	754434	0				0	0.2	0	60		0		0		342		0			613 W DALY			Y	Y	R	N	Y
2007	BUTSO91E	732 NORT	30-Aug-90	Perimeter		1226159	754396	0				0	0.2	0	56		0		0		367		0			732 NORTH			Y	Y	R	N	Y
2008	BUTSO91E	732 NORT	30-Aug-90	Garden		1226159	754396	0				0	0.2	0	73		0		0		426		0			732 NORTH			Y	Y	R	Y	Y
2009	BUTSO91E	732 NORT	30-Aug-90	Bare Area		1226159	754396	0				0	0.2	0	73		0		0		286		0			732 NORTH			Y	Y	R	N	Y
2010	BUTSO91E	1603 6TH	15-Aug-90	Perimeter		1226369	754316	0				0	0.2	0	29		0		0		153		0			1603 6TH STREET			Y	Y	R	N	Y
2011	BUTSO91E	1603 6TH	15-Aug-90	Play Area		1226369	754316	0				0	0.2	0	18		0		0		78		0			1603 6TH STREET			Y	Y	R	N	Y
2012	BUTSO91E	1603 6TH	15-Aug-90	Garden		1226369	754316	0				0	0.2	0	63		0		0		120		0			1603 6TH STREET			Y	Y	R	N	Y

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
2013	BUTSO91E	1603 6TH	15-Aug-90	Bare Area		1226369	754316	0				0	0.2	0	54		0		0		280		0			1603 6TH STREET			Y	Y	R	Y	Y
2014	BUTSO91E	618 W DA	06-Sep-90	Perimeter		1226730	754243	0				0	0.2	0	41		0		0		430		0			618 W DALY			Y	Y	R	N	Y
2015	BUTSO91E	618 W DA	06-Sep-90	Bare Area		1226730	754243	0				0	0.2	0	54		0		0		3642		0			618 W DALY			Y	Y	R	Y	Y
2016	BUTSO91E	506 W DA	23-Aug-90	Perimeter		1227246	754324	0				0	0.2	0	61		0		0		1254		0			506 W DALY			Y	Y	R	Y	Y
2017	BUTSO91E	506 W DA	23-Aug-90	Play Area		1227246	754324	0				0	0.2	0	50		0		0		397		0			506 W DALY			Y	Y	R	N	Y
2018	BUTSO91E	506 W DA	23-Aug-90	Garden		1227246	754324	0				0	0.2	0	72		0		0		641		0			506 W DALY			Y	Y	R	N	Y
2019	BUTSO91E	506 W DA	23-Aug-90	Bare Area		1227246	754324	0				0	0.2	0	65		0		0		574		0			506 W DALY			Y	Y	R	N	Y
2020	BUTSO91E	200 W DA	23-Aug-90	Perimeter		1228466	754558	0				0	0.2	0	49		0		0		1041		0			200 W DALY			Y	Y	R	N	Y
2021	BUTSO91E	200 W DA	23-Aug-90	Play Area		1228466	754558	0				0	0.2	0	47		0		0		1042		0			200 W DALY			Y	Y	R	N	Y
2022	BUTSO91E	200 W DA	23-Aug-90	Garden		1228466	754558	0				0	0.2	0	48		0		0		945		0			200 W DALY			Y	Y	R	N	Y
2023	BUTSO91E	200 W DA	23-Aug-90	Bare Area		1228466	754558	0				0	0.2	0	52		0		0		1155		0			200 W DALY			Y	Y	R	Y	Y
2024	BUTSO91E	427 TRAN	14-Aug-90	Perimeter		1227451	754249	0				0	0.2	0	71		0		0		1299		0			427 TRANSIT			Y	Y	R	N	Y
2025	BUTSO91E	427 TRAN	14-Aug-90	Play Area		1227451	754249	0				0	0.2	0	49		0		0		596		0			427 TRANSIT			Y	Y	R	N	Y
2026	BUTSO91E	427 TRAN	14-Aug-90	Garden		1227451	754249	0				0	0.2	0	77		0		0		886		0			427 TRANSIT			Y	Y	R	N	Y
2027	BUTSO91E	427 TRAN	14-Aug-90	Bare Area		1227451	754249	0				0	0.2	0	88		0		0		2558		0			427 TRANSIT			Y	Y	R	Y	Y
2028	BUTSO91E	421 NORT	27-Aug-90	Perimeter		1227365	754826	0				0	0.2	0	26		0		0		158		0			421 NORTH			Y	Y	R	N	Y
2029	BUTSO91E	421 NORT	27-Aug-90	Play Area		1227365	754826	0				0	0.2	0	79		0		0		733		0			421 NORTH			Y	Y	R	Y	Y
2030	BUTSO91E	421 NORT	27-Aug-90	Garden		1227365	754826	0				0	0.2	0	24		0		0		137		0			421 NORTH			Y	Y	R	N	Y
2031	BUTSO91E	421 NORT	27-Aug-90	Bare Area		1227365	754826	0				0	0.2	0	44		0		0		356		0			421 NORTH			Y	Y	R	N	Y
2032	BUTSO91E	24 E CEN	20-Aug-90	Perimeter		1229658	752895	0				0	0.2	0	71		0		0		2763		0			24 E CENTER			Y	Y	R	Y	Y
2033	BUTSO91E	24 E CEN	20-Aug-90	Bare Area		1229658	752895	0				0	0.2	0	44		0		0		1857		0			24 E CENTER			Y	Y	R	N	Y
2034	BUTSO91E	16 E CEN	22-Aug-90	Perimeter		1229552	752898	0				0	0.2	0	61		0		0		3991		0			16 E CENTER			Y	Y	R	Y	Y
2035	BUTSO91E	16 E CEN	22-Aug-90	Play Area		1229552	752898	0				0	0.2	0	48		0		0		1175		0			16 E CENTER			Y	Y	R	N	Y
2036	BUTSO91E	16 E CEN	22-Aug-90	Bare Area		1229552	752898	0				0	0.2	0	69		0		0		2763		0			16 E CENTER			Y	Y	R	N	Y
2037	BUTSO91E	62 W DAL	15-Aug-90	Perimeter		1228859	754632	0				0	0.2	0	36		0		0		576		0			62 W DALY			Y	Y	R	N	Y
2038	BUTSO91E	62 W DAL	15-Aug-90	Play Area		1228859	754632	0				0	0.2	0	39		0		0		236		0			62 W DALY			Y	Y	R	N	Y
2039	BUTSO91E	62 W DAL	15-Aug-90	Garden		1228859	754632	0				0	0.2	0	48		0		0		851		0			62 W DALY			Y	Y	R	Y	Y
2040	BUTSO91E	102 W DA	15-Aug-90	Perimeter		1228778	754620	0				0	0.2	0	53		0		0		1607		0			102 W DALY			Y	Y	R	N	Y
2041	BUTSO91E	102 W DA	15-Aug-90	Play Area		1228778	754620	0				0	0.2	0	43		0		0		1314		0			102 W DALY			Y	Y	R	N	Y
2042	BUTSO91E	102 W DA	15-Aug-90	Garden		1228778	754620	0				0	0.2	0	63		0		0		1965		0			102 W DALY			Y	Y	R	Y	Y
2043	BUTSO91E	102 W DA	15-Aug-90	Bare Area		1228778	754620	0				0	0.2	0	62		0		0		1238		0			102 W DALY			Y	Y	R	N	Y
2044	BUTSO91E	20 GLADS	14-Aug-90	Perimeter		1229993	754487	0				0	0.2	0	79		0		0		1662		0			20 GLADSTONE TERRAC			Y	Y	R	Y	Y
2045	BUTSO91E	20 GLADS	14-Aug-90	Play Area		1229993	754487	0				0	0.2	0	48		0		0		987		0			20 GLADSTONE TERRAC			Y	Y	R	N	Y
2046	BUTSO91E	20 GLADS	14-Aug-90	Garden		1229993	754487	0				0	0.2	0	52		0		0		1399		0			20 GLADSTONE TERRAC			Y	Y	R	N	Y
2047	BUTSO91E	20 GLADS	14-Aug-90	Bare Area		1229993	754487	0				0	0.2	0	56		0		0		1422		0			20 GLADSTONE TERRAC			Y	Y	R	N	Y
2048	BUTSO91E	4 GLADST		Perimeter		1229698	754445	0				0	0.2	0	93		0		0		938		0			4 GLADSTONE TERRACE			Y	Y	R	Y	Y
2049	BUTSO91E	4 GLADST		Bare Area		1229698	754445	0				0	0.2	0	50		0		0		872		0			4 GLADSTONE TERRACE			Y	Y	R	N	Y
2050	BUTSO91E	131 W DA	15-Aug-90	Perimeter		1228584	754761	0				0	0.2	0	55		0		0		136		0			131 W DALY			Y	Y	R	N	Y
2051	BUTSO91E	131 W DA	15-Aug-90	Play Area		1228584	754761	0				0	0.2	0	40		0		0		825		0			131 W DALY			Y	Y	R	Y	Y
2052	BUTSO91E	131 W DA	15-Aug-90	Bare Area		1228584	754761	0				0	0.2	0	36		0		0		492		0			131 W DALY			Y	Y	R	N	Y
2053	BUTSO91E	43 W DAL	27-Aug-90	Perimeter		1229114	754852	0				0	0.2	0	58		0		0		671		0			43 W DALY			Y	Y	R	N	Y
2054	BUTSO91E	43 W DAL	27-Aug-90	Bare Area		1229114	754852	0				0	0.2	0	65		0		0		859		0			43 W DALY			Y	Y	R	Y	Y
2055	BUTSO91E	116 E DA	25-Aug-90	Perimeter		1229950	755062	0				0	0.2	0	69		0		0		1351		0			116 E DALY			Y	Y	R	Y	Y
2056	BUTSO91E	116 E DA	25-Aug-90	Play Area		1229950	755062	0				0	0.2	0	51		0		0		962		0			116 E DALY			Y	Y	R	N	Y
2057	BUTSO91E	144 E DA	23-Aug-90	Perimeter		1230215	755257	0				0	0.2	0	71		0		0		972		0			144 E DALY			Y	Y	R	N	Y
2058	BUTSO91E	144 E DA	23-Aug-90	Garden		1230215	755257	0				0	0.2	0	96		0		0		1121		0			144 E DALY			Y	Y	R	Y	Y
2059	BUTSO91E	144 E DA	23-Aug-90	Bare Area		1230215	755257	0				0	0.2	0	62		0		0		611		0			144 E DALY			Y	Y	R	N	Y
2060	BUTSO91E	115 E CL	14-Aug-90	Perimeter		1229922	755558	0				0	0.2	0	62		0		0		1218		0			115 E CLARK ST			Y	Y	R	Y	Y
2061	BUTSO91E	115 E CL	14-Aug-90	Play Area		1229922	755558	0				0	0.2	0	86		0		0		1139		0			115 E CLARK ST			Y	Y	R	N	Y
2062	BUTSO91E	115 E CL	14-Aug-90	Garden		1229922	755558	0				0	0.2	0	86		0		0		782		0			115 E CLARK ST			Y	Y	R	N	Y
2063	BUTSO91E	115 E CL	14-Aug-90	Bare Area		1229922	755558	0				0	0.2	0	74		0		0		831		0			115 E CLARK ST			Y	Y	R	N	Y
2064	BUTSO91E	1619 N M	14-Aug-90	Perimeter		1229386	755111	0				0	0.2	0	61		0		0		1415		0			1619 N MAIN			N	Y	R	N	Y
2065	BUTSO91E	1619 N M	14-Aug-90	Play Area		1229386	755111	0				0	0.2	0	53		0		0		1253		0			1619 N MAIN			N	Y	R	N	Y
2066	BUTSO91E	1619 N M	14-Aug-90	Bare Area		1229386	755111	0				0	0.2	0	89		0		0		2028		0			1619 N MAIN			N	Y	R	Y	Y
2067	BUTSO91E	1614 N M	30-Aug-90	Perimeter		1229567	755030	0				0	0.2	0	99		0		0		2357		0			1614 N MAIN			Y	Y	R	Y	Y
2068	BUTSO91E	1614 N M	30-Aug-90	Play Area		1229567	755030	0				0	0.2	0	64		0		0		833		0			1614 N MAIN			Y	Y	R	N	Y
2069	BUTSO91E	1614 N M	30-Aug-90	Bare Area		1229567	755030	0				0	0.2	0	77		0		0		1586		0			1614 N MAIN			Y	Y	R	N	Y
2070	BUTSO91E	2809 S M	16-Aug-90	Perimeter		1227458	737030	0				0	0.2	0	61		0		0		197		0			2809 S MONTANA			Y	Y	R	Y	Y
2071	BUTSO91E	2809 S M	16-Aug-90	Play Area		1227458	737030	0				0	0.2	0	28		0		0		46		0			2809 S MONTANA			Y	Y	R	N	Y
2072	BUTSO91E	2809 S M	16-Aug-90	Bare Area		1227458	737030	0				0	0.2	0	54		0		0		108		0			2809 S MONTANA			Y	Y	R	N	Y
2073	BUTSO91E	2805 S M	23-Aug-90	Perimeter		1227687	737467	0				0	0.2	0	66		0		0		255		0			2805 S MONTANA			Y	Y	R	Y	Y
2074	BUTSO91E	2805 S M	23-Aug-90	Garden		1227687	737467	0				0	0.2	0	26		0		0		61		0			2805 S MONTANA			Y	Y	R	N	Y
2075	BUTSO91E	2805 S M	23-Aug-90	Bare Area		1227687	737467	0				0	0.2	0	65		0		0		210		0			2805 S MONTANA			Y	Y	R	N	Y
2076	BUTSO91E	3234 S M	16-Aug-90	Perimeter		1227868	735812	0				0	0.2	0	80		0		0		297		0			3234 S MONTANA			Y	Y	R	N	Y
2077	BUTSO91E	3234 S M	16-Aug-90	Play Area		1227868	735812	0				0	0.2	0	102		0		0		476		0			3234 S MONTANA			Y	Y	R	N	Y
2078	BUTSO91E	3234 S M	16-Aug-90	Garden		1227868	735812	0				0	0.2	0	98		0		0		247		0			3234 S MONTANA			Y	Y	R	N	Y
2079	BUTSO91E	3234 S M	16-Aug-90	Bare Area		1227868	735812	0				0	0.2	0	114		0		0		496		0			3234 S MONTANA			Y	Y	R	Y	Y
2080	BUTSO91E	200 MCKI	23-Aug-90	Perimeter		1228271	736022	0				0	0.2	0	86		0		0		177		0			200 MCKINLEY AV			Y	Y	R	N	Y
2081	BUTSO91E	200 MCKI	23-Aug-90	Play Area		1228271	736022	0				0	0.2	0	146		0		0		373		0			200 MCKINLEY AV			Y	Y	R	Y	Y
2082	BUTSO91E	200 MCKI	23-Aug-90	Bare Area		1228271	736022	0				0	0.2	0	106		0		0		259		0			200 MCKINLEY AV			Y	Y	R	N	Y
2083	BUTSO91E	240 CALH	27-Aug-90	Perimeter		1228112	735274	0				0	0.2	0	61		0		0		300		0			240 CALHOUN ST			Y	Y	R	Y	Y
2084	BUTSO91E	240 CALH	27-Aug-90	Garden		1228112	735274	0				0	0.2	0	19		0		0		26		0			240 CALHOUN ST			Y	Y	R	N	Y
2085	BUTSO91E	204 CALH	20-Aug-90	Perimeter		1228384	735264	0				0	0.2	0	156		0		0		813		0			204 CALHOUN ST			Y	Y	R	N	Y
2086	BUTSO91E	204 CALH	20-Aug-90	Play Area		1228384	735264	0				0	0.2	0	502		0		0		1014		0			204 CALHOUN ST			Y	Y	R	N	Y
2087	BUTSO91E	204 CALH	20-Aug-90	Bare Area		1228384	735264	0				0	0.2	0	411		0		0		1074		0			204 CALHOUN ST			Y	Y	R	Y	Y

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
2088	BUTSO91E	138 CALH	16-Aug-90	Perimeter		1228580	735256	0				0	0.2	0	18		0		0		47		0			138 CALHOUN ST			Y	Y	R	N	Y
2089	BUTSO91E	138 CALH	16-Aug-90	Play Area		1228580	735256	0				0	0.2	0	36		0		0		113		0			138 CALHOUN ST			Y	Y	R	Y	Y
2090	BUTSO91E	138 CALH	16-Aug-90	Bare Area		1228580	735256	0				0	0.2	0	13		0		0		36		0			138 CALHOUN ST			Y	Y	R	N	Y
2091	BUTSO91E	135 CALH	16-Aug-90	Perimeter		1228887	735406	0				0	0.2	0	38		0		0		118		0			135 CALHOUN ST			Y	Y	R	N	Y
2092	BUTSO91E	135 CALH	16-Aug-90	Play Area		1228887	735406	0				0	0.2	0	49		0		0		119		0			135 CALHOUN ST			Y	Y	R	Y	Y
2093	BUTSO91E	135 CALH	16-Aug-90	Garden		1228887	735406	0				0	0.2	0	31		0		0		89		0			135 CALHOUN ST			Y	Y	R	N	Y
2094	BUTSO91E	135 CALH	16-Aug-90	Bare Area		1228887	735406	0				0	0.2	0	16		0		0		36		0			135 CALHOUN ST			Y	Y	R	N	Y
2190	BUTSO91E	1118 FAR	22-Aug-90	Perimeter		1232165	745415	0				0	0.2	0	73		0		0		720		0			1118 FARRELL ST			Y	Y	R	Y	Y
2191	BUTSO91E	1118 FAR	22-Aug-90	Play Area		1232165	745415	0				0	0.2	0	73		0		0		13		0			1118 FARRELL ST			Y	Y	R	N	Y
2192	BUTSO91E	1208 FAR	17-Aug-90	Perimeter		1232475	745408	0				0	0.2	0	96		0		0		703		0			1208 FARRELL ST			Y	Y	R	Y	Y
2193	BUTSO91E	1208 FAR	17-Aug-90	Play Area		1232475	745408	0				0	0.2	0	72		0		0		475		0			1208 FARRELL ST			Y	Y	R	N	Y
2194	BUTSO91E	1208 FAR	17-Aug-90	Bare Area		1232475	745408	0				0	0.2	0	84		0		0		677		0			1208 FARRELL ST			Y	Y	R	N	Y
2195	BUTSO91E	1226 FAR	17-Aug-90	Perimeter		1232616	745404	0				0	0.2	0	78		0		0		969		0			1226 FARRELL ST			Y	Y	R	Y	Y
2196	BUTSO91E	1226 FAR	17-Aug-90	Play Area		1232616	745404	0				0	0.2	0	85		0		0		920		0			1226 FARRELL ST			Y	Y	R	N	Y
2197	BUTSO91E	1226 FAR	17-Aug-90	Garden		1232616	745404	0				0	0.2	0	87		0		0		751		0			1226 FARRELL ST			Y	Y	R	N	Y
2198	BUTSO91E	1106 SEC	17-Aug-90	Perimeter		1232064	745712	0				0	0.2	0	91		0		0		2612		0			1106 SECOND ST			Y	Y	R	Y	Y
2199	BUTSO91E	1106 SEC	17-Aug-90	Play Area		1232064	745712	0				0	0.2	0	296		0		0		1463		0			1106 SECOND ST			Y	Y	R	N	Y
2200	BUTSO91E	1106 SEC	17-Aug-90	Bare Area		1232064	745712	0				0	0.2	0	103		0		0		2460		0			1106 SECOND ST			Y	Y	R	N	Y
2201	BUTSO91E	1118 SEC	24-Aug-90	Perimeter		1232198	745708	0				0	0.2	0	97		0		0		1307		0			1118 SECOND ST			Y	Y	R	Y	Y
2202	BUTSO91E	1118 SEC	24-Aug-90	Garden		1232198	745708	0				0	0.2	0	64		0		0		604		0			1118 SECOND ST			Y	Y	R	N	Y
2203	BUTSO91E	1118 SEC	24-Aug-90	Bare Area		1232198	745708	0				0	0.2	0	95		0		0		1197		0			1118 SECOND ST			Y	Y	R	N	Y
2204	BUTSO91E	1115 SEC	29-Aug-90	Perimeter		1232166	745882	0				0	0.2	0	124		0		0		710		0			1115 SECOND ST			N	Y	R	N	Y
2205	BUTSO91E	1115 SEC	29-Aug-90	Play Area		1232166	745882	0				0	0.2	0	97		0		0		954		0			1115 SECOND ST			N	Y	R	N	Y
2206	BUTSO91E	1115 SEC	29-Aug-90	Bare Area		1232166	745882	0				0	0.2	0	151		0		0		1031		0			1115 SECOND ST			N	Y	R	Y	Y
2207	BUTSO91E	1131 THI	21-Aug-90	Perimeter		1232167	746140	0				0	0.2	0	80		0		0		1098		0			1131 THIRD ST			N	Y	R	Y	Y
2208	BUTSO91E	1131 THI	21-Aug-90	Play Area		1232167	746140	0				0	0.2	0	4		0		0		28		0			1131 THIRD ST			N	Y	R	N	Y
2209	BUTSO91E	1131 THI	21-Aug-90	Bare Area		1232167	746140	0				0	0.2	0	47		0		0		842		0			1131 THIRD ST			N	Y	R	N	Y
2210	BUTSO91E	1246 SHO	23-Aug-90	Perimeter		1232680	746133	0				0	0.2	0	86		0		0		830		0			1246 SHORT ST			Y	Y	R	N	Y
2211	BUTSO91E	1246 SHO	23-Aug-90	Play Area		1232680	746133	0				0	0.2	0	62		0		0		584		0			1246 SHORT ST			Y	Y	R	N	Y
2212	BUTSO91E	920 ERGO	16-Aug-90	Perimeter		1232720	746048	0				0	0.2	0	71		0		0		1074		0			920 ERGO ST			N	Y	R	Y	Y
2213	BUTSO91E	920 ERGO	16-Aug-90	Play Area		1232720	746048	0				0	0.2	0	48		0		0		175		0			920 ERGO ST			N	Y	R	N	Y
2214	BUTSO91E	920 ERGO	16-Aug-90	Garden		1232720	746048	0				0	0.2	0	65		0		0		524		0			920 ERGO ST			N	Y	R	N	Y
2215	BUTSO91E	920 ERGO	16-Aug-90	Bare Area		1232720	746048	0				0	0.2	0	59		0		0		342		0			920 ERGO ST			N	Y	R	N	Y
2216	BUTSO91E	1246 SHO	06-Sep-90	Perimeter		1232680	746133	0				0	0.2	0	103		0		0		1213		0			1246 SHORT ST			Y	Y	R	N	Y
2217	BUTSO91E	1246 SHO	06-Sep-90	Play Area		1232680	746133	0				0	0.2	0	97		0		0		767		0			1246 SHORT ST			Y	Y	R	N	Y
2218	BUTSO91E	1246 SHO	06-Sep-90	Bare Area		1232680	746133	0				0	0.2	0	145		0		0		1379		0			1246 SHORT ST			Y	Y	R	Y	Y
2219	BSBLP	11	05-Dec-95	1201		1227853	750245	0		S001886		0	0.08	0	0		0		0		986		0			210 W Woolman ST			N	Y	R	N	Y
2220	BSBLP	11	05-Dec-95	1202		1227853	750245	0		S001887		0	0.08	0	0		0		0		11600		0			210 W Woolman ST			N	Y	R	Y	Y
2221	BSBLP	13	05-Jun-97	37001		1230410	744587	0		7-1471		0	0.08	0	0		0		0		3010		0			1028 S Californi ST			N	Y	R	N	Y
2222	BSBLP	13	05-Jun-97	37002		1230410	744587	0		7-1472		0	0.08	0	0		0		0		10900		0			1028 S Californi ST			N	Y	R	N	Y
2223	BSBLP	13	05-Jun-97	37003		1230410	744587	0		7-1473		0	0.08	0	0		0		0		2290		0			1028 S Californi ST			N	Y	R	N	Y
2224	BSBLP	13	05-Jun-97	37004		1230410	744587	0		7-1474		0	0.08	0	0		0		0		28100		0			1028 S Californi ST			N	Y	R	Y	Y
2225	BSBLP	13	05-Jun-97	37005		1230410	744587	0		7-1475		0	0.08	0	0		0		0		3000		0			1028 S Californi ST			N	Y	R	N	Y
2226	BSBLP	13	05-Jun-97	37006		1230410	744587	0		7-1476		0	0.08	0	0		0		0		4350		0			1028 S Californi ST			N	Y	R	N	Y
2227	BSBLP	13	05-Jun-97	37007		1230410	744587	0		7-1477		0	0.08	0	0		0		0		1680		0			1028 S Californi ST			N	Y	R	N	Y
2228	BSBLP	13	05-Jun-97	37008		1230410	744587	0		7-1478		0	0.08	0	0		0		0		9050		0			1028 S Californi ST			N	Y	R	N	Y
2229	BSBLP	16	30-Nov-95	SOFIT		1227619	748839	0		SO01810		0	0.08	0	0		0		0		1540		0			315 W Broadway ST			N	Y	R	N	Y
2230	BSBLP	16	21-Jun-95	02001		1227619	748839	0		S000473		0	0.08	0	0		0		0		8860		0			315 W Broadway ST			N	Y	R	Y	Y
2231	BSBLP	16	21-Jun-95	02002		1227619	748839	0		S000474		0	0.08	0	0		0		0		597		0			315 W Broadway ST			N	Y	R	N	Y
2232	BSBLP	17	29-Jul-96	24001		1225471	748849	0		S002439		0	0.08	0	0		0		0		1090		0			917 W Broadway ST			N	Y	R	N	Y
2233	BSBLP	17	29-Jul-96	24002		1225471	748849	0		S002440		0	0.08	0	0		0		0		983		0			917 W Broadway ST			N	Y	R	N	Y
2234	BSBLP	17	29-Jul-96	24003		1225471	748849	0		S002441		0	0.08	0	0		0		0		3880		0			917 W Broadway ST			N	Y	R	N	Y
2235	BSBLP	17	29-Jul-96	24004		1225471	748849	0		S002442		0	0.08	0	0		0		0		2240		0			917 W Broadway ST			N	Y	R	N	Y
2236	BSBLP	17	29-Jul-96	24005		1225471	748849	0		S002443		0	0.08	0	0		0		0		67100		0			917 W Broadway ST			N	Y	R	Y	Y
2237	BSBLP	17	29-Jul-96	24006		1225471	748849	0		S002444		0	0.08	0	0		0		0		1420		0			917 W Broadway ST			N	Y	R	N	Y
2238	BSBLP	17	29-Jul-96	24007		1225471	748849	0		S002445		0	0.08	0	0		0		0		5400		0			917 W Broadway ST			N	Y	R	N	Y
2239	BSBLP	17	29-Jul-96	24008		1225471	748849	0		S002446		0	0.08	0	0		0		0		842		0			917 W Broadway ST			N	Y	R	N	Y
2240	BSBLP	18	16-Jul-96	19001		1230735	753230	0		S002395		0	0.08	0	0		0		0		3340		0			79 Bennett ST			N	Y	R	Y	Y
2241	BSBLP	18	16-Jul-96	19002		1230735	753230	0		S002396		0	0.08	0	0		0		0		603		0			79 Bennett ST			N	Y	R	N	Y
2242	BSBLP	18	16-Jul-96	19003		1230735	753230	0		S002397		0	0.08	0	0		0		0		2460		0			79 Bennett ST			N	Y	R	N	Y
2243	BSBLP	19	29-Apr-97	33001		1225570	751596	0		7-1394		0	0.08	0	0		0		0		2060		0			929 Hornet ST	EAST SIDE		N	Y	R	N	Y
2244	BSBLP	19	29-Apr-97	33002		1225570	751596	0		7-1395		0	0.08	0	0		0		0		2910		0			929 Hornet ST			N	Y	R	N	Y
2245	BSBLP	19	29-Apr-97	33003		1225570	751596	0		7-1396		0	0.08	0	0		0		0		1520		0			929 Hornet ST	WEST SIDE		N	Y	R	N	Y
2246	BSBLP	19	29-Apr-97	33004		1225570	751596	0		7-1397		0	0.08	0	0		0		0		2970		0			929 Hornet ST	FRONT		N	Y	R	N	Y
2247	BSBLP	19	29-Apr-97	33005		1225570	751596	0		7-1398		0	0.08	0	0		0		0		3320		0			929 Hornet ST			N	Y	R	Y	Y
2248	BSBLP	19	29-Apr-97	33006		1225570	751596	0		7-1399		0	0.08	0	0		0		0		486		0			929 Hornet ST			N	Y	R	N	Y
2249	BSBLP	19	29-Apr-97	33007		1225570	751596	0		7-1400		0	0.08	0	0		0		0		757		0			929 Hornet ST	FRONT HALF		N	Y	R	N	Y
2250	BSBLP	19	29-Apr-97	33008		1225570	751596	0		7-1401		0	0.08	0	0		0		0		714		0			929 Hornet ST	BACK HALF		N	Y	R	N	Y
2251	BSBLP	20	27-Oct-95	6001		1231205	744970	0		S001754		0	0.08	0	0		0		0		735		0			1036 S Utah ST			N	Y	R	N	Y
2252	BSBLP	20	27-Oct-95	6002		1231205	744970	0		S001755		0	0.08	0	0		0		0		5950		0			1036 S Utah ST			N	Y	R	Y	Y
2253	BSBLP	20	27-Oct-95	6003		1231205	744970	0		S001756		0	0.08	0	0		0		0		2460		0			1036 S Utah ST			N	Y	R	N	Y
2254	BSBLP	20	27-Oct-95	6004		1231205	744970	0		S001757		0	0.08	0	0		0		0		932		0			1036 S Utah ST			N	Y	R	N	Y
2255	BSBLP	21	09-Jul-96	1		1229774	751279	0		S002323		0	0.08	0	121		0		0		1190		0			109 Belle ST	NORTH SIDE		N	Y	R	N	Y
2256	BSBLP	21	09-Jul-96	2		1229774	751279	0		S002324		0	0.08	0	355		0		0		2720		0			109 Belle ST	SOUTH SIDE		N	Y	R	Y	Y
2257	BSBLP	21	09-Jul-96	3		1229774	751279	0		S002325		0	0.08	0	61		0		0		1330		0			109 Belle ST	SEDIMENT		N	Y	R	N	Y

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
2258	BSBLP	21	09-Jul-96	4		1229774	751279	0		S002326		0	0.08	0	32		0		0		1560		0			109 Belle ST	STORMWATER SEDIMENT		N	Y	R	N	Y
2259	BSBLP	22	19-Sep-96	29001		1228670	752929	0		S003224		0	0.08	0	0		0		0		989		0			36 W Center ST			N	Y	R	N	Y
2260	BSBLP	22	19-Sep-96	29002		1228670	752929	0		S003225		0	0.08	0	0		0		0		1360		0			36 W Center ST			N	Y	R	N	Y
2261	BSBLP	22	19-Sep-96	29003		1228670	752929	0		S003226		0	0.08	0	0		0		0		2970		0			36 W Center ST			N	Y	R	Y	Y
2262	BSBLP	22	19-Sep-96	29004		1228670	752929	0		S003227		0	0.08	0	0		0		0		906		0			36 W Center ST			N	Y	R	N	Y
2263	BSBLP	23	16-Jul-96	16001		1228895	752791	0		S002386		0	0.08	0	0		0		0		1930		0			31 Missoula AVE			N	Y	R	N	Y
2264	BSBLP	23	16-Jul-96	16002		1228895	752791	0		S002387		0	0.08	0	0		0		0		3990		0			31 Missoula AVE			N	Y	R	Y	Y
2265	BSBLP	23	16-Jul-96	16003		1228895	752791	0		S002388		0	0.08	0	0		0		0		1850		0			31 Missoula AVE			N	Y	R	N	Y
2266	BSBLP	24	27-Sep-96	30001		1228146	754499	0		6-1450		0	0.08	0	25		0		150		517		978			246 W Daly ST			N	Y	R	N	Y
2267	BSBLP	24	27-Sep-96	30002		1228146	754499	0		6-1451		0	0.08	0	59		4		368		2840		3540			246 W Daly ST			N	Y	R	Y	Y
2268	BSBLP	24	27-Sep-96	30003		1228146	754499	0		6-1452		0	0.08	0	0		5		225		2620		3540			246 W Daly ST			N	Y	R	N	Y
2269	BSBLP	25	09-Aug-96	25001		1229386	755111	0		S002553		0	0.08	0	0		0		0		2300		0			1619 N Main ST			N	Y	R	Y	Y
2270	BSBLP	25	09-Aug-96	25002		1229386	755111	0		S002554		0	0.08	0	0		0		0		1800		0			1619 N Main ST			N	Y	R	N	Y
2271	BSBLP	25	09-Aug-96	25003		1229386	755111	0		S002555		0	0.08	0	0		0		0		956		0			1619 N Main ST			N	Y	R	N	Y
2272	BSBLP	25	09-Aug-96	25004		1229386	755111	0		S002556		0	0.08	0	0		0		0		956		0			1619 N Main ST			N	Y	R	N	Y
2273	BSBLP	25	09-Aug-96	25005		1229386	755111	0		S002557		0	0.08	0	0		0		0		988		0			1619 N Main ST			N	Y	R	N	Y
2274	BSBLP	25	09-Aug-96	25006		1229386	755111	0		S002558		0	0.08	0	0		0		0		1370		0			1619 N Main ST			N	Y	R	N	Y
2275	BSBLP	25	09-Aug-96	25007		1229386	755111	0		S002559		0	0.08	0	0		0		0		178		0			1619 N Main ST			N	Y	R	N	Y
2276	BSBLP	25	09-Aug-96	25008		1229386	755111	0		S002560		0	0.08	0	0		0		0		748		0			1619 N Main ST			N	Y	R	N	Y
2291	BSBLP	41	25-Oct-95	4001		1230032	744343	0		S001748		0	0.08	0	0		0		0		744		0			1039 Maryland AVE			Y	Y	R	N	Y
2292	BSBLP	41	25-Oct-95	4002		1230032	744343	0		S001749		0	0.08	0	0		0		0		893		0			1039 Maryland AVE	Basement		Y	Y	R	N	Y
2293	BSBLP	41	25-Oct-95	4003		1230032	744343	0		S001750		0	0.08	0	0		0		0		610		0			1039 Maryland AVE			Y	Y	R	N	Y
2294	BSBLP	41	25-Oct-95	4004		1230032	744343	0		S001751		0	0.08	0	0		0		0		714		0			1039 Maryland AVE	SOUTH SIDE		Y	Y	R	N	Y
2295	BSBLP	41	25-Oct-95	4005		1230032	744343	0		S001752		0	0.08	0	0		0		0		1050		0			1039 Maryland AVE	NORTH SIDE		Y	Y	R	Y	Y
2296	BSBLP	42	17-Aug-95	3001		1226053	749398	0		S000746		0	0.08	0	0		0		0		856		0			315 N Alabama ST			Y	Y	R	N	Y
2297	BSBLP	42	17-Aug-95	3002		1226053	749398	0		S00747		0	0.08	0	0		0		0		2740		0			315 N Alabama ST			Y	Y	R	Y	Y
2298	BSBLP	42	17-Aug-95	3003		1226053	749398	0		S00748		0	0.08	0	0		0		0		286		0			315 N Alabama ST			Y	Y	R	N	Y
2299	BSBLP	42	17-Aug-95	3004		1226053	749398	0		S00749		0	0.08	0	0		0		0		412		0			315 N Alabama ST			Y	Y	R	N	Y
2300	BSBLP	42	17-Aug-95	3005		1226053	749398	0		S00750		0	0.08	0	0		0		0		502		0			315 N Alabama ST			Y	Y	R	N	Y
2301	BSBLP	42	17-Aug-95	3006		1226053	749398	0		S00751		0	0.08	0	0		0		0		521		0			315 N Alabama ST			Y	Y	R	N	Y
2302	BSBLP	42	17-Aug-95	3007		1226053	749398	0		S00752		0	0.08	0	0		0		0		876		0			315 N Alabama ST			Y	Y	R	N	Y
2303	BSBLP	43	09-Jul-96	13001		1228706	739674	0		S002327		0	0.08	0	0		0		0		270		0			2433 S Colorado ST			Y	Y	R	N	Y
2304	BSBLP	43	09-Jul-96	13002		1228706	739674	0		S002328		0	0.08	0	0		0		0		2920		0			2433 S Colorado ST	Driveway		Y	Y	R	Y	Y
2305	BSBLP	43	09-Jul-96	13003		1228706	739674	0		S002329		0	0.08	0	0		0		0		346		0			2433 S Colorado ST			Y	Y	R	N	Y
2306	BSBLP	43	09-Jul-96	13004		1228706	739674	0		S002330		0	0.08	0	0		0		0		2430		0			2433 S Colorado ST			Y	Y	R	N	Y
2307	BSBLP	43	09-Jul-96	13005		1228706	739674	0		S002331		0	0.08	0	0		0		0		1430		0			2433 S Colorado ST			Y	Y	R	N	Y
2308	BSBLP	43	09-Jul-96	13006		1228706	739674	0		S002332		0	0.08	0	0		0		0		1560		0			2433 S Colorado ST			Y	Y	R	N	Y
2309	BSBLP	43	09-Jul-96	13007		1228706	739674	0		S002333		0	0.08	0	0		0		0		1640		0			2433 S Colorado ST			Y	Y	R	N	Y
2310	BSBLP	43	09-Jul-96	13008		1228706	739674	0		S002334		0	0.08	0	0		0		0		173		0			2433 S Colorado ST			Y	Y	R	N	Y
2311	BSBLP	43	09-Jul-96	13009		1228706	739674	0		S002335		0	0.08	0	0		0		0		50		0			2433 S Colorado ST			Y	Y	R	N	Y
2321	BSBLP	47	09-Jul-96	14001		1225401	750348	0		S002336		0	0.08	0	0		0		0		720		0			918 Antimony ST			Y	Y	R	N	Y
2322	BSBLP	47	09-Jul-96	14002		1225401	750348	0		S002337		0	0.08	0	0		0		0		2910		0			918 Antimony ST			Y	Y	R	Y	Y
2323	BSBLP	47	09-Jul-96	14003		1225401	750348	0		S002338		0	0.08	0	0		0		0		1160		0			918 Antimony ST			Y	Y	R	N	Y
2324	BSBLP	47	09-Jul-96	14004		1225401	750348	0		S002339		0	0.08	0	0		0		0		817		0			918 Antimony ST			Y	Y	R	N	Y
2325	BSBLP	47	09-Jul-96	14005		1225401	750348	0		S002340		0	0.08	0	0		0		0		734		0			918 Antimony ST			Y	Y	R	N	Y
2326	BSBLP	47	09-Jul-96	14006		1225401	750348	0		S002341		0	0.08	0	0		0		0		516		0			918 Antimony ST			Y	Y	R	N	Y
2327	BSBLP	48	03-Nov-93	1		1231423	744823	0		S6180		0	0.08	0	0		0		0		1230		0			1111 S Arizona ST			Y	Y	R	Y	Y
2328	BSBLP	51	21-Aug-96	27001		1229748	753226	0		S002673		0	0.08	0	0		0		0		774		0			8 Bennett ST			Y	Y	R	N	Y
2329	BSBLP	51	21-Aug-96	27002		1229748	753226	0		S002674		0	0.08	0	0		0		0		723		0			8 Bennett ST			Y	Y	R	N	Y
2330	BSBLP	51	21-Aug-96	27003		1229748	753226	0		S002675		0	0.08	0	0		0		0		2490		0			8 Bennett ST			Y	Y	R	N	Y
2331	BSBLP	51	21-Aug-96	27004		1229748	753226	0		S002676		0	0.08	0	0		0		0		5570		0			8 Bennett ST			Y	Y	R	Y	Y
2332	BSBLP	51	21-Aug-96	27005		1229748	753226	0		S002677		0	0.08	0	0		0		0		2000		0			8 Bennett ST			Y	Y	R	N	Y
2333	BSBLP	51	21-Aug-96	27006		1229748	753226	0		S002678		0	0.08	0	0		0		0		2060		0			8 Bennett ST			Y	Y	R	N	Y
2334	BSBLP	51	21-Aug-96	27007		1229748	753226	0		S002679		0	0.08	0	0		0		0		2500		0			8 Bennett ST			Y	Y	R	N	Y
2335	BSBLP	51	14-May-99	27008		1229748	753226	0		9-0169		0	0.08	0	0		0		0		1320		0			8 Bennett ST			Y	Y	R	N	Y
2336	BSBLP	52	09-Sep-96	28001		1230660	753248	0		S002915		0	0.08	0	0		0		0		692		0			77 Bennett ST			Y	Y	R	Y	Y
2337	BSBLP	52	09-Sep-96	28002		1230660	753248	0		S002916		0	0.08	0	0		0		0		223		0			77 Bennett ST			Y	Y	R	N	Y
2338	BSBLP	52	09-Sep-96	28003		1230660	753248	0		S002917		0	0.08	0	0		0		0		426		0			77 Bennett ST	PATIO		Y	Y	R	N	Y
2339	BSBLP	52	09-Sep-96	28004		1230660	753248	0		S002918		0	0.08	0	0		0		0		560		0			77 Bennett ST			Y	Y	R	N	Y
2340	BSBLP	52	09-Sep-96	28005		1230660	753248	0		S002919		0	0.08	0	0		0		0		580		0			77 Bennett ST			Y	Y	R	N	Y
2341	BSBLP	53	16-Jul-96	20001		1230735	753230	0		S002398		0	0.08	0	0		0		0		1420		0			81 Bennett ST			N	Y	R	N	Y
2342	BSBLP	53	16-Jul-96	20002		1230735	753230	0		S002399		0	0.08	0	0		0		0		2310		0			81 Bennett ST			N	Y	R	Y	Y
2343	BSBLP	54	18-Jul-96	11		1227782	750765	0				0	0.08	0	0		0		0		1050		0			229 Boardman ST			Y	Y	R	N	Y
2344	BSBLP	54	18-Jul-96	3		1227782	750765	0				0	0.08	0	0		0		0		413		0			229 Boardman ST			Y	Y	R	N	Y
2345	BSBLP	54	18-Jul-96	4		1227782	750765	0				0	0.08	0	0		0		0		238		0			229 Boardman ST			Y	Y	R	N	Y
2346	BSBLP	54	18-Jul-96	5		1227782	750765	0				0	0.08	0	0		0		0		1270		0			229 Boardman ST			Y	Y	R	Y	Y
2347	BSBLP	54	18-Jul-96	6		1227782	750765	0				0	0.08	0	0		0		0		454		0			229 Boardman ST			Y	Y	R	N	Y
2348	BSBLP	54	18-Jul-96	7		1227782	750765	0				0	0.08	0	0		0		0		295		0			229 Boardman ST			Y	Y	R	N	Y
2349	BSBLP	54	18-Jul-96	8		1227782	750765	0				0	0.08	0	0		0		0		347		0			229 Boardman ST			Y	Y	R	N	Y
2350	BSBLP	57	27-Jul-93	1		1225428	748850	0		S5381		0	0.08	0	0		0		0		1490		0			921 W Broadway ST			Y	Y	R	Y	Y
2351	BSBLP	57	27-Jul-93	2		1225428	748850	0		S5382		0	0.08	0	0		0		0		173		0			921 W Broadway ST			Y	Y	R	N	Y
2352	BSBLP	67	18-Sep-96	29001		1228670	752929	0		S003224		0	0.08	0	0		0		0		989		0			36 W Center DR			N	Y	R	N	Y
2353	BSBLP	67	18-Sep-96	29002		1228670	752929	0		S003225		0	0.08	0	0		0		0		1360		0			36 W Center DR			N	Y	R	N	Y
2354	BSBLP	67	18-Sep-96	29003		1228670	752929	0		S003226		0	0.08	0	0		0		0		2970		0			36 W Center DR			N	Y	R	Y	Y
2355	BSBLP	67	18-Sep-96	29004		1228670	752929	0		S003227		0	0.08	0	0		0		0		906		0			36 W Center DR			N	Y	R	N	Y

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
2356	BSBLP	68	14-Jul-97	042001		1229967	754691	0		S008117		0	0.08	0	41		0		0		398		0			1516 Clayton AVE			Y	Y	R	N	Y
2357	BSBLP	68	14-Jul-97	042002		1229967	754691	0		S008118		0	0.08	0	34		0		0		807		0			1516 Clayton AVE			Y	Y	R	N	Y
2358	BSBLP	68	14-Jul-97	042003		1229967	754691	0		S008119		0	0.08	0	37		0		0		1290		0			1516 Clayton AVE			Y	Y	R	Y	Y
2359	BSBLP	68	14-Jul-97	042004		1229967	754691	0		S008120		0	0.08	0	51		0		0		1210		0			1516 Clayton AVE			Y	Y	R	N	Y
2360	BSBLP	68	14-Jul-97	042005		1229967	754691	0		S008121		0	0.08	0	39		0		0		384		0			1516 Clayton AVE			Y	Y	R	N	Y
2361	BSBLP	68	31-Jul-98	12501		1229967	754691	0		S009134		0	0.08	0	39		0		0		989		0			1516 Clayton AVE			Y	Y	R	N	Y
2362	BSBLP	68	31-Jul-98	12502		1229967	754691	0		S009134		0	0.08	0	40		0		0		520		0			1516 Clayton AVE			Y	Y	R	N	Y
2363	BSBLP	68	22-Sep-98	12503		1229967	754691	0		8-0680		0	0.08	0	0		0		0		870		0			1516 Clayton AVE	SLOPE RE-SAMPLED PER		Y	Y	R	N	Y
2364	BSBLP	68	22-Sep-98	12504		1229967	754691	0		8-0681		0	0.08	0	0		0		0		939		0			1516 Clayton AVE	NORTH HALF RE-SAMPLE		Y	Y	R	N	Y
2365	BSBLP	70	18-Nov-92	1		1228870	744148	0				0	0.08	0	0		0		0		2100		0			1003 S Colorado ST	Yard		Y	Y	R	Y	Y
2366	BSBLP	71	09-Jul-96	13001		1228706	739674	0		S002327		0	0.08	0	0		0		0		270		0			2432 S Colorado ST			Y	Y	R	N	Y
2367	BSBLP	71	09-Jul-96	13002		1228706	739674	0		S002328		0	0.08	0	0		0		0		2920		0			2432 S Colorado ST			Y	Y	R	Y	Y
2368	BSBLP	71	09-Jul-96	13003		1228706	739674	0		S002329		0	0.08	0	0		0		0		346		0			2432 S Colorado ST			Y	Y	R	N	Y
2369	BSBLP	71	09-Jul-96	13004		1228706	739674	0		S002330		0	0.08	0	0		0		0		2430		0			2432 S Colorado ST			Y	Y	R	N	Y
2370	BSBLP	71	09-Jul-96	13005		1228706	739674	0		S002331		0	0.08	0	0		0		0		1430		0			2432 S Colorado ST			Y	Y	R	N	Y
2371	BSBLP	71	09-Jul-96	13006		1228706	739674	0		S002332		0	0.08	0	0		0		0		1560		0			2432 S Colorado ST			Y	Y	R	N	Y
2372	BSBLP	71	09-Jul-96	13007		1228706	739674	0		S002333		0	0.08	0	0		0		0		1640		0			2432 S Colorado ST			Y	Y	R	N	Y
2373	BSBLP	71	09-Jul-96	13008		1228706	739674	0		S002334		0	0.08	0	0		0		0		173		0			2432 S Colorado ST			Y	Y	R	N	Y
2374	BSBLP	71	09-Jul-96	13009		1228706	739674	0		S002335		0	0.08	0	0		0		0		50		0			2432 S Colorado ST			Y	Y	R	N	Y
2375	BSBLP	72	09-Mar-93	8001		1228389	749623	0		S001761		0	0.08	0	0		0		0		694		0			118 W Copper ST			N	Y	R	N	Y
2376	BSBLP	72	09-Mar-93	8002		1228389	749623	0		S001762		0	0.08	0	0		0		0		1160		0			118 W Copper ST			N	Y	R	Y	Y
2377	BSBLP	73	13-Nov-95	1		1224680	749826	0				0	0.08	0	0		0		0		312		0			915 W Copper ST			Y	Y	R	N	Y
2378	BSBLP	73	13-Nov-95	6		1224680	749826	0				0	0.08	0	0		0		0		5540		0			915 W Copper ST			Y	Y	R	Y	Y
2379	BSBLP	74	13-Nov-95	1		1225487	749511	0		S001761		0	0.08	0	0		0		0		312		0			918 W Copper ST			Y	Y	R	N	Y
2380	BSBLP	74	13-Nov-95	2		1225487	749511	0		S001762		0	0.08	0	0		0		0		5540		0			918 W Copper ST			Y	Y	R	Y	Y
2381	BSBLP	76	12-May-93	1		1228718	746083	0				0	0.08	0	0		0		0		661		0			632 S Dakota ST	location unknown		Y	Y	R	Y	Y
2382	BSBLP	78	19-Jul-96	23001		1228778	754620	0		S002430		0	0.08	0	0		0		0		7970		0			102 W Daly ST			Y	Y	R	Y	Y
2383	BSBLP	78	19-Jul-96	23002		1228778	754620	0		S002431		0	0.08	0	0		0		0		1190		0			102 W Daly ST			Y	Y	R	N	Y
2384	BSBLP	78	19-Jul-96	23003		1228778	754620	0		S002432		0	0.08	0	0		0		0		703		0			102 W Daly ST			Y	Y	R	N	Y
2385	BSBLP	78	19-Jul-96	23004		1228778	754620	0		S002433		0	0.08	0	0		0		0		905		0			102 W Daly ST			Y	Y	R	N	Y
2386	BSBLP	79	29-Jul-97	44001		1228243	754518	0		7-1769		0	0.08	0	0		0		0		219		0			240 W Daly ST			Y	Y	R	N	Y
2387	BSBLP	79	29-Jul-97	44002		1228243	754518	0		7-1770		0	0.08	0	0		0		0		566		0			240 W Daly ST			Y	Y	R	N	Y
2388	BSBLP	79	29-Jul-97	44003		1228243	754518	0		7-1771		0	0.08	0	0		0		0		3310		0			240 W Daly ST	SOUTH EAST YARD		Y	Y	R	Y	Y
2389	BSBLP	79	29-Jul-97	44004		1228243	754518	0		7-1772		0	0.08	0	0		0		0		893		0			240 W Daly ST			Y	Y	R	N	Y
2390	BSBLP	79	29-Jul-97	44005		1228243	754518	0		7-1773		0	0.08	0	0		0		0		64		0			240 W Daly ST			Y	Y	R	N	Y
2391	BSBLP	79	29-Jul-97	44006		1228243	754518	0		7-1774		0	0.08	0	0		0		0		1450		0			240 W Daly ST			Y	Y	R	N	Y
2392	BSBLP	79	29-Jul-97	44007		1228243	754518	0		7-1775		0	0.08	0	0		0		0		164		0			240 W Daly ST			Y	Y	R	N	Y
2393	BSBLP	79	06-Aug-99	44008		1228243	754518	0		9-0664		0	0.08	0	22		0		0		96		0			240 W Daly ST			Y	Y	R	N	Y
2394	BSBLP	79	06-Aug-99	44009		1228243	754518	0		9-0665		0	0.08	0	43		0		0		241		0			240 W Daly ST			Y	Y	R	N	Y
2395	BSBLP	79	06-Aug-99	44010		1228243	754518	0		9-0666		0	0.08	0	16		0		0		1610		0			240 W Daly ST			Y	Y	R	N	Y
2396	BSBLP	80	31-Jul-97	45001		1228172	754505	0		7-1767		0	0.08	0	0		0		0		17500		0			244 W Daly ST	NORTH SIDE		N	Y	R	N	Y
2397	BSBLP	80		45002		1228172	754505	0		7-1768		0	0.08	0	0		0		0		18900		0			244 W Daly ST	SOUTH SIDE		N	Y	R	Y	Y
2398	BSBLP	84	30-May-97	34001		1224348	747314	0		7-1444		0	0.08	0	0		0		0		601		0			1146 W Diamond ST			Y	Y	R	N	Y
2399	BSBLP	84	30-May-97	34002		1224348	747314	0		7-1445		0	0.08	0	0		0		0		512		0			1146 W Diamond ST			Y	Y	R	N	Y
2400	BSBLP	84	30-May-97	34003		1224348	747314	0		7-1446		0	0.08	0	0		0		0		1250		0			1146 W Diamond ST			Y	Y	R	N	Y
2401	BSBLP	84	30-May-97	34004		1224348	747314	0		7-1447		0	0.08	0	0		0		0		245		0			1146 W Diamond ST			Y	Y	R	N	Y
2402	BSBLP	84	30-May-97	34005		1224348	747314	0		7-1448		0	0.08	0	0		0		0		675		0			1146 W Diamond ST			Y	Y	R	N	Y
2403	BSBLP	84	30-May-97	34006		1224348	747314	0		7-1449		0	0.08	0	0		0		0		498		0			1146 W Diamond ST			Y	Y	R	N	Y
2404	BSBLP	84	30-May-97	34007		1224348	747314	0		7-1450		0	0.08	0	0		0		0		1300		0			1146 W Diamond ST	NEIGHBORS W PERIM		Y	Y	R	Y	Y
2405	BSBLP	85	20-Apr-98	68001		1226748	750077	0		S008838		0	0.08	0	0		0		0		4120		0			532 Edison ST			N	Y	R	Y	Y
2406	BSBLP	85	20-Apr-98	68002		1226748	750077	0		S008839		0	0.08	0	0		0		0		3600		0			532 Edison ST			N	Y	R	N	Y
2407	BSBLP	85	20-Apr-98	68003		1226748	750077	0		S008840		0	0.08	0	0		0		0		689		0			532 Edison ST	NORTH EAST YARD		N	Y	R	N	Y
2408	BSBLP	85	20-Apr-98	68004		1226748	750077	0		S008841		0	0.08	0	0		0		0		650		0			532 Edison ST	SOUTH EAST YARD		N	Y	R	N	Y
2413	BSBLP	94	02-Jun-98	10901		1225601	749785	0		S008980		0	0.08	0	0		0		0		1650		0			421/423 N Excelsior			Y	Y	R	Y	Y
2414	BSBLP	94	02-Jun-98	10902		1225601	749785	0		S008991		0	0.08	0	0		0		0		545		0			421/423 N Excelsior			Y	Y	R	N	Y
2415	BSBLP	95	13-Nov-95	7001		1232759	745564	0		S001758		0	0.08	0	0		0		0		1400		0			1245 Farrell ST			Y	Y	R	Y	Y
2416	BSBLP	95	13-Nov-95	7002		1232759	745564	0		S001759		0	0.08	0	0		0		0		980		0			1245 Farrell ST			Y	Y	R	N	Y
2417	BSBLP	95	13-Nov-95	7003		1232759	745564	0		S001760		0	0.08	0	0		0		0		943		0			1245 Farrell ST			Y	Y	R	N	Y
2418	BSBLP	99	27-Oct-92	1		1229539	744750	0				0	0.08	0	0		0		0		905		0			103 E Fremont ST	LEFT SIDE		Y	Y	R	Y	Y
2419	BSBLP	99	27-Oct-92	2		1229539	744750	0				0	0.08	0	0		0		0		719		0			103 E Fremont ST	RIGHT SIDE		Y	Y	R	N	Y
2420	BSBLP	101	14-Sep-98	13900		1226793	748226	0		S009628		0	0.08	0	0		0		0		1340		0			601 Galena ST			N	Y	R	Y	Y
2421	BSBLP	101	14-Sep-98	13901		1226793	748226	0		S009629		0	0.08	0	0		0		0		1010		0			601 Galena ST			N	Y	R	N	Y
2422	BSBLP	101	20-Apr-99	13902		1226793	748226	0		999428		0	0.08	0	0		0		0		310		0			601 Galena ST	GARAGE FLOOR		N	Y	R	N	Y
2423	BSBLP	104	10-Jun-97	40001		1224634	748137	0		7-1591		0	0.08	0	61		6		370		908		2050			1108 W Galena ST			Y	Y	R	Y	Y
2424	BSBLP	104	10-Jun-97	40002		1224634	748137	0		7-1592		0	0.08	0	48		0		232		160		341			1108 W Galena ST			Y	Y	R	N	Y
2425	BSBLP	104	10-Jun-97	40003		1224634	748137	0		7-1593		0	0.08	0	43		0		373		285		758			1108 W Galena ST			Y	Y	R	N	Y
2426	BSBLP	104	10-Jun-97	40004		1224634	748137	0		7-1594		0	0.08	0	37		0		0		56		148			1108 W Galena ST			Y	Y	R	N	Y
2427	BSBLP	105	14-Oct-97	51001		1229738	754449	0		S008469		0	0.08	0	0		0		0		1230		0			6 Gladstone TERR			Y	Y	R	Y	Y
2428	BSBLP	105	14-Oct-97	51002		1229738	754449	0		S008470		0	0.08	0	0		0		0		1020		0			6 Gladstone TERR	SOUTH WEST YARD		Y	Y	R	N	Y
2429	BSBLP	106	29-Oct-92	1		1228345	746716	0				0	0.08	0	0		0		0		884		0			114 W Gold ST			Y	Y	R	Y	Y
2430	BSBLP	106	29-Oct-92	2		1228345	746716	0				0	0.08	0	0		0		0		867		0			114 W Gold ST			Y	Y	R	N	Y
2431	BSBLP	110	11-Jun-97	39001		1225501	751451	0		7-1587		0	0.08	0	0		0		0		178		0			934 Hornet ST			Y	Y	R	N	Y
2432	BSBLP	110	11-Jun-97	39002		1225501	751451	0		7-1588		0	0.08	0	0		0		0		352		0			934 Hornet ST			Y	Y	R	Y	Y
2433	BSBLP	110	11-Jun-97	39003		1225501	751451	0		7-1589		0	0.08	0	0		0		0		110		0			934 Hornet ST	SOUTH YARD		Y	Y	R	N	Y
2434	BSBLP	110	11-Jun-97	39004		1225501	751451	0		7-1590		0	0.08	0	0		0		0		333		0			934 Hornet ST	SE YARD/DOG PEN		Y	Y	R	N	Y

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
2435	BSBLP	112	21-Jul-97	43001		1229426	744448	0		S008166		0	0.08	0	0		0		0		660		0			936 S Iowa AVE			Y	Y	R	N	Y
2436	BSBLP	112	21-Jul-97	43002		1229426	744448	0		S008167		0	0.08	0	0		0		0		744		0			936 S Iowa AVE			Y	Y	R	N	Y
2437	BSBLP	112	21-Jul-97	43003		1229426	744448	0		S008168		0	0.08	0	0		0		0		1330		0			936 S Iowa AVE			Y	Y	R	N	Y
2438	BSBLP	112	21-Jul-97	43004		1229426	744448	0		S008169		0	0.08	0	0		0		0		639		0			936 S Iowa AVE			Y	Y	R	N	Y
2439	BSBLP	112	21-Jul-97	43005		1229426	744448	0		S008170		0	0.08	0	0		0		0		1470		0			936 S Iowa AVE			Y	Y	R	Y	Y
2440	BSBLP	112	21-Jul-97	43006		1229426	744448	0		S008171		0	0.08	0	0		0		0		575		0			936 S Iowa AVE			Y	Y	R	N	Y
2441	BSBLP	116	18-Jul-96	22001		1228987	753174	0		S002425		0	0.08	0	0		0		0		1130		0			19 W LaPlatta ST			Y	Y	R	N	Y
2442	BSBLP	116	18-Jul-96	22002		1228987	753174	0		S002426		0	0.08	0	0		0		0		2800		0			19 W LaPlatta ST			Y	Y	R	Y	Y
2443	BSBLP	116	18-Jul-96	22003		1228987	753174	0		S002427		0	0.08	0	0		0		0		1430		0			19 W LaPlatta ST			Y	Y	R	N	Y
2444	BSBLP	116	18-Jul-96	22004		1228987	753174	0		S002428		0	0.08	0	0		0		0		780		0			19 W LaPlatta ST			Y	Y	R	N	Y
2445	BSBLP	116	18-Jul-96	22005		1228987	753174	0		S002429		0	0.08	0	0		0		0		1390		0			19 W LaPlatta ST			Y	Y	R	N	Y
2446	BSBLP	117	16-Jul-96	17001		1228865	753191	0		S002389		0	0.08	0	0		0		0		340		0			27 W LaPlatta ST			Y	Y	R	N	Y
2447	BSBLP	117	16-Jul-96	17002		1228865	753191	0		S002390		0	0.08	0	0		0		0		147		0			27 W LaPlatta ST			Y	Y	R	N	Y
2448	BSBLP	117	16-Jul-96	17003		1228865	753191	0		S002391		0	0.08	0	0		0		0		352		0			27 W LaPlatta ST			Y	Y	R	Y	Y
2449	BSBLP	118	16-Jul-96	18001		1229787	753031	0		S002392		0	0.08	0	0		0		0		1190		0			35 E LaPlatta ST			Y	Y	R	Y	Y
2450	BSBLP	118	16-Jul-96	18002		1229787	753031	0		S002393		0	0.08	0	0		0		0		1120		0			35 E LaPlatta ST			Y	Y	R	N	Y
2451	BSBLP	118	16-Jul-96	18003		1229787	753031	0		S002394		0	0.08	0	0		0		0		891		0			35 E LaPlatta ST			Y	Y	R	N	Y
2452	BSBLP	121	28-Jul-92	1		1228986	739489	0				0	0.08	0	0		0		0		246		0			2501 S Main ST			Y	Y	R	N	Y
2453	BSBLP	121	28-Jul-92	2		1228986	739489	0				0	0.08	0	0		0		0		429		0			2501 S Main ST			Y	Y	R	Y	Y
2454	BSBLP	121	28-Jul-92	3		1228986	739489	0				0	0.08	0	0		0		0		164		0			2501 S Main ST			Y	Y	R	N	Y
2455	BSBLP	126	13-Aug-96	26001		1228002	750361	0		S002561		0	0.08	0	0		0		0		870		0			521 N Montana ST			Y	Y	R	N	Y
2456	BSBLP	126	13-Aug-96	26002		1228002	750361	0		S002562		0	0.08	0	0		0		0		1780		0			521 N Montana ST			Y	Y	R	N	Y
2457	BSBLP	126	13-Aug-96	26003		1228002	750361	0		S002563		0	0.08	0	0		0		0		330		0			521 N Montana ST			Y	Y	R	N	Y
2458	BSBLP	126	13-Aug-96	26004		1228002	750361	0		S002564		0	0.08	0	0		0		0		2230		0			521 N Montana ST			Y	Y	R	Y	Y
2459	BSBLP	126	13-Aug-96	26005		1228002	750361	0		S002565		0	0.08	0	0		0		0		530		0			521 N Montana ST			Y	Y	R	N	Y
2460	BSBLP	127	13-Oct-97	50001		1227979	750919	0		S008425		0	0.08	0	0		0		0		724		0			711 1/2 N Montana ST			Y	Y	R	Y	Y
2461	BSBLP	127	13-Oct-97	50002		1227979	750919	0		S008426		0	0.08	0	0		0		0		577		0			711 1/2 N Montana ST			Y	Y	R	N	Y
2462	BSBLP	127	13-Oct-97	50003		1227979	750919	0		S008427		0	0.08	0	0		0		0		454		0			711 1/2 N Montana ST			Y	Y	R	N	Y
2463	BSBLP	127	13-Oct-97	50004		1227979	750919	0		S008428		0	0.08	0	0		0		0		474		0			711 1/2 N Montana ST			Y	Y	R	N	Y
2464	BSBLP	127	13-Oct-97	50005		1227979	750919	0		S008429		0	0.08	0	0		0		0		262		0			711 1/2 N Montana ST			Y	Y	R	N	Y
2465	BSBLP	127	14-May-99	17700		1227979	750919	0		9-0170		0	0.08	0	0		0		0		263		0			711 1/2 N Montana ST	N LOT W HALF		Y	Y	R	N	Y
2466	BSBLP	127	14-May-99	17701		1227979	750919	0		9-0171		0	0.08	0	0		0		0		121		0			711 1/2 N Montana ST	N LOT E HALF		Y	Y	R	N	Y
2467	BSBLP	127	14-May-99	17702		1227979	750919	0		9-0172		0	0.08	0	0		0		0		366		0			711 1/2 N Montana ST			Y	Y	R	N	Y
2468	BSBLP	127	14-May-99	17703		1227979	750919	0		9-0173		0	0.08	0	0		0		0		513		0			711 1/2 N Montana ST	E LOT W HALF		Y	Y	R	N	Y
2469	BSBLP	127	14-May-99	17704		1227979	750919	0		9-0174		0	0.08	0	0		0		0		285		0			711 1/2 N Montana ST	E LOT E HALF		Y	Y	R	N	Y
2470	BSBLP	129	24-Jul-92	1		1230698	753333	0				0	0.08	0	0		0		0		605		0			114 O'neill ST			Y	Y	R	Y	Y
2471	BSBLP	129	24-Jul-92	2		1230698	753333	0				0	0.08	0	0		0		0		415		0			114 O'neill ST			Y	Y	R	N	Y
2472	BSBLP	131	19-Jun-97	41001		1229457	752363	0		S008038		0	0.08	0	0		0		0		4410		0			207 E PACIFIC AVE			Y	Y	R	Y	Y
2473	BSBLP	131	19-Jun-97	41002		1229457	752363	0		S008039		0	0.08	0	0		0		0		4080		0			207 E PACIFIC AVE			Y	Y	R	N	Y
2474	BSBLP	131	19-Jun-97	41003		1229457	752363	0		S008040		0	0.08	0	0		0		0		2000		0			207 E PACIFIC AVE			Y	Y	R	N	Y
2475	BSBLP	131	19-Jun-97	41004		1229457	752363	0		S008041		0	0.08	0	0		0		0		3950		0			207 E PACIFIC AVE			Y	Y	R	N	Y
2476	BSBLP	131	19-Jun-97	41005		1229457	752363	0		S008042		0	0.08	0	0		0		0		4140		0			207 E PACIFIC AVE			Y	Y	R	N	Y
2477	BSBLP	131	19-Jun-97	41006		1229457	752363	0		S008043		0	0.08	0	0		0		0		2710		0			207 E PACIFIC AVE			Y	Y	R	N	Y
2478	BSBLP	131	19-Jun-97	41007		1229457	752363	0		S008044		0	0.08	0	0		0		0		1740		0			207 E PACIFIC AVE			Y	Y	R	N	Y
2479	BSBLP	131	19-Jun-97	41008		1229457	752363	0		S008045		0	0.08	0	0		0		0		1890		0			207 E PACIFIC AVE	REAR YARD DOG KENNEL		Y	Y	R	N	Y
2480	BSBLP	131	07-Aug-97	41009		1229457	752363	0		7-1787		0	0.08	0	0		0		0		2760		0			207 E PACIFIC AVE			Y	Y	R	N	Y
2481	BSBLP	131	07-Aug-97	41010		1229457	752363	0		7-1788		0	0.08	0	0		0		0		1460		0			207 E PACIFIC AVE			Y	Y	R	N	Y
2482	BSBLP	131	07-Aug-97	41011		1229457	752363	0		7-1789		0	0.08	0	0		0		0		3020		0			207 E PACIFIC AVE			Y	Y	R	N	Y
2483	BSBLP	135	30-May-97	36001		1224544	749275	0		S008001		0	0.08	0	68		0		0		275		0			1126 W QUARTZ ST			Y	Y	R	Y	Y
2484	BSBLP	135	30-May-97	36002		1224544	749275	0		S008002		0	0.08	0	59		0		0		259		0			1126 W QUARTZ ST			Y	Y	R	N	Y
2485	BSBLP	139	03-Jun-93	1		1232620	745698	0		S4582		0	0.08	0	0		0		0		585		0			1228 E SECOND ST			Y	Y	R	Y	Y
2486	BSBLP	142	10-Sep-92	1		1226948	747494	0				0	0.08	0	0		0		0		1170		0			520 W SILVER ST			Y	Y	R	N	Y
2487	BSBLP	142	10-Sep-92	2		1226948	747494	0				0	0.08	0	0		0		0		2010		0			520 W SILVER ST			Y	Y	R	Y	Y
2488	BSBLP	147	27-Nov-93	1		1225550	749391	0		S6173		0	0.08	0	0		0		0		600		0			909 W QUARTZ ST			Y	Y	R	Y	Y
2489	BSBLP	148	20-Apr-98	069001		1225476	749238	0		S008842		0	0.08	0	0		0		0		604		0			920 W QUARTZ ST			Y	Y	R	N	Y
2490	BSBLP	148	20-Apr-98	069002		1225476	749238	0		S008843		0	0.08	0	0		0		0		1090		0			920 W QUARTZ ST			Y	Y	R	N	Y
2491	BSBLP	148	20-Apr-98	069003		1225476	749238	0		S008844		0	0.08	0	0		0		0		1570		0			920 W QUARTZ ST			Y	Y	R	Y	Y
2492	BSBLP	150	16-Jul-96	15001		1227451	754249	0		S002380		0	0.08	0	0		0		0		1060		0			427 TRANSIT ST			Y	Y	R	Y	Y
2493	BSBLP	150	16-Jul-96	15002		1227451	754249	0		S002381		0	0.08	0	0		0		0		467		0			427 TRANSIT ST			Y	Y	R	N	Y
2494	BSBLP	150	16-Jul-96	15003		1227451	754249	0		S002382		0	0.08	0	0		0		0		241		0			427 TRANSIT ST			Y	Y	R	N	Y
2495	BSBLP	150	16-Jul-96	15004		1227451	754249	0		S002383		0	0.08	0	0		0		0		619		0			427 TRANSIT ST			Y	Y	R	N	Y
2496	BSBLP	150	16-Jul-96	15005		1227451	754249	0		S002384		0	0.08	0	0		0		0		749		0			427 TRANSIT ST			Y	Y	R	N	Y
2497	BSBLP	150	16-Jul-96	15006		1227451	754249	0		S002385		0	0.08	0	0		0		0		708		0			427 TRANSIT ST			Y	Y	R	N	Y
2500	BSBLP	159	05-Oct-94	1		1230662	745312	0		S000215		0	0.08	0	0		0		0		461		0			928 S WYOMING ST	SOUTH WEST YARD		Y	Y	R	N	Y
2501	BSBLP	159	05-Oct-94	2		1230662	745312	0		S000216		0	0.08	0	0		0		0		508		0			928 S WYOMING ST	NORTH WEST YARD		Y	Y	R	Y	Y
2502	BSBLP	161	02-Jun-98	10701		1229420	753392	0		S008973		0	0.08	0	38		0		0		8300		0			3 E BENNETT ST			N	Y	R	N	Y
2503	BSBLP	161	02-Jun-98	10702		1229420	753392	0		S008974		0	0.08	0	44		0		0		12400		0			3 E BENNETT ST			N	Y	R	Y	Y
2504	BSBLP	161	02-Jun-98	10703		1229420	753392	0		S0089975		0	0.08	0	59		0		0		2810		0			3 E BENNETT ST			N	Y	R	N	Y
2505	BSBLP	162	08-Jul-98	11201		1230194	752964	0		S009052		0	0.08	0	0		0		0		2690		0			105 E CENTER ST			N	Y	R	Y	Y
2506	BSBLP	162	08-Jul-98	11202		1230194	752964	0		S009053		0	0.08	0	0		0		0		1380		0			105 E CENTER ST			N	Y	R	N	Y
2507	BSBLP	162	08-Jul-98	11203		1230194	752964	0		S009054		0	0.08	0	0		0		0		111		0			105 E CENTER ST	NORTH WEST YARD		N	Y	R	N	Y
2508	BSBLP	162	01-Sep-98	11204		1230194	752964	0		S009469		0	0.08	0	0		0		0		2490		0			105 E CENTER ST			N	Y	R	N	Y
2509	BSBLP	163	15-Jul-98	11601		1226437	746142	0		S009072		0	0.08	0	0		0		0		1320		0			640 S CLARK ST			N	Y	R	N	Y
2510	BSBLP	163	15-Jul-98	11602		1226437	746142	0		S009073		0	0.08	0	0		0		0		1920		0			640 S CLARK ST	UNDER DECK		N	Y	R	N	Y
2511	BSBLP	163	13-Aug-98	11603		1226437	746142	0		S009332		0	0.08	0	0		0		0		3170		0			640 S CLARK ST			N	Y	R	Y	Y

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measurement Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
2512	BSBLP	163	13-Aug-98	11604		1226437	746142	0		S009333		0	0.08	0	0		0		0		498		0			640 S CLARK ST			N	Y	R	N	Y
2513	BSBLP	163	13-Aug-98	11605		1226437	746142	0		S009334		0	0.08	0	0		0		0		1650		0			640 S CLARK ST			N	Y	R	N	Y
2514	BSBLP	163	13-Aug-98	11606		1226437	746142	0		S009335		0	0.08	0	0		0		0		770		0			640 S CLARK ST			N	Y	R	N	Y
2515	BSBLP	164	12-Nov-97	53001		1232474	745921	0		S008625		0	0.08	0	112		0		448		2610		3020				SOUTH EAST YARD		N	Y	R	Y	Y
2516	BSBLP	164	12-Nov-97	53002		1232474	745921	0		S008626		0	0.08	0	115		0		617		2350		3760				NORTH EAST YARD		N	Y	R	N	Y
2517	BSBLP	164	12-Nov-97	53003		1232474	745921	0		S008627		0	0.08	0	112		0		575		2350		3760						N	Y	R	N	Y
2518	BSBLP	165	01-Oct-97	49001		1224701	748902	0		S008396		0	0.08	0	0		0		0		656		0			115 S EMMETT ST			Y	Y	R	Y	Y
2519	BSBLP	165	01-Oct-97	49002		1224701	748902	0		S008397		0	0.08	0	0		0		0		275		0			115 S EMMETT ST			Y	Y	R	N	Y
2520	BSBLP	165	01-Oct-97	49003		1224701	748902	0		S008398		0	0.08	0	0		0		0		156		0			115 S EMMETT ST			Y	Y	R	N	Y
2521	BSBLP	165	01-Oct-97	49004		1224701	748902	0		S008399		0	0.08	0	0		0		0		160		0			115 S EMMETT ST			Y	Y	R	N	Y
2522	BSBLP	165	01-Oct-97	49005		1224701	748902	0		S008400		0	0.08	0	0		0		0		383		0			115 S EMMETT ST	EAST BLVD		Y	Y	R	N	Y
2525	BSBLP	167	25-Oct-95	04001		1230032	744343	0		S001748		0	0.08	0	0		0		0		744		0			1039 MARYLAND AVE			Y	Y	R	N	Y
2526	BSBLP	167	25-Oct-95	04002		1230032	744343	0		S001749		0	0.08	0	0		0		0		893		0			1039 MARYLAND AVE			Y	Y	R	N	Y
2527	BSBLP	167	25-Oct-95	04003		1230032	744343	0		S001750		0	0.08	0	0		0		0		610		0			1039 MARYLAND AVE			Y	Y	R	N	Y
2528	BSBLP	167	25-Oct-95	04004		1230032	744343	0		S001751		0	0.08	0	0		0		0		714		0			1039 MARYLAND AVE	SOUTH WEST YARD		Y	Y	R	N	Y
2529	BSBLP	167	25-Oct-95	04005		1230032	744343	0		S001752		0	0.08	0	0		0		0		1050		0			1039 MARYLAND AVE	SOUTH WEST YARD		Y	Y	R	Y	Y
2532	BSBLP	180	20-Apr-98	70001		1226233	749094	0		S008845		0	0.08	0	0		0		0		923		0			730/732 W GRANITE ST			Y	Y	R	N	Y
2533	BSBLP	180	20-Apr-98	70002		1226233	749094	0		S008846		0	0.08	0	0		0		0		2470		0			730/732 W GRANITE ST			Y	Y	R	Y	Y
2534	BSBLP	181	07-Dec-95	01101		1227149	749231	0		S001888		0	0.08	0	0		0		0		498		0			217 N JACKSON AVE			Y	Y	R	N	Y
2535	BSBLP	181	07-Dec-95	01102		1227149	749231	0		S001889		0	0.08	0	0		0		0		617		0			217 N JACKSON AVE			Y	Y	R	Y	Y
2536	BSBLP	182	19-Aug-92	1		1225734	749385	0				0	0.08	0	0		0		0		1800		0			849 W QUARTZ ST			Y	Y	R	Y	Y
2537	BSBLP	182	19-Aug-92	2		1225734	749385	0				0	0.08	0	0		0		0		1120		0			849 W QUARTZ ST			Y	Y	R	N	Y
2538	BSBLP	183	10-Oct-96	1		1225713	749227	0		S003308		0	0.08	0	0		0		0		527		0			850 W QUARTZ ST	SANDBOX		Y	Y	R	Y	Y
2539	BSBLP	184	13-Aug-98	012801		1225162	753468	0		S009341		0	0.08	0	0		0		0		332		0			1005 17TH ST	N OF RETAINING WALL		Y	Y	R	N	Y
2540	BSBLP	184	13-Aug-98	012802		1225162	753468	0		S009342		0	0.08	0	0		0		0		1050		0			1005 17TH ST	WASH BACK PORCH		Y	Y	R	Y	Y
2541	BSBLP	185	29-Jul-98	012401		1229502	753389	0		S009127		0	0.08	0	21		0		0		634		0			7 BENNETT ST			Y	Y	R	Y	Y
2542	BSBLP	185	29-Jul-98	012402		1229502	753389	0		S009128		0	0.08	0	30		0		0		520		0			7 BENNETT ST			Y	Y	R	N	Y
2543	BSBLP	185	29-Jul-98	012403		1229502	753389	0		S009129		0	0.08	0	32		0		0		547		0			7 BENNETT ST			Y	Y	R	N	Y
2544	BSBLP	185	29-Jul-98	012404		1229502	753389	0		S009130		0	0.08	0	37		0		0		527		0			7 BENNETT ST			Y	Y	R	N	Y
2545	BSBLP	186	21-Jul-98	012101		1225584	749677	0		S009121		0	0.08	0	40		0		0		800		0			903 W COPPER ST			Y	Y	R	Y	Y
2546	BSBLP	187	19-Oct-98	015200		1228407	747764	0		8-0817		0	0.08	0	0		0		0		719		0			213 S DAKOTA ST			N	Y	R	N	Y
2547	BSBLP	187	19-Oct-98	015201		1228407	747764	0		8-0818		0	0.08	0	0		0		0		885		0			213 S DAKOTA ST	DRIVEWAY		N	Y	R	N	Y
2548	BSBLP	187	19-Oct-98	015202		1228407	747764	0		8-0819		0	0.08	0	0		0		0		1290		0			213 S DAKOTA ST	SW OF SHED		N	Y	R	Y	Y
2549	BSBLP	187	19-Oct-98	015203		1228407	747764	0		8-0820		0	0.08	0	0		0		0		285		0			213 S DAKOTA ST			N	Y	R	N	Y
2552	BSBLP	189	29-Apr-97	032001		1229366	744802	0		7-1388		0	0.08	0	56		7		0		935		0			858 S MAIN ST	NORTH WEST		Y	Y	R	N	Y
2553	BSBLP	189	29-Apr-97	032002		1229366	744802	0		7-1389		0	0.08	0	37		8		0		1870		0			858 S MAIN ST	SOUTH WEST		Y	Y	R	N	Y
2554	BSBLP	189	29-Apr-97	032003		1229366	744802	0		7-1390		0	0.08	0	57		11		0		2450		0			858 S MAIN ST			Y	Y	R	N	Y
2555	BSBLP	189	29-Apr-97	032004		1229366	744802	0		7-1391		0	0.08	0	71		8		0		1470		0			858 S MAIN ST	NORTH EAST		Y	Y	R	N	Y
2556	BSBLP	189	29-Apr-97	032005		1229366	744802	0		7-1392		0	0.08	0	41		14		0		1830		0			858 S MAIN ST	SOUTH EAST		Y	Y	R	N	Y
2557	BSBLP	189	29-Apr-97	032006		1229366	744802	0		7-1393		0	0.08	0	4		14		0		3430		0			858 S MAIN ST			Y	Y	R	Y	Y
2558	BSBLP	190	02-Jun-98	010201		1229567	755030	0		S008956		0	0.08	0	39		0		0		674		0			1614 N MAIN ST			Y	Y	R	Y	Y
2559	BSBLP	190	02-Jun-98	010202		1229567	755030	0		S008957		0	0.08	0	40		0		0		238		0			1614 N MAIN ST			Y	Y	R	N	Y
2560	BSBLP	190	02-Jun-98	010203		1229567	755030	0		S008958		0	0.08	0	41		0		0		188		0			1614 N MAIN ST			Y	Y	R	N	Y
2561	BSBLP	191	29-Apr-98	1		1228198	751488	0		8-0167		0	0.08	0	165		0		0		1070		0			822 N MONTANA ST	RD EMBANKMENT ABOVE		Y	Y	R	N	Y
2562	BSBLP	191	29-Apr-98	2		1228198	751488	0		8-0168		0	0.08	0	361		0		0		1040		0			822 N MONTANA ST	RR BED		Y	Y	R	N	Y
2563	BSBLP	191	29-Apr-98	3		1228198	751488	0		8-0169		0	0.08	0	451		0		0		1150		0			822 N MONTANA ST	RD EMBANKMENT ABOVE		Y	Y	R	Y	Y
2564	BSBLP	191	29-Apr-98	4		1228198	751488	0		8-0170		0	0.08	0	138		0		0		592		0			822 N MONTANA ST			Y	Y	R	N	Y
2565	BSBLP	192	16-Apr-98	063001		1228061	747663	0				0	0.08	0	48		0		0		733		0			219 S MONTANA ST			Y	Y	R	Y	Y
2566	BSBLP	192	16-Apr-98	063002		1228061	747663	0				0	0.08	0	51		0		0		733		0			219 S MONTANA ST			Y	Y	R	Y	Y
2567	BSBLP	193	01-Oct-98	014600		1229678	753455	0		8-0688		0	0.08	0	0		0		0		480		0			12 O'NEILL ST			Y	Y	R	Y	Y
2568	BSBLP	193	01-Oct-98	014601		1229678	753455	0		8-0689		0	0.08	0	0		0		0		363		0			12 O'NEILL ST			Y	Y	R	N	Y
2569	BSBLP	193	01-Oct-98	014602		1229678	753455	0		8-0690		0	0.08	0	0		0		0		312		0			12 O'NEILL ST	EAST VACANT LOT		Y	Y	R	N	Y
2570	BSBLP	195	20-Jul-98	012001		1228398	745924	0		S009090		0	0.08	0	0		0		0		523		0			653 PLACER ST			Y	Y	R	Y	Y
2571	BSBLP	195	20-Jul-98	012002		1228398	745924	0		S009091		0	0.08	0	0		0		0		254		0			653 PLACER ST			Y	Y	R	N	Y
2572	BSBLP	195	20-Jul-98	012003		1228398	745924	0		S009092		0	0.08	0	0		0		0		457		0			653 PLACER ST			Y	Y	R	N	Y
2573	BSBLP	196	19-Aug-98	012901		1228435	747240	0		S009395		0	0.08	0	70		0		0		833		0			109 W PORPHYRY ST			Y	Y	R	N	Y
2574	BSBLP	196	19-Aug-98	012902		1228435	747240	0		S009396		0	0.08	0	84		0		0		1470		0			109 W PORPHYRY ST			Y	Y	R	N	Y
2575	BSBLP	196	19-Aug-98	012903		1228435	747240	0		S009397		0	0.08	0	92		0		0		494		0			109 W PORPHYRY ST	VACANT LOT		Y	Y	R	N	Y
2576	BSBLP	196	19-Aug-98	012904		1228435	747240	0		S009398		0	0.08	0	95		0		0		1480		0			109 W PORPHYRY ST			Y	Y	R	Y	Y
2577	BSBLP	197	01-Jul-98	011101		1226749	749192	0		S009050		0	0.08	0	0		0		0		2470		0			618 W QUARTZ ST			Y	Y	R	Y	Y
2578	BSBLP	198	22-Oct-98	015100		1226870	745259	0		8-0815		0	0.08	0	0		0		0		285		0			810 TRAVONIA ST			Y	Y	R	Y	Y
2579	BSBLP	198	22-Oct-98	015101		1226870	745259	0		8-0816		0	0.08	0	0		0		0		144		0			810 TRAVONIA ST			Y	Y	R	N	Y
2580	BSBLP	199	29-Apr-98	097001		1229858	749914	0		8-0163		0	0.08	0	92		0		0		1140		0			426 N WYOMING ST			Y	Y	R	Y	Y
2581	BSBLP	199	29-Apr-98	097002		1229858	749914	0		8-0164		0	0.08	0	103		0		0		285		0			426 N WYOMING ST			Y	Y	R	N	Y
2582	BSBLP	199	29-Apr-98	097003		1229858	749914	0		8-0165		0	0.08	0	161		0		0		604		0			426 N WYOMING ST	VACANT LOT		Y	Y	R	N	Y
2583	BSBLP	199	29-Apr-98	097004		1229858	749914	0		8-0166		0	0.08	0	43		0		0		808		0			426 N WYOMING ST			Y	Y	R	N	Y
2584	BSBLP	201	12-Apr-99	16600		1227415	750705	0		9-0108		0	0.08	0	0		0		0		782		0			407 BOARDMAN ST			Y	Y	R	N	Y
2585	BSBLP	201	12-Apr-99	16601		1227415	750705	0		9-0109		0	0.08	0	0		0		0		791		0			407 BOARDMAN ST			Y	Y	R	Y	Y
2586	BSBLP	201	12-Apr-99	16602		1227415	750705	0		9-0110		0	0.08	0	0		0		0		576		0			407 BOARDMAN ST			Y	Y	R	N	Y
2587	BSBLP	202	26-Oct-98	15300		1225345	749687	0		8-0856		0	0.08	0	0		0		0		715		0			937 W COPPER ST			Y	Y	R	N	Y
2588	BSBLP	202	26-Oct-98	15301		1225345	749687	0		8-0857		0	0.08	0	0		0		0		3030		0			937 W COPPER ST			Y	Y	R	Y	Y
2589	BSBLP	202	26-Oct-98	15302		1225345	749687	0		8-0858		0	0.08	0	0		0		0		1080		0			937 W COPPER ST			Y	Y	R	N	Y
2590	BSBLP	202	26-Oct-98	15303		1225345	749687	0		8-0859		0	0.08	0	0		0		0		805		0			937 W COPPER ST			Y	Y	R	N	Y
2591	BSBLP	202	26-Oct-98	15304		1225345	749687	0		8-0860		0	0.08	0	0		0		0		907		0			937 W COPPER ST			Y	Y	R	N	Y
2593	BSBLP	206	04-Sep-98	13700		1227108	747924	0		S009626		0	0.08	0	0		0		0		1130		0			503 MERCURY ST			Y	Y	R	Y	Y

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
2594	BSBLP	207	01-Sep-98	13300		1229586	752735	0		S009470		0	0.08	0	0		0		0		1110		0			101 MULLEN ST	PLAY AREA		Y	Y	R	Y	Y
2595	BSBLP	208	29-Sep-98	14200		1229850	745758	0		8-0682		0	0.08	0	0		0		0		666		0			723 NEVADA AVE	SOIL AT RETAINING WA		Y	Y	R	N	Y
2596	BSBLP	208	29-Sep-98	14201		1229850	745758	0		8-0683		0	0.08	0	0		0		0		829		0			723 NEVADA AVE	DRIVEWAY		Y	Y	R	Y	Y
2597	BSBLP	208	29-Sep-98	14202		1229850	745758	0		8-0684		0	0.08	0	0		0		0		583		0			723 NEVADA AVE	WEST HALF VACANT LOT		Y	Y	R	N	Y
2598	BSBLP	208	29-Sep-98	14203		1229850	745758	0		8-0685		0	0.08	0	0		0		0		762		0			723 NEVADA AVE	EAST HALF VACANT LOT		Y	Y	R	N	Y
2599	BSBLP	213	26-Mar-99	16300		1227386	750436	0		9-0076		0	0.08	0	0		0		0		259		0			410 VIRGINIA ST	BASKETBALL COURT		Y	Y	R	N	Y
2600	BSBLP	213	26-Mar-99	16301		1227386	750436	0		9-0077		0	0.08	0	0		0		0		710		0			410 VIRGINIA ST	RR BED BEHIND HOUSE		Y	Y	R	Y	Y
2602	BSBLP	215	14-May-99	17400		1229864	752783	0		9-0166		0	0.08	0	0		0		0		443		0			35 WELLS ST			Y	Y	R	Y	Y
2603	BSBLP	216	17-Jun-99	18000		1227270	749105	0		9-0225		0	0.08	0	0		0		0		656		0			415 W GRANITE ST			Y	Y	R	Y	Y
2604	BSBLP	216	17-Jun-99	18001		1227270	749105	0		9-0226		0	0.08	0	0		0		0		386		0			415 W GRANITE ST			Y	Y	R	N	Y
2605	BSBLP	216	17-Jun-99	18002		1227270	749105	0		9-0227		0	0.08	0	0		0		0		278		0			415 W GRANITE ST			Y	Y	R	N	Y
2606	BSBLP	217	15-Jul-98	11701		1227868	749898	0		S009074		0	0.08	0	0		0		0		788		0			455 N IDAHO ST			Y	Y	R	Y	Y
2607	BSBLP	217	15-Jul-98	11702		1227868	749898	0		S009075		0	0.08	0	0		0		0		545		0			455 N IDAHO ST			Y	Y	R	N	Y
2608	BSBLP	218	14-May-99	16800		1229394	745534	0		9-0164		0	0.08	0	0		0		0		1000		0			722 S MAIN ST			Y	Y	R	Y	Y
2609	BSBLP	218	14-May-99	16801		1229394	745534	0		9-0165		0	0.08	0	0		0		0		624		0			722 S MAIN ST			Y	Y	R	N	Y
2610	BSBLP	218	14-May-99	16802		1229394	745534	0		9-0168		0	0.08	0	0		0		0		606		0			722 S MAIN ST			Y	Y	R	N	Y
2611	BSBLP	219	14-May-99	17200		1229186	744808	0		9-0167		0	0.08	0	0		0		0		315		0						Y	Y	R	Y	Y
2612	BSBLP	221	03-Dec-98	15700		1229198	745771	0		8-0918		0	0.08	0	0		0		0		402		0			671 S MAIN ST			Y	Y	R	Y	Y
2613	BSBLP	222	03-Dec-98	15400		1228138	752698	0		8-0912		0	0.08	0	0		0		0		551		0			107 MISSOULA ST			Y	Y	R	Y	Y
2614	BSBLP	223	23-Apr-98	75001		1230725	744649	0		S008868		0	0.08	0	0		0		0		791		0			1042 NEVADA AVE			Y	Y	R	N	Y
2615	BSBLP	223	23-Apr-98	75002		1230725	744649	0		S008869		0	0.08	0	0		0		0		1790		0			1042 NEVADA AVE	GARAGE PERIMETER		Y	Y	R	N	Y
2616	BSBLP	223	23-Apr-98	75003		1230725	744649	0		S008870		0	0.08	0	0		0		0		448		0			1042 NEVADA AVE			Y	Y	R	N	Y
2617	BSBLP	223	23-Apr-98	75004		1230725	744649	0		S008871		0	0.08	0	0		0		0		1240		0			1042 NEVADA AVE	SOUTH WEST YARD		Y	Y	R	N	Y
2618	BSBLP	223	23-Apr-98	75005		1230725	744649	0		S008872		0	0.08	0	0		0		0		1310		0			1042 NEVADA AVE	NORTH WEST YARD		Y	Y	R	N	Y
2619	BSBLP	223	23-Apr-98	75006		1230725	744649	0		S008873		0	0.08	0	0		0		0		2930		0			1042 NEVADA AVE			Y	Y	R	Y	Y
2620	BSBLP	224	30-Mar-99	16400		1232166	745882	0		9-0101		0	0.08	0	0		0		0		987		0			1115 E SECOND ST			N	Y	R	Y	Y
2621	BSBLP	224	30-Mar-99	16401		1232166	745882	0		9-0102		0	0.08	0	0		0		0		883		0			1115 E SECOND ST			N	Y	R	N	Y
2622	BSBLP	224	30-Mar-99	16402		1232166	745882	0		9-0103		0	0.08	0	0		0		0		942		0			1115 E SECOND ST			N	Y	R	N	Y
2623	BSBLP	225	22-Mar-99	16000		1227786	750534	0		9-0062		0	0.08	0	0		0		0		627		0			223 VIRGINIA ST			Y	Y	R	Y	Y
2624	BSBLP	227	14-May-99	17100		1231074	744625	0		9-0159		0	0.08	0	0		0		0		114		0			1112 S WYOMING ST	SAND BOX		Y	Y	R	N	Y
2625	BSBLP	227	14-May-99	17101		1231074	744625	0		9-0160		0	0.08	0	0		0		0		761		0			1112 S WYOMING ST	SOUTH EAST YARD		Y	Y	R	Y	Y
2626	BSBLP	229	17-May-99	17600		1226526	748241	0		9-0191		0	0.08	0	0		0		0		462		0			631/633 W GALENA ST	LOWER EAST YARD		Y	Y	R	Y	Y
2627	BSBLP	229	17-May-99	17601		1226526	748241	0		9-0192		0	0.08	0	0		0		0		256		0			631/633 W GALENA ST	UPPER EAST YARD		Y	Y	R	N	Y
2628	BSBLP	230	17-Apr-98	62001		1233043	745426	0		S008819		0	0.08	0	0		0		0		2790		0			1042 GAYLORD ST			Y	Y	R	Y	Y
2629	BSBLP	230	17-Apr-98	62002		1233043	745426	0		S008820		0	0.08	0	0		0		0		927		0			1042 GAYLORD ST			Y	Y	R	N	Y
2630	BSBLP	230	17-Apr-98	62003		1233043	745426	0		S008821		0	0.08	0	0		0		0		1290		0			1042 GAYLORD ST			Y	Y	R	N	Y
2631	BSBLP	230	17-Apr-98	62004		1233043	745426	0		S008822		0	0.08	0	0		0		0		764		0			1042 GAYLORD ST			Y	Y	R	N	Y
2632	BSBLP	230	17-Apr-98	62005		1233043	745426	0		S008823		0	0.08	0	0		0		0		1230		0			1042 GAYLORD ST			Y	Y	R	N	Y
2633	BSBLP	230	17-Apr-98	62006		1233043	745426	0		S008824		0	0.08	0	0		0		0		1280		0			1042 GAYLORD ST			Y	Y	R	N	Y
2634	BSBLP	231	22-Oct-98	15000		1227096	748927	0		8-0028		0	0.08	0	0		0		0		663		0			512/514 W GRANITE ST			Y	Y	R	Y	Y
2635	BSBLP	231	22-Oct-98	15001		1227096	748927	0		8-0029		0	0.08	0	0		0		0		557		0			512/514 W GRANITE ST			Y	Y	R	N	Y
2636	BSBLP	231	03-Dec-98	15002		1227096	748927	0		8-0911		0	0.08	0	0		0		0		343		0			512/514 W GRANITE ST	514 W GRANITE		Y	Y	R	N	Y
2637	BSBLP	233	01-Sep-98	13400		1229587	752629	0		S009471		0	0.08	0	0		0		0		1220		0			106 MULLEN ST			Y	Y	R	N	Y
2638	BSBLP	233	01-Sep-98	13401		1229587	752629	0		S009472		0	0.08	0	0		0		0		2930		0			106 MULLEN ST			Y	Y	R	Y	Y
2639	BSBLP	234	25-Sep-98	14300		1230257	745070	0		8-0686		0	0.08	0	0		0		0		565		0			917 NEVADA AVE			Y	Y	R	N	Y
2640	BSBLP	234	25-Sep-98	14301		1230257	745070	0		8-0687		0	0.08	0	0		0		0		849		0			917 NEVADA AVE			Y	Y	R	Y	Y
2641	BSBLP	237	20-Jul-98	12001		1228398	745924	0		S009090		0	0.08	0	0		0		0		523		0			653 PLACER ST			Y	Y	R	Y	Y
2642	BSBLP	237	20-Jul-98	12002		1228398	745924	0		S009091		0	0.08	0	0		0		0		254		0			653 PLACER ST			Y	Y	R	N	Y
2643	BSBLP	237	20-Jul-98	12003		1228398	745924	0		S009092		0	0.08	0	0		0		0		457		0			653 PLACER ST			Y	Y	R	N	Y
2644	BSBLP	238	01-Sep-98	13500		1228277	743824	0		S009473		0	0.08	0	0		0		0		2340		0			1037 PLACER ST			Y	Y	R	Y	Y
2645	BSBLP	238	01-Sep-98	13501		1228277	743824	0		S009474		0	0.08	0	0		0		0		423		0			1037 PLACER ST	DRIVEWAY		Y	Y	R	N	Y
2646	BSBLP	241	16-Sep-98	14000		1227834	750367	0		S009630		0	0.08	0	0		0		0		6520		0			211 WOOLMAN ST			Y	Y	R	Y	Y
2647	BSBLP	241	16-Sep-98	14001		1227834	750367	0		S009631		0	0.08	0	0		0		0		858		0			211 WOOLMAN ST	DRIVEWAY		Y	Y	R	N	Y
2648	BSBLP	243	01-Jul-99	19600		1230649	744409	0		999432		0	0.08	0	53		0		0		440		0			1105 NEVADA AVE			Y	Y	R	Y	Y
2649	BSBLP	244	06-Jul-99	20100		1227204	747925	0		999432		0	0.08	0	0		0		0		548		0			431 W MERCURY ST			Y	Y	R	Y	Y
2650	BSBLP	246	02-Jul-99	19500		1226610	754405	0		9-0269		0	0.08	0	39		0		0		176		0			625 W DALY ST			Y	Y	R	N	Y
2651	BSBLP	246	02-Jul-99	19501		1226610	754405	0		9-0270		0	0.08	0	34		0		0		157		0			625 W DALY ST			Y	Y	R	N	Y
2652	BSBLP	246	02-Jul-99	19502		1226610	754405	0		9-0271		0	0.08	0	39		0		0		181		0			625 W DALY ST			Y	Y	R	N	Y
2653	BSBLP	246	02-Jul-99	19503		1226610	754405	0		9-0272		0	0.08	0	30		0		0		541		0			625 W DALY ST	EAST GARDEN		Y	Y	R	Y	Y
2654	BSBLP	247	01-Jul-99	19800		1228612	754766	0		9-0276		0	0.08	0	184		0		0		980		0			129 W DALY ST	STORAGE SHED BASEMEN		Y	Y	R	N	Y
2655	BSBLP	247	01-Jul-99	19801		1228612	754766	0		9-0277		0	0.08	0	4		0		0		906		0			129 W DALY ST			Y	Y	R	N	Y
2656	BSBLP	247	20-Jul-99	19802		1228612	754766	0		9-0366		0	0.08	0	592		0		0		5950		0			129 W DALY ST	BATHROOM ATTIC		Y	Y	R	Y	Y
2657	BSBLP	247	30-Jul-99	19803		1228612	754766	0		9-0367		0	0.08	0	75		0		0		5830		0			129 W DALY ST	BEDROOM ATTIC		Y	Y	R	N	Y
2658	BSBLP	248	17-Jul-98	11401		1225554	749679	0		S009081		0	0.08	0	98		0		0		1540		0			905 W COPPER ST			N	Y	R	N	Y
2659	BSBLP	248	23-Sep-98	11402		1225554	749679	0		8-0666		0	0.08	0	19		0		0		1040		0			905 W COPPER ST			N	Y	R	N	Y
2660	BSBLP	248	23-Sep-98	11403		1225554	749679	0		8-0667		0	0.08	0	26		0		0		2230		0			905 W COPPER ST			N	Y	R	N	Y
2661	BSBLP	248	23-Sep-98	11404		1225554	749679	0		8-0668		0	0.08	0	30		0		0		2290		0			905 W COPPER ST			N	Y	R	Y	Y
2662	BSBLP	248	23-Sep-98	11405		1225554	749679	0		8-0669		0	0.08	0	37		0		0		1220		0			905 W COPPER ST			N	Y	R	N	Y
2663	BSBLP	249	22-Jul-99	20600		1235348	744431	0		9-0423		0	0.08	0	0		0		0		212		0			1920 SILVER BO BLVD			Y	Y	R	Y	Y
2664	BSBLP	249	22-Jul-99	20601		1235348	744431	0		9-0424		0	0.08	0	0		0		0		204		0			1920 SILVER BO BLVD			Y	Y	R	N	Y
2665	BSBLP	249	22-Jul-99	20602		1235348	744431	0		9-0425		0	0.08	0	0		0		0		22		0			1920 SILVER BO BLVD	SAND BOX		Y	Y	R	N	Y
2666	BSBLP	250	30-Jul-99	20900		1227752	749466	0				0	0.08	0	35		0		0		504		0			305 W QUARTZ ST	UPPER		Y	Y	R	Y	Y
2667	BSBLP	250	30-Jul-99	20901		1227752	749466	0				0	0.08	0	39		0		0		393		0			305 W QUARTZ ST	LOWER		Y	Y	R	N	Y
2668	BSBLP	251	23-Jun-99	19200		1230047	753003	0				0	0.08	0	31		0		0		207		0			53 E CENTER ST			Y	Y	R	N	Y
2669	BSBLP	251	23-Jun-99	19201		1230047	753003	0				0	0.08	0	37		0		0		866		0			53 E CENTER ST			Y	Y	R	Y	Y

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
2670	BSBLP	252	28-Jul-99	20504		1228042	754481	0				0	0.08	0	0		0		0		1260		0			308 W DALY ST			Y	Y	R	N	Y
2671	BSBLP	252	22-Jul-99	20500		1228042	754481	0				0	0.08	0	0		0		0		1150		0			308 W DALY ST			Y	Y	R	N	Y
2672	BSBLP	252	22-Jul-99	20501		1228042	754481	0				0	0.08	0	7		0		0		1110		0			308 W DALY ST			Y	Y	R	N	Y
2673	BSBLP	252	22-Jul-99	20502		1228042	754481	0				0	0.08	0	0		0		0		1490		0			308 W DALY ST			Y	Y	R	Y	Y
2674	BSBLP	252	22-Jul-99	20503		1228042	754481	0				0	0.08	0	11		0		0		500		0			308 W DALY ST	EARTHEN BSMT		Y	Y	R	N	Y
2675	BSBLP	253	13-Aug-98	12801		1225162	753468	0				0	0.08	0	81		0		0		332		0			1005 17TH ST	N. of Ret. Wall		Y	Y	R	N	Y
2676	BSBLP	253	13-Aug-98	12802		1225162	753468	0				0	0.08	0	294		0		0		1050		0			1005 17TH ST	Back porch		Y	Y	R	Y	Y
2677	BSBLP	256	14-May-99	17000		1226074	751035	0				0	0.08	0	0		0		0		448		0			809 WAUKESHA ST			Y	Y	R	Y	Y
2678	BSBLP	256	14-May-99	17001		1226074	751035	0				0	0.08	0	0		0		0		319		0			809 WAUKESHA ST			Y	Y	R	N	Y
2679	BSBLP	263	20-Jul-99	20200		1226115	751703	0				0	0.08	0	0		0		0		296		0			804 ZARELDA ST			Y	Y	R	Y	Y
2680	BSBLP	267	20-Jul-99	20200		1226115	751703	0				0	0.08	0	0		0		0		296		0			804 ZARELDA ST			Y	Y	R	Y	Y
2681	BSBLP	269	02-Jun-99	19300		1228470	750496	0		9-0249		0	0.08	0	38		0		0		523		0			617 N ALASKA AVE			Y	Y	R	Y	Y
2682	BSBLP	269	02-Jun-99	19301		1228470	750496	0		9-0250		0	0.08	0	35		0		303		0		0			617 N ALASKA AVE	SOUTH DRIVE		Y	Y	R	N	Y
2683	BSBLP	270	04-Aug-99	21100		1227618	749881	0		9-0668		0	0.08	0	0		0		0		495		0			412 N WASHINGTO ST			Y	Y	R	Y	Y
2684	BSBLP	270	04-Aug-99	21101		1227618	749881	0		9-0669		0	0.08	0	0		0		0		443		0			412 N WASHINGTO ST	WEST BLVD		Y	Y	R	N	Y
2685	BSBLP	271	19-Jul-99	20400		1229918	750657	0		9-0360		0	0.08	0	74		0		0		244		0			708 N WYOMING ST			Y	Y	R	N	Y
2686	BSBLP	271	19-Jul-99	20401		1229918	750657	0		9-0361		0	0.08	0	29		0		0		558		0			708 N WYOMING ST	SOUTH EAST YARD		Y	Y	R	Y	Y
2687	BSBLP	271	19-Jul-99	20402		1229918	750657	0		9-0362		0	0.08	0	50		0		0		487		0			708 N WYOMING ST	OUTSIDE FENCE		Y	Y	R	N	Y
2688	BSBLP	271	19-Jul-99	20403		1229918	750657	0		9-0363		0	0.08	0	25		0		0		503		0			708 N WYOMING ST			Y	Y	R	N	Y
2689	BSBLP	271	19-Jul-99	20404		1229918	750657	0		9-0364		0	0.08	0	22		0		0		350		0			708 N WYOMING ST	BEHIND HOUSE		Y	Y	R	N	Y
2690	BSBLP	272	01-Jul-99	19700		1228638	754770	0		9-0274		0	0.08	0	218		0		0		5790		0			127 W DALY ST	CLOSET ATTIC		Y	Y	R	N	Y
2691	BSBLP	272	01-Jul-99	19701		1228638	754770	0		9-0275		0	0.08	0	6		0		0		385		0			127 W DALY ST			Y	Y	R	N	Y
2692	BSBLP	272	20-Jul-99	19702		1228638	754770	0		9-0365		0	0.08	0	360		0		0		6730		0			127 W DALY ST	FRONT ATTIC		Y	Y	R	Y	Y
2693	BSBLP	273	06-Jul-99	20000		1228186	754691	0		9-0279		0	0.08	0	34		0		0		2770		0			221 W DALY ST			Y	Y	R	Y	Y
2694	BSBLP	274	04-Sep-97	48001		1226052	749339	0		8318		0	0.08	0	0		0		0		1870		0			301 N ALABAMA ST			Y	Y	R	N	Y
2695	BSBLP	274	04-Sep-97	48002		1226052	749339	0		8319		0	0.08	0	0		0		0		906		0			301 N ALABAMA ST	WEST GARDEN		Y	Y	R	N	Y
2696	BSBLP	274	04-Sep-97	48003		1226052	749339	0		8320		0	0.08	0	0		0		0		1980		0			301 N ALABAMA ST			Y	Y	R	Y	Y
2697	BSBLP	274	04-Sep-97	48004		1226052	749339	0		8321		0	0.08	0	0		0		0		341		0			301 N ALABAMA ST			Y	Y	R	N	Y
2698	BSBLP	275	14-Jul-93	1		1227043	750152	0		S5178		0	0.08	0	0		0		0		1380		0			542 N FRANKLIN ST	LOCATION UNKNOWN		Y	Y	R	Y	Y
2699	BSBLP	276	03-Aug-93	1		1225703	749385	0		S5383		0	0.08	0	0		0		0		811		0			855 W QUARTZ ST			N	Y	R	N	Y
2700	BSBLP	276	03-Aug-93	2		1225703	749385	0		S5384		0	0.08	0	0		0		0		1430		0			855 W QUARTZ ST			N	Y	R	Y	Y
2701	BSBLP	277	25-Aug-98	13200		1229404	753297	0		S009406		0	0.08	0	225		0		0		33300		0			4 BENNETT ST	INCLUDING DRIVE		N	Y	R	Y	Y
2702	BSBLP	277	25-Aug-98	13201		1229404	753297	0		S009407		0	0.08	0	35		0		0		458		0			4 BENNETT ST	VACANT LOT		N	Y	R	N	Y
2703	BSBLP	277	14-Dec-98	13202		1229404	753297	0		S013202		0	0.08	0	0		0		0		218		0			4 BENNETT ST	EAST YARD/VACANT LOT		N	Y	R	N	Y
2704	BSBLP	277	14-Dec-98	13203		1229404	753297	0		S013203		0	0.08	0	0		0		0		4460		0			4 BENNETT ST	MINUS DRIVEWAY		N	Y	R	N	Y
2705	BSBLP	278	01-Sep-99	21300		1229033	754021	0		9-1027		0	0.08	0	0		0		0		1480		0			1406 B ST			Y	Y	R	Y	Y
2706	BSBLP	279	01-Sep-99	21600		1228730	735251	0		9-1031		0	0.08	0	0		0		0		40		0			130 CALHOUN ST			Y	Y	R	Y	Y
2707	BSBLP	279	01-Sep-99	21601		1228730	735251	0		9-1032		0	0.08	0	0		0		0		33		0			130 CALHOUN ST			Y	Y	R	N	Y
2708	BSBLP	280	01-Sep-99	21700		1228409	749773	0		9-1037		0	0.08	0	0		0		0		465		0			125 W COPPER ST	NORTH DRIVE		Y	Y	R	N	Y
2709	BSBLP	280	01-Sep-99	21701		1228409	749773	0		9-1038		0	0.08	0	0		0		0		719		0			125 W COPPER ST	WEST HALF		Y	Y	R	N	Y
2710	BSBLP	280	01-Sep-99	21702		1228409	749773	0		9-1039		0	0.08	0	0		0		0		641		0			125 W COPPER ST	EAST HALF		Y	Y	R	N	Y
2711	BSBLP	280	01-Sep-99	21703		1228409	749773	0		9-1040		0	0.08	0	0		0		0		1220		0			125 W COPPER ST	INCLUDES NW SLOPE		Y	Y	R	Y	Y
2712	BSBLP	282	01-Sep-99	21200		1228318	752688	0		9-1022		0	0.08	0	0		0		0		538		0			79 MISSOULA ST			Y	Y	R	Y	Y
2713	BSBLP	284	06-Aug-99	21000		1226522	752579	0		9-0667		0	0.08	0	26		0		0		1360		0			705 MISSOULA ST	WEST HALF		Y	Y	R	Y	Y
2714	BSBLP	284	01-Sep-99	21001		1226522	752579	0		9-1024		0	0.08	0	0		0		0		810		0			705 MISSOULA ST	EAST HALF		Y	Y	R	N	Y
2715	BSBLP	284	01-Sep-99	21002		1226522	752579	0		9-1025		0	0.08	0	0		0		0		355		0			705 MISSOULA ST			Y	Y	R	N	Y
2716	BSBLP	284	01-Sep-99	21003		1226522	752579	0		9-1026		0	0.08	0	0		0		0		289		0			705 MISSOULA ST			Y	Y	R	N	Y
2717	BSBLP	288	22-Sep-99	22200		1228558	753056	0		9-1538		0	0.08	0	30		0		0		599		0			47 W CENTER ST			Y	Y	R	N	Y
2718	BSBLP	288	22-Sep-99	22201		1228558	753056	0		9-1539		0	0.08	0	21		0		0		908		0			47 W CENTER ST			Y	Y	R	Y	Y
2722	BSBLP	290	15-Sep-99	21900		1229988	755089	0		9-1352		0	0.08	0	60		0		0		1630		0			120 E DALY ST			Y	Y	R	N	Y
2723	BSBLP	290	15-Sep-99	21901		1229988	755089	0		9-1353		0	0.08	0	51		0		0		1520		0			120 E DALY ST	SOUTH DRIVE		Y	Y	R	N	Y
2724	BSBLP	290	15-Sep-99	21902		1229988	755089	0		9-1354		0	0.08	0	58		0		0		1300		0			120 E DALY ST			Y	Y	R	N	Y
2725	BSBLP	290	15-Sep-99	21903		1229988	755089	0		9-1355		0	0.08	0	653		0		0		2720		0			120 E DALY ST	ATTIC		Y	Y	R	Y	Y
2726	BSBLP	291	27-Jul-98	12301		1230780	748737	0		S009125		0	0.08	0	44		0		0		573		0			337 E PARK ST			Y	Y	R	N	Y
2727	BSBLP	291	27-Jul-98	12302		1230780	748737	0		S009126		0	0.08	0	66		0		0		405		0			337 E PARK ST	ADJOINING VACANT LOT		Y	Y	R	N	Y
2728	BSBLP	291	27-Sep-94	1		1230780	748737	0		S000194		0	0.08	0	0		0		0		375		0			337 E PARK ST	E LOT ADJACENT YARD		Y	Y	R	N	Y
2729	BSBLP	291	27-Sep-94	2		1230780	748737	0		S000195		0	0.08	0	0		0		0		200		0			337 E PARK ST			Y	Y	R	N	Y
2730	BSBLP	291	27-Sep-94	3		1230780	748737	0		S000196		0	0.08	0	0		0		0		978		0			337 E PARK ST	FRONT YARD		Y	Y	R	Y	Y
2731	BSBLP	291	27-Sep-94	4		1230780	748737	0		S000197		0	0.08	0	0		0		0		700		0			337 E PARK ST	REAR YARD		Y	Y	R	N	Y
2732	BSBLP	292	02-Jun-98	10601		1227170	753683	0		S008971		0	0.08	0	18		0		0		367		0			1408 5TH ST			Y	Y	R	N	Y
2733	BSBLP	292	02-Jun-98	10602		1227170	753683	0		S008972		0	0.08	0	59		0		0		3130		0			1408 5TH ST	EDGE OF ROAD		Y	Y	R	Y	Y
2734	BSBLP	292	07-Oct-99	10603		1227170	753683	0		9-1674		0	0.08	0	0		0		0		137		0			1408 5TH ST			Y	Y	R	N	Y
2735	BSBLP	292	07-Oct-99	10604		1227170	753683	0		9-1675		0	0.08	0	0		0		0		550		0			1408 5TH ST			Y	Y	R	N	Y
2736	BSBLP	292	07-Oct-99	10605		1227170	753683	0		9-1676		0	0.08	0	0		0		0		92		0			1408 5TH ST	LOWER DRIVE		Y	Y	R	N	Y
2737	BSBLP	292	07-Oct-99	10606		1227170	753683	0		9-1677		0	0.08	0	0		0		0		113		0			1408 5TH ST	UPPER DRIVE		Y	Y	R	N	Y
2738	BSBLP	294	30-Oct-96	31001		1227056	754484	0		S003375		0	0.08	0	0		0		0		910		0			517 W DALY ST			Y	Y	R	N	Y
2739	BSBLP	294	30-Oct-96	31002		1227056	754484	0		S003376		0	0.08	0	0		0		0		683		0			517 W DALY ST			Y	Y	R	N	Y
2740	BSBLP	294	30-Oct-96	31003		1227056	754484	0		S003377		0	0.08	0	0		0		0		796		0			517 W DALY ST			Y	Y	R	N	Y
2741	BSBLP	294	30-Oct-96	31004		1227056	754484	0		S003378		0	0.08	0	0		0		0		205		0			517 W DALY ST			Y	Y	R	N	Y
2742	BSBLP	294	30-Oct-96	31005		1227056	754484	0		S003379		0	0.08	0	0		0		0		370		0			517 W DALY ST			Y	Y	R	N	Y
2743	BSBLP	294	30-Oct-96	31006		1227056	754484	0		S003380		0	0.08	0	0		0		0		384		0			517 W DALY ST			Y	Y	R	N	Y
2744	BSBLP	294	29-Jun-98	1		1227056	754484	0		8-0314		0	0.08	0	7		17		450		6560		4820			517 W DALY ST	UNKNOWN LOCATION		Y	Y	R	Y	Y
2747	BSBLP	297	03-Jun-97	38001		1232790	745280	0		7-1479		0	0.08	0	0		0		0		840		0			1249 E 1ST ST			Y	Y	R	N	Y
2748	BSBLP	297	03-Jun-97	38002		1232790	745280	0		7-1480		0	0.08	0	0		0		0		2300		0			1249 E 1ST ST			Y	Y	R	N	Y
2749	BSBLP	297	03-Jun-97	38003		1232790	745280	0		7-1481		0	0.08	0	0		0		0		2040		0			1249 E 1ST ST			Y	Y	R	N	Y

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
2750	BSBLP	297	03-Jun-97	38004		1232790	745280	0		7-1482		0	0.08	0	0		0		0		1930		0			1249 E 1ST ST			Y	Y	R	N	Y
2751	BSBLP	297	03-Jun-97	38005		1232790	745280	0		7-1483		0	0.08	0	0		0		0		735		0			1249 E 1ST ST			Y	Y	R	N	Y
2752	BSBLP	297	03-Jun-97	38006		1232790	745280	0		7-1484		0	0.08	0	0		0		0		2900		0			1249 E 1ST ST			Y	Y	R	Y	Y
2753	BSBLP	297	03-Jun-97	38007		1232790	745280	0		7-1485		0	0.08	0	0		0		0		1100		0			1249 E 1ST ST			Y	Y	R	N	Y
2754	BSBLP	297	03-Jun-97	38008		1232790	745280	0		7-1486		0	0.08	0	0		0		0		1550		0			1249 E 1ST ST			Y	Y	R	N	Y
2755	BSBLP	298	07-May-98	10001		1227548	745161	0		S008922		0	0.08	0	0		0		0		2100		0			806 S WASHINGTO ST			N	Y	R	Y	Y
2756	BSBLP	298	07-May-98	10002		1227548	745161	0		S008923		0	0.08	0	0		0		0		1470		0			806 S WASHINGTO ST			N	Y	R	N	Y
2757	BSBLP	298	07-May-98	10003		1227548	745161	0		S008924		0	0.08	0	0		0		0		144		0			806 S WASHINGTO ST	VACANT LOT		N	Y	R	N	Y
2758	BSBLP	298	22-Oct-98	10004		1227548	745161	0		8-0813		0	0.08	0	0		0		0		224		0			806 S WASHINGTO ST			N	Y	R	N	Y
2759	BSBLP	298	22-Oct-98	10005		1227548	745161	0		8-0814		0	0.08	0	0		0		0		155		0			806 S WASHINGTO ST			N	Y	R	N	Y
2760	BSBLP	298	03-Dec-98	10006		1227548	745161	0		8-0913		0	0.08	0	0		0		0		1180		0			806 S WASHINGTO ST			N	Y	R	N	Y
2761	BSBLP	300	16-Oct-98	14800		1227127	748353	0		8-0824		0	0.08	0	0		0		0		1020		0			504/506 W PARK ST			Y	Y	R	Y	Y
2762	BSBLP	300	16-Oct-98	14801		1227127	748353	0		8-0825		0	0.08	0	0		0		0		221		0			504/506 W PARK ST	WEST LOT (508 W PARK		Y	Y	R	N	Y
2763	BSBLP	301	25-Aug-98	13100		1226804	754580	0		S009400		0	0.08	0	90		0		0		2620		0			600 N NORTH ST	"W VACANT LOT, E MID		N	Y	R	N	Y
2764	BSBLP	301	25-Aug-98	13101		1226804	754580	0		S009401		0	0.08	0	80		0		0		2710		0			600 N NORTH ST	"W VACANT LOT, W MID		N	Y	R	N	Y
2765	BSBLP	301	25-Aug-98	13102		1226804	754580	0		S009402		0	0.08	0	44		0		0		4050		0			600 N NORTH ST	"W VACANT LOT, W EDG		N	Y	R	Y	Y
2766	BSBLP	301	25-Aug-98	13103		1226804	754580	0		S009403		0	0.08	0	42		0		0		1620		0			600 N NORTH ST	"W VACANT LOT, W COR		N	Y	R	N	Y
2767	BSBLP	301	25-Aug-98	13104		1226804	754580	0		S009404		0	0.08	0	56		0		0		2140		0			600 N NORTH ST	"W VACANT LOT, S EDG		N	Y	R	N	Y
2768	BSBLP	301	25-Aug-98	13105		1226804	754580	0		S009405		0	0.08	0	94		0		0		576		0			600 N NORTH ST	"W VACANT LOT, E SID		N	Y	R	N	Y
2769	BSBLP	301	29-Mar-99	13106		1226804	754580	0		9-0078		0	0.08	0	0		0		0		328		0			600 N NORTH ST			N	Y	R	N	Y
2770	BSBLP	301	29-Mar-99	13107		1226804	754580	0		9-0079		0	0.08	0	0		0		0		372		0			600 N NORTH ST			N	Y	R	N	Y
2771	BSBLP	301	29-Mar-99	13108		1226804	754580	0		9-0080		0	0.08	0	0		0		0		223		0			600 N NORTH ST			N	Y	R	N	Y
2772	BSBLP	301	29-Mar-99	13109		1226804	754580	0		9-0081		0	0.08	0	0		0		0		292		0			600 N NORTH ST			N	Y	R	N	Y
2773	BSBLP	302	30-Apr-98	99001		1229367	755224	0		8-0182		0	0.08	0	23		0		0		1480		0			1629 N MAIN ST			N	Y	R	N	Y
2774	BSBLP	302	30-Apr-98	99002		1229367	755224	0		8-0183		0	0.08	0	20		0		0		1980		0			1629 N MAIN ST			N	Y	R	Y	Y
2775	BSBLP	302	30-Apr-98	99003		1229367	755224	0		8-0184		0	0.08	0	43		0		0		1320		0			1629 N MAIN ST			N	Y	R	N	Y
2776	BSBLP	302	30-Apr-98	99004		1229367	755224	0		8-0185		0	0.08	0	8		0		0		1420		0			1629 N MAIN ST			N	Y	R	N	Y
2777	BSBLP	303	20-Apr-99	16700		1228353	747823	0		9-0116		0	0.08	0	0		0		0		474		0			144 W MERCURY ST			Y	Y	R	Y	Y
2778	BSBLP	304	15-Sep-99	22000		1230183	755220	0		9-1356		0	0.08	0	12		0		0		342		0			140 E DALY ST			Y	Y	R	N	Y
2779	BSBLP	304	15-Sep-99	22001		1230183	755220	0		9-1357		0	0.08	0	31		0		0		322		0			140 E DALY ST			Y	Y	R	N	Y
2780	BSBLP	304	15-Sep-99	22002		1230183	755220	0		9-1358		0	0.08	0	22		0		0		213		0			140 E DALY ST			Y	Y	R	N	Y
2781	BSBLP	304	15-Sep-99	22003		1230183	755220	0		9-1359		0	0.08	0	63		0		0		422		0			140 E DALY ST	ATTIC		Y	Y	R	Y	Y
2782	BSBLP	305	16-Sep-99	22100		1228761	749768	0		9-1360		0	0.08	0	0		0		0		874		0			29 W COPPER ST			Y	Y	R	Y	Y
2783	BSBLP	318	28-Jul-99	20700		1228917	753049	0		9-0498		0	0.08	0	23		0		0		645		0			21 W CENTER ST			N	Y	R	N	Y
2784	BSBLP	318	28-Jul-99	20701		1228917	753049	0		9-0499		0	0.08	0	9		0		0		1440		0			21 W CENTER ST			N	Y	R	N	Y
2785	BSBLP	318	28-Jul-99	20702		1228917	753049	0		9-0500		0	0.08	0	32		0		0		1450		0			21 W CENTER ST			N	Y	R	Y	Y
2786	BSBLP	318	28-Jul-99	20703		1228917	753049	0		9-0501		0	0.08	0	52		0		0		1050		0			21 W CENTER ST			N	Y	R	N	Y
2787	BSBLP	319	11-Jun-99	17900		1228306	749775	0		9-0220		0	0.08	0	0		0		0		1220		0			131 W COPPER ST			N	Y	R	Y	Y
2788	BSBLP	319	11-Jun-99	17901		1228306	749775	0		9-0221		0	0.08	0	0		0		0		1100		0			131 W COPPER ST	NORTH EAST YARD		N	Y	R	N	Y
2789	BSBLP	319	11-Jun-99	17902		1228306	749775	0		9-0222		0	0.08	0	0		0		0		920		0			131 W COPPER ST	SOUTH EAST YARD		N	Y	R	N	Y
2790	BSBLP	319	11-Jun-99	17903		1228306	749775	0		9-0223		0	0.08	0	0		0		0		1150		0			131 W COPPER ST	NORTH DRIVE		N	Y	R	N	Y
2791	BSBLP	319	11-Jun-99	17904		1228306	749775	0		9-0224		0	0.08	0	0		0		0		434		0			131 W COPPER ST			N	Y	R	N	Y
2792	BSBLP	320	23-Jun-98	11001		1229056	744335	0		S009046		0	0.08	0	0		0		0		1920		0			924 S COLORADO ST			N	Y	R	N	Y
2793	BSBLP	320	23-Jun-98	11002		1229056	744335	0		S009047		0	0.08	0	0		0		0		1290		0			924 S COLORADO ST			N	Y	R	N	Y
2794	BSBLP	320	23-Jun-98	11003		1229056	744335	0		S009048		0	0.08	0	0		0		0		2450		0			924 S COLORADO ST			N	Y	R	Y	Y
2795	BSBLP	321	12-Apr-99	16500		1228634	747611	0		9-0104		0	0.08	0	0		0		0		1140		0			238 S DAKOTA ST			N	Y	R	N	Y
2796	BSBLP	321	12-Apr-99	16501		1228634	747611	0		9-0105		0	0.08	0	0		0		0		968		0			238 S DAKOTA ST	BEHIND HOUSE		N	Y	R	N	Y
2797	BSBLP	321	12-Apr-99	16502		1228634	747611	0		9-0106		0	0.08	0	0		0		0		1610		0			238 S DAKOTA ST	VACANT LOT-DIRT PILE		N	Y	R	Y	Y
2798	BSBLP	321	12-Apr-99	16503		1228634	747611	0		9-0107		0	0.08	0	0		0		0		957		0			238 S DAKOTA ST	VACANT LOT		N	Y	R	N	Y
2799	BSBLP	322	28-Apr-98	96001		1228694	754780	0		S008904		0	0.08	0	0		0		0		819		0			123 W DALY ST			N	Y	R	N	Y
2800	BSBLP	322	28-Apr-98	96002		1228694	754780	0		S008905		0	0.08	0	0		0		0		1640		0			123 W DALY ST			N	Y	R	N	Y
2801	BSBLP	322	28-Apr-98	96003		1228694	754780	0		S008906		0	0.08	0	0		0		0		1880		0			123 W DALY ST			N	Y	R	N	Y
2802	BSBLP	322	28-Apr-98	96004		1228694	754780	0		S008907		0	0.08	0	0		0		0		230		0			123 W DALY ST			N	Y	R	N	Y
2803	BSBLP	322	28-Apr-98	96005		1228694	754780	0		S008908		0	0.08	0	0		0		0		1640		0			123 W DALY ST			N	Y	R	N	Y
2804	BSBLP	322	28-Apr-98	96006		1228694	754780	0		S008909		0	0.08	0	0		0		0		68		0			123 W DALY ST			N	Y	R	N	Y
2805	BSBLP	322	28-Apr-98	96007		1228694	754780	0		S008910		0	0.08	0	0		0		0		375		0			123 W DALY ST			N	Y	R	N	Y
2806	BSBLP	322	31-Jul-98	96008		1228694	754780	0		S009131		0	0.08	0	33		0		0		589		0			123 W DALY ST	NORTH DRIVE		N	Y	R	N	Y
2807	BSBLP	322	31-Jul-98	96009		1228694	754780	0		S009132		0	0.08	0	22		0		0		194		0			123 W DALY ST	MID-DRIVE		N	Y	R	N	Y
2808	BSBLP	322	31-Jul-98	96010		1228694	754780	0		S009133		0	0.08	0	28		0		0		284		0			123 W DALY ST	BOTTOM-DRIVE		N	Y	R	N	Y
2809	BSBLP	322	26-Feb-99	96011		1228694	754780	0		9-0041		0	0.08	0	558		0		0		4340		0			123 W DALY ST	DIRT INSIDE WALLS		N	Y	R	Y	Y
2810	BSBLP	322	23-Apr-99	96012		1228694	754780	0		9-0117		0	0.08	0	0		0		0		678		0			123 W DALY ST			N	Y	R	N	Y
2811	BSBLP	322	23-Apr-99	96013		1228694	754780	0		9-0118		0	0.08	0	0		0		0		3020		0			123 W DALY ST			N	Y	R	N	Y
2812	BSBLP	323	17-Apr-98	65001		1231887	745163	0		S008829		0	0.08	0	0		0		0		1850		0			1011 MICHIGAN AVE			N	Y	R	N	Y
2813	BSBLP	323	17-Apr-98	65002		1231887	745163	0		S008830		0	0.08	0	0		0		0		1120		0			1011 MICHIGAN AVE			N	Y	R	N	Y
2814	BSBLP	323	17-Apr-98	65003		1231887	745163	0		S008831		0	0.08	0	0		0		0		919		0			1011 MICHIGAN AVE			N	Y	R	N	Y
2815	BSBLP	323	17-Apr-98	65004		1231887	745163	0		S008832		0	0.08	0	0		0		0		3210		0			1011 MICHIGAN AVE			N	Y	R	Y	Y
2816	BSBLP	323	17-Apr-98	65005		1231887	745163	0		S008833		0	0.08	0	0		0		0		1410		0			1011 MICHIGAN AVE			N	Y	R	N	Y
2817	BSBLP	324	17-Jul-98	11801		1228084	751002	0		S009076		0	0.08	0	46		0		0		3730		0			723 N MONTANA ST			Y	Y	R	N	Y
2818	BSBLP	324	17-Jul-98	11802		1228084	751002	0		S009077		0	0.08	0	53		0		0		943		0			723 N MONTANA ST			Y	Y	R	N	Y
2819	BSBLP	324	17-Jul-98	11803		1228084	751002	0		S009080		0	0.08	0	98		0		0		4280		0			723 N MONTANA ST	GARAGE PERIMETER		N	Y	R	Y	Y
2820	BSBLP	324	17-Jul-98	11804		1228084	751002	0		S009078		0	0.08	0	63		0		0		1730		0			723 N MONTANA ST			Y	Y	R	N	Y
2821	BSBLP	325	12-Nov-98	15500		1228505	746088	0		8-0914		0	0.08	0	0		0		0		3950		0			636 PLACER ST			N	Y	R	Y	Y
2822	BSBLP	325	12-Nov-98	15501		1228505	746088	0		8-0915		0	0.08	0	0		0		0		237		0			636 PLACER ST	SOUTH LOT(638)		N	Y	R	N	Y
2823	BSBLP	325	12-Nov-98	15502		1228505	746088	0		8-0916		0	0.08	0	0		0		0		468		0			636 PLACER ST	BACK LOT		N	Y	R	N	Y
2824	BSBLP	326	22-Oct-98	14700		1228377	749502	0		8-0821		0	0.08	0	0		0		0		1990		0			115 W QUARTZ ST			N	Y	R	Y	Y

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
2825	BSBLP	326	22-Oct-98	14701		1228377	749502	0		8-0822		0	0.08	0	0		0		0		1090		0			115 W QUARTZ ST			N	Y	R	N	Y
2826	BSBLP	326	22-Oct-98	14702		1228377	749502	0		8-0823		0	0.08	0	0		0		0		1990		0			115 W QUARTZ ST			N	Y	R	Y	Y
2827	BSBLP	327	11-Dec-98	15600		1227853	750535	0		8-0917		0	0.08	0	0		0		0		2380		0			217 W VIRGINIA ST	NORTH YARD/DRIVE		N	Y	R	Y	Y
2828	BSBLP	328	05-Oct-98	14400		1227732	750534	0		8-0673		0	0.08	0	0		0		0		580		0			305 W VIRGINIA ST	VACANT LOT WEST END		N	Y	R	N	Y
2829	BSBLP	328	05-Oct-98	14401		1227732	750534	0		8-0674		0	0.08	0	0		0		0		219		0			305 W VIRGINIA ST	VACANT LOT EAST END		N	Y	R	N	Y
2830	BSBLP	328	05-Oct-98	14402		1227732	750534	0		8-0675		0	0.08	0	0		0		0		87		0			305 W VIRGINIA ST	PILE AT VACANT LOT		N	Y	R	N	Y
2831	BSBLP	328	05-Oct-98	14403		1227732	750534	0		8-0676		0	0.08	0	0		0		0		772		0			305 W VIRGINIA ST	LOWER PORTION		N	Y	R	N	Y
2832	BSBLP	328	05-Oct-98	14404		1227732	750534	0		8-0677		0	0.08	0	0		0		0		1430		0			305 W VIRGINIA ST	UPPER PORTION		N	Y	R	N	Y
2833	BSBLP	328	05-Oct-98	14405		1227732	750534	0		8-0678		0	0.08	0	0		0		0		2260		0			305 W VIRGINIA ST			N	Y	R	Y	Y
2834	BSBLP	329	10-Jul-98	11501		1227376	746649	0		S009067		0	0.08	0	45		0		0		2050		0			505 S WASHINGTO ST			N	Y	R	Y	Y
2835	BSBLP	329	10-Jul-98	11502		1227376	746649	0		S009068		0	0.08	0	52		0		0		1440		0			505 S WASHINGTO ST	GARAGE PERIMETER		N	Y	R	N	Y
2836	BSBLP	329	10-Jul-98	11503		1227376	746649	0		S009069		0	0.08	0	45		0		0		841		0			505 S WASHINGTO ST			N	Y	R	N	Y
2837	BSBLP	329	10-Jul-98	11504		1227376	746649	0		S009070		0	0.08	0	56		0		0		1130		0			505 S WASHINGTO ST			N	Y	R	N	Y
2838	BSBLP	329	10-Jul-98	11505		1227376	746649	0		S009071		0	0.08	0	27		0		0		1030		0			505 S WASHINGTO ST			N	Y	R	N	Y
1511	BUTSO95A	FSUA-11	23-Oct-95	119712040	DRY	1229610	753114	0			FD	0	0.17	4	35		0		664		5050		9380		3.7	South of 19 Caplatta		U	N	Y	N	Y	
2550	BSBLP	188	07-Jul-98	011301		0	0	0		S009054		0	0.08	0	0		0		0		1090		0			745 S MAIN ST			Y	Y	R	N	Y
2551	BSBLP	188	07-Jul-98	011302		0	0	0		S009055		0	0.08	0	0		0		0		7150		0			745 S MAIN ST			Y	Y	R	Y	Y
1492	BUTSD89A	SD-187	11-Aug-89	01		1227148	742419	0	8-86696	MHT985		0	0.1	0	76		20	J	886		1330		3160						N	Y	N	Y	
1493	BUTSD89A	SD-187	11-Aug-89	01		1227148	742419	0				0	0.1	0	63	U	11		249	U	987		1558						N	Y	N	N	
542	BUTSO87A	RY-108	13-Jul-87	A	DRY	1227220	750358	5856	MHJ 977	MHJ 977	FD	0	0.08	3	56		7		346		900		1860		8.15	"503 W. Woolman, BUT			Y	Y	R	Y	Y
562	BUTSO87A	RY-127	16-Jul-87	A	DRY	1223346	741081	5496	MHR 023	MHR 023	FD	0	0.08	3	101		6		156		172		560		8.14	" Vienna St., WILLIA			Y	Y	R	Y	Y
652	BUTSO87A	VG-016	16-Jul-87	A	DRY	1223408	741104	5497	MHR 030	MHR 030	FD	0	0.5	3	51		2	U	154		139		689		7.72	" Vienna St., Willia	"0-6"" SAMPLE FROM V		Y	Y	R	Y	Y
447	BUTSO87A	RY-009	16-Jun-87	A	DRY	1228810	746120	5589	MHH 697	MHH 697	FD	0	0.08	3	58		8		240		897		1370		7.39	"623 S. Colorado, BU			Y	Y	R	Y	Y
637	BUTSO87A	VG-002	16-Jun-87	A	DRY	1228830	746143	5591	MHH 692	MHH 692	FD	0	0.5	3	79		6		145		415		723		8.06	"623 S. Colorado, Bu	"0-6"" SAMPLE FROM V		Y	Y	R	Y	Y
N/A	BUTSO93B	MLW-47	08-Jun-93		DRY							1.5	1.5		100				450		120		400										
N/A	BUTSO93B	MLW-48	08-Jun-93		DRY							1.5	1.5		150				890		110		670										
N/A	BUTSO93B	MLW-52	08-Jun-93		DRY							1.5	1.5		380				220		270		690										
N/A	BUTSO93B	MLW-53	08-Jun-93		DRY							1.5	1.5		400				160		310		720										
N/A	BUTSO93B	MLW-49	08-Jun-93		DRY							1.5	1.5		98				120		63		230										
N/A	BUTSO93B	MLW-50	08-Jun-93		DRY							1.5	1.5		550				460		280		460										
N/A	BUTSO93B	MLW-29	08-Jun-93		DRY							1.5	1.5		740				730		280		780										
N/A	BUTSO93B	MLW-56	08-Jun-93		DRY							1.5	1.5		230				1400		130		630										
N/A	BUTSO93B	MLW-59	08-Jun-93		DRY							1.5	1.5		56				23		7		72										
N/A	BUTSO93B	MLW-60	08-Jun-93		DRY							1.5	1.5		200				45		9		99										
N/A	BUTSO93B	MLW-36	08-Jun-93		DRY							1.5	1.5		350				1300		260		720										
N/A	BUTSO93B	MLW-61	08-Jun-93		DRY							1.5	1.5		650				2000		720		760										
N/A	BUTSO93B	MLW-62	08-Jun-93		DRY							1.5	1.5		57				300		51		240										
N/A	BUTSO93B	MLW-39	08-Jun-93		DRY							1.5	1.5		<10				66		12		55										
N/A	BUTSO93B	MLW-63	08-Jun-93		DRY							1.5	1.5		<10				53		13		71										
N/A	BUTSO93B	MLW-64	08-Jun-93		DRY							1.5	1.5		<10				32		15		54										
N/A	BUTSO93B	MLW-65	08-Jun-93		DRY							1.5	1.5		<10				15		6		32										
N/A	BUTSO93B	MLW-66	08-Jun-93		DRY							1.5	1.5		<10				20		13		48										
N/A	BUTSO93B	MLW-67	08-Jun-93		DRY							1.5	1.5		<10				39		10		46										
N/A	BUTSO93B	MLW-68	08-Jun-93		DRY							1.5	1.5		<10				16		8		29										
N/A	BUTSO93B	MLW-70	08-Jun-93		DRY							1.5	1.5		16				130		65		180										
N/A	BUTSO93B	MLW-71	08-Jun-93		DRY							1.5	1.5		<10				50		17		66										
N/A	BUTSO93B	NB-3	03-Jun-93		DRY							1.5	1.5		34				830		13		190										
N/A	BUTSO93B	NB-31	08-Jun-93		DRY							1.5	1.5		<10				190		7		77										
N/A	BUTSO93B	NB-32	08-Jun-93		DRY							1.5	1.5		<10				290		8		54										
N/A	BUTSO93B	NB-33	08-Jun-93		DRY							60	60		650				740		360		510										
N/A	BUTSO93B	NB-34	08-Jun-93		DRY							60	60		520				1300		550		650										
N/A	BUTSO93B	NB-35	08-Jun-93		DRY							1.5	1.5		150				470		120		540										
N/A	BUTSO93B	NB-36	08-Jun-93		DRY							1.5	1.5		360				1300		180		710										
N/A	BUTSO93B	NB-37	08-Jun-93		DRY							1.5	1.5		16				90		23		82										
N/A	BUTSO93B	NB-38	08-Jun-93		DRY							1.5	1.5		15				83		17		100										
N/A	BUTSO93B	NB-39	08-Jun-93		DRY							1.5	1.5		360				970		280		84										
N/A	BUTSO93B	NB-40	08-Jun-93		DRY							1.5	1.5		250				1300		86		49										
N/A	BUTSO93B	NB-12	04-Jun-93		DRY							1.5	1.5		340				1300		140		180										
N/A	BUTSO93B	NB-41	08-Jun-93		DRY							1.5	1.5		120				230		88		130										
N/A	BUTSO93B	NB-42	08-Jun-93		DRY							1.5	1.5		<10				130		14		76										
N/A	BUTSO93B	NB-43	08-Jun-93		DRY							1.5	1.5		15				71		38		110										
N/A	BUTSO93B	NB-16	04-Jun-93		DRY							1.5	1.5		49				200		43		120										
N/A	BUTSO93B	NB-44	08-Jun-93		DRY							1.5	1.5		38				160		38		100										
N/A	BUTSO93B	NB-45	08-Jun-93		DRY							1.5	1.5		480				4500		140		450										
N/A	BUTSO93B	NB-46	08-Jun-93		DRY							1.5	1.5		210				1800		15		200										
N/A	BUTSO93B	NB-24	04-Jun-93		DRY							1.5	1.5		34				45		64		160										
N/A	BUTSO93B	NB-50	08-Jun-93		DRY							2	2		<10				22		12		130										
N/A	BUTSO93B	NB-51	08-Jun-93		DRY							2	2		38				110		80		540										
N/A	BUTSO93B	NB-52	08-Jun-93		DRY							1.5	1.5		56				51		83		230										
N/A	BUTSO93B	NB-53	08-Jun-93		DRY							1.5	1.5		<10				16		8		67										
N/A	BUTSO93B	MLE-3	07-Jun-93		DRY							1.5	1.5		210				1400		270		820										
N/A	BUTSO93B	MLE-4	07-Jun-93		DRY							1.5	1.5		200				1600		300		680										
N/A	BUTSO93B	MLE-6	07-Jun-93		DRY							1.5	1.5		44				620		97		750										
N/A	BUTSO93B	MLE-7	07-Jun-93		DRY							1.5	1.5		190				3300		430		1600										
N/A	BUTSO93B	MLE-10	07-Jun-93		DRY							1.5	1.5		740				1400		360		690										

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic mg/kg	Arsenic Qual.	Cadmium mg/kg	Cadmium Qual.	Copper mg/kg	Copper Qual.	Lead mg/kg	Lead Qual.	Zinc mg/kg	Zinc Qual.	pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
N/A	BUTSO93B	MLE-11	07-Jun-93		DRY							1.5	1.5		74				2100		460		1000										
N/A	BUTSO93B	MLE-12	07-Jun-93		DRY							1.5	1.5		860				830		360		330										
N/A	BUTSO93B	MLE-14	07-Jun-93		DRY							1.5	1.5		700				2700		61		210										
N/A	BUTSO93B	MLE-15	07-Jun-93		DRY							1.5	1.5		510				3600		560		2000										
N/A	BUTSO93B	MLE-20	07-Jun-93		DRY							1.5	1.5		180				1200		220		560										
N/A	BUTSO93B	MLE-21	07-Jun-93		DRY							1.5	1.5		280				1700		450		1200										
N/A	BUTSO93B	MLE-23	07-Jun-93		DRY							1.5	1.5		470				3400		570		1500										
N/A	BUTSO93B	MLE-24	07-Jun-93		DRY							1.5	1.5		510				5000		680		110										
N/A	BUTSO93B	MLE-25	07-Jun-93		DRY							1.5	1.5		230				2600		590		1500										
N/A	BUTSO93B	MY-2	05-Jun-93		DRY							1.5	1.5		570				930		320		490										
N/A	BUTSO93B	MY-3	05-Jun-93		DRY							1.5	1.5		540				1000		340		280										
N/A	BUTSO93B	MY-5	05-Jun-93		DRY							1.5	1.5		270				620		320		1000										
N/A	BUTSO93B	MY-7	05-Jun-93		DRY							1.5	1.5																				
N/A	BUTSO93B	MY-8	05-Jun-93		DRY							1.5	1.5		130				1200		190		230										
N/A	BUTSO93B	MY-9	05-Jun-93		DRY							1.5	1.5		170				1400		240		360										
N/A	BUTSO93B	MY-10	05-Jun-93		DRY							1.5	1.5		140				970		220		180										
N/A	BUTSO93B	MY-12	05-Jun-93		DRY							1.5	1.5		26				790		59		85										
N/A	BUTSO93B	MY-13	05-Jun-93		DRY							1.5	1.5		70				750		45		89										
N/A	BUTSO93B	MY-59	11-Jun-93		DRY							1.5	1.5																				
N/A	BUTSO93B	MY-20	05-Jun-93		DRY							1.5	1.5		200				3500		490		2100										
N/A	BUTSO93B	MY-45	08-Jun-93		DRY							1.5	1.5		69				380		590		290										
N/A	BUTSO93B	MY-46	08-Jun-93		DRY							1.5	1.5		240				1200		330		1200										
N/A	BUTSO93B	MY-47	08-Jun-93		DRY							1.5	1.5		810				1800		890		6300										
N/A	BUTSO93B	MY-48	08-Jun-93		DRY							1.5	1.5		2100				3500		670		1700										
N/A	BUTSO93B	MY-38	06-Jun-93		DRY							1.5	1.5		450				1300		550		640										
N/A	BUTSO93B	MY-49	08-Jun-93		DRY							1.5	1.5		260				940		390		400										
N/A	BUTSO93B	MY-50	08-Jun-93		DRY							1.5	1.5		390				1500		500		580										
N/A	BUTSO93B	MY-40	06-Jun-93		DRY							1.5	1.5		150				620		550		880										
N/A	BUTSO93B	MY-41	06-Jun-93		DRY							1.5	1.5		120				720		760		1200										
N/A	BUTSO93B	MY-52	11-Jun-93		DRY							1.5	1.5		43				800		590		1300										
N/A	BUTSO93B	MY-53	11-Jun-93		DRY							1.5	1.5		110				1200		470		1000										
N/A	BUTSO93B	MY-57	11-Jun-93		DRY							1.5	1.5		660				880		400		200										
N/A	BUTSO93B	MY-58	11-Jun-93		DRY							1.5	1.5		710				630		630		310										
N/A	BUTSO93B	LY-2	07-Jun-93		DRY							1.5	1.5		18				240		580		830										
N/A	BUTSO93B	LY-4	07-Jun-93		DRY							1.5	1.5		140				310		650		460										
N/A	BUTSO93B	LY-5	07-Jun-93		DRY							1.5	1.5		54				370		530		1400										
N/A	BUTSO93B	LY-8	07-Jun-93		DRY							1.5	1.5		24				440		400		1300										
N/A	BUTSO93B	LY-9	07-Jun-93		DRY							1.5	1.5		2100				2500		620		420										
N/A	BUTSO93B	LY-12	07-Jun-93		DRY							1.5	1.5		21				260		660		1200										
N/A	BUTSO93B	LY-13	07-Jun-93		DRY							1.5	1.5		51				640		610		1000										
N/A	BUTSO93B	LY-14	07-Jun-93		DRY							1.5	1.5		16				140		530		1100										
N/A	BUTSO93B	LY-16	07-Jun-93		DRY							1.5	1.5		120				750		2000		2700										
N/A	BUTSO93B	LY-17	07-Jun-93		DRY							1.5	1.5		90				720		2100		1500										
N/A	BUTSO93B	LY-18	07-Jun-93		DRY							1.5	1.5		260				720		2000		3100										
N/A	BUTSO93B	LY-21	07-Jun-93		DRY							1.5	1.5		51				1000		510		1100										
N/A	BUTSO93B	LY-22	07-Jun-93		DRY							1.5	1.5		29				710		470		730										
N/A	BUTSO93B	LY-25	07-Jun-93		DRY							1.5	1.5		320				300		530		470										
N/A	BUTSO93B	LY-26	07-Jun-93		DRY							1.5	1.5		780				1300		1400		1300										
N/A	BUTSO93B	LY-28	09-Jun-93		DRY							1.5	1.5		190				1800		930		2700										
N/A	BUTSO93B	LY-29	09-Jun-93		DRY							1.5	1.5		580				3100		780		1000										
N/A	BUTSO93B	LY-31	09-Jun-93		DRY							1.5	1.5		41				370		760		850										
N/A	BUTSO93B	LY-32	09-Jun-93		DRY							1.5	1.5		170				6300		380		1400										
N/A	BUTSO93B	LY-43	09-Jun-93		DRY							1.5	1.5		80				1100		550		1000										
N/A	BUTSO93B	LY-44	09-Jun-93		DRY							1.5	1.5		77				750		540		1000										
N/A	BUTSO93B	LY-39	09-Jun-93		DRY							1.5	1.5		30				200		580		950										
N/A	BUTSO93B	LY-40	09-Jun-93		DRY							1.5	1.5		17				150		570		710										
N/A	BUTSO93B	LY-41	09-Jun-93		DRY							1.5	1.5		16				120		570		640										
N/A	BUTSO93B	LY-53	09-Jun-93		DRY							1.5	1.5		11				76		70		160										
N/A	BUTSO93B	LY-54	09-Jun-93		DRY							1.5	1.5		25				260		360		420										
N/A	BUTSO93B	LY-57	09-Jun-93		DRY							1.5	1.5		150				1200		270		480										
N/A	BUTSO93B	LY-58	09-Jun-93		DRY							1.5	1.5		180				1600		310		390										
N/A	BUTSO93B	LY-59	09-Jun-93		DRY							1.5	1.5		180				1000		320		970										
N/A	BUTSO93B	UY-3	11-Jun-93		DRY							1.5	1.5		190				2100		390		1300										
N/A	BUTSO93B	UY-4	11-Jun-93		DRY							1.5	1.5		120				900		730		1400										
N/A	BUTSO93B	UY-5	11-Jun-93		DRY							1.5	1.5		140				1700		370		2900										
N/A	BUTSO93B	UY-13	11-Jun-93		DRY							2	2		26				220		480		4700										
N/A	BUTSO93B	UY-14	11-Jun-93		DRY							2	2		44				400		340		2700										
N/A	BUTSO93B	UY-16	11-Jun-93		DRY							1.5	1.5		47				570		240		6800										
N/A	BUTSO93B	UY-17	11-Jun-93		DRY							1.5	1.5		110				830		490		4400										
N/A	BUTSO93B	UY-20	11-Jun-93		DRY							1.5	1.5		250				1700		1200		4000										
N/A	BUTSO93B	UY-21	11-Jun-93		DRY							1.5	1.5		360				1300		72		1800										
N/A	BUTSO93B	UY-24	11-Jun-93		DRY							1.5	1.5		51				270		440		2500										
N/A	BUTSO93B	UY-25	11-Jun-93		DRY							1.5	1.5		55				260		300		4200										
N/A	BUTSO93B	UY-27	11-Jun-93		DRY							1.5	1.5		180				1200		660		1900										
N/A	BUTSO93B	UY-28	11-Jun-93		DRY							1.5	1.5		160				1000		450		980										

Identification Number	Data Source Reference	Sample Location Name	Sample Date	Further Sample Identification	Measure-ment Basis	Sample Coordinate East	Sample Coordinate North	Sample Elevation	Field Sample Number	Laboratory Sample Number	Field Duplicate Sample	Upper Sample Depth Feet	Lower Sample Depth Feet	QA/QC Level	Arsenic		Cadmium		Copper		Lead		Zinc		pH	Location	Comment	A-B Level	Post-Reclamation Map	Pre-Reclamation Map	Residential Sample	Within BPSOU	Residential Yard Sample
															mg/kg	Qual.	mg/kg	Qual.	mg/kg	Qual.	mg/kg	Qual.	mg/kg	Qual.									
N/A	BUTSO93B	UY-29	11-Jun-93		DRY							1.5	1.5		120				900		610		1900										
N/A	BUTSO93B	UY-31	11-Jun-93		DRY							1.5	1.5		13				500		240		1700										
N/A	BUTSO93B	UY-32	11-Jun-93		DRY							1.5	1.5		31				360		350		1500										
N/A	BUTSO93B	UY-35	11-Jun-93		DRY							1.5	1.5		270				380		2300		2600										
N/A	BUTSO93B	UY-36	11-Jun-93		DRY							1.5	1.5		95				890		1800		1200										
N/A	BUTSO93B	UY-38	11-Jun-93		DRY							1.5	1.5		270				2400		550		1000										
N/A	BUTSO93B	UY-39	11-Jun-93		DRY							1.5	1.5		150				1600		370		1500										
N/A	BUTSO93B	UY-40	11-Jun-93		DRY							1.5	1.5		260				1400		680		1200										

Appendix C

Montana Department of
ENVIRONMENTAL QUALITY

Brian Schweitzer, Governor

P.O. Box 200901 • Helena, MT 59620-0901 • (406) 444-2544 • www.deq.mt.gov

September 22, 2006

Max H. Dodson
Assistant Regional Administrator
US EPA Region 8
One Denver Place
999 18th Street
Denver, Colorado 80202-2405

RE: The Montana Department of Environmental Quality's Partial Concurrence in the Record of Decision, Butte Priority Soils Operable Unit, Silver Bow Creek/Butte Area NPL Site

Dear Mr. Dodson:

The Montana Department of Environmental Quality (DEQ) partially concurs with the Record of Decision (ROD) for the Butte Priority Soils Operable Unit, Silver Bow Creek/Butte Area NPL Site in Montana. DEQ believes elements in this ROD will lead to significant improvement over current conditions affecting human health and the environment in the BPSOU. As the support agency, we appreciate those areas where EPA has considered our comments and suggestions, and we offer our continued support during remedial design, remedial action and long-term operation and maintenance of the BPSOU site.

DEQ concurs with and supports the following aspects of the ROD:

- EPA's determination that there are present and potential human health and environmental risks in the Operable Unit that must be addressed pursuant to CERCLA and the NCP.

- EPA's residential metals abatement program, including the prioritization method, the whole property approach to assessment and abatement, management by Butte-Silver Bow County Health Department, long-term tracking, and medical monitoring.

- The decision not to consider flow augmentation until the major remedial components described in the ROD are designed and implemented.

- The need for a controlled groundwater area as a part of this Selected Remedy, together with an adequately funded education and well abandonment program. The controlled groundwater area together with institutional controls for solid wastes left in place should minimize human contact with contaminated materials.

In partially concurring, however, DEQ does not agree with all the decisions made by EPA or all the statements and opinions expressed in the ROD. The areas of disagreement between our agencies have been extensively documented in previous State comments and won't be reiterated here. However, as you know, DEQ does not concur with the overarching decision to leave accessible, major sources of groundwater contamination in place. We refer specifically to the Parrot Tailings, Diggings East Tailings and the North Side Tailings. Our concern is that leaving these wastes in place poses a significant and permanent threat to groundwater and to the long-term water quality in Silver Bow Creek.

EPA's remedy decision relies upon capturing and treating highly contaminated ground water in perpetuity to protect Silver Bow Creek. However, the State believes that significantly more weight should have been given to Metro Storm Drain Alternative 5b, which called for the removal of the major sources of groundwater contamination, as the State in fact did at the Silver Bow Creek/Butte Area NPL site. The State believes that such removal would substantially reduce toxicity, mobility, and volume of groundwater contamination and greatly increase the permanence and long-term effectiveness of the remedy for this highly contaminated groundwater area. With the degree of uncertainty surrounding the question of whether the aquifer would clean up in a reasonable period of time following waste removal, the State believes the more protective approach of removing the major sources of contamination would be the appropriate action.

DEQ also has concerns about the long-term implementation of the Butte Reclamation Evaluation System (BRES) for waste left in place. The reclamation repair component must be aggressively implemented, adequately funded and seek to establish diverse, self-sustaining vegetative covers for this component to remain protective over time.

Again, we thank EPA for consulting with DEQ in developing the ROD. We look forward to working closely with the EPA, responsible parties, Butte-Silver Bow County Government, landowners and the public in Butte in designing and implementing the remedy to help ensure a clean and healthful environment for the citizens of the State, especially those who live or work in Butte.

Sincerely,

Richard H. Opper
Director

Appendix D – BPSOU Potentially Responsible Parties (PRP) List

1. **Atlantic Richfield Company (ARCO)**
   Ms. Robin Bullock
   317 Anaconda Road
   Butte, Montana 59701
   Fax (406) 782-9980
   (406) 782-9964 Ext. 414

   Ms. Pam Sbar, Esq.
   (406) 782-9964 Ext. 414

2. **Central Butte Mining Corporation**
   Mr. Frank C. Crowley, Esq.
   44 West 6th Avenue, Suite 200
   Helena, Montana 59624
   (406) 443-2211

3. **North Butte Mining Corporation**
   Mr. Frank C. Crowley, Esq.
   44 West 6th Avenue, Suite 200
   Helena, Montana 59624
   (406) 443-2211

4. **Tzarina-Travona Mining Corporation**
   Mr. Frank C. Crowley, Esq.
   44 West 6th Avenue, Suite 200
   Helena, Montana 59624
   (406) 443-2211

5. **Mountain Con Mining Corporation/ Mountain Mining Properties, Inc.**
   Ms. Bill O'Leary, Esq.
   Corette, Pohlman & Kebe
   129 West Park Street
   Butte, Montana 59701
   (406) 782-5800

6. **West Butte Metals**
   Ms. Bill O'Leary, Esq.
   Corette, Pohlman & Kebe
   129 West Park Street
   Butte, Montana 59701
   (406) 782-5800

7. **Bluebird Mining Company**
   Ms. Bill O'Leary, Esq.
   Corette, Pohlman & Kebe
   129 West Park Street
   Butte, Montana 59701
   (406) 782-5800

8. **New Butte Mining, Inc.**
   Mr. Frank C. Crowley, Esq
   44 West 6th Avenue, Suite 200
   Helena, Montana 59624
   (406) 443-2211

9. **Mr. Dennis Washington** (in his individual capacity)
   c/o Ms. Becky Summerville
   Datsopoulos, McDonald and Lind
   201 West Main Street
   Missoula, Montana 59802
   (406) 728-0810

10. **Montana Resources, Inc.**
    Mr. Steve Walsh
    600 Shields Avenue
    Butte, Montana 59701
    (406) 723-4081

    Ms. Becky Summerville
    Datsopoulos, McDonald and Lind
    201 West Main Street
    Missoula, Montana 59802
    (406) 728-0810

Appendix D – BPSOU Potentially Responsible Parties (PRP) List – *Continued*

11. **Montana Western Railway Company, Inc. ***
701 ½ Railroad Street
Butte, Montana 59701

Burlington Northern – Santa Fe Railroad has taken back ownership of the property
Mr. Leo Berry
Browning, Kaleczyc, Berry & Hoven, PC
139 Last Chance Gulch
Helena, Montana 59601
(406) 449-6220

12. **Universal Royal Apex Limited**
Mr. William F. Boyd
505 Front Avenue
Coeur d'Alene, Idaho 83814
(208) 667-3511

13. **Union Pacific Railroad Company/Oregon Shortline Railroad Company**
Mr. Ken Welch AVP
Environmental Manager
1416 Dodge Street, Room 930
Omaha, Nebraska 68179

Ms. Nancy Roberts
1416 Dodge Street, Room 930
Omaha, Nebraska 68179

Mr. Leo Berry
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Appendix E

Butte Reclamation Evaluation System (BRES)

Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

March 2006

Prepared for:

U.S. Environmental Protection Agency




Prepared by

CDM
Helena, Montana

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RESPONSE ACTION CONTRACT
FOR REMEDIAL, ENFORCEMENT OVERSIGHT, AND NON-TIME CRITICAL REMOVAL ACTIVITIES AT SITES OF RELEASE OR THREATENED RELEASE OF HAZARDOUS SUBSTANCES IN EPA REGION VIII

U.S. EPA CONTRACT NO. EP-W-05-049

FINAL DRAFT
BUTTE RECLAMATION EVALUATION SYSTEM (BRES)
BUTTE PRIORITY SOILS OPERABLE UNIT
SILVER BOW CREEK/BUTTE AREA NPL SITE
BUTTE, MONTANA

Work Assignment No.: 206-RSBD-0822

March 2006

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Abbreviations and Acronyms

ARARs	applicable or relevant and appropriate requirements
AR	Atlantic Richfield
ARCO	Atlantic Richfield Company
BHRS	Butte Hill Revegetation Specifications
BLM	Bureau of Land Management
BMP	best management practice
BPSOU	Butte Priority Soils Operable Unit
BRES	Butte Reclamation Evaluation System
BSB County	Butte-Silver Bow County
BSBRS	Butte-Silver Bow County Revegetation Standards
CDM	CDM Federal Programs Corporation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act, as amended
CTEC	Citizen's Technical Environmental Committee
COC	contaminant of concern
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
FS	feasibility study
FSPRA	field survey of previously reclaimed areas
FSUA	field survey of unreclaimed areas
GIS	Geographic Information System
GPS	Global Positioning System
LAO	Lower Area One
MDEQ	Montana Department of Environmental Quality
MERDI	Montana Economic Revitalization and Development Institute
mg/kg	milligrams per kilogram
m^2	square meter
NPL	National Priorities List
N-TCRA	non-time critical removal action
OU	operable unit
O&M	operation and maintenance
RAOs	remedial action objectives
RGs	remedial goals
PRP	Potentially Responsible Party
QC	quality control
RASD	response action summary document
RI	reclamation improvement
RI/FS	remedial investigation/feasibility study
ROD	record of decision
RRU	Reclamation Research Unit
SAP	sampling and analysis plan

TCRA	time-critical removal action
UWS	undesirable weedy species
VI	vegetation improvement

Executive Summary

Land reclamation has been, and will continue to be, a vital component of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) response actions implemented at the Butte Priority Soils Operable Unit (BPSOU). Response actions may also involve a variety of engineering applications including storm water controls, caps over mine waste, and waste removals. The Butte Reclamation Evaluation System (BRES) is the result of the U.S. Environmental Protection Agency's (EPA's) recognition of the need for a formalized assessment tool to evaluate the stability, integrity, and continued protection of human health and the environment attained by land reclamation over the long term. As specified in the record of decision (ROD), the BRES (i.e., this document) sets the performance standard that all reclaimed areas in the BPSOU must achieve, the methodology for evaluating these reclaimed areas, and guidelines for corrective actions.

One important response action technology at the BPSOU is the construction of caps over waste areas or contaminated areas. An erosive cap is unstable and impermanent. If the cover soil comprising the cap erodes to a point where waste material is exposed, contaminants of concern (COCs) may be transported off-site by water or wind, and may come into contact with human or environmental receptors on the site. The BRES describes quantifiable evaluation criteria (e.g., vegetation cover, erosional condition, gullies, etc.) that must be achieved and maintained on reclaimed areas to ensure protectiveness. The periodic evaluation of reclaimed sites against the BRES performance standard will direct the appropriate types of corrective actions that may be needed at each site.

The BRES is specifically designed for use in the upland environment in Butte, Montana. To accommodate the diverse land types and end land uses within the BPSOU, the BRES is designed to address reclaimed uplands in residential, recreational, and commercial/industrial land settings. However, residential yards, and playgrounds are specifically excluded from the BRES. The BRES has components that allow it to be applied to areas reclaimed as open space within this urban setting.

During the 2001 field season, EPA, with input from the stakeholder Technical Group, calibrated and validated the Draft BRES (CDM Federal Programs Corporation [CDM]/Reclamation Research Unit [RRU] 2003) so that the system would be ready for use upon issuance of the ROD. This process involved evaluating a select number of sites, identifying the level of training required of field personnel to obtain precise (i.e., reproducible) results, refining methods and procedures, and identifying relevant reclamation performance standards. The BRES Calibration and Validation Report (CDM/RRU 2003) describes that process in detail. Now that it has been validated and calibrated for use on remediated sites at the BPSOU, the BRES provides the means for representatives of EPA, Montana Department of Environmental Quality (MDEQ), the Potentially Responsible Party (PRP) Group, consultants, and others to determine if these lands are being maintained at a level consistent with remedial objectives.

The BRES program described herein meets EPA's goals of having an assessment tool that:

- Emphasizes soil and vegetation parameters critical to maintaining site stability, integrity, and overall protectiveness of the remedy
- Can be easily and quickly applied in the field to evaluate the large number of sites
- Utilizes a minimum amount of equipment
- Is simple to learn by new evaluators
- Provides precise (i.e., reproducible) results when applied by different evaluators

This document describes the overall BRES program, which includes the components of the BRES, how the BRES should be applied in the field, and how the BRES fits into the long-term operation and maintenance, which includes tracking, monitoring, and maintenance of reclaimed sites at the BPSOU.

EPA has identified six preparatory activities that should be completed prior to field evaluation of reclaimed sites using the BRES:

- Finalizing the list of response action sites that will be included in the BRES program
- Obtaining new low-level aerial photographs for use during BRES assessments
- Delineating discrete polygons where appropriate within remediated sites for evaluation under the BRES
- Completing the BRES Field Manual
- Fine tuning the engineered cap integrity checklist/evaluation process based on field experience
- Designing and implementing a data management strategy to ensure accurate and complete tracking of BRES information

Section 1 Overview

1.1 Introduction

In the ROD, EPA specifies that the BRES is a performance standard that reclaimed areas in the BPSOU must achieve. The BRES is an evaluation tool developed to ensure the integrity of most reclaimed lands, including soil cover caps or other forms of engineered caps covering mine-waste material left-in-place. These caps must perform at a level that maintains long-term protection of human health and the environment and otherwise complies with performance standards at the BPSOU.

It is important to understand that the BRES is not an operation and maintenance (O&M) plan. The BRES sets forth the performance standard that reclaimed areas must achieve. The BRES also provides the methodology to guide the evaluation of the reclamation against the performance standard. The periodic evaluation of reclaimed sites against the BRES performance standard will direct the appropriate level of corrective action work that may be needed at each site.

BRES-directed corrective action work may simply be some type of typical O&M, such as vegetation improvements (VI) or repair of actively eroding gullies. However, corrective action may also involve full and complete reclamation of a response action site. This BRES-directed corrective action work differs from more "conventional" O&M (e.g., controlling access, maintenance of fences, weed spraying, litter control, etc.) because the corrective action is directed specifically at maintaining cap integrity. Conventional O&M activities will be outlined in a separate O&M plan.

The BPSOU is one of three remedial OUs identified by EPA within the Butte Area portion of the Silver Bow Creek/Butte Area National Priorities List (NPL) site within and near Butte, Montana. The OU consists of historic mining sites situated entirely within an urban setting, encompassing much of the cities of Butte and Walkerville. Mine waste and mill tailings accumulated from over 100 years of mining are dispersed throughout the OU, posing health risks to human and ecological receptors.

Soon after Butte was named a Superfund site, EPA recognized that arsenic- and lead-contaminated wastes within the populated urban area of Butte presented health risks. As a result, numerous response actions (Non-Time Critical Removal Actions [N-TCRAs] and Time Critical Removal Actions [TCRAs]) were implemented beginning in 1988 and continuing through the Remedial Investigation/Feasibility Study (RI/FS) process leading up to the ROD. Over 400 acres of land within the BPSOU were addressed through response actions prior to the ROD. The RI/FS determined that, in most cases, source controls, capping, and land reclamation techniques used during response actions to address contaminated solid media were consistent with the long-term remedial goals for the site and adopted most of the response actions as a portion of the remedy for contaminated solid media at the BPSOU.

Reclamation in Butte evolved over time as factors controlling reclamation success were better understood and implementation practices improved. Response actions taken for mine-impacted lands within the BPSOU involved a variety of engineering applications, including storm water controls, caps over mine waste, and removals. The remedial investigation report identified 182 mining-related sites that have been impacted by or represent potential sources of arsenic and metal contaminants within the BPSOU (PRP Group 2002). While most of these sites have been addressed under EPA-sanctioned response actions prior to the ROD, cap integrity and vegetation response at the BPSOU have been inconsistent, due in part to the variations in the procedures and practices used by the various entities to reclaim these sites. These entities have included the EPA, Atlantic Richfield (AR), MDEQ, and former state agencies.

Recognizing the need to evaluate the stability, integrity, and degree of protection attained by reclamation, EPA began formally evaluating these lands in 1992. Since then, EPA has conducted land reclamation assessments in Butte, Anaconda, and at a variety of sites throughout the Clark Fork River Basin of Montana. During this period, several soil and vegetation parameters were used to provide data and information regarding the efficacy of reclamation efforts on these mine lands. From this work, EPA recognized the need for a formalized evaluation tool that would allow agency personnel to determine whether sites were meeting the remedial goals and if that trend was likely to continue. EPA requirements for such a tool are that it must:

- Emphasize soil and vegetation parameters critical to maintaining site stability, integrity, and overall protectiveness;
- Be easily and quickly applied in the field due to the large number of sites that need to be evaluated;
- Utilize a minimum amount of equipment;
- Be simple to learn by new evaluators; and
- Provide precise (i.e., reproducible) results when applied by different evaluators.

The BRES is the resulting formalized assessment tool to evaluate the performance standard compliance, stability, integrity, and protectiveness attained by reclamation within the urban upland environment in Butte. The methodology was first proposed in the initial draft BRES document (CDM/RRU 2000) and discussed at a public meeting of interested stakeholders in September 2000. At the meeting, EPA received written comments on the BRES from the MDEQ, AR, Big Butte Biologic Compost, Bighorn Environmental, Butte-Silver Bow (BSB) County, the Citizens Technical Environmental Committee (CTEC), and the Natural Resource Conservation Service. EPA was pleased with the number and quality of constructive stakeholder comments and responded formally to each comment in a document entitled *EPA Responses to Comments Received on the Butte Evaluation System Revision 0 Dated August 15, 2000*

(CDM 2001). Since then, the BRES has been further refined for use with the BPSOU ROD

The BRES is specifically designed for use in Butte. To accommodate the diverse land types and end land use within the BPSOU, the BRES is designed to address residential, recreational, and commercial/industrial land uses. Residential yards and playgrounds are specifically excluded. The system also has components that allow it to be applied to areas reclaimed as open space within the upland urban setting.

1.2 Regulatory, Removal, and Reclamation History

In 1991, EPA developed the Statement of Work for the BPSOU RI/FS (CDM 1991). The RI/FS was separated into two phases: Phase I and Phase II, which were to be implemented concurrently. Phase I tasks focused on mine wastes and contaminated soils within residential areas and in adjacent and upgradient contaminant source areas within the OU where the potential for human health impacts from exposure to contaminants was greatest. Phase II focused on an evaluation of the characteristics and impacts of metals and arsenic contamination on Silver Bow Creek, and on other source materials located outside of residential areas.

In 1994, the Montana Natural Resource Information System produced Map 94ARCO68 that compiled all of the facilities and source areas that had been identified within the BPSOU by EPA, State Agencies, BSB County and other entities comprising the PRP Group. Map 94ARCO68 depicts the reclamation status of the BPSOU (unreclaimed areas and areas where reclamation/removal activities had been completed) through 1993. This map served as the basis for further site characterization and reclamation work during the Phase II BPSOU Remedial Investigation.

In 1996, EPA approved the Final Phase II RI/FS Work Plan and Addendum for the BPSOU (PRP Group 1996a). This document presented a plan to build upon the soil/waste characterization and removal reclamation work that had been compiled on Map 94ARCO68. The goal for the Phase II RI/FS Soil/Mine Waste Investigation was to fully characterize the BPSOU with respect to contaminated soil and waste material. To accomplish this goal, EPA, together with the State and the PRP Group, conducted the field survey of unreclaimed areas (FSUA) and the field survey of previously reclaimed areas (FSPRA).

The FSUA was conducted to complete the site characterization with respect to unreclaimed land within the BPSOU (outside of residential areas) and identify those source areas that exceed arsenic and/or lead removal action levels for removal/reclamation. The FSUA integrated previously-collected analytical data with new analytical data and observations to identify source areas that exceed action level lead and/or arsenic concentrations and areas that may potentially impact surface water quality through erosion and off-site sediment transport.

Previously reclaimed sites were evaluated as part of the FSPRA. The goal of the FSPRA was to evaluate all the facilities/source areas identified as "reclaimed" on Map

94ARCO68 to determine whether these sites were adequately reclaimed for the purposes of final remediation at the BPSOU. The work plan specified that:

- Those facilities/source areas that are adequately reclaimed require only continued short-term O&M at this time.
- Those facilities/source areas that are inadequately reclaimed require additional reclamation prior to reverting to long-term monitoring and corrective action as appropriate.

The FSPRA evaluated previously reclaimed sites in accordance with reclamation protocol described in a document entitled *Field Survey of Previously Reclaimed Areas Site Inspection Protocol* (PRP Group 1996b). This document did not make final remedial action determinations for any site. Final remedial decisions regarding these areas are contained in the ROD. The response action summary document (RASD) and the feasibility study (FS) contained additional evaluation of the reclaimed areas.

Final summary documents for the FSUA and FSPRA were published in 1997 and include:

- Final Field Survey of Unreclaimed Areas Summary Report (CDM 1997)
- Technical Memorandum: Field Survey of Previously Reclaimed Areas (PRP Group 1997a)

The FSUA identified 27 unreclaimed sites with lead concentrations greater than the 2,300 mg/kg non-residential action level, and 32 sites with arsenic concentrations that exceeded the 500 mg/kg commercial action level for arsenic. Three of the sites that exceeded the commercial arsenic action level also exceeded the non-residential lead action level.

The FSPRA evaluated the condition of 95 reclaimed areas in 1996 and 1997. Twenty-nine sites evaluated during the FSPRA were identified as being inadequate with respect to the reclamation protocol and required further reclamation.

With the exception of seven sites slated to be addressed under the Montana Economic Revitalization and Development Institute (MERDI) Program, the PRP Group reclaimed all the sites that were identified in the FSUA with lead concentrations above 2,300 mg/kg and the previously reclaimed sites identified for additional reclamation during the FSPRA. This work was conducted under the two EPA-approved Response Action Work Plan Addenda for the Previously Reclaimed Areas Operation and Maintenance (PRP Group 1997b) and the 1997 Unreclaimed Areas (PRP Group 1997c). Reclamation was performed in accordance with the EPA-approved Butte Hill Revegetation Specifications (BHRS). Sites identified during the FSUA with arsenic concentrations above the arsenic action level (residential - 250 mg/kg; commercial - 500 mg/kg; and recreational [open space] - 1,000 mg/kg) may

be removed or reclaimed as part of future response actions. Techniques and methods used to address these sites were evaluated in the FS.

1.3 Function of Butte Reclamation Evaluation System

This section describes the function of the BRES within the CERCLA regulatory framework set forth by EPA for the BPSOU. Other key components of the CERCLA process, with respect to the BPSOU, are also discussed.

Appendix A provides a flow chart that depicts the regulatory logic by which mine-impacted lands within the BPSOU were addressed prior to the ROD, and how performance standards set by the BRES will be used to maintain reclaimed sites after the ROD. This section further describes how response action sites within the BPSOU will be evaluated by the BRES to ensure that they are maintained at a level that will remain protective and otherwise comply with performance standards over the long-term.

1.3.1 The BRES Tool

The BRES is a tool that establishes detailed performance standards and the methodology used to evaluate the stability, integrity, and degree of human and environmental protectiveness afforded by EPA-sanctioned response actions implemented on lands impacted by mining within the BPSOU. The BRES will be used to continuously evaluate and maintain reclaimed and revegetated sites in perpetuity. Results from the application of the BRES will be used to trigger corrective actions that ensure the response actions are appropriately maintained.

1.3.2 Evaluation of Reclaimed and Unreclaimed Lands

As described in Section 1.1, the FSUA was implemented as part of the Phase II Remedial Investigation to identify and characterize all unreclaimed mine-impacted land within the BPSOU, and the FSPRA was implemented to evaluate all previously reclaimed land within the BPSOU. Unreclaimed sites that were identified in the FSUA with lead concentrations above the remedial goal (RG) of 2,300 mg/kg (excluding the MERDI properties), and previously reclaimed sites identified for additional reclamation during the FSPRA, were subsequently reclaimed in accordance with the BHRS. As a result of this process, all mine-impacted lands identified in the two documents within the BPSOU fall into one of the following three categories:

1. Current reclamation deemed protective for the short-term. Sites are designated for long-term monitoring and corrective action, as appropriate.

2. Unreclaimed site with lead concentration below the PRG (2,300 mg/kg). Sites in this category may exceed the arsenic removal action level and may contain elevated concentrations of other contaminants of concern (e.g., copper and zinc that may adversely impact surface water quality).

3. The site is one of seven MERDI properties.

The MERDI properties are slated for urban development under the MERDI program. Plans for the MERDI properties will be evaluated by EPA to ensure that these sites are developed in a fashion that complies with ARARs and provides for the long-term protection of human health and the environment.

Sites falling into categories 1 and 2 were evaluated in the RASD and the feasibility study (FS) to direct the selection of the final remedy for these sites in the ROD. The regulatory functions of the RASD, FS, ROD, and the BRES, in the context of mine-impacted lands at the BPSOU, are briefly described below.

1.3.3 Schedule

This Final BRES document describes the basis for the BRES and incorporates changes to the BRES methodologies based on stakeholder comments and the 2001 calibration and validation work conducted by the Technical Group. (This work is fully described in the Calibration and Validation Report [CDM/RRU 2003]). The final portion in the development of the BRES will be the preparation of a field manual for use by the field team during BRES evaluations. The BRES Field Manual will be developed after the finalization of the ROD and will be appended to this BRES document. Polygon delineation at BPSOU response action sites and database development (discussed in later sections) should commence immediately following the completion of the ROD.

Section 2 Goals, Objectives, and Standards

2.1 BRES Goals and Objectives

The BRES is identified in the ROD as the program used to evaluate the integrity of all reclaimed land, soil cover caps, or other forms of engineered caps covering mine-waste material left-in-place at the BPSOU. This system establishes evaluation procedures for performance standards to direct the long-term monitoring and corrective action of response actions to which it applies. The BRES will ensure that response actions and future remedial actions are maintained at a level that provides for the continuous protection of human health and the environment and compliance with ARARs.

EPA's goal is to have a reclamation evaluation procedure that can quickly, consistently, and cost-effectively identify areas of current or imminent reclamation failure, and determine what specific actions are required to remediate those areas to acceptable condition. Several attempts have been made by various entities to establish reclamation performance standards and a methodology to evaluate response action sites at the BPSOU, including draft versions of the BRES. After consideration of comments on previous drafts and evaluation of on-the-ground experience, the BRES is EPA's final determination regarding a necessary and appropriate evaluation system.

The BRES is designed to facilitate the collection of precise (repeatable) information by persons with experience in ecological and soil erosion assessment techniques. The system enables the assessors to quickly collect information that describes post-reclamation conditions with a minimal amount of field equipment. The BRES includes a field training program and a field manual with example photographs to guide the field crew. The system also incorporates historic site data into the decision-making process.

2.2 Stakeholder Involvement

EPA realized during the initial meetings with the BSPOU stakeholders that their involvement and input during the development of the BRES was important and useful. During BRES development, stakeholder representatives from BSB County, ARCO, MDEQ, CTEC, and EPA were involved at two levels: technical and management. During this period, which included the calibration and validation process, the Technical Group identified evaluation parameters and developed site assessment methodologies while the Management Group provided guidance by establishing overarching objectives and considerations.

2.3 Data Quality Objectives

The data quality objective (DQO) process (EPA 2000) describes EPA's policy for describing project decisions, the data quality required to support those decisions, specific data types needed, data collection requirements, and analytical techniques

necessary to generate the specified data quality. The process also ensures that the resources required to generate the data are justified. Using the DQO process consists of seven steps. The use of DQOs in the development of the BRES is discussed below.

Step 1: State the Problem

The purpose of this step is to describe the problem to be studied so that the focus of the study will be unambiguous.

Many mine waste areas containing elevated concentrations of contaminants of concern (COCs) have been addressed "in-place" at the BPSOU through response actions involving land reclamation techniques using coversoil caps and revegetation. These actions have been designed to cap and stabilize COCs such that they no longer pose threats to human health or the environment. At these sites, vegetated and engineered cap integrity is critical to ensuring waste does not become exposed. Monitoring and corrective action, as appropriate, of reclaimed areas at the BPSOU is required to ensure healthy stands of vegetation and to maintain the integrity of soil caps in perpetuity (EPA 1999b). Proactive monitoring of these areas and conducting the appropriate level of corrective action will therefore be required. With these issues in mind, EPA developed the BRES in conjunction with the stakeholder groups to address several problems related to these needs.

For this project, the planning for developing the BRES tool was conducted by EPA, the decision makers for the BPSOU, with support from their contractors, CDM and the RRU. Stakeholder input was received from BSB County, ARCO, MDEQ, and CTEC. These stakeholders will play vital roles for the use of the BRES, which includes future implementation, technical support, citizen advisory, funding, and agency oversight of the BRES.

This Final BRES was completed for incorporation into the ROD. However, certain specific components of the BRES (e.g., polygon delineation) will be developed and/or refined after the ROD as part of the remedial design activities at the BPSOU.

Step 2: Identify the Decision
The principal study question and the alternative actions are listed below.

Principal Study Question	Alternative Actions
Does the initial version of the BRES meet its intended goal to provide an objective and precise method for evaluating the long-term protectiveness of response actions at the BPSOU?	1. Recommend the use of the BRES without modification. 2. Work with the stakeholders to modify the BRES such that it meets the objective.

In working with the stakeholders during the initial phase of the BRES development, it was determined that the initial draft BRES methodology (CDM/RRU 2000) did not

meet the intended goal, but could with appropriate modification. The stakeholders identified important questions that, once answered, would allow the BRES to meet the intended goal; these included:

- Were any changes needed to the list of BRES parameters?
- What methodology should be used to evaluate each parameter?
- How precise do field estimates need to be?
- What parameters were identified as trigger items (see below) and what metrics should be used to trigger additional response action?
- If action is recommended, what type of action will be required to bring the site up to an acceptable level?
- Should response action sites be evaluated as one unit or are there compelling reasons to divide sites up to better understand conditions and the need for additional action?
- What, if any, historical data or other information is available for a particular response action site that might make the decision-making process more efficient and thorough?

Step 3: Identify the Inputs to the Decision

Information and data required to answer the above questions include the following:

- Percent live cover data for desirable species, undesirable weedy species (UWS), noxious weeds, litter, and rocks greater than two inches on a site
- Identification of desirable species and weedy species that are dominant, frequent, and infrequent
- Identification of a precise erosion evaluation methodology (modified Bureau of Land Management [BLM] procedure with seven variables to score was used)
- Identification of a precise cover estimation methodology (an ocular technique was used in conjunction with quantitative point measurement verification to improve visual cover estimates and meet the precision goal)
- Identification of exposed mine waste (or the potential for waste to become exposed), site edge problems, bulk soil failure, land slumps, subsidence, barren areas, and/or gullies

To improve the precision (or repeatability) of BRES estimates, it is necessary to divide response action areas into smaller land units, called polygons. This will be accomplished by assessing the variability of vegetation cover, erosion, size and degree of barren areas, and land forms and land use throughout the response action site. The overall size of the response action site and the potential size of polygons were also evaluated (see Step 5 for a discussion on the metrics used to determine when polygon delineation is appropriate).

From the information variables listed above, maintenance action triggers were identified. Triggers are specific parameters and their associated metrics (see Step 5). Polygon-based trigger parameters are vegetation and erosion. These parameters are evaluated for the polygon as a whole. Localized trigger parameters, which initiate an action if they are observed anywhere in the polygon, are site edge problems, exposed waste material, bulk soil failure or mass instability, barren areas, or the presence of gullies. If a trigger is identified, the BRES logic diagrams for that trigger item (Appendix C) form the basis for decisions about required data or corrective action. When additional quantitative environmental data are required, the PRP Group will submit a site-specific sampling and analysis plan (SAP) to EPA.

Step 4: Define the Study Boundaries

The spatial boundaries of the BRES program encompass the upland BPSOU areas that have undergone response actions. The Geographic Information System (GIS) will serve as the tracking mechanism for the boundaries of the individual BRES sites. These boundaries were defined by a stakeholder group effort and will remain fixed unless site boundaries are changed as a result of the ROD or remedial design. Each response action area will be evaluated in terms of the need to delineate polygons. Polygon boundary delineation will occur over several years (i.e., it will take several years because of the large number of sites) and the boundaries will remain fixed; however, boundaries can be changed after two full BRES evaluation periods (i.e., after eight years). Boundary alteration is discussed in Section 4.1.3. It is recommended that site evaluations occur between mid-late June and early August.

Step 5: Develop a Decision Rule

The primary BRES decision rule involves determining whether a response action site requires corrective action. During the 2001 calibration and validation process, EPA and the other stakeholders customized the BRES so that this decision could be made with known accuracy and precision. This step of the DQOs identifies and discusses:

1. Parameters that were developed to characterize response action sites in terms of meeting human health and environmental risk objectives and performance standards

2. Metrics ("action levels" in DQO parlance) used for each parameter that collectively go into the corrective action decision

3. Accuracy and precision in making parameter estimations and corrective action decisions

The BRES parameters and their associated metrics were refined by the stakeholders in the field during the 2001 calibration and validation process. All potentially useful parameters were evaluated during this process and many different metrics were used before the stakeholders felt the system was calibrated and would provide accurate and precise information for use in making corrective action decisions. See Section 7

and the Calibration and Validation Report (CDM/RRU 2003) for more detailed discussion on this process.

The parameters deemed appropriate by EPA and the stakeholders during the development of the BRES are vegetation cover, erosion, the presence of gullies or exposed waste material, the condition of site edges, and the existence of barren areas (see BRES field evaluation form [Appendix D]). The BRES evaluation contains decision diagrams (Appendix C) to help evaluators determine what additional data are required or what corrective action should be taken for a particular site. The diagrams apply decision rules for the key parameters (i.e., the trigger items); these are briefly discussed below and detailed discussions are provided in Section 7.

Vegetation Cover
In accordance with the Strip and Underground Mine Reclamation Act, SS 82-4-201 through 82-4-254, MCA, the BRES must ensure that vegetated cover soil caps and other reclaimed lands within the BPSOU support a diverse plant community including native species to the extent that the constituents of the vegetation cover are not incompatible with the performance of the remedy.

1. For polygons that fall in the lowest live vegetation cover category (less than 21 percent), the technical recommendation is that the site undergo either vegetation or reclamation improvement (VI or RI). If a site undergoes VI, and then falls into the less than 21 percent live cover category again during the next BRES evaluation, the polygon is then required to undergo RI in order to meet the BHRS.

2. For polygons that fall into the middle live vegetation cover category (21-40 percent), UWS are considered. If greater than 10 percent of the polygon is covered by UWS, then a recommendation will be made that VI be implemented on the polygon. If less than 10 percent of the area of the polygon is covered by UWS, then the polygon should undergo a regularly-scheduled BRES evaluation in four years.

3. Polygons that fall into the upper vegetation cover category (41-100 percent) should be re-evaluated in four years.

Erosion
If the erosion evaluation score is 55 or less, no immediate action is required and the polygon will continue on the regular BRES evaluation schedule of every four years. A score of greater than 55 triggers a recommendation for corrective action. The need for an engineering assessment and O&M plan are discussed in Section 7.

Gullies
If a gully exists within a polygon, it should be noted on the field evaluation form whether the gully is actively eroding or healing. If the gully is healing as defined by the BRES, no immediate action is required and the polygon will continue on the regular BRES evaluation schedule of every four years. Action is recommended for actively eroding gullies. The engineering assessment, corrective action plan, construction schedule, and further evaluations are discussed in Section 7

Exposed Waste Material
If there is exposed waste on a site, it triggers a recommendation for action. Signs of bulk soil failure or land slumps also trigger a recommendation for action. An engineering assessment should be performed on these areas to determine the appropriate type of corrective action needed to repair the cap.

Site Edges
The site edge trigger parameter is primarily for monitoring purposes, except when gullies or exposed waste materials are present. As previously described, for these circumstances, the recommendation is for corrective action to repair the gully, and for removal or covering of exposed waste material. If neither gullies nor exposed waste exist, yet a significant difference is identified between the site edge and the site interior, then the area should be tracked in the GIS and O&M databases for future trend analysis to determine whether site edge condition is improving or declining. These sites should undergo a regularly-scheduled BRES evaluation in four years, which must include the entire polygon, not just the barren areas.

Barren Areas
If barren area(s) are located within a polygon, but cover less than 25 percent of the polygon, a VI plan and/or a RI plan must be developed to repair only the barren area(s). If a VI plan is implemented and the next BRES evaluation at the site indicates that the VI actions failed, the barren area(s) must be addressed according to the BHRS. If barren area(s) cover 25 percent or more of a polygon, the same decision logic is used, except that the VI plan and/or RI plan must include the entire polygon, not just the barren area(s). If a VI plan is implemented and the next BRES evaluation indicates that the VI actions fail, a RI plan must be developed and approved and the entire polygon must then be brought up to the BHRS.

Under each of the above circumstances, corrective action work must be completed within a calendar year of the BRES evaluation and the polygon should then undergo a full BRES evaluation three years following completion of the corrective action work (e.g., four years after the initial BRES assessment).

Step 6: Specify Tolerable Limits on Decision Errors
General sources of potential errors in using the BRES involve the inexperience of novice field crew members. These types of errors will be brought within tolerable limits by 1) selecting crew members with experience with this type of environmental assessment, and 2) conducting an annual training program on all aspects of the BRES. Decision errors that can occur during the collection of cover and erosion data are recognized, and procedures are therefore built into to BRES to meet tolerable limits for these types of data. The method of training field crews to estimate cover and the selection of cover classes (e.g., 21-39 percent live vegetation cover) were chosen to hold decision errors within tolerable limits. During training sessions, the field crew's ability to precisely estimate cover is repeatedly tested by comparing visual estimates to quantitative measures of cover. Once field crew members can repeatedly estimate

vegetation cover to within ±10 percent of the measured value, the tolerable limit has been met and the vegetation portion of the training is complete.

During the initial erosional condition training session field crew members will calibrate themselves by scoring erosional condition on different BRES polygons using the BRES Erosion Condition Class Determination guidelines (BLM 1981), and then comparing individual scores with one another. Once the field crew can reliably rank erosional condition within ±10 percent of the group mean, the tolerable limit for erosion estimating has been met and the erosion evaluation portion of the training is considered complete.

Step 7: Optimize the Design
The BRES procedure described in the initial BRES document (CDM/RRU 2000) was optimized during the 2001 field calibration and validation work. System design was optimized to increase field worker efficiency in pre-assessment preparation, field data collection precision, and decision making logic. Training sessions to optimize the precision of field crew members are necessary. Pre-assessment preparation supplies field personnel with available GIS information pertinent to the field survey, including an aerial photograph with site boundaries highlighted. The field form includes spaces for pertinent data, which is quick and easy to collect. The BRES includes a field manual that summarizes the BRES methodology so that it is easy to use in the field. To the extent possible, data should be collected and stored electronically in the field to minimize post-field data entry. The decision logic diagrams clearly indicate actions required at sites found to require corrective action.

Further refinement of the BRES design will occur as polygon delineation is completed and the database is developed.

2.4 Criteria, Standards, and Goals

Existing criteria, standards, and goals were incorporated into the design of the BRES. The BRES was built around RAOs for contaminated solid media and RGs (as described in the final ROD), as well as the BHRSs (Appendix B), the Butte-Silver Bow County Revegetation Standards (BSBRS) (BSB 1995a, b; BSB 1996), and reclamation and revegetation ARARs.

2.5 Summary of BRES Calibration/Validation Activities

BPSOU stakeholders were involved in the 2001 field BRES calibration and validation effort at two levels, the technical level and the management level. Both groups provided input into the calibration and validation process.

Two overarching goals were identified for the calibration and validation field season. These were to: (1) develop a system that can accommodate the environmental variability within sites and adequately describe (to management) the conditions at a site, and (2) formalize the decision-making process in terms of the recommended maintenance of vegetated caps. The Technical Group worked interactively during 2001 to verify the BRES evaluation parameters in the Draft BRES document and to calibrate and validate the evaluation techniques so that the system could achieve

EPA's goal of having a cost-effective procedure that would yield accurate and reproducible results. The Technical Group agreed that ultimately the BRES must be a tool for managers and decision makers to ensure the long-term integrity of reclaimed sites within the BPSOU. To meet these overall goals, the Technical Group's tasks for the 2001 BRES calibration and validation program were to:

- Select a set of reclaimed sites to test the Draft BRES. These sites included the full range of land types and reclamation conditions present at the BPSOU.
- Verify the efficacy of evaluation parameters in the Draft BRES document and either add or delete parameters.
- Resolve technical, managerial, training and implementation issues through interactive dialog among Technical Group members and build consensus on all issues to the extent possible.
- Ensure that the Final BRES would have a consistent decision logic to make technical recommendations for either repairing problem sites or monitoring potential problem sites.

The general approach to the calibration and validation process was to continue to test and refine the Draft BRES in an iterative manner until the Technical Group was satisfied that the system was ready for use at the BPSOU.

During the calibration and validation field season, the Technical Group visited 13 sites that were representative of the complexity found the BPSOU. Evaluations were performed at these sites as a means to develop and finalize the BRES field form and decision logic for technical recommendations for site corrective action. Specific decision diagrams were created for each of the parameters evaluated in the BRES and a time frame for evaluations and cap repairs was established. At the end of the summer, the Technical Group presented a new draft of the BRES to the Management Group in a series of three meetings and presentations. The Technical Group received suggestions and recommendations for the Management Group and altered parts of the system based on these recommendations; these revisions are included in this final BRES document.

Section 3 Process and Schedule

This section outlines the management of the BRES program and the annual and long-term schedule for the BRES process.

3.1 Management and Administration

Figure 3-1 depicts the BRES management and administration organization structure. The BRES Administrator from the PRP Group will direct the field evaluators and oversee BRES-related data storage issues and maintenance construction. This individual will be advised by and report to the Technical Group, whom will report directly the Management Group. EPA, as the lead agency, and MDEQ, as the support agency, will oversee the BRES program.

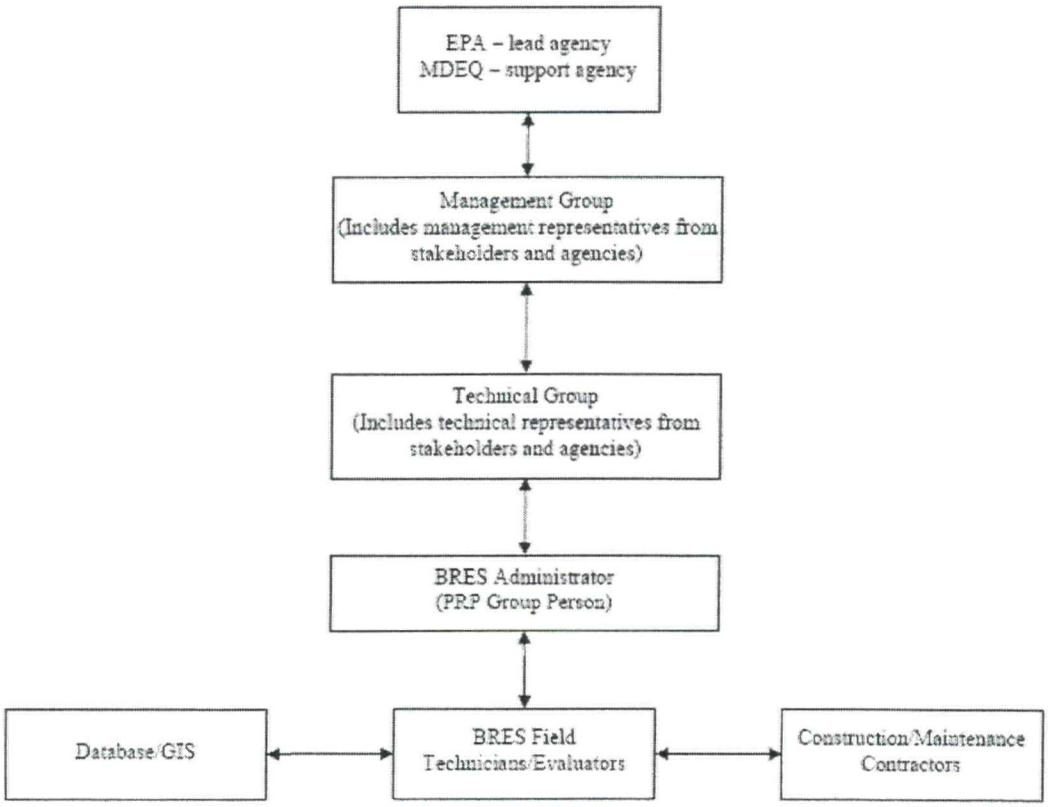

Figure 3-1
BRES Management and Administration

3.2 Timing and Overview

The first year of BRES implementation will follow the ROD. Polygons must be delineated for sites prior to BRES implementation. The summer following polygon delineation will become Year 1 for the BRES process. Annual BRES events are described below. The BRES process will continue indefinitely, unless another program for assessing reclamation is developed by EPA.

3.2.1 Annual Timetable for BRES

The annual BRES process is documented in the Annual BRES Process Flowchart (Appendix E). The BRES Administrator, on behalf of the PRP Group, shall be responsible for meeting reporting deadlines and ensuring that field data are collected, reported, and tracked in the O&M database in a timely manner.

Pre-field assessment preparation should take place in the spring of each year. For the individual sites scheduled for BRES evaluation during the upcoming summer, the administrator should organize reports containing pertinent site information and aerial photographs from the O&M database and GIS. Details about this task are presented below. After pre-field-assessment preparation, the field training session should begin (described below).

Field evaluations will follow the one- to two-week training period. Data may be entered into the BRES database during collection or at the end of the field season. After the field evaluations, the administrator will complete a report of technical recommendations, based on the BRES results and the corresponding BRES decision logic.

The Management Group, which is composed of management representatives of the BPSOU stakeholders, will review the report of technical recommendations and develop a set of management directives, based on recommendations and pertinent modifying criteria. EPA, in consultation with MDEQ, will adopt or modify these recommendations. The final directives will instruct the PRP Group regarding the corrective action work that should be done within the calendar year of the site field evaluations. Based on the final directives, the PRP Group shall develop site-specific O&M corrective action plans. If BRES logic directs further sampling or assessment of sites in order to make a corrective action decision, the PRP Group should notify EPA of sampling or additional assessment activities in time for EPA to review and approve the SAP and provide oversight.

Documentation will be maintained on a site-specific basis. This documentation includes historic data, corrective action reports, and SAPs. Separate files will allow the BRES Administrator and others to track the data, assessment results, and corrective action measures for each site.

The EPA will review and approve the site-specific BRES O&M corrective action plans, with or without modifications, before the spring of the year. Once a plan is approved

by EPA, corrective action work may begin. Corrective action work must be completed within a calendar year of the date of the original BRES field evaluation.

3.2.2 Long-Term Schedule

Because of the large number of response action sites in the BPSOU, BRES evaluations will take place in four-year cycles. Preliminary indications are that there may be approximately 150 BPSOU sites where it may be appropriate to use the BRES. At the outset of the remedial design/remedial action (RD/RA) activities at the BPSOU, the initial list of BRES sites will be developed by EPA in consultation with Montana DEQ and other BPSOU stakeholders. Some of these sites may have only a small portion of reclaimed ground because they have been paved or have had a structure built on them. Site review, and reconnaissance if necessary, should be conducted for all sites to determine the appropriateness of using the BRES.

In addition, unreclaimed sites (i.e., Category 2 and 3 sites described in Section 1.3.2) may be addressed by future RD/RA activities if action levels are exceeded or if they are found to be a source of COCs to surface water (via the Surface Water Management Program). These sites will need to be incorporated into the site list for periodic BRES evaluation after capping or removal actions for these sites are completed.

The large number of sites necessitates dividing them into groups and staggering the BRES evaluations and corrective action activities over a four-year period. A four-year cycle was chosen for two reasons:

- The decision logic for the BRES states that after corrective action work is done on a BRES polygon, that polygon should be evaluated with the BRES three full growing seasons after the corrective action work is completed; a four-year cycle provides the correct timing between the corrective action activities and the recurrent BRES evaluations.

- The division of BRES sites into four groups allows adequate time for pre-assessment preparation and field evaluations during the peak standing biomass period of the growing season. A shorter cycle might not allow enough time to perform evaluations on the number of sites to be completed in a year, and a longer cycle would not provide correct timing between BRES evaluations, as articulated in the BRES decision logic.

All sites in the same group will be evaluated during the same year. Groups should not be split once they are created because of the complications that would arise in BRES scheduling and site tracking. The long-term schedule for the BRES is presented in Table 3-1.

	Summer Following ROD	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
BRES Site Evaluations	Polygon delineation	Group A	Group B	Group C	Group D	Group A	Group B	Group C	Group D	
Corrective Action, if necessary			Group A	Group B	Group C	Group D	Group A	Group B	Group C	Group D
Polygon Boundary Re-evaluation										All Groups

Table 3-1
Long-Term BRES Schedule

Polygon delineation will be completed for all sites prior to the first year of the BRES cycle. Once polygons are delineated at sites, they will remain fixed until the official review period in Year 9 of the BRES process. Re-evaluation of polygons in Year 9 allows two full BRES cycles to occur before polygon boundaries are re-evaluated. The logic behind polygon delineation, including the timing of polygon boundary review, is detailed in Section 4.

3.3 Field Crew Training

The BRES Administrator will lead a mandatory one- to two-week field crew training session prior to each field evaluation season. A field manual will be designed and provided to the field crew as a training guide and to assist them with the field evaluation process. Field crew members will also receive software and data management training as needed.

During the training session, field crew members will make quantitative measurements and visual estimates of vegetation and erosional parameters to calibrate themselves to make reproducible estimates of vegetation cover and erosional assessments in the field. Field crew members will also be trained to identify trigger items and correctly record the appropriate information on the field form.

3.3.1 Vegetation

The field crew will be trained to visually estimate vegetation cover on BRES polygons by using a modified point intercept method. The crew will visit several polygons that include a range in percent vegetation cover values. It is recommended that modified point intercept frames of 0.25 square meters (m^2) be used to quantitatively measure cover. The recommended method consists of laser pointers used in conjunction with a grid of 10 points on a frame. The type of material intercepted by the lasers is recorded and used to determine percent live plant cover, litter, rocks, and bare ground. The frames should be placed using a random method that places the frames over an area large enough to represent variability at the site. If the recommended method is not used, EPA requires that an equivalent method be approved by EPA prior to use.

The number of frames necessary to characterize a polygon changes with the variability among frame placements. If the variability is large, more frames are necessary; when the variability is small, fewer frames are needed to adequately characterize the site mean. The following equation (Bonham 1989) may be used to determine sample adequacy for a two-sided confidence interval.

$$n = t^2 s^2 / (K)^2$$

where:

- n = number of observations needed to obtain an estimate of the true mean within a defined range (e.g. within 10 percent of the true mean)
- t = value selected from t-distribution table
- s^2 = the sample variance
- K = the proportion that includes the difference of the sample mean from the population mean (e.g. within 10 percent of the true mean). K was set for BRES purposes at 10 percent.

Results of the summer 2001 calibration and validation period (CDM/RRU 2003) indicate that between 30 and 50 frames should be placed at a site, depending on variability within a site (polygon).

After an adequate number of frames are placed and the ground cover measured, the field crew should begin to calibrate themselves to the different percentages of cover. The field crew's experience should be tested by making a visual estimate of cover on an area, then quantitatively measuring cover on the same area. Once the field crew can reliably estimate vegetation cover to within ±10 percent, the vegetation portion of the training is complete.

3.3.2 Erosion

The field crew will be trained in erosion evaluation using a modification of the BLM erosion evaluation method (BLM 1981). The Calibration and Validation Report (CDM/RRU 2003) explains how the BLM method was customized for use in the BRES. After the initial erosional condition training session, field crew members will calibrate themselves by evaluating several sites that vary in erosional condition. The field crew experience will be tested by scoring erosional condition on different BRES polygons using the BRES Erosion Condition Class Determination guidelines, and then comparing their scores with one another. Once the field crew can reliably rank erosional conditions within ±10 percent of the group mean, the erosion evaluation portion of the training will be complete.

3.3.3 Trigger Items

The field crew will be trained to identify trigger items (see Section 3.4.1) and record appropriate information on the field form. The field crew's experience will be tested

during the training session by evaluating an area and then comparing evaluations within the group. If there are discrepancies in trigger item identification, the field crew members and the trainer will discuss these discrepancies, referring to the BRES Field Manual when necessary. Training will be complete when the field crew consistently identifies trigger items.

3.4 BRES Field Manual

As previously discussed, a field manual will be developed to outline training activities. The BRES Field Manual will provide instructions for proper completion of BRES field forms. The following topics will be covered in the BRES field manual:

- Preparation of necessary pre-assessment materials
- Instructions for filling out field forms
- Specific instructions on how to visually estimate ground cover and erosional condition
- Definitions and descriptions of trigger items and other pertinent information associated with each trigger item
- Methods of quality control (QC) on field observations

In addition to field evaluation instructions, the BRES Field Manual will include photographs representing different ground cover values for live cover as well as examples of varying degrees of erosional characteristics.

3.5 Field Evaluations

BRES field evaluations will be performed by scientists experienced with the assessment of vegetation and erosional parameters, and who are trained as described above. The BRES was specifically designed for sites where the response action left mine waste in-place. At these sites, vegetated and engineered cap integrity is critical to ensuring waste does not become exposed. Field evaluations will be completed on all sites designated for the BRES in accordance with a four-year cyclical schedule.

3.5.1 Upland Vegetation Caps

An erosive cap is unstable and impermanent. If the cover soil comprising the cap erodes to a point where waste material is exposed, COCs may be transported off-site by water or wind, and may come into contact with human or environmental receptors on the site. The vegetation growing in cover soil overlying waste left-in-place serves several purposes critical to the stability and permanence of the protective cap. First, plants stabilize the soil by minimizing water and/or wind erosion. Second, plant foliage provides a greater surface area than bare ground for rainwater evaporation. Third, plants transpire soil water during carbon assimilation. Both of the latter processes minimize infiltration of surface water to the waste material beneath the cap surface. Standing or fallen dead plant material can reduce wind and water erosion and provide an evaporative surface for rain and storm water; however, excessive

plant litter accumulation can retard evaporation and thereby enhance infiltration. In general however, plants and dead plant material act in several ways to minimize surface water percolation and the transport of COCs off-site and to groundwater. Therefore, erosional stability as determined in part by vegetation cover, is critical to a determination of the functionality and permanence of a response action at the BPSOU.

Specific characteristics of a site help identify both localized and polygon-specific cap integrity or stability problems. In the BRES, these characteristics are referred to as trigger items and serve to identify areas of current or imminent cap failures that may cause human health risk because of site conditions. Trigger items of the BRES field evaluation form include:

- Less than 21 percent live cover by desirable species
- Greater than 65 for total erosion evaluation score
- Significant difference between site edges and interiors
- Exposed waste material
- Bulk soil failure, land slumps, or subsidence
- Barren areas
- Gullies

Each of these trigger items is explained in detail in Section 6.

3.5.2 Engineered Cap Evaluation

Engineered caps are constructed using standard engineering materials, as compared to coversoil caps, which are constructed using only cover soil and vegetation. Engineered caps include rip-rap, rock covers, concrete, shotcrete, asphalt, and dirt parking lots or trails. Because engineered caps function as a barrier in areas to which the public has access, it is critical that they remain protective and functional.

A checklist for engineered cap integrity has been developed for use by BRES field evaluators (Appendix F). This checklist will be used during site evaluations when engineered caps are present. Information on this checklist will be entered into the BRES database.

3.5.3 Residential Yards and Playgrounds

The BRES evaluation does not include residential yards or playgrounds. Response actions on these areas are covered in the Butte-Silver Bow County Residential Lead Abatement Program.

3.5.4 Riparian Area Evaluation

The BRES does not include the evaluation of riparian areas; these exist along Silver Bow Creek, and Blacktail Creek within the BPSOU. Only response actions completed

in the upland areas of the BPSOU are included in the BRES. If deemed necessary by EPA, a response action decision tool will be developed for these areas. Montana State University's Riparian Evaluation System, which was developed for use on the Clark Fork River, could be modified for use in riparian areas at the BPSOU.

3.6 Annual Maintenance Evaluation

Butte-Silver Bow County personnel currently perform annual maintenance evaluations on BPSOU response action sites. These maintenance evaluations are different from the BRES evaluations. Maintenance evaluations ensure that sites are safe and remain well-maintained by evaluating the following parameters:

- Weeds
- Security
- Debris
- Fire potential
- Adjacent areas
- Signs and fences
- Drainage ditches
- Run-on
- Other

To improve efficiencies, EPA and the PRP Group have discussed conducting maintenance evaluations and the BRES evaluations at the same time for those sites that are scheduled for both. However, until this approach is agreed upon, these evaluations will be conducted separately.

Section 4 Polygon Delineation and Use

Prior to implementation of the four-year BRES cycle, polygon delineation must be completed. This procedure is described in this section.

4.1 Polygons

Because a variety of land units may lie within the same politically bounded site, it would be impossible to assign a meaningful score to the site as a whole. Thus, to improve the precision (or repeatability) of BRES estimates, sites will be divided into smaller land units based upon factors such as vegetation homogeneity, slope angle and aspect, and land type, which might include residential lawns, parking lots, open space, and driveways. These smaller units will reduce within-polygon variability with respect to BRES parameters and thereby increase scoring precision. For example, polygon lines would separate a lawn from a reclaimed grassland area or dirt parking lot. A site that has been reclaimed with rangeland vegetation but has differences in aspect or slope may also be subdivided into polygons because these differences can control site vegetation and erosional characteristics.

Using polygons, the average score within a polygon will describe the actual conditions more precisely than it would if the parameter had a large range. For example, if the vegetation cover in a polygon ranges between 30 and 45 percent, an average reported value of 37.5 percent would describe that stand of vegetation in a way that is useful and interpretable by site managers. Conversely, if the vegetation cover at a site ranges between 10 and 75 percent in different areas, an average value of 42.5 percent does not describe the site in a useful manner.

A larger range in potentially measured values will result in a larger range in the estimated values among observers. If the vegetation cover ranges between 10 and 75 percent at a site, one observer might focus their attention on the parts of the site with less cover while another observer focuses on an area with greater cover. Both observers would have assigned the site vegetation cover a number that they thought was representative. However, these estimates are different because of the wide range of potential conditions to measure. This inconsistency decreases the usefulness of the data for the decision makers. Polygons block the land into more internally homogeneous units and thus increase the repeatability of estimates made for each of the parameters. This increase in repeatability has been observed by researchers working with similar evaluation systems and other statistically based sampling techniques like stratification (BLM 1981); (Hansen 1995); (CDM/RRU 1999); (BLM 2000).

4.1.1 Polygon Delineation Process

Polygon delineation will occur once every nine years. After two full BRES cycles, polygon lines will be re-evaluated and altered if needed. Initial polygon delineation will occur upon completion of the ROD as an Agency-led project with PRP Group interaction. Logistically, polygons will be delineated in two steps. First, aerial

photographs will be reviewed in the office to pinpoint specific areas within a site that might differ from each other with respect to land use, erosional characteristics, and/or vegetation cover. Using GIS software, tentative polygon lines will be drawn on the aerial photograph and the preliminary site map will be printed for field use. The preliminary polygon lines are tentative indicators to the field crew about potentially different areas within a site. Aerial photographs are limited because they are a snapshot in time of a dynamic system. Nonetheless, they are an essential preparatory step in polygon delineation. The field crew should also review post-response action information (e.g., as-built drawings) for each site and any other previously collected information. This information/data will support or refute observations in the field and direct the polygon delineation process.

Following the office preparation phase, field crew members will visit each site, bringing with them all preliminary materials. They should walk over the entire area and note differences in land use, vegetation, erosional characteristics, existence of barren areas, and the size of the affected areas. If site conditions differ from aerial photographs, these differences should be noted on the printed aerial photographs. Upon completion of the site reconnaissance, polygon lines will be mapped using a resource-grade GPS with sub-meter accuracy. If necessary, polygon boundary lines will be modified in the GIS program to accurately represent any changes the field crew made to polygon boundaries.

4.1.2 Polygon Delineation Guidelines

1. Vegetation Cover. If vegetation cover varies distinctly across a site, then a polygon boundary shall separate the different areas. Variations in cover may be caused by differences in reclamation techniques, cover soil quality, slope angle, aspect, weed invasion, or plant species. The term distinct in this case is defined by the vegetation cover classes used in the BRES. The cover classes are less than 21 percent, 21-40 percent, and greater than 40 percent live plant cover. Separate polygons should be delineated if the percent vegetation cover between the two areas:

   - differs more than 15 percent, or
   - crosses the threshold between the middle and lower cover classes

   If there is not a sharp line of demarcation between the two different areas, best professional judgment should be used when determining the polygon boundaries.

2. Erosion. If erosional condition varies distinctly across a site, then a polygon boundary should separate the different areas. Differences in erosional condition can be caused by differences in slope or vegetation cover within a site. The term distinct in this case is defined by the erosional condition threshold value of 55 points. Areas should fall into two different polygons if the erosional condition score:

- differs more than 20 points, and
- crosses the threshold score of 55 points

If there is not a sharp line of demarcation between the two different areas, then best professional judgment should be used when determining the polygon boundaries.

3. Barren Areas. Parts of a site with a high frequency of barren areas should be culled out as individual polygons from areas of generally better vegetation. A barren area is defined as an area at least 75 square feet (ft^2), with less than 10 percent total vegetation cover. Rock outcrops do not count as barren areas. If a polygon is delineated because of barren areas, the barren areas should cover at least 25 percent of that polygon. These barren area polygons will allow for representative vegetation cover estimates in both the more barren and better vegetated polygons.

4. Land Form or Land Use. Polygons should be delineated based on differences in landform or land use. For example, engineered caps, ditches (including grass-lined swales), sedimentation ponds, parking lots, gravel trails, playgrounds, asphalt parking lots, and manicured lawns should be separated from each other and from reclaimed open areas by polygon boundaries.

5. Size. Minimum size guidelines for polygon delineation were identified during the calibration and validation period in 2001. Because a predetermined minimum size might interfere with professional judgment during the polygon delineation process, size criteria should be used as a guideline, not a specified requirement. As a guideline, a polygon should generally encompass an area greater than or equal to 10 percent of the site. The size guideline was established to prevent the BRES from incurring an excessive number of polygons.

6. Variable Vegetation Cover or Erosion. Some sites have variable vegetation cover and erosional conditions at small scales, while other sites have large internally homogenous areas that differ from other large areas of the site. When the variation or patchiness occurs at scales that are smaller than 10 percent of the site, or when the entire site is covered by small-scale variability, then the smaller areas of difference should not be broken into separate polygons. Effort should be made by the field crew to obtain the best average vegetation and erosion estimates possible. These variable or patchy polygons provide the most difficult areas to average. Often, repeatability decreases in these patchy polygons. Nonetheless, if the variability occurs at a scale so small that too many polygons would be created at a site, then the best option is to lump all of the small patchy areas into a larger polygon.

4.1.3 Alteration of Polygon Boundaries

Once established, polygon boundaries should only be altered using the mechanisms outlined below. It is anticipated that as system implementation begins, there will be more polygons, but as time passes and polygons are brought up to BRES standards,

some polygon boundaries will become irrelevant and will therefore be removed. Some polygon lines will exist for longer periods because they signify a significant break in conditions, such as a steep slope and a flat area. Some polygon lines would remain indefinitely, such as those between a rip-rapped slope and a revegetated grassland area. If new polygons need to be added, they should be delineated as outlined above.

Polygon boundaries will undergo re-evaluation nine years following implementation of the BRES. By year nine, two BRES evaluations will have been completed on all polygons.

During the summer prior to polygon re-assessment, it will be necessary to take a new set of aerial photographs. During re-evaluation, the field crew should follow a process similar to that outlined above. Existing boundaries that appear questionable, based on the aerial photograph will be highlighted. In the field, the survey crew will walk all existing polygon lines and make notes as to whether they are still appropriate or need to be changed. Upon completion of the site reconnaissance, the new polygon lines will be mapped using a GPS with sub-meter accuracy. Polygon boundary lines will be modified in the GIS to accurately represent any changes the field crew made to polygon boundaries.

EPA recognizes that the delineation and re-evaluation of polygons at all sites at one time will be a concentrated effort. Nonetheless, the complete re-evaluation of polygon boundaries in one field season every nine years will have several benefits. First, aerial photographs, taken the year before the re-evaluation, will be current for all sites. Second, a specific field crew can be hired on a seasonal basis once every nine years and trained to perform this task. Third, the evaluation, management, and tracking of polygon boundaries will be easier if done at one time.

4.1.4 Annual Maintenance Evaluation and Polygons

The annual maintenance evaluation (see Section 3.5) will be performed each year on a site-by-site basis; the maintenance evaluation will not be performed for each individual polygon. The site-based approach for the maintenance evaluation was chosen because the questions asked during the maintenance evaluation should not vary within a site. For example, the fences are designed to surround the site based on political boundaries and will not change on a polygon basis within the site.

4.2 Parameters Estimated by Polygon versus by Site

Percent ground cover estimates and erosional condition assessments require a homogenous area for evaluation; therefore, polygons are required for evaluation of these two parameters.

Some parameters can trigger an action and do not require a homogenous area for evaluation; therefore, they are recorded on a site basis and not by individual polygons. These localized trigger items evaluated on a site basis include:

- Significant difference between site edges and interiors
- Exposed waste material
- Bulk soil failure/land slumps/subsidence
- Barren areas
- Gullies

Regardless of the number of polygons, only one BRES field form should be used per site during the field evaluation. In addition to recording the trigger item on the field form, the evaluators should outline and label the area of the trigger item on the aerial photograph. If barren areas are observed on a site, the polygon in which they are located should also be noted on the field evaluation form. Each of the individual trigger items is described in detail in Section 6.

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Section 5 Methods and Procedures

5.1 Office Preparation

Prior to the field season, the BRES Administrator shall prepare field assessment packets for the field crew. The contents of these packets are detailed in the sections below.

5.1.1 Field Forms

The BRES Administrator shall include one field form (Appendix D) for each site in the site assessment packet. To reduce the time spent filling in field forms, field packets will include forms that have been prepared specifically for each site. Static information should be filled in automatically using a mail merge from the Reclamation/O&M database. The following fields should be completed prior to the field visit:

- Site name and number
- Number of polygons
- General slope angle and aspect of site

5.1.2 Aerial Photographs

Field packets will also include aerial photographs prepared specifically for each site. The aerial photograph should be printed on a standard 8.5" x 11" page. The GIS database should be used to add the following information to each aerial photograph:

- Site boundaries
- Polygon boundaries
- Site name and number
- Contour lines (where useful)
- North arrow and scale bar
- Month and year of the aerial photograph
- Site acreage
- Special features such as storm drains, shaft caps, channels, informal sedimentation basins, etc.
- Blank space for day, month, and year of evaluation (to be filled in by evaluator)
- Blank space for evaluator's initials

During the site evaluation, aerial photographs will be used to identify and label the location of trigger items. At the completion of the field evaluation, aerial photographs and field notes should be submitted to the BRES Administrator along with the completed site evaluation field form.

5.1.3 Supplemental Information

Any other data relevant to the evaluation of the site should also be included in the field assessment packet. These data may include dates and details of previous response actions (e.g., cover soil depth and seed mix) and maintenance activities (e.g., weed spraying). Office preparation of field packets should be completed each year during the winter and early spring.

5.2 Field Survey/Site Evaluations

The field survey will occur each summer. Field evaluation of the BRES sites scheduled for evaluation that year should take place between late June and early August, during peak standing biomass. The BRES Administrator will lead the BRES evaluation process. EPA, with assistance from the state, will provide oversight as deemed necessary. Other stakeholders may participate in the BRES process, if they desire.

5.3 Data Transfer and Database Management

Currently, data from the field are being entered and stored in databases managed by ARCO and BSB County; these are ARCO's reclamation database and BSB County's GIS and O&M databases. In the future, new data will be submitted to the BRES Administrator upon completion of fieldwork and then entered into the appropriate database. Database management issues will be refined after completion of the ROD. ARCO is currently developing a data management plan, which will include the BRES.

GIS will be an important component of data management and a GIS file should be created to document the location of trigger items. This polygon layer or shape file should be digitized from notes on the aerial photographs and should track locations of the trigger items and information about them, such as date identified and other information from the field form. A new GIS trigger item layer file should be made at the beginning of every four-year BRES cycle.

A subset of the total data in the BPSOU databases will be exported into GIS format. This information might include, but will not be limited to:

- Soil analytical data
- Vegetation information: species observed, weeds, and percent vegetation cover (method, observer, year)
- Present and past erosion information
- Maintenance activities

- Response action history
- Cover soil depth
- As-built information

5.4 Quality Control Program

A QC program will be instituted to ensure integrity of data used to make management decisions. Two main areas in which data quality will be enforced are vegetation cover and field data transfer.

5.4.1 Vegetation

Visual estimates of plant cover are often preferred in applied contexts for their rapidity. Unfortunately, visual estimates of ground cover are subject to error or potential bias by the person or persons making the estimates. To decrease the range of inter-observer variability in visual estimates, the BRES uses QC protocol.

BRES QC consists of comparing quantitative measurements of ground cover to visual estimates. At the end of each week during the field evaluation season, 10 percent of the polygons evaluated that week will be randomly chosen and then quantitatively measured using the modified point intercept method. If the precision target has not been met, the previous week's site must be reevaluated. Because QC measurements are made weekly, the field crew is continuously able to compare visual estimates with measured values, thus maintaining a level of calibration that allows them to make precise visual cover estimates throughout the field season. Refer to the earlier discussion of the use of the laser point intercept method in Section 3.3.1.

5.4.2 Field, Analytical, and Spatial Data

QC for BRES data is necessary to ensure all data are useful (i.e., accurate) for their intended purpose and properly entered into the databases. Several mechanisms should be used to enforce data quality for the BRES.

Data from the field forms should be verified once they have been entered into the database(s). Optimally, a person other than the person who entered the data would check each entry from the field forms to ensure that the data are correct. If a different person is unavailable, then the original person should enter all data, then check the correctness of all data, in two different steps. This QC step ensures that transcription errors are corrected before data are finalized in the database and disseminated to other users.

When soil or waste materials are analyzed, the quality of the analytical data should be assessed using the validation procedures documented in the Clark Fork River Superfund Site Investigations Data Management and Data Validation Plan (ARCO 2000). Once validation has been performed, data are assigned the following QC codes:

U - Undetected (below the detection limits of the analytical instrument)

E - Enforcement quality data

S - Screening quality data

These QC codes should always be included in the database(s) with the analytical data, so that the quality of the analytical data can always be interpreted by the end user(s).

Spatial data are information associated with a location in space and will be tracked in the GIS database. This information will be input to GIS through either digitization of field notes on aerial photographs or from a GPS survey. Information digitized from aerial photographs will be somewhat imprecise due to the evaluators' limitations with aerial photograph interpretation in the field. Information from a GPS instrument is usually more precise than from a digitized photograph and care should be taken to enforce this precision in several steps. First, GPS-obtained data must be differentially corrected. Second, any points or lines generated with a GPS should be "ground truthed" by projecting the data over an aerial photograph and/or comparing the GPS results of known reference point in the field. If a hand-held GPS unit is being used to mark locations, then the user should ensure that the unit is triangulating from an adequate number of satellites in appropriately distant positions (the number and position of satellites can be checked easily on most units.) The metadata for the GIS files should track how the data were positioned spatially in the system (i.e., GIS or digitized by hand) and the datum to which the points or lines are referenced.

Section 6 Evaluation Parameters

This section defines the BRES field evaluation parameters. For greater detail about how each parameter was selected, please refer to the BRES Calibration and Validation Report (CDM/RRU 2003). A detailed discussion of the decision logic developed by the Technical Group for each parameter is presented in Section 7.

6.1 Ground Cover

Ground cover estimates are used in the BRES as an indicator of the condition of upland vegetation caps. Because ground cover assessments require a homogenous area for evaluation, ground cover is evaluated on a polygon-by-polygon basis, not on an entire site basis. Although several ground cover parameters are estimated at each polygon, percent live vegetation cover is the most critical and is therefore used more extensively in the decision-making process than the other parameters.

6.1.1 Live Cover

Percent live cover refers to the percentage of ground surface covered by the current season's plant growth; exceptions include UWS and noxious weeds, which are defined below. Standing plant material from the current year (i.e., live, dead, or senescent) should be included in the estimate of percent live vegetation cover. During the 2001 calibration and validation period, raw data collected and analyzed indicated that the potential for additive errors in ground cover estimation was less when only live cover estimates were used for site evaluation. Therefore, BRES field personnel should estimate and record all of the vegetation parameters on the field form (Appendix D), but only percent live vegetation cover of desirable species will factor into the decision-making process. The other ground cover values recorded on the field form should be considered if future corrective action is required at the site.

Percent live vegetation cover of desirable species will be used as a trigger item in the BRES. If the evaluation determines that there is less than 21 percent live cover of desirable species, this lack of desirable vegetation triggers a recommendation for additional action at the polygon.

6.1.2 Litter

Litter is defined as the uppermost layer of organic debris composed of dead plant material from previous year's growth or other slightly decomposed organic materials. The BRES definition of litter also includes moss and straw mulch. Litter is recorded on the field form because it might have utility in the decision making process regarding potential corrective action at a site. Litter does not count toward the percent live cover estimate, and is not a trigger item.

6.1.3 Undesirable Weedy Species

UWS are plant species that are acceptable for BPSOU sites in small numbers, but are considered undesirable in large numbers. UWS are identified on the Vegetation

Species Grouping for the BPSOU list (Appendix G). UWS are plants with certain life history characteristics that could undermine the integrity of the response action at the site. For example, the UWS might be shallow rooted, or have a short seasonal, annual or biennial life cycle; characteristics that reduce the stability of a vegetation cap. In the BRES, UWS can only count for up to 5 percent of the total cover on the site. For example, if 10 percent of the site is covered by *Kochia scoparia* and 20 percent is covered by this year's growth of desirable species, then the total live cover estimate would be 25 percent.

6.1.4 Noxious Weeds

Noxious weeds are defined as all plants on the state and county noxious weed lists (Appendix H). Noxious weeds are those regulated by law or those that are difficult to control. In general, noxious weeds are non-native plants that compete with desirable plants for nutrients, water, and/or space. Noxious weeds do not count towards the estimate of percent live vegetation cover, and do not serve as a trigger item. The percent cover by noxious weeds should be estimated in the field and recorded in the BRES database so that appropriate O&M measures can be taken to reduce the weed infestation.

6.1.5 Rocks

During the calibration and validation period, the Technical Group decided that rocks less than 2 inches in size do not contribute to erosion protection, whereas rocks greater than 2 inches may provide some degree of erosion protection. For BRES purposes, therefore, rocks are defined as any solid material greater than 2 inches on at least one side. Material smaller than 2 inches should be considered bare ground when estimating total ground cover. The percent of the polygon covered by rocks should be recorded on the BRES field form and considered when planning corrective action at a site.

6.2 Erosion

The BRES uses a modified version of the BLM Erosion Classification System (BLM 1981). During the calibration and validation process, the Technical Group added greater detail and specificity to the original BLM category descriptions. During BRES site evaluations, the field evaluator should refer to the BRES Erosion Condition Class Determination guideline (Appendix I), and then record scores for each erosion parameter on the BRES field evaluation form. In the BRES, a score of 55 or greater triggers a recommendation for action at a polygon. Because erosional condition assessments require a homogenous area for evaluation, erosion is evaluated on a polygon-by-polygon basis, not across an entire site.

6.3 Site Edges

The edge of a site can be either inside or outside the boundary of a response area. Differences between site edges and the interior of the site are included as a trigger

item on the field form and should be evaluated by site, not polygon. Several factors might cause differences between the site interior and the site edge:

- Cover soil may be thin around the site edges, which may cause stressed and sparse vegetation or lack of successful establishment of desirable vegetation due to a lack of adequate rooting depth for desirable plant species.
- Increased erosion at site edges due to run-on from a street, alley, storm water ditch, sidewalk, and/or adjacent property. Site edges may also be steeper than the majority of the site, which may increase erosion due to run-off.
- Unfenced site edges that experience more traffic, especially when there is no adjacent sidewalk. This foot or bike traffic reduces the ability of the vegetation to persist.
- Rock layers around the edges of a site.

Whether a difference between a site edge and the site interior is significant enough to note on the field form will rely, to some degree, on the evaluator's professional judgment. In order to guide the process of site edge difference identification, check box categories are listed on the field form. The purpose of the check boxes will be to guide the evaluator's interpretation of the potential differences in the site edge. Check box parameters are:

- Lime rock barriers
- Increased weeds
- Increased erosion
- Gullies
- Depositional area
- Steeper slope
- Less vegetation
- Other

The items listed above should serve as a guide to be used by BRES field evaluators to identify differences between the edges and interior of a site. If differences are identified at a site and the check boxes on the form have not accounted for these differences, the evaluator should note the differences on the field form. In addition to check boxes, the field form has a space for the evaluator to estimate the width of the affected area. The evaluator should also draw an outline of the affected area on the aerial photo and label it appropriately.

6.4 Exposed Waste Material

Exposed waste material includes mine tailings and waste rock, as well as any soils that have been contaminated by metals, arsenic, or acid material from mining operations in the BPSOU. When the chosen response action is a vegetated soil cap over waste left-in-place, exposed waste material indicates some failure of the cap material to provide adequate cover and an increased potential for human or environmental receptors to come into contact with COCs. The existence of exposed waste material at a site is considered a trigger item; this should be recorded on the BRES field evaluation form and the area outlined and labeled on the aerial photograph.

6.5 Bulk Soil Failure or Mass Instability

Bulk soil movement or mass instability indicates a current or potential for underlying waste material to become exposed. If these situations are identified at a site, the BRES field crew should record this information on the BRES field evaluation form and the area should be outlined and labeled on the aerial photograph. The field form also has a check box for the existence of subsidence at a site, even though subsidence is the responsibility of the landowner and is not a CERCLA issue. Evidence of subsidence will be recorded in the BRES database and BSB County personnel will be notified.

6.6 Barren Areas

Barren coversoil can lead to increased erosion and may compromise cap integrity. Barren areas may be considered BRES trigger items if they are:

- Greater than 75 ft^2 in area
- Have no more than 10 percent total plant cover (live cover + litter) on the area

Barren areas do not include rock outcrops. If the barren area(s) meets the above conditions, the field crew should record the number of barren areas, whether barren areas cover over 25 percent of the site (see Decision Logic – Appendix C), and in which polygon the barren area(s) are located. In addition, the approximate location of the barren area(s) should be outlined and labeled on the aerial photograph. Barren areas are to be included in the erosion evaluation and the estimation of live plant cover for the polygon.

6.7 Gullies

The presence of gullies indicates that soil loss by water erosion is occurring or has occurred in the past, which increases the chance of exposing covered waste material. An active gully has unstable sidewalls with little or no vegetation or recent soil loss by erosion. Active cutting, sometimes referred to as "head-cutting", may be occurring at the up-gradient end of the channel. If a gully is actively eroding it may jeopardize the stability of the vegetation cap and is therefore considered a trigger item.

Conversely, a healing gully is identified by the reestablishment of vegetation on the sidewall and reduction in soil loss in the channel bottom. A healing gully is not considered a trigger item, but the presence of a healing gully and its physical characteristics (depth and length) should be noted on the BRES field form and the location outlined on the aerial photograph. The location of gullies will be tracked in the GIS and O&M databases.

6.8 Field Evaluation - Riparian Lower Area One

EPA conducted an Expedited Response Action for LAO between 1992 and 1997 that included the removal of mill tailings and manganese stockpiles, and the importation of backfill material and revegetation. In addition, a ground water collection and treatment system was constructed as part of the LAO response action. The final configuration for this area will be determined during RD/RA.

The approach to reclamation at LAO differed significantly from that applied to the uplands in Butte. In LAO, waste material was excavated in and around Silver Bow Creek to a specified design contour interval and cover soil was brought in to replace the contaminated soil. The only waste remaining in LAO is located under the slag walls and water treatment plant, or at significant depth (8-10 feet). In contrast, upland BPSOU response action areas have waste left-in-place. For LAO, the concerns are managing and treating contaminated groundwater, maintaining the integrity of the reconstructed stream channel, and preventing potential down cutting of the channel in flood events that may expose deeply buried mine waste material.

The BRES methodology was customized for the uplands and therefore is not applicable to evaluate LAO. A separate O&M plan will be developed by EPA and the PRP Group specifically for LAO to ensure that the response actions function as designed.

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Section 7 Corrective Action Triggers

A decision logic diagram has been developed for each trigger item in the BRES. During the calibration and validation period, Technical and Management Group members agreed upon the logic that should be followed if a BRES evaluation identifies a trigger item at a polygon or site. The decision logic for each parameter follows; decision logic diagrams are included in Appendix C.

7.1 Polygon-Based Parameters

7.1.1 Vegetation

The logic diagram for the vegetation cover category makes distinctions among the three live vegetation cover categories.

1. For polygons that fall in the lowest live vegetation cover category (less than 21 percent), the site must undergo either VI or RI. The VI or RI should be completed on the polygon within a calendar year of the BRES evaluation and the polygon should undergo another BRES evaluation three years following corrective action work (i.e., back on the four-year BRES evaluation cycle). If a site undergoes VI, and then falls into the less than 21 percent live cover category again during any future BRES evaluations, the polygon is then required to undergo RI, in order to meet the BHRS.

2. For polygons that fall into the middle live vegetation cover category (21-40 percent), UWS are considered. If greater than 10 percent of the polygon is covered by UWS, VI will be implemented on the polygon. If less than 10 percent of the area of the polygon is covered by UWS, the polygon should undergo a regularly scheduled BRES evaluation in four years.

3. Polygons that fall into the upper vegetation cover category (41-100 percent) should be re-evaluated in four years.

7.1.2 Erosion

If the erosion evaluation score is 55 or less, no immediate action is required and the polygon will continue on the regular BRES evaluation schedule of every four years. A score of greater than 55 triggers a recommendation for corrective action. An engineering assessment on the erosional and flow patterns shall be performed to determine the appropriate type of corrective action needed to reduce erosion. The approved corrective action plan should be implemented within the calendar year. The area repaired should be monitored at least yearly and preferably also after large storm events. If the erosion control actions are failing, the site should be repaired immediately. The polygon will undergo a full BRES evaluation three years following the corrective action work.

7.2 Localized Trigger Parameters

7.2.1 Site Edges

The site edge parameter is primarily a monitoring category, except when gullies or exposed waste materials are present. Gullies or exposed waste material along the site edge trigger corrective action to repair the gully, and remove or cover the exposed waste material. Corrective action work should be completed within a calendar year of the BRES evaluation and then undergo a full BRES evaluation three years following corrective action work (i.e., back on the four-year BRES evaluation cycle).

If neither gullies nor exposed waste exist, yet a significant difference has been identified between the site edge and the site interior, the area should be tracked in the GIS and O&M databases for future trend analysis to determine whether site edge condition is improving or declining. These sites shall undergo a regularly scheduled BRES evaluation in four years.

7.2.2 Exposed Waste

Exposed waste on a site triggers corrective action. An engineering assessment shall be performed on the area of exposed waste to determine the appropriate type of action needed to repair the cap. The approved corrective action plan must be implemented within the calendar year. The site shall undergo a full BRES evaluation three years following the corrective action work.

7.2.3 Bulk Soil Failure or Mass Instability

Signs of bulk soil failure or land slumps trigger corrective action. An engineering assessment shall be performed on the area to determine the appropriate type of action needed to repair the cap. The approved corrective action plan must be implemented within the calendar year. The area repaired should be monitored after large storm events until the next BRES evaluation, which should be completed three years following the corrective action work. If the corrective actions are failing, the area must be repaired immediately. If subsidence is present on site, then BSB County should be notified so that appropriate actions can be taken.

7.2.4 Barren Areas

If barren area(s) are located within a polygon but cover less than 25 percent of the polygon, a VI plan and/or a RI plan shall be developed to repair only the barren area(s). All pertinent historic data or recent management records should be reviewed prior to plan development. If no usable data or records exist, these data gaps should be filled prior to completion of the corrective action plan. If a VI plan is implemented and the next BRES evaluation indicates that the VI actions failed, the barren areas must be reclaimed in accordance with the BHRS.

If barren area(s) cover over 25 percent or more of a polygon, the same decision logic is used, except that the VI plan and/or RI plan must include the entire polygon, not just the barren areas. If a VI plan is implemented and the next BRES evaluation indicates

that the VI actions fail, a RI plan must be developed and approved and the entire polygon must then be reclaimed in accordance with the BHRS.

Under each of the above circumstances, the corrective action must be completed within a calendar year of the BRES evaluation and the polygon should then undergo a full BRES evaluation three years following completion of the corrective action work.

7.2.5 Gullies

If a gully exists within a polygon, it should be noted on the field evaluation form whether the gully is actively eroding or healing. If the gully is healing as defined by the BRES, no immediate action is required and the polygon will continue on the regular BRES evaluation schedule of every four years. If gullies within the polygon are actively eroding, corrective action is recommended. An engineering assessment on the gullies should be performed and an approved corrective action plan to repair the gullies should be implemented within the calendar year. The area repaired should be monitored at least yearly and preferably also after large storm events, until the next BRES evaluation (three years following completion of corrective action work). If the corrective actions are failing, the area should be repaired immediately.

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Section 8 Recommendations and Action

8.1 BRES Technical Report

At the end of each BRES field season, the BRES Administrator shall prepare an annual report summarizing the field season activities, findings, and recommendations for actions in accordance with the requirements of this plan. The BRES Technical Report shall include:

- A summary of each site evaluated
- Date of the evaluation
- Aerial photograph with GIS overlay of trigger items identified
- A brief discussion of the site conditions and trigger items
- Recommendations based on the BRES decision logic

A BRES summary sheet that lists pertinent information shall also be developed for each site. A conclusion section should be included at the end of the report that summarizes the overall findings of the field evaluation season. Table 8-1 below is an example of a summary table.

Total No. of Sites Evaluated	50	**Trigger Items Identified at Each Site (Polygon)**						
Total Polygons	73							
Total Trigger Items	10							
Sites with trigger items:		Vegetation	Erosion	Site Edges	Exposed Waste	Soil Failure	Barren Areas	Gullies
Site # 1, Polygon A	1		1					
Site # 6	1				1			
Site # 7	3	1		1	1			
Site # 14	2	1	1					
Site # 22, Polygon C	3		1				1	1

Table 8-1
Example: Overall Findings from One BRES Evaluation Period

The conclusion section shall also include the schedule for development of the SAP(s) (if collection of analytical data are required), estimated date of data collection, estimated date of annual site corrective action plan(s) completion, and schedule of completion of corrective action work. Relevant information, such as field forms, should be attached to the BRES technical recommendation report.

8.2 Management Review of Technical Report

Upon completion, the BRES technical recommendation report will be reviewed by the Management Group. When reviewing the report for each site/polygon, the Management Group should incorporate any site specific modifying criteria deemed necessary for making decisions that are logical from a management standpoint. For example, a polygon located in a privately owned site has less than 20 percent live vegetation and is used as a parking area. The Technical Group follows the BRES decision logic diagram, and recommends VI or RI at the polygon. The Management Group may decide on a different action after taking into consideration the modifying criteria (in this case land use and property ownership).

8.3 BRES Corrective Action Directives Report

After a complete review of the BRES technical report, the Management Group will make corrective action directives for work. This report should be an EPA lead and should incorporate appropriate Management Group comments and modifications to the technical recommendations report. The BRES corrective action directives report should contain the decisions made by EPA about the corrective action work to be completed at each site/polygon at which trigger items were identified. This includes recommendations for conducting an engineering assessment, more complete vegetation analyses, soil analytical work, and/or the assessment of the need for storm water controls. This document will also be used to guide the PRP Group during development of a SAP for the collection of any environmental data needed to follow the BRES decision logic. These environmental data along with available historical data will be used to produce an annual site-specific corrective action plan.

8.4 Annual Site-Specific Corrective Action Plan

Annual site-specific corrective action plans will be developed each winter by the PRP Group, in accordance with the Directives Report. As mentioned above, several activities must be completed prior to development of this plan for sites that were assessed using the BRES.

- All BRES site evaluations scheduled for that year must be completed and information entered into the database.

- Based on the BRES evaluations, a technical recommendations report should be completed by the BRES Administrator.

- The Management Group should review the technical recommendations report and incorporate relevant modifying criteria into recommendations. A new report will be produced by EPA, which will consider the Management Group's input. This report directs future actions on sites/polygons with trigger items and justifies any deviation from the recommendations made by the Technical Group. This report should be titled BRES Corrective Action Directives Report.

- The PRP Group should review the BRES corrective action directives report and develop a site-specific SAP(s) for collecting additional environmental data relevant to future corrective action work. The SAP(s) must be approved by the EPA prior to sample collection. EPA will have the opportunity to provide sampling oversight, if desired.

- After environmental and historical data have been collected and compiled, the PRP Group will develop site-specific work plans to address the deficiencies identified at specific sites during the BRES evaluation. The work plans will describe the VI or RI work that is proposed to complete the corrective action. These work plans must be reviewed and approved by the EPA. Site-specific work plans will be prepared as addenda to the BRES O&M Plan and will be filed and tracked on a site-by-site basis.

- Following EPA approval, corrective action work may commence on BRES sites/polygons where trigger items were identified. Corrective action work should begin as early in the spring as possible so that all sites/polygons requiring work can be completed during the same field season. This is important because sites/polygons requiring corrective action work will be scheduled for the next BRES evaluation in three years (i.e., on the four-year BRES cycle). The BRES evaluation schedule is strict so that all sites evaluated in the same year will always be evaluated together. For example, if sites A, B, and C are evaluated in 2004, the next time sites A, B, and C will be evaluated is 2008, whether corrective action work is conducted on the site/polygon. Therefore, if corrective action work is not completed on a site/polygon during the calendar year following the BRES evaluation, it will not have three full growing seasons to heal.

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Section 9 Future Activities

Future activities include:

- Finalizing the list of response action sites that will be included in the BRES program
- Determine schedule for taking new low-level aerial photographs
- Polygon delineation
- Completing the BRES Field Manual
- Developing a long-term O&M plan for LAO (if needed)
- Testing the engineered cap integrity checklist and evaluating these caps
- Designing and implementing a data management strategy to ensure accurate and complete tracking of BRES information

Polygon delineation will occur with technical representatives of EPA present. The field team delineating polygons should be skilled in the assessment of vegetation and erosion, especially at reclaimed sites. The field team should use the guidelines provided in this document to decide upon formal boundaries for polygons. Up-to-date aerial photographs should be procured for the polygon delineation process.

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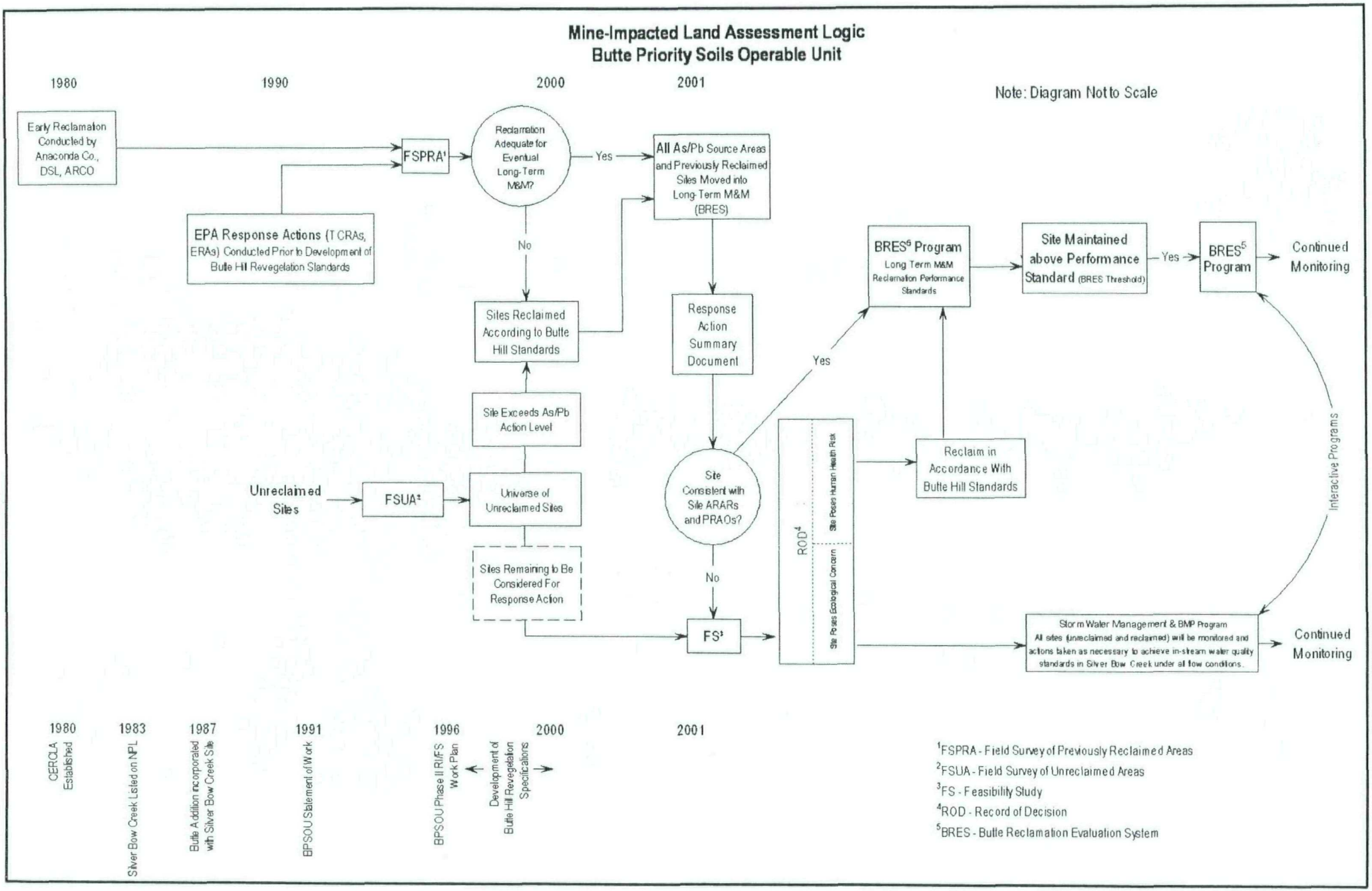
BRES Appendix A

Mine Impacted Land Assessment Logic

Mine-Impacted Land Assessment Logic
Butte Priority Soils Operable Unit



BRES Appendix B

Butte Hill Revegetation Specifications

BUTTE HILL REVEGETATION SPECIFICATIONS

as of September 2006

BUTTE HILL LIMESTONE STABILIZATION

GENERAL

Work described in this section shall consist of preparing the ground surface for limestone stabilization, hauling, placing, and spreading the limestone and fill on prepared areas in accordance with this Specification at the locations shown on the Drawings.

MATERIALS

Limestone sources will be approved by EPA. Limestone may be from any approved source and shall have a calcium carbonate equivalent content of not less than 65%. All limestone must be <1 inch in diameter and 50% (weight basis) must pass a 60 mesh (<0.25 mm) sieve.

CONSTRUCTION REQUIREMENTS

pH Testing of Subgrade

The responsible party (RP) Group shall test the subgrade soil pH of all areas to be revegetated. The frequency of testing shall not be less than one test per 40,000 square feet (approximately 200 x 200 foot grid). Limestone addition shall include areas to be revegetated where the subgrade soil has a pH of less than 5.5. Acid-base accounting (ABA) may be required by EPA under certain circumstances, such as the presence of acid-generating minerals, and the method used to determine ABA shall be as described in EPA-600/2-78-054. Documentation of this sampling effort, including a map showing sampling locations and sample results, shall be included in the final construction completion document(s) for the project.

Installation of Limestone

The surface of the subgrade in the area to be covered shall be brought to grade and finished smooth and uniform immediately prior to dumping and spreading the limestone. The limestone shall be placed prior to the placing of the cover soil. A minimum 350 tons/acre (approximately 2 inches) of limestone shall be placed on the low pH soil. Placement of the limestone layer on a site will be based on site-specific data and approved by EPA prior to placement of limestone.

Grades on the area to be covered shall be maintained in a true and even condition. Where grades have not been established, the areas shall be graded and sloped to drain. The surface shall be left smooth in an even and properly compacted condition to prevent, insofar as practical, the formation of low places or pockets where water will stand.

BUTTE HILL COVER SOIL

GENERAL

The work of this section covers all operations required for furnishing, excavating, hauling, stockpiling, spreading, and seedbed preparation of approved cover soil.

SUBMITTALS

Cover soil submittals will be provided in the Design Report or under separate cover and approved by EPA prior to use. The following submittals shall be provided to EPA for each cover soil source:

- The intended cover soil source site location, including details on the area and depth to be excavated at the source site location.

- For each cover soil source, the RP Group shall be required to secure at least 3 soil samples from the source area. EPA will be notified in advance of the sampling effort and the approximate location and depth where samples will be collected.

- Each of the above 3 soil samples shall be analyzed by an approved laboratory for the following parameters: texture class and particle size; pH; saturation percent; electrical conductivity (EC) in mmhos/cm; organic matter percent; NO_3 - nitrogen; available phosphorus (P); and available potassium (K). The above parameters shall be analyzed using USDA classification and test methods as described in ASA/SSSA Monograph No. 9, Methods of Soil Analysis, Parts 1-2, most recent edition or as described in EPA approved Clark Fork River Superfund Site Investigations documents. Also, each of the above 3 soil samples shall be analyzed by an approved laboratory for the following soil metals parameters: arsenic, cadmium, copper, lead, and zinc. Cover soil placement shall not begin until test results of the soil samples are known.

MATERIALS

Cover soil sources will be approved by EPA. Cover soil thickness shall be a minimum of 18 inches, unless otherwise approved by EPA in writing. Eighteen inches is considered the minimum thickness required for long-term vegetation success. Sufficient cover soil should be applied to account for settling, sloughing, and erosion. Cover soil material shall be reasonably free of any trash, rocks, lumps of soil, stumps, and brush. Rock content (i.e., particles >2.0 mm) must constitute <45% (by volume) of the cover soil and the maximum allowable rock size is 6 inches in diameter. To the extent possible, the cover soil source should be free of any noxious weeds.

Cover soil shall be a friable material and the <2.0 mm fraction characterized as loam, sandy loam, sandy clay loam, sandy clay, clay loam, silty clay, silty clay loam, silt loam, or silt in accordance with the USDA Soil Conservation Service textural classification provided below. Per approval of EPA, loamy sand may be acceptable from 6 to 18 inches in certain circumstances.

The soil pH shall be between 5.5 and 8.5. The soil SAR shall be <12. Soil saturation percent will be less than 85% and greater than 25%. The soil shall have an EC less than 4 mmhos/cm. NO_3, P, and K will be used by EPA and the RP Group to verify fertilizer rates.

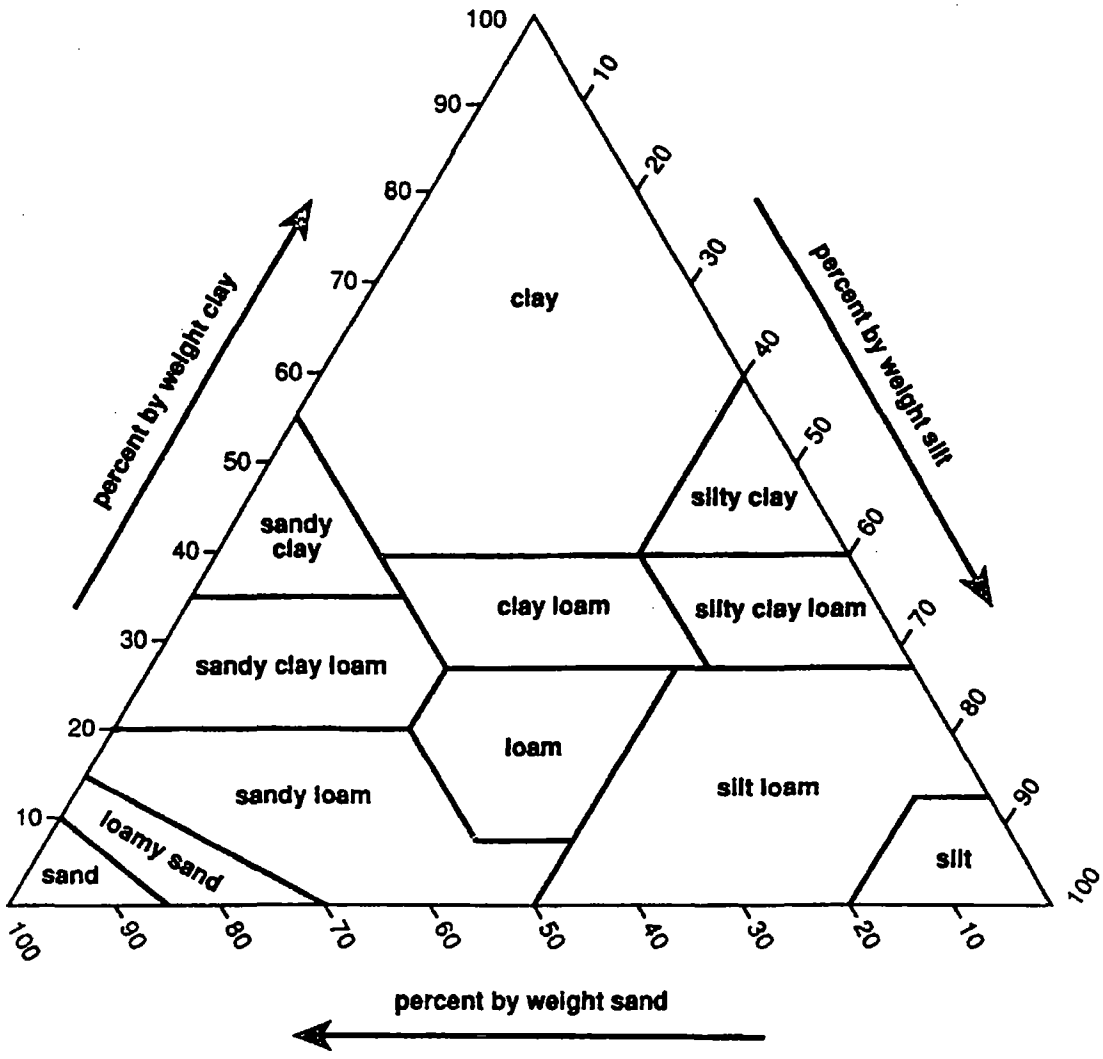


Figure 1. Graphic guide for textural classification of the less than 2 mm portion. (Source: USDA Soil Conservation Service)

The following chemical suitability criteria are general guidelines to be followed as screening standards:

As	<97 mg/kg
Cd	<4 mg/kg
Cu	<250 mg/kg
Pb	<100 mg/kg
Zn	<250 mg/kg

With the exception of zinc, these suitability criteria were established for parks, play areas, and residential yards in the Final Work Plan for Residential Areas, Butte Priority Soils Expedited Response Action prepared by ARCO dated May 1, 1995. These values were provided in a February 14, 1995, letter from Sara Weinstock (EPA) to Dave Sinkbeil (ARCO) providing final comments on the above work plan. The criterion for zinc was reduced to <250 mg/kg from <500 mg/kg to take into account potential phytotoxic effects noted at the higher level in the Final Baseline Ecological Risk Assessment, Anaconda Regional Water, Waste, and Soils Operable Unit, Anaconda Smelter NPL Site, Anaconda, Montana, prepared in October 1997 by CDM Federal Programs Corporation for EPA. The chemical suitability criteria listed above were established for the Butte Hill and may not be appropriate for use at other Clark Fork River Basin Superfund Sites.

It should be noted that some exceedances of the above criteria may still allow successful long-term vegetation. Therefore, if cover soil sampling shows a variance from the chemical suitability criteria, the RP Group will notify EPA and a plan to address the usability of that cover soil source will be discussed. EPA must approve in writing any cover soil sources which exceed the above suitability criteria.

CONSTRUCTION REQUIREMENTS

Visual inspection of excavated cover soil shall be a continuous process to carefully observe and recognize changes in source material characteristics. Visual inspection, in conjunction with hand-texturing of the <2.0 mm fraction, will be used to determine the adequacy of the borrow material ahead of excavation, to assure that current material meets textural criteria, and to identify areas to move to if material begins to fall out of specification. Each inspection shall record the location, test number for that day, date, time, estimated rock content percentage, and soil texture (<2.0 mm fraction). The frequency of inspection is dependent on the variability of the cover soil source material, but must be performed and recorded at least once daily during periods of source material excavation and transport. It is desirable to have the same person perform the inspections for the duration of excavation at a particular source area. In addition to the above visual inspections, textural analysis by laboratory hydrometer testing may be requested by EPA at a rate not to exceed one test for every 5,000 cubic yards of cover soil material excavated. These tests will be used for comparison and guidance for field testing and field observations. Copies of all inspection records and laboratory analyses shall be provided to EPA for review. Summaries of inspection records and analyses shall be included in the final construction completion documents for the project.

For revegetation purposes, slopes must not exceed a maximum of 3:1 (3 horizontal to 1 vertical) unless previously agreed to by EPA and the RP Group because of site specific requirements. Cover soil shall not be placed until the areas to be covered have been properly prepared, the limestone layer appropriately applied (if required), all construction work in the area has been completed and approved by the RP Group, and EPA notified that all subgrade preparations have been completed.

After the cover soil has been spread, large clods, hard lumps, rocks, and large roots over 6 inches in diameter; litter; or other foreign material (exposed iron, timbers, etc.) shall be raked up, removed from the cover soil and disposed of properly. Further preparation of the cover soil for seeding is provided in the specifications for Seeding and Fertilizing.

The RP Group shall grade the source area borrow site(s) to existing contours at slopes not to exceed 3:1 (unless previously agreed to by EPA and the RP Group because of site specific requirements) and to provide positive drainage. The RP Group shall replace stockpiled topsoil to the borrow area. The borrow area shall be prepared for seeding, mulching, and fertilizing as are other areas receiving cover soil.

BUTTE HILL ORGANIC AMENDMENT APPLICATION

GENERAL

Organic amendment application shall consist of furnishing, applying, and incorporating soil amendments, such as manure and compost, at locations and rates designated on the Drawings.

SUBMITTALS

Organic amendment submittals will be provided in the Design Report or under separate cover and approved by EPA prior to use. The following submittals shall be provided to EPA for each organic amendment source:

- Location of Supplier;
- For each supplier, at least three organic amendment analyses, including gravimetric water content, rock and other fragment content, and organic matter content, as described further under Materials; and
- Proposed organic amendment application and incorporation methods and equipment.

MATERIALS

Analyses for organic amendments (such as manure, compost, etc.) shall include the gravimetric water content (%, dry weight), the percentage of rock and/or other fragments >2.0 mm fraction (%, dry weight), and organic matter content of the <2.0 mm fraction (%, dry weight). The organic matter content of the <2.0 mm fraction shall be determined in the laboratory using Walkley-Black procedure, ASA, Meth. Soil Anal., 1986, Method 29-3.5.2.

If manure is used as the organic amendment source, cattle manure shall be the preferred manure type. Straw bedding material mixed into the manure is acceptable, but it shall not constitute more than 20% of the dry weight.

Application Rate

The field application rate shall be calculated using 3% organic amendment on a dry weight basis in the upper 6 inches of cover soil. Upon approval or direction from EPA, the 3% application rate may be modified to account for site-specific conditions. Analyses for organic amendments shall be submitted for each Supplier on a regular basis to determine if adjustments to the field application rates are necessary. The water and rock and/or other fragment content shall be deducted in calculating the field organic amendment application rate. Documentation of the organic amendment application, including application rate calculations, shall be included in the final construction completion documents(s) for the project.

CONSTRUCTION REQUIREMENTS

Stockpiling Organic Amendment

Prior to stockpiling organic amendment on site, the Contractor shall develop an acceptable stockpiling plan for the RP Group review and approval. The plan shall include the location of the stockpile and adequate measures to prevent contamination of underlying and adjacent soils and prevent air or water pollution.

Site Grading

Prior to placement of the organic amendment, all areas shall be graded as necessary to approximately restore the design contours of the ground or to produce a contour that will blend with contours of adjacent areas. This shall include grading erosion channels in revegetated areas that are to receive organic amendment.

Organic Amendment Application

Organic Amendment shall be applied with agricultural manure spreaders or other approved application equipment that enables spreading a uniformly regulated amount of material.

For a specified application rate, the Contractor shall apply the organic amendment in a uniform manner across the landscape. Localized organic amendment application thicker than 6 inches is unacceptable.

Contractor shall calibrate the organic amendment spreader prior to each use of the equipment unless site conditions have not changed and equipment settings have not been altered since previous calibration. Calibration records shall be furnished to the RP Group. Upon request, copies of equipment calibration shall be provided to EPA for review. All calibration records shall be included in the final construction completion document(s) for the project.

Under no circumstances shall the Contractor apply the organic amendment during wind conditions strong enough to displace material onto adjacent sites.

Organic Amendment Incorporation

Following organic amendment application, the soil shall be ripped to a 6-inch depth at 12-inch centers. The soil shall then be tilled to a depth of 6 inches with a disc, rototiller, moldboard plow, or chisel plow. An agricultural disc with a disc diameter of approximately 20 inches having cone-shaped discs at a spacing width of 6-8 inches is recommended. Multiple tilling equipment passes may be required to achieve adequate incorporation. Adequate incorporation will be a complete and uniform mixing of the manure and soil to a depth of 6 inches. All tillage procedures shall be completed as soon as practicable after amendment application.

BUTTE HILL SEEDING AND FERTILIZING

GENERAL

Revegetation work described in this section includes fertilization, seeding, and mulching on all project designated and disturbed areas upon completion of construction work. These areas include finished embankment slopes, borrow areas, areas to be revegetated, and disturbed areas.

MATERIALS

Seed

Seed mixes used must be in compliance with all applicable laws and regulations, including Section 80-5-123, MCA, (Label requirements for agricultural, vegetable, flower and indigenous seeds), 80-5-134, MCA, (Prohibitions), and other state and county restrictions and requirements relating to seed mixes and labeling. Weed species prohibited in the mix should include those species prohibited in the downstream Montana counties as well as those prohibited in the county of planting.

Hand collected native species and some of the special wetland species collected cannot meet the following requirements. All other seed shall comply with, and be labeled in accordance with Montana seed law, Title 80, Chapter 5, Montana Code Annotated (MCA). Indigenous seeds, as defined in Section 80-5-120(14), MCA, in amounts of one pound or more, whether in packages or bulk, must be labeled with the following information:

1. Name and mailing address of the seed labeler;

2. Lot number or other lot identification mark;

3. The Statement "Labeled only for reclamation purposes";

4. The common name, genus, species, and subspecies, when applicable, including the name of each kind of seed present in excess of 5 percent. When two or more kinds of seed are named on the label, the label shall specify the percentage of each. When only one kind of seed is present in excess of 5 percent and no variety name or type designation is shown, the percentage must apply to seed of the kind named. If the name of the variety is given, the name may be associated with the name of the kind. The percentage in this case may be shown as "pure seed" and must apply only to the seed of the variety named;

5. State or county of origin;

6. The percentage of viable seed, together with the date of the test. When labeling mixtures, the percentage viability of each kind shall be stated. The method used to determine viability shall be stated on the label;

7. The percentage by weight of pure seed;

8. The percentage by weight of all seeds;

9. The percentage by weight of inert matter;

10. The percentage by weight of other crop seeds; and

11. The name and rate of occurrence per pound of each kind of restricted weed seed present;

As required by ARM 4.12.3010, seed shall contain no "Prohibited" noxious weed seed. The seed shall contain no "Restricted" weed seed in excess of the maximum numbers per pound, as specified by ARM 4.12.3011, or as specified by the appropriate BSB County Weed Board, whichever is more stringent.

As defined by MCA 80-5-120(14), indigenous seeds include the seeds of those plants that are naturally adapted to an area where the intended use is for revegetation of disturbed sites. These species include grasses, forbs, shrubs, and legumes.

The Contractor must supply the RP Group with all seed bag tags and certification from the supplier stating that the seed complies with the Federal Seed Act and the Montana Seed Laws, Title 80, Chapter 5, MCA and applicable regulations. Upon request, copies of said tags shall be submitted to EPA for review. Copies of seed bag tags and certification shall be included in the final construction completion documentation the project.

When legumes are seeded as the predominant mixture, the seed supplier shall include inoculants (rhizobia) and provide documentation as specified in the Seed Certification. Seed Certifications shall be submitted to the RP Group prior to any seeding. The Contractor shall also submit a copy of the bill or other documentation from the seed supplier showing actual bulk weights of the individual seed types combined in the mix an verification of legume inoculation. The required certifications and documentation shall be provided to the RP Group at least three days prior to the seeding.

Fertilizer

Fertilizer shall be delivered in standard-size bags of the manufacturer showing weight analysis and manufacturer's name, or in bulk quantities accompanied with written certifications from the manufacturer stating that the fertilizer supplied complies with applicable Specifications.

Fertilizer shall be soluble commercial carrier of available plant food element or combination thereof. The fertilizer to be used on the project shall supply the quantities of available chemical elements stipulated below. The fertilizer shall be of uniform composition and in good condition for application by suitable equipment. It shall be labeled with the manufacturer's guaranteed analysis, as governed by applicable fertilizer laws. Any fertilizer that becomes contaminated or damaged, making it unsuitable for use, shall not be accepted. All required fertilizer certificates shall be provided to the RP Group a minimum of three days prior to fertilizing. The certification shall include the guaranteed analysis of the fertilizers stated in the terms of the percentages of nitrogen, and available phosphorous, potash, and boron, in that order.

Mulch

Vegetative mulch shall be either grass hay or straw. Grass hay material shall be composed primarily of perennial grasses. The grass hay mulch shall contain greater than 70 percent grass by weight and shall not contain more than 10 percent alfalfa, crested wheatgrass or yellow sweet clover. Grass hay shall be relatively free of noxious weeds and other undesirable species.

Straw mulch material shall be clean grain straw, shall be relatively free of noxious weeds and other undesirable species, and shall not contain greater than 5 percent cereal seed by weight, i.e., seed heads. Wheat straw will be used whenever possible. Harvesting will be performed with modern combines, which leave less grain in the straw. Written approval of straw and hay sources from the supervisor of the BSB County weed board shall be obtained.

Chopped or ground material is not acceptable. The mulch material is not acceptable if it is damaged by rotting, molding, etc. to seriously limit its use for mulch. It shall be relatively free of stones, dirt, roots, stumps, or other foreign material.

Application rates shall be 3,000 lbs/acre on flat non-critical erosion and potential dust generating areas and 4,000 lbs/acre on all critical runoff and potential dust generating areas. Exact application rates will be adjusted in the field to accommodate differences in mulch material and seedbed conditions.

CONSTRUCTION REQUIREMENTS

Seedbed Preparation

Prior to executing the seeding, fertilizing and mulching work items, the seed bed at all sites shall be prepared so these items can most efficiently be completed, with the areas resulting in reasonable conformity to specified line and grade. The fertilizing, seeding, and mulching work items shall be executed only after the seedbed condition has been approved by the RP Group. The cover soil shall be prepared as described in the Cover Soil specifications.

The seedbed surface must be in a condition that does not preclude growth at the time of application of seed. Conditions that may preclude growth include, but are not limited to: large clumps, clods, and impervious crusts of dirt; areas too tightly compacted to allow seed growth; and areas of loose soils which could possibly become too compacted during the seed applications to allow growth. The decisions on the conditions of the seedbed shall be made by the RP Group. If the RP Group determines the seedbed is inadequate for seeding, the Contractor shall treat the inadequate areas, as directed by the RP Group, to attain as nearly as practicable the adequate condition at no additional cost to the RP Group.

Excessively tight or compacted soils shall be loosened to the minimum depth of 6 inches. Disking, chiseling, or tilling of the soils shall be done at right angles to the natural flow of water on the slopes, unless otherwise directed or approved by the RP Group. Compaction of the soil, when required, shall be performed by equipment that shall produce a uniform rough-textured surface ready for seeding and mulching.

Existing structures and facilities shall be adequately protected and any damage done by the Contractor shall be repaired or adjusted to the satisfaction of the RP Group.

Seed Application

General

Slopes and areas finished during the period of October 15 through June 15 may be permanently seeded within this time period. The Contractor must obtain the RP Group permission to commence seeding operations. Slopes and areas finished during the period June 16 through October 14 shall receive an annual cover crop from the strawmulch seed to protect the in-place cover soils during this period. The control of noxious weeds and other undesirable species will also be addressed during this period. The perennial seed mix shall then be applied to the areas after October 15. EPA shall be notified prior to commencement of seeding activities.

Specifications of each type of seed mix are outlined below. The seeding of steep slopes, narrow medians, or small areas that are impractical to seed by drill may be performed by using the hydraulic seeding methods, when approved by the RP Group. The hydraulic seeding methods shall be used when the seedbed surface is too wet or swampy to permit seeding by drill. Hydraulic seeding methods shall not be used during adverse weather, as determined by the RP Group.

The applied seed, regardless of the method of application, shall not be covered by a soil thickness greater than 1 inch in depth.

Seed Application Equipment

Drill Seeding

Seeding equipment used for applying grass/forb seed must be designed, modified or equipped to regulate the application rate and planting depth of the seed mixture. Seed must be uniformly distributed in the drill hopper during the drilling operation. Acceptable drills are: custom seeders, furrow drills, disc drills or other drills approved by the RP Group. All seeding equipment shall be operated perpendicular to the slope. Contractor shall calibrate the drill seeder prior to each use of the equipment unless site conditions have not changed and equipment settings have not been altered since previous calibration. Calibration records shall be furnished to the RP Group. Upon request, copies of equipment calibration shall be provided to EPA for review. A summary of all calibration records shall be included in the final construction completion document(s) for the project.

Planting depth shall be regulated by depth bands or coulters. The drill box shall be partitioned by dividers no more than 24 inches apart, in order to provide for more even distribution on sloping areas. The rows or planted seed shall be a maximum of 8 inches apart. Drilling depth shall be from 1/4 to 1 inch.

Broadcast Seeding

Seeding by hand or mechanical broadcasting shall be permitted on areas inaccessible to drills or impractical to seed by other prescribed methods. The broadcast seeding rate shall not be less than twice the drill seeding rate. Following the seeding, the soil shall be hand-raked to cover the seed. Broadcast seeding requires the prior approval of the RP Group.

Hydraulic Seeding

The Contractor must provide one pound of wood fiber mulch per each 3 gallons water in the hydraulic seeder as a cushion against seed damage. The mulch used as a cushion may be part of the total required mulch with the remainder applied after the seed is in place. The Contractor may be required to use extension hoses to reach the extremities of slopes.

When using vegetative mulch, the Contractor may mix the seed with the fertilizer if his hydraulic seed equipment is capable of uniformly mixing water, fertilizer, and seed, in that order, and power blowing or spraying the mixture uniformly over the seedbed. After blending, the slurry shall be applied to the seedbed within 45 minutes after the seed has been added to the water-fertilizer mixture. If the slurry cannot be applied within the specified time, it shall be fortified, at no cost to the RP Group, with the correct ratio of seed to the remaining slurry and a new 45-minute time frame established for applying the fortified mixture. At no time shall seed and fertilizer remain in a slurry for more than 45 minutes.

Seed Application Areas/Rates - The revegetation mixes include:

Butte Hill 1997 Primary Seed Mixture
Revegetation Mix

Seed Mixture	Rate, #PLS/Acre
Slender Wheatgrass	3.0
Thickspike Wheatgrass	2.0
Sheep Fescue	2.0
Crested Wheatgrass	1.0
Ladak Alfalfa	1.0
Red Clover	2.0
Canada Bluegrass	1.0
Birdsfoot Trefoil	1.0
Total	**13.0**

Butte Hill

Alternate Seed Mixture No. 1 - Gentle Sloped Areas (Less than 10:1) Revegetation Mix

Seed Mixture	Rate, #PLS/Acre	Planting
Bozoisky Russian Wildrye	5.0	Initial seeding, drill seeded on 15-18 inch centers.
Ladak Alfalfa	2.0	Interseeded during following years as determined by vegetation monitoring.
Total	**7.0**	

Butte Hill

Alternate Seed Mixture No. 2 B Grass-lined Ditches

Seed Mixture	Rate, #PLS/Acre
Smooth Brome	5.0
Birdsfoot Trefoil	1.0
Red Clover	0.5

Pure live seed application rates shall be as specified in the tables.

The 1997 primary seed mixture was proposed by BSB County and is based upon their monitoring results for successful revegetation within the Butte area and has been reviewed and approved by BSB County, EPA and the State for use in upland areas of the Butte Priority Soils Operable Unit. The Alternate Seed Mixture No. 1 will only be used in areas with slopes of <10:1 that are particularly susceptible to weed infestation. Additional optimal conditions for use of the alternative seed mix include locations with high moisture holding capacity and shelter from strong wind conditions. The Alternate Seed Mixture No. 2 has been proposed by BSB County and is an option for hand seeding grass-lined ditches and detention basins.

Calculations of pure "live seed" may be made on the basis of either a germination test or a tetrazolium test in addition to the purity analysis. Seed shall be applied on a pure "live seed" basis. The quantity of pure "live seed" in a 100-lb. container shall be determined by the formula: 100 multiplied by germination percentage, and this product multiplied by the purity percentage. For example, if the seed is 85 percent pure and test 90 percent germination, then a 100-lb. container would contain 76.5 pounds of pure "live seed".

Fertilizer Application

If surface soil nutrient availability data are not available, fertilizer will be applied at a rate to achieve soil concentrations of 60 lbs. of nitrogen (N) per acre, 80 lbs. of P_2O_5 per acre, and 150 lbs. of K_2O per acre. Mechanical or hydraulic methods of application are allowed, providing a uniform application at the specified rate is accomplished. The application method is subject to approval by the RP Group. When scheduling and soil conditions permit, the fertilizer shall be incorporated into the soil by disking, raking, or shallow plowing to the full depth of the topsoil or to a maximum depth of six inches, whichever is less.

Fertilizer shall be applied to the prepared seedbed prior to seeding or mulching and shall be blended with the top layer of soil or concurrently with the seed (as "no-till" drills allow). Upon EPA approval, fertilizer may be applied subsequent to seeding and mulching. Re-fertilization following seedling establishment will not require incorporation. In no instance shall subsoil be incorporated into the seedbed as a result of the fertilization operation.

Mulch Application

Mulch is usually applied during the summer and early fall and drill seeded after October 15th. The mulch shall be applied in a uniform manner by a mulch spreader at rates varying from 2,000 to 4,000 lbs. per acre. The actual rate utilized shall depend upon site conditions (i.e., slope, erosion potential, etc.) and shall be approved by the RP Group and EPA prior to application. The mulch spreader shall be designed specifically for this type of work. The vegetative material shall be fed in the mechanical spreader at an even, uniform rate.

The mulch shall be anchored into the seedbed by using a mulch tiller (crimper). Straw or hay shall be clean grain straw and shall be pliable.

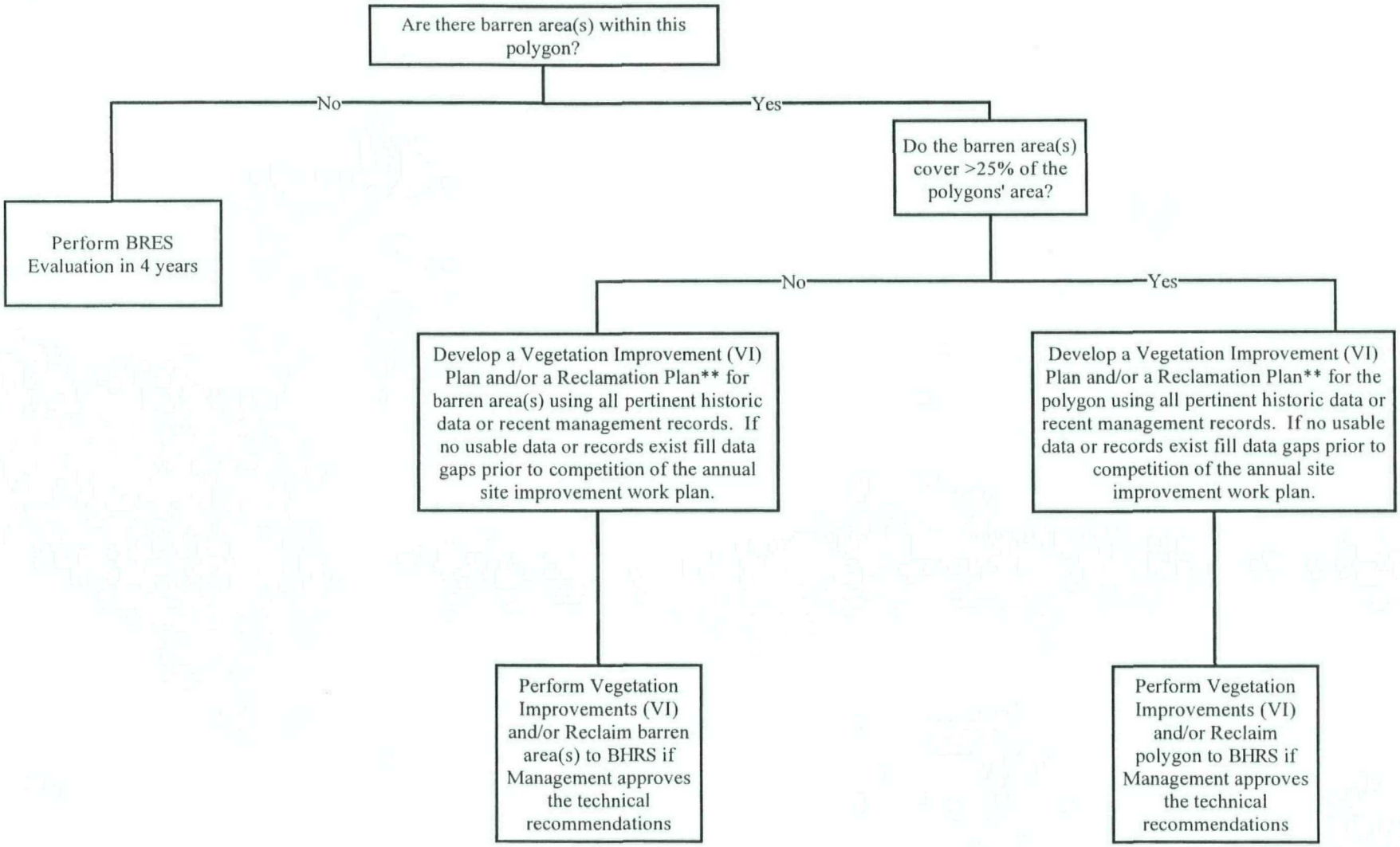
Mulch tillers shall have round, flat, notched blades of these approximate dimensions: 0.25-inch thick by 18 inches in diameter and spaced 8 inches apart. The tiller shall have sufficient weight to force the vegetative mulch a minimum of 3 inches into the soil and shall be equipped with disc scrapers. Mulch tilling shall be done on all slopes capable of being safely traversed by a tracked vehicle. All mulch tilling shall be done perpendicular of the flow-line of the slope.

Mulch, where required, will be applied to seeded areas as close as possible to the completion of seeding operations for the area. Mulch shall not be applied in the presence of free surface water, but may be applied upon damp ground.

Mulch shall not be applied to areas having a substantial vegetative growth, such as grasses, weeds, and grains. Areas not to be mulched shall be determined by the RP Group. Mulching shall not be done during adverse weather conditions or when wind prevents uniform distribution. Application shall be in a manner to not seriously disturb the seedbed surface.

BRES Appendix C

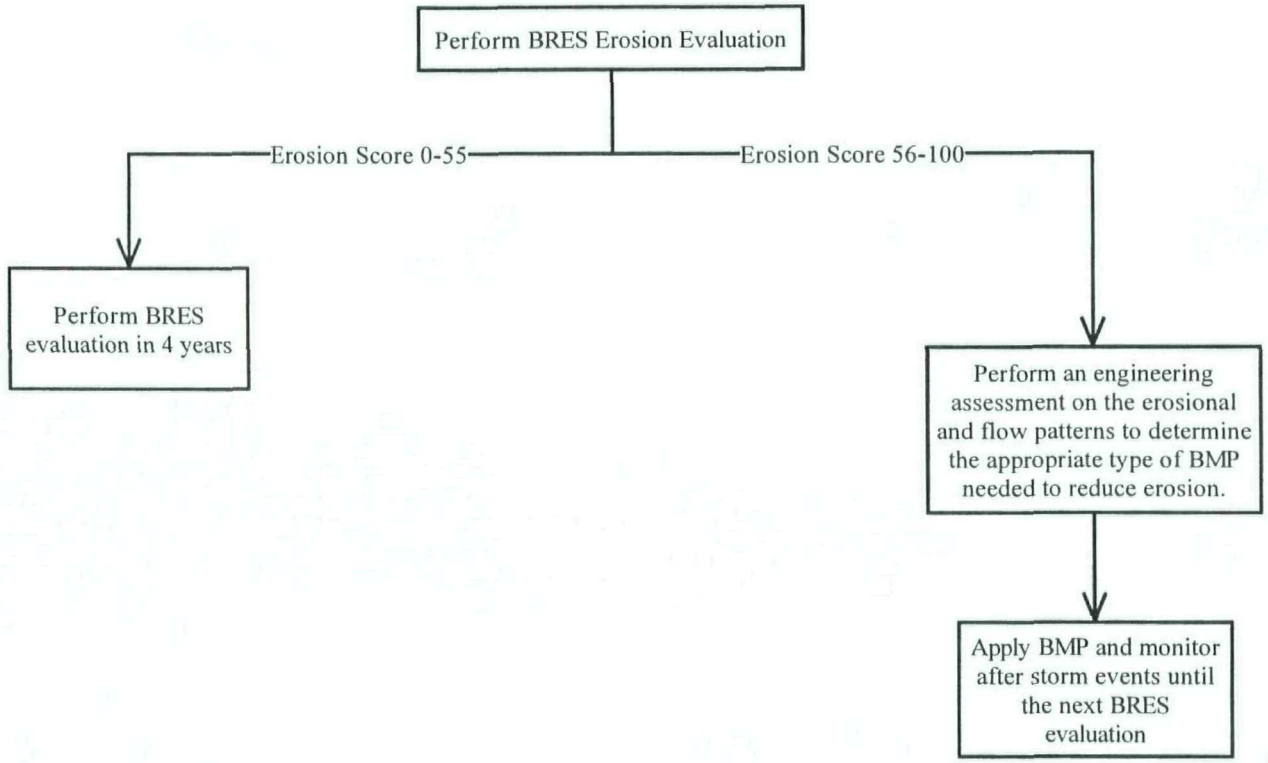
BRES Decision Logic



**Reclamation will occur only within a polygon that has had Vegetation Improvements (VI) fail and is not meeting the BHRS.

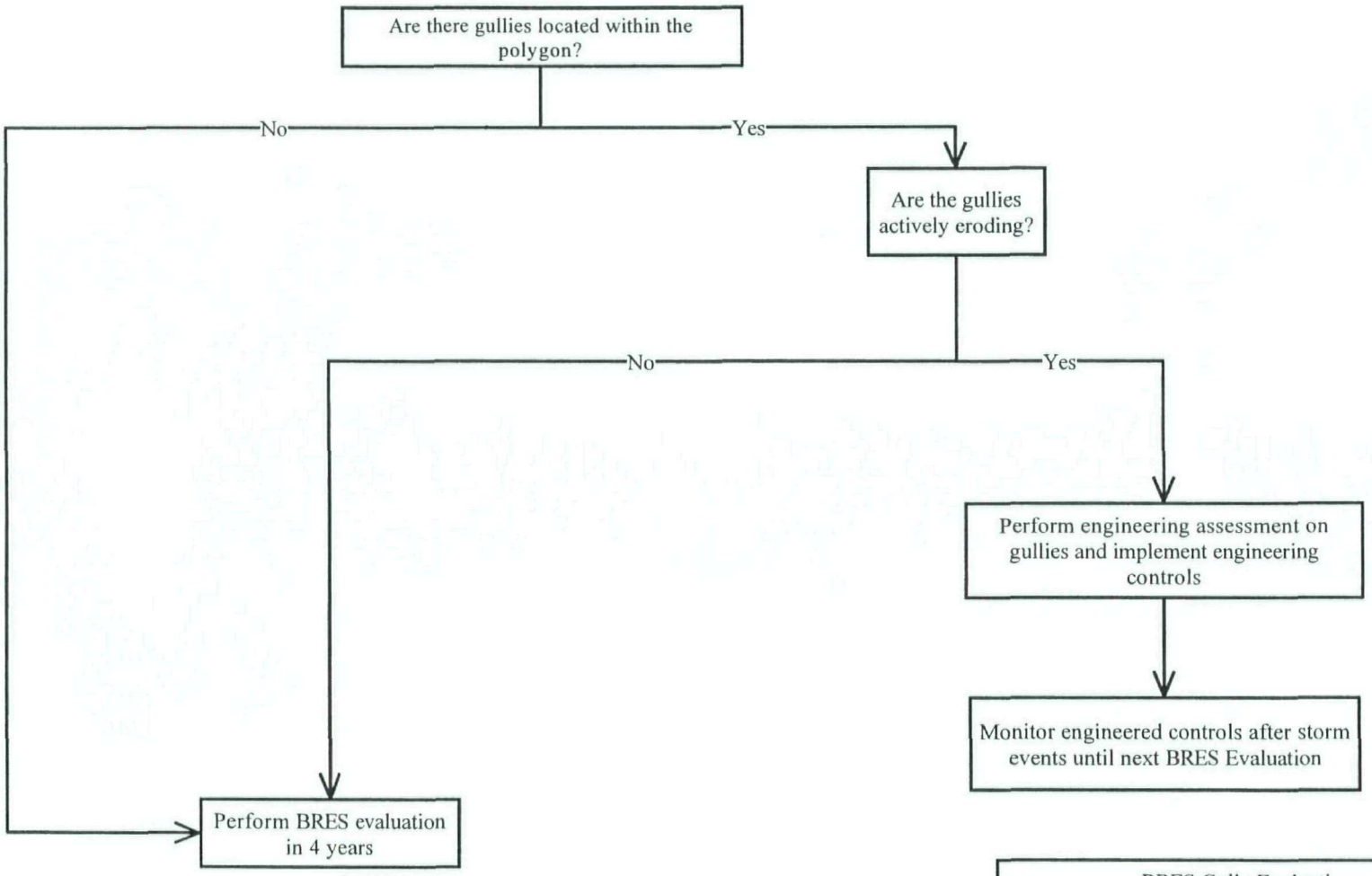
BRES Barren Area Evaluation

BHRS- Butte Hill Revegetation Specification
BRES- Butte Reclamation Evaluation System
SAP- Sampling and Analysis Plan



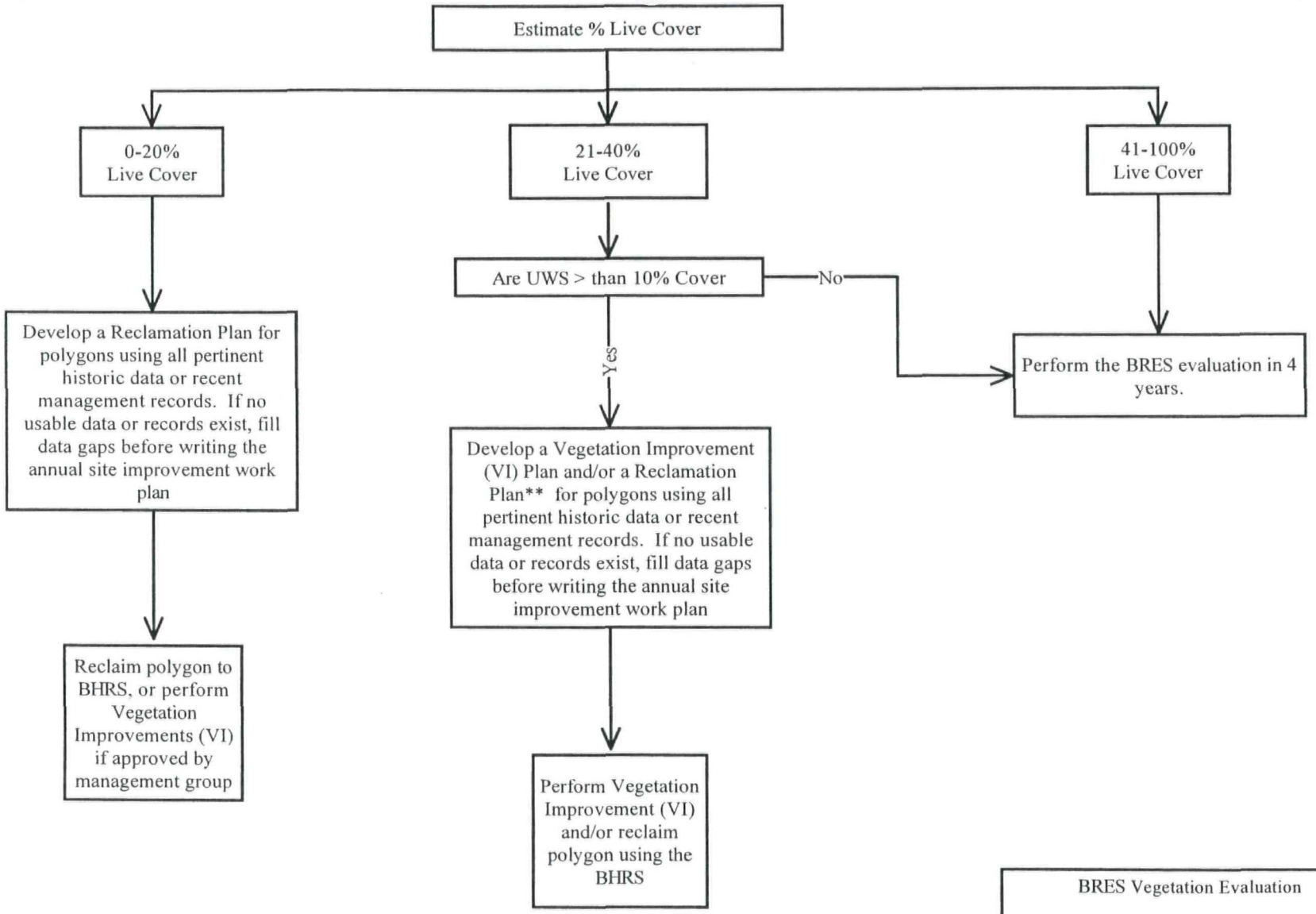
BRES Erosion Evaluation

BMP- Best Management Practice
BRES- Butte Reclamation Evaluation System



BRES Gully Evaluation

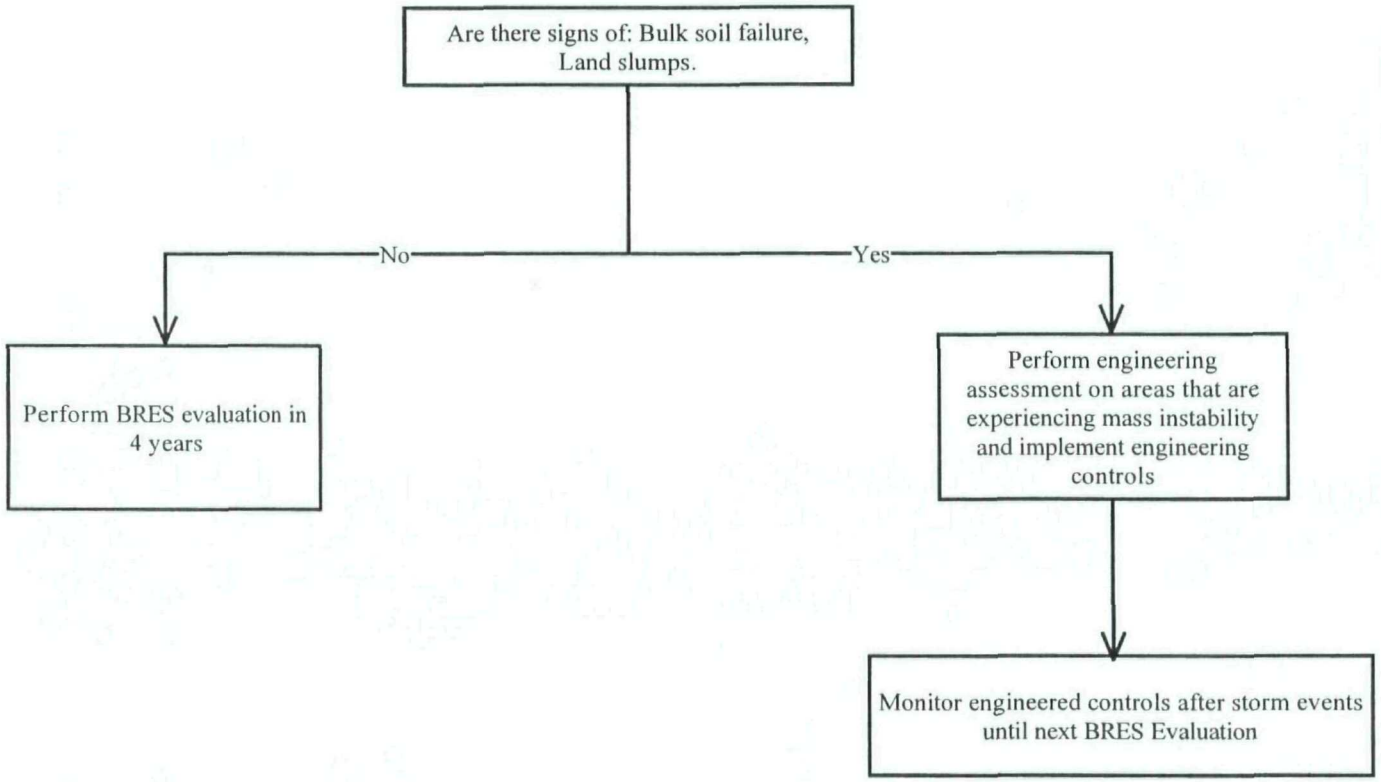
BRES- Butte Reclamation Evaluation System



**Reclamation will occur only within a polygon that has had Vegetation Improvements (VI) fails and is not meeting the BHRS.

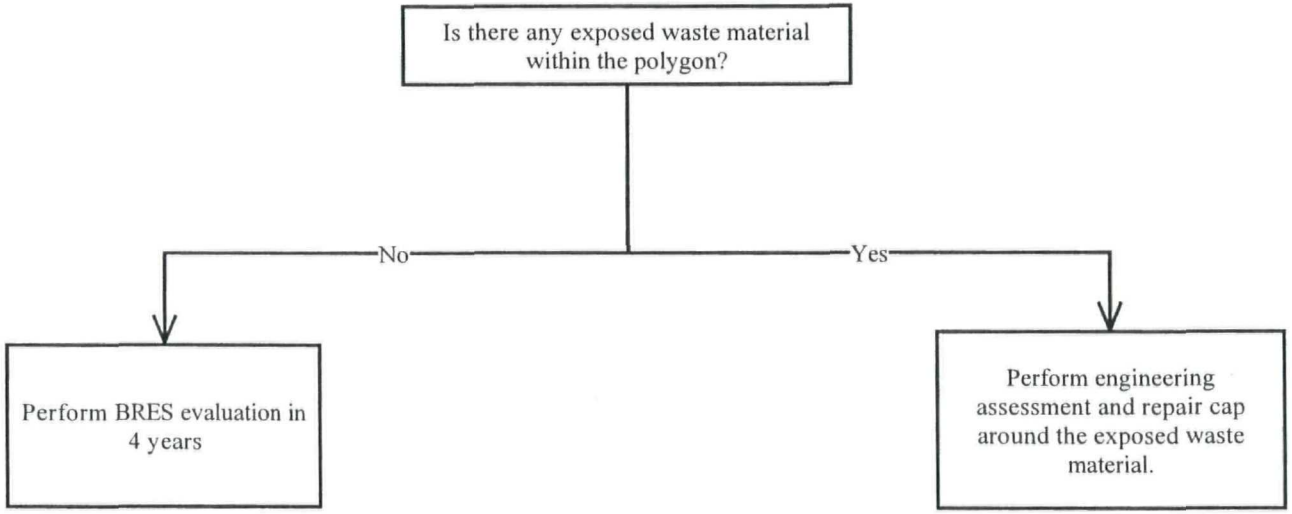
BRES Vegetation Evaluation

BRES- Butte Reclamation Evaluation System
UWS-Undesirable Weedy Species
BHRS- Butte Hill Revegetation Specification
VI- Vegetation Improvements



BRES Mass Instability Evaluation

BRES- Butte Reclamation Evaluation System



BRES Exposed Waste Material Evaluation

BRES Appendix D

BRES Field Form

BRES FIELD FORM

Site Name: _____ **Date:** _____

Team Members (Circle your name): _____

Number of Polygons: _____ Slope: _____ Aspect: _____ Area Description: _____

_____

Polygon Evaluation	1	2	3
Vegetation (% live)			
Erosion (BLM score)			
% live weedy species			

Vegetation: % of ground covered by:	POLYGON 1	2	3
Live (desirable) species			
*Live (undesirable weedy) species			
*Noxious weeds			
TOTAL % LIVE			
Litter			
Rocks > 2"			

*Up to 5% of undesirable species and 0% of noxious weeds may count toward live cover.

Erosion (BLM Form)	POLYGON 1	2	3
Surface Litter			
Surface Rock Movement			
Pedestalling			
Flow Patterns			
Rills			
Gullies			
Soil Movement			

Other BRES Trigger Items
Identify trigger areas (using #) on air photo

3. Site Edges: Are polygon edges (outer edges of site only) significantly different than remainder of the polygon?
Y_____ N_____ (check applicable items)

☐ **lime rock barrier** ☐ **depositional area**
☐ **more weeds** ☐ **steeper slope**
☐ **increased erosion** ☐ **less vegetation**
☐ **gullies** ☐ **other**_____

Estimate width of affected edge _____

4. Exposed Waste Material? Y_____ N_____

- Estimated pH_____
- Approximate area _____
- Number of areas with exposed waste _____

1. Percent live: please check appropriate category:

1	☐ **0-20**	☐ **21-39**	☐ **40-100**
2	☐ **0-20**	☐ **21-39**	☐ **40-100**
3	☐ **0-20**	☐ **21-39**	☐ **40-100**

2. Total BLM score 1____, 2____, 3____. Please check appropriate category.

1	☐ **0-55**	☐ **56-100**
2	☐ **0-55**	☐ **56-100**
3	☐ **0-55**	☐ **56-100**

5. Is there evidence of: Y_____ N_____

☐ **bulk soil failure** ☐ **land slumps**
☐ **subsidence**

Species Present:	Dominant	Frequent	Infreq.
Sheep fescue			
Crested wheatgrass			
Slender wheatgrass			
Yellow sweetclover			
Alfalfa			
Other:			
_____			
_____			
_____			
_____			

Use polygon number in boxes

Weeds Present:	Dominant	Frequent	Infreq.
Spotted knapweed			
Dalmation toadflax			
Cheatgrass			
Baby's breath			
Kochia			
Thistle			
Other:			
_____			
_____			
_____			

Use polygon number in boxes

6. Barren Areas: Y_____ N_____

- At Least 75 ft^2
- Not a rock outcrop
- Less than 10 % total cover (live & litter)

Number of barren areas _____

Do barren areas cover over 25% of polygon? Y____N____

Polygon barren area(s) located in (circle) 1 2 3

7. Gullies (over 6" in depth):

Y_____ N_____

Are any gullies actively eroding?

Y_____ N_____

Number of gullies _____

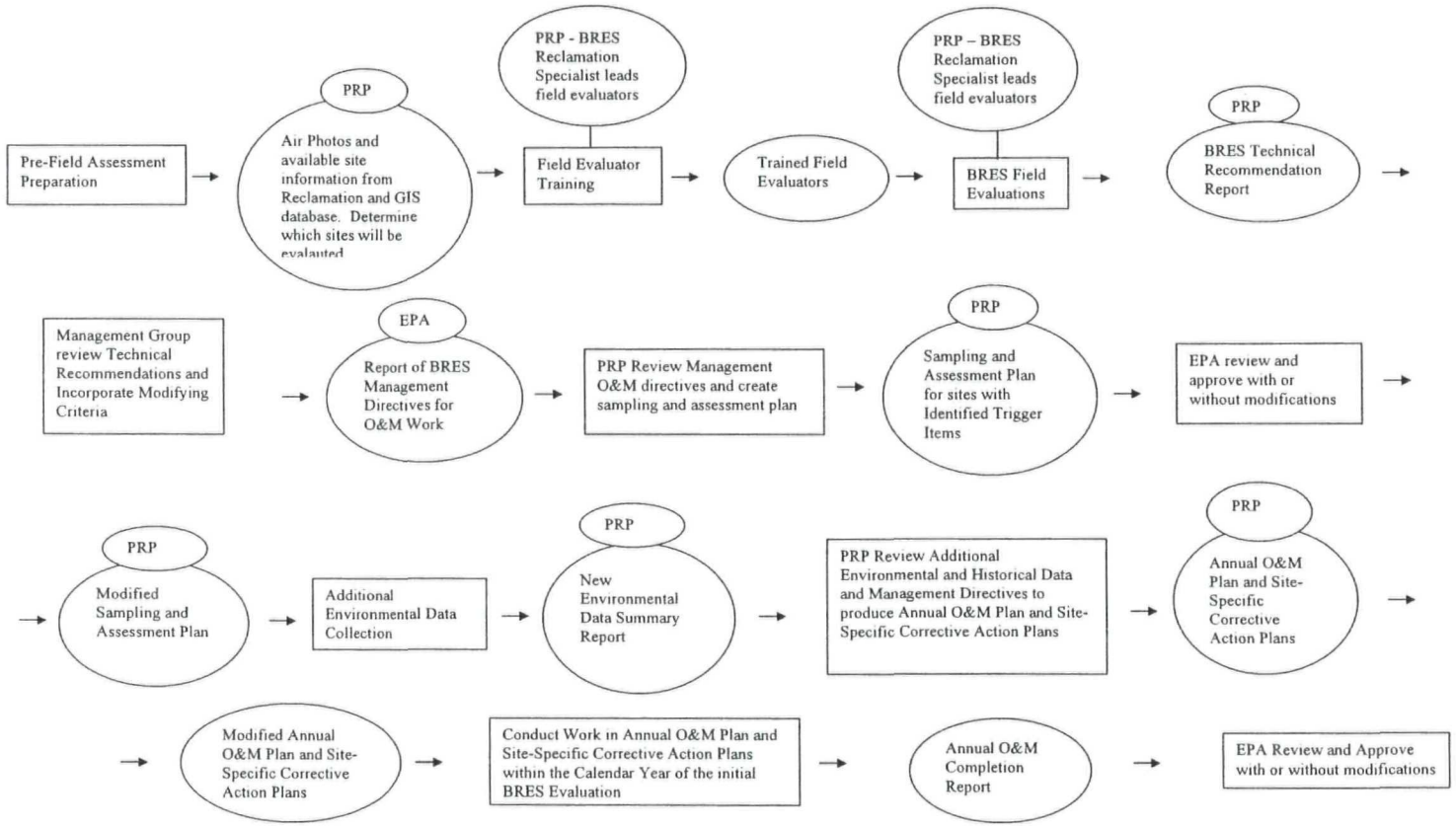
Comments.

Additional Vegetation:

Species	Dominant	Frequent	Infreq

BRES Appendix E

Annual BRES Process Flow Chart



Annual BRES Process Flowchart

BRES Appendix F

BRES Engineered Cap Integrity Field Form

Butte Reclamation Evaluation System (BRES)
Raw Data Field Form for Engineered Caps

Date_____ **Site Name/Number**_____
Field Team Members_____
Area Description_____

Rock Cap
Type of rock (limestone, pit run gravel, etc.)_____ Design thickness_____
Surface staining: None_____ Moderate_____ Excessive_____ Describe stain pattern/color_____

Displaced rock: None_____ Moderate_____ Excessive_____ Pattern of displacement: Localized_____ Universal_____
Describe movement (storm water rills, steep slope instability, vehicular, etc.)_____

Does rock cap have a geotextile liner? Yes_____ No_____ If yes, describe condition of liner (good, exposed, torn, poorly anchored, etc.)_____
Exposed subgrade materials? Yes_____ No_____ Describe exposed subgrade if noted (area, localized, dispersed, etc.)____

General comments regarding rock cap:_____

Concrete or Shotcrete Cap
Did design specify for sulfate resistant concrete? Yes_____ No_____ Unknown_____ Design thickness_____
Type of reinforcing (fiber, re-bar, welded wire fabric.)_____ Control joints? Yes____ No____
Surface staining: None_____ Moderate_____ Excessive_____ Describe stain pattern/color_____

Surface cracking: None_____ Moderate_____ Excessive_____ Describe the approximate frequency, length, and average thickness of the cracks if noted._____

Surface spalling: None_____ Moderate_____ Excessive_____ Describe the spalling pattern if noted._____

Exposed subgrade materials? Yes_____ No_____ Describe exposed subgrade if noted (area, localized, dispersed, etc.)____

Evidence of undercutting at edges of cap? None_____ Moderate_____ Excessive_____ Describe undercutting of subgrade soil at edges of cap if noted_____
General comments regarding concrete/shotcreet cap:_____

Asphalt Cap
Design Thickness_____ Is there a layer of base course under asphalt? Yes_____ No_____ Base course thickness_____
Surface cracking: None_____ Moderate_____ Excessive_____ Describe the frequency, length, and average thickness of the cracks if noted._____

Holes in asphalt? Yes_____ No_____ Describe number, size, shape of holes in asphalt if noted._____

Exposed subgrade materials? Yes_____ No_____ Describe exposed subgrade if noted (area, localized, dispersed, etc.)____

Evidence of undercutting at edges of cap? None_____ Moderate_____ Excessive_____ Describe undercutting of subgrade soil at edges of cap if noted_____
General comments regarding asphalt cap:_____

BRES Appendix G

BPSOU Plant Species Classes

BSPOU Plant Species Classes

Species Name	Life form Code	Life form Class	Common Name	Desirability Code
Achillea millefolium	PF	Perennial Forbs	Yarrow	AS
Agoseris glauca	PF	Perennial Forbs	False Dandelion	AS
Agropyron cristatum	PG	Perennial Grasses	Crested Wheatgrass	AS
Agropyron dasystachyum	PG	Perennial Grasses	Thickspike Wheatgrass	AS
Agropyron elongatum	PG	Perennial Grasses	Tall Wheatgrass	AS
Agropyron intermedium	PG	Perennial Grasses	Intermediate Wheatgrass	AS
Agropyron repens	PG	Perennial Grasses	Quackgrass	AS
Agropyron smithii	PG	Perennial Grasses	Western Wheatgrass	AS
Agropyron spicatum	PG	Perennial Grasses	Bluebunch Wheatgrass	AS
Agropyron spp.	PG	Perennial Grasses	Wheatgrass	AS
Agropyron trachycaulum	PG	Perennial Grasses	Slender Wheatgrass	AS
Agrostis alba	PG	Perennial Grasses	Redtop	AS
Agrostis scabra	PG	Perennial Grasses	Ticklegrass	AS
Agrostis tenuis	PG	Perennial Grasses	Colonial Bentgrass	AS
Allium cernuum	PF	Perennial Forbs	Nodding Onion	AS
Alopecurus pratensis	PG	Perennial Grasses	Meadow Foxtail	AS
Alyssum alyssoides	AF	Annual Forbs	Alyssum	UWS
Alyssum desertorum	AF	Annual Forbs	Alyssum	UWS
Alyssum murale	AF	Annual Forbs	Alyssum	UWS
Amaranthus albus	AF	Annual Forbs	White Pigweed	UWS
Amaranthus retroflexus	AF	Annual Forbs	Pigweed	UWS
Andropogon scoparius	PG	Perennial Grasses	Little Bluestem	AS
Antennaria rosea	PF	Perennial Forbs	Pussy Toes	AS
Arabis glabra	PF	Perennial Forbs	Smooth Rockress	AS
Arabis holboellii	PF	Perennial Forbs	Rockcress	AS
Arabis sp.	PF	Perennial Forbs	Rockcress	AS
Artemisia absinthium	BF	Biennial Forbs	Wormwood	UWS
Artemisia frigida	SS	Semi-shrubs	Pasture Sagewort	AS
Artemisia longifolia	S	Shrubs	Longleaf Sagewort	AS
Artemisia ludoviciana	PF	Perennial Forbs	Lousiana Sagewort	AS
Artemisia tridentata	S	Shrubs	Big Sagebrush	AS
Aster adscendens	PF	Perennial Forbs	Aster	AS
Aster sp.	PF	Perennial Forbs	Aster	AS
Astragalus adsurgens	PF	Perennial Forbs	Milkvetch	AS
Astragalus cicer	PF	Perennial Forbs	Cicer Milkvetch	AS
Atriplex hastata	AF	Annual Forbs	Orache	UWS
Avena sativa	AG	Annual Grasses	Wild Oats	UWS
Balsamhorriza saggitata	PF	Perennial Forb	Arrowleaf balsamroot	AS
Barbarea orthoceras	AF	Annual Forbs	Barbarea	UWS
Berberis repens	PF	Perennial Forb	Oregon grape	AS
Berteroa incana	AF	Annual Forbs	Berteroa	UWS
Brassica rapa	AF	Annual Forbs	Rape Mustard	UWS
Brassica sp.	AF	Annual Forbs	Rape Mustard	UWS
Bromus biebersteinii	PG	Perennial Grasses	Meadow Brome	AS
Bromus inermis	PG	Perennial Grasses	Smooth Brome	AS
Bromus japonicus	AG	Annual Grasses	Japanese Brome	UWS
Bromus marginatus	PG	Perennial Grasses	Mountain Brome	AS
Bromus tectorum	AG	Annual Grasses	Cheatgrass	UWS
Camelina microcarpa	AF	Annual Forbs	Littleseed False Flax	UWS
Capsella bursa-pastoris	AF	Annual Forbs	Shepherd's Purse	UWS
Cardaria draba	PF	Perennial Forbs	Whitetop	NXW
Carduus nutans	BF	Biennial Forbs	Musk Thistle	UWS

BSPOU Plant Species Classes

Species Name	Life form Code	Life form Class	Common Name	Desirability Code
ssp.macrolepis				
Centaurea cyanus	AF	Annual Forbs	Bachelor's Buttons	UWS
Cercocarpus ledifolius	S	Shrub	Mountain Mahogony	AS
Chaenactis douglasii	PF	Perennial Forbs	Chaenactis	AS
Chenopodium album	AF	Annual Forbs	Goosefoot	UWS
Chenopodium leptophyllum	AF	Annual Forbs	Narrowleaf Goosefoot	UWS
Chenopodium pratericola	AF	Annual Forbs	Goosefoot	UWS
Chenopodium sp.	AF	Annual Forbs	Goosefoot	UWS
Chrysothamnus nauseosus	S	Shrubs	Rubber Rabbitbrush	AS
Cirsium arvense	PF	Perennial Forbs	Canada Thistle	NXW
Cirsium undulatum	PF	Perennial Forbs	Prairie Thistle	AS
Cleome serrulata	AF	Annual Forbs	Rocky Mountain Bee Plant	AS
Collomia linearis	AF	Annual Forbs	Collomia	AS
Comandra umbellata	PF	Perennial Forbs	Bastard Toadflax	AS
Convolvulus arvensis	PF	Perennial Forbs	Field Bindweed	NXW
Dactylis glomerata	PG	Perennial Grasses	Orchard Grass	AS
Dasiphora fruticosa	S	Shrub	Shrubby Cinquefoil	AS
Deschampsia caespitosa	PG	Perennial Grasses	Tufted Hairgrass	AS
Descurainia pinnata	AF	Annual Forbs	Tansy Mustard	UWS
Descurainia richardsonii	AF	Annual Forbs	Tansy Mustard	UWS
Descurainia sophia	AF	Annual Forbs	Tansy Mustard	UWS
Distichlis spicata	PG	Perennial Grasses	Inland Saltgrass	AS
Dougalsia Montana	PF	Perennial Forb	Douglasia	AS
Dracocephalum parviflorum	AF	Annual Forbs	Dragonhead	AS
Echinacea sp.	PF	Perennial Forbs	Purple Prairie Coneflower	AS
Elymus canadensis	PG	Perennial Grasses	Canada Wildrye	AS
Elymus cinereus	PG	Perennial Grasses	Great Basin Wildrye	AS
Elymus junceus	PG	Perennial Grasses	Russian Wildrye	AS
Epilobium angustifolium	PF	Perennial Forbs	Fireweed	AS
Epilobium brachycarpum	AF	Annual Forbs	Willow Herb	AS
Epilobium ciliatum	PF	Perennial Forbs	Willow Herb	AS
Epilobium paniculatum	AF	Annual Forbs	Willow Herb	AS
Erigeron compositus	PF	Perennial Forbs	Daisy Fleabane	AS
Erigeron disectum	PF	Perennial Forb	Cutleaf daisy	AS
Erigeron pinnatisectus	PF	Perennial Forbs	Daisy Fleabane	AS
Erigeron sp.	PF	Perennial Forbs	Daisy Fleabane	AS
Eriogonum sp.	PF	Perennial Forb	Wild Buckwheat	AS
Erodium cicutarium	PF	Perennial Forbs	Cranesbill	UWS
Erysimum asperum	PF	Perennial Forbs	Western Wallfower	AS
Erysimum repandum	AF	Annual Forbs	Wallflower	AS
Eschscholtzia californica	AF	Annual Forbs	California Poppy	AS
Festuca ovina	PG	Perennial Grasses	Sheep Rescue	AS
Festuca pratensis	PG	Perennial Grasses	Meadow Fescue	AS
Festuca scabrella	PG	Perennial Grasses	Rough Fescue	AS
Filago arvensis	AF	Annual Forbs	Filago	UWS
Fraxinus pennsylvanica	S	Shrub	Mountain Ash	AS
Gaillardia aristata	PF	Perennial Forbs	Blanket Flower	AS
Gayophytum ramosissimum	AF	Annual Forbs	Ground Smoke	AS

BSPOU Plant Species Classes

Species Name	Life form Code	Life form Class	Common Name	Desirability Code
Geranium viscosissimum	PF	Perennial Forbs	Geranium	AS
Grindelia squarrosa	PF	Perennial Forbs	Curlycup Gumweed	AS
Gypsophila paniculata	PF	Perennial Forbs	Baby's Breath	UWS
Haplopappus acaulis Stenotus acaulis	PF	Perennial Forb	yellow tufted daisy	AS
Helianthus annuus	AF	Annual Forbs	Annual Sunflower	UWS
Heliomeris multiflora	PF	Perennial Forbs	Snowy Goldeneye	AS
Heterotheca villosa	PF	Perennial Forbs	Golden Aster	AS
Hordeum jubatum	PG	Perennial Grasses	Foxtail Barley	AS
Iva axillaris	PF	Perennial Forbs	Poverty Sumpweed	AS
Juncus balticus	PG	Perennial Grasses	Baltic Rush	AS
Juniperus horizontalis	S	Shrub	Creeping Juniper	AS
Juniperus scopulorum	T	Trees	Rocky Mountain Juniper	AS
Kochia scoparia	AF	Annual Forbs	Kochia	UWS
Lactuca serriola	AF	Annual Forbs	Prickly Lettuce	UWS
Lappula redowskii	AF	Annual Forbs	Stickseed	UWS
Lepidium densiflorum	AF	Annual Forbs	Pepperweed	UWS
Lepidium perfoliatum	AF	Annual Forbs	Pepperweed (clasping)	UWS
Lepidium ramosissimum	AF	Annual Forbs	Pepperweed	UWS
Linaria dalmatica	PF	Perennial Forbs	Spotted Toadflax	NXW
Linaria vulgaris	PF	Perennial Forbs	Butter and Eggs	UWS
Linum lewisii	PF	Perennial Forbs	Blue Flax	AS
Linum sp.	PF	Perennial Forbs	Flax	AS
Lithospermum ruderale	PF	Perennial Forbs	Puccoon	AS
Lotus corniculatus	PF	Perennial Forbs	Birdsfoot Trefoil	AS
Lupinus sp.	PF	Perennial Forb	Lupine	AS
Lychnis alba	AF	Annual Forbs	Lychnis	AS
Machaeranthera canescens	PF	Perennial Forbs	Machaeranthera	AS
Malva rotundifolia	PF	Perennial Forbs	Cheese Weed	UWS
Matricaria matricarioides	AF	Annual Forbs	Pineapple Weed	UWS
Medicago lupulina	PF	Perennial Forbs	Black Medic	AS
Medicago sativa	PF	Perennial Forbs	Alfalfa	AS
Melilotus alba	BF	Biennial Forbs	White Sweetclover	AS
Melilotus officinalis	BF	Biennial Forbs	Yellow Sweetclover	AS
Mentzelia dispersa	AF	Annual Forbs	Stickleaf	AS
Mentzelia laevicaulis	BF	Biennial Forbs	Evening Star	AS
Oenothera caespitosa	PF	Perennial Forbs	Gumbo Lily	AS
Oenothera villosa	BF	Biennial Forbs	Evening Primrose	AS
Onobrychis viciaefolia	PF	Perennial Forbs	Sanfoin	AS
Onopordum acanthium	BF	Biennial Forbs	Scotch Thistle	UWS
Oryzopsis hymenoides	PG	Perennial Grasses	Indian Ricegrass	AS
Oxytropis sp.	PF	Shrub	Locoweed	AS
Panicum capillare	AG	Annual Grasses	Witchgrass	UWS
Papaver sp.	AF	Annual Forbs	Poppy	AS
Penstemon sp.	PF	Perennial Forbs	Beard Tongue	AS
Phacelia Hastata	PF	Perennial Forbs	Phacelia	AS
Phacelia heterophylla	PF	Perennial Forbs	Phacelia	AS
Phleum pratense	PG	Perennial Grasses	Timothy	AS
Pinus contorta	T	Trees	Lodgepole Pine	AS
Pinus flexelis	T	Tree	Limber Pine	AS
Pinus ponderosa	T	Tree	Ponderosa Pine	AS

BSPOU Plant Species Classes

Species Name	Life form Code	Life form Class	Common Name	Desirability Code
Poa ampla	PG	Perennial Grasses	Big Bluegrass	AS
Poa compressa	PG	Perennial Grasses	Canada Bluegrass	AS
Poa interior	PG	Perennial Grasses	Interior Bluegrass	AS
Poa palustris	PG	Perennial Grasses	Fowl Bluegrass	AS
Poa pratensis	PG	Perennial Grasses	Kentucky Bluegrass	AS
Poa secunda	PG	Perennial Grasses	Sandberg Bluegrass	AS
Poa sp.	PG	Perennial Grasses	Bluegrass	AS
Polygonum aviculare	AF	Annual Forbs	Knotweed	UWS
Polygonum convolvulus	AF	Annual Forbs	Black Blindweed	UWS
Polygonum lapathifolium	AF	Annual Forbs	Knotweed	UWS
Polygonum sawatchense	AF	Annual Forbs	Knotweed	AS
Populus acuminata	T	Tree	black cottonwood	AS
Populus angustifolia	T	Tree	narrowleaf cottonwood	AS
Populus tremuloides	T	Trees	Quaking Aspen	AS
Potentilla norvegica	PF	Perennial Forbs	Cinquefoil	AS
Potentilla sp.	PF	Perennial Forbs	Cinquefoil	AS
Prunus americana	S	Shrubs	Wild Plum	AS
Prunus virginiana	S	Shrubs	Chokecherry	AS
Pseudotsuga menziessi	T	Tree	Douglass Fir	AS
Puccinellia nuttalliana	PG	Perennial Grasses	Alkaligrass	AS
Purshia tridentate	S	Shrub	Bitterbrush	AS
Ratibida columnifera	PF	Perennial Forbs	Prairie Coneflower	AS
Ribes sp.	S	Shrub	gooseberry/currant	AS
Rosa woodsii	S	Shrub	Wild Rose	AS
Rubus ideaus	S	Shrub	raspberry	AS
Rumex acetosella	PF	Perennial Forbs	Sheep Sorrel	UWS
Rumex crispus	PF	Perennial Forbs	Curlyleaf Dock	UWS
Rumex salicifolius	PF	Perennial Forbs	Willowleaf Dock	AS
Rumex sp.	PF	Perennial Forbs	Dock	AS
Salix sp.	S	Shrub	Willows	AS
Salsola iberica	AF	Annual Forbs	Russian Thistle	UWS
Setaria viridis	AG	Annual Grasses	Green Foxtail	UWS
Silene cserei	AF	Annual Forbs	Catchfly	UWS
Silene noctiflora	AF	Annual Forbs	Catchfly	UWS
Silene vulgaris	AF	Annual Forbs	Catchfly	UWS
Sisymbrium altissimum	AF	Annual Forbs	Tumbling Hedge Mustard	UWS
Sisymbrium loeselii	AF	Annual Forbs	Hedge Mustard	UWS
Sitanion hystrix	PG	Perennial Grasses	Squirreltail Grass	AS
Solanum triflorum	AF	Annual Forbs	Nightshade	UWS
Solidago gigantea	PF	Perennial Forbs	Tall Goldenrod	AS
Stipa columbiana	PG	Perennial Grasses	Columbia Needlegrass	AS
Stipa comata	PG	Perennial Grasses	Needle-and-Thread Grass	AS
Stipa sp.	PG	Perennial Grasses	Needlegrass	AS
Stipa viridula	PG	Perennial Grasses	Green Needlegrass	AS
Taraxacum officinale	PF	Perennial Forbs	Common Dandelion	UWS
Thlaspi arvense	AF	Annual Forbs	Pennycress	UWS
Tragopogon dubius	BF	Biennial Forbs	Salsify	UWS
Trifolium hybridum	PF	Perennial Forbs	Alsike Clover	AS
Trifolium pratense	PF	Perennial Forbs	Red Clover	AS
Trifolium repens	PF	Perennial Forbs	White Clover	AS
Triticum aestivum	AG	Annual Grasses	Wheat	UWS
Unknown dicot	PF	Perennial Forbs		AS

BSPOU Plant Species Classes

Species Name	Life form Code	Life form Class	Common Name	Desirability Code
Unknown garden scroph	PF	Perennial Forbs		AS
Verbascum thapsus	BF	Biennial Forbs	Common Mullein	UWS
Verbena bracteata	AF	Annual Forbs	Creeping Charlie	UWS
Verbena hastata	PF	Perennial Forbs	Vervain	AS
Vulpia octoflora	AG	Annual Grasses	Six-weeks Fescue	AS
Vaccinium scoparium	S	Shrub	Grouse whortleberry	AS

Notes:

Lifeform Code:

PG-Perennial Grasses
AS- Annual Grasses
PF-Perennial Forbs
AF- Annual Forbs
BF-Biennial Forbs
SS- Semi-shrubs
S-Shrubs
T- Trees

Desirability Code:

AS-Acceptable species.
UWS- Undesirable weedy species
NXS-Noxious weeds

BRES Appendix H

Noxious Weed List for Montana and Butte-Silver Bow County

Noxious Weed List for Montana and Butte-Silver Bow County

Category I

Category I noxious weeds are weeds that are currently established and generally widespread in many counties of the state. Management criteria include awareness and education, containment and suppression of existing infestations, and prevention of new infestations. These weeds are capable of rapid spread and render land unfit or greatly limit beneficial uses.

- leafy spurge *Euphorbia esula*
- Canada thistle *Cirsium arvense*
- Russian knapweed *Centaurea repens*
- spotted knapweed *Centaurea maculosa*
- diffuse knapweed *Centaurea diffusa*
- field bindweed *Convolvulus arvensis*
- whitetop (hoary cress) *Cardaria draba*
- Dalmatian toadflax *Linaria dalmatica*
- St. Johnswort (goatweed) *Hypericum perforatum*
- sulfur cinquefoil *Potentilla recta*
- common tansy *Tanacetum vulgare*
- oxeye daisy *Chrysanthemum leucanthemum* L.
- houndstongue *Cynoglossum officinale* L.

Category II

Category II noxious weeds have recently been introduced into the state or are rapidly spreading from their current infestation sites. These weeds are capable of rapid spread and invasion of lands, rendering lands unfit for beneficial uses. Management criteria include awareness and education, monitoring and containment of known infestations and eradication where possible.

- dyer's woad *Isatis tinctoria*
- purple loosestrife or lythrum *Lythrum salicaria or Lythrum virgatum*
- tansy ragwort *Senecio jacobaea* L.
- meadow hawkweed complex *Hieracium pratense, H. floribundum, H. piloselloides*
- orange hawkweed *Hieracium aurantiacum* L.
- tall buttercup *Ranunculus acris* L.
- tamarisk (saltcedar) *Tamarix* spp.

Category III

Category III noxious weeds have not been detected in the state or may be found only in small, scattered, localized infestations. Management criteria include awareness and education, early detection and immediate action to eradicate infestations. These weeds are known pests in nearby states and are capable of rapid spread and render land unfit for beneficial uses.

- yellow starthistle *Centaurea solstitialis*
- common crupina *Crupina vulgaris*
- rush skeletonweed *Chondrilla juncea*

Category IV

County (Butte-Silver Bow County) declared noxious weeds.

- Baby's breath *Gysophila paniculated*
- Wild caraway *Carum carvi*
- Matrimony vine *Lycium balimisolium* L.

BRES Appendix I

BRES Erosion Condition Class Determination

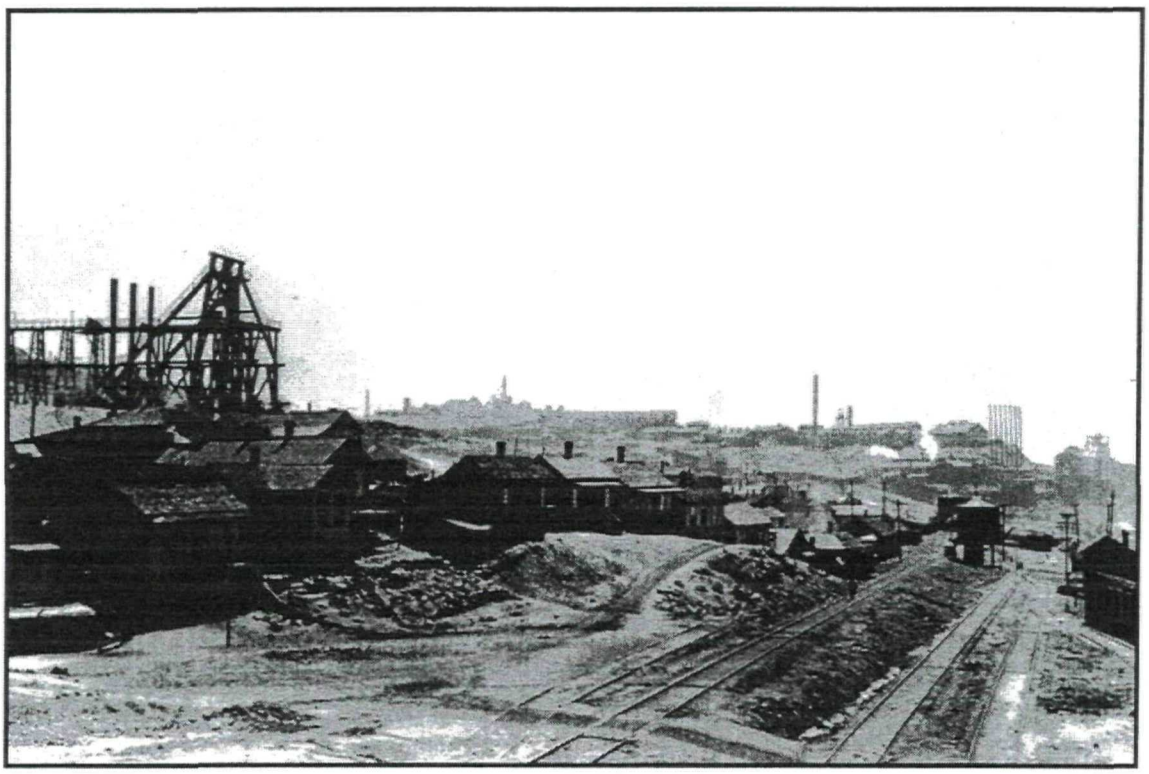
BRES EROSION CONDITION CLASS DETERMINATION

SURFACE LITTER	No movement, or if present, less than 2 percent of the unattached litter has been translocated and redeposited against obstacles. 0 or 3	Between 2 and 10 percent of the unattached litter has been translocated and redeposited against obstacles. 6	Between 10 and 25 percent of the unattached litter has been translocated and redepostied against obstacles. 8	Between 25 and 50 percent of the unattached litter has been translocated and redeposited against obstacles. 11	More than 50 percent of the unattached litter has been translocated and redeposited against obstacles. 14
SURFACE ROCK MOVEMENT	No movement, or if present, less than 2 percent of the surface rock fragments show localized concentration. 0 or 2	Between 2 and 10 percent of the surface rock fragments show localized concentration. 5	Between 10 and 25 percent of the surface rock fragments show localized concentration. 8	Between 25 and 50 percent of the surface rock fragments show localized concentration. 11	More than 50 percent of the surface rock fragments show localized concentration. 14
PEDESTALLING	Pedestals are mostly less than 0.1 inches (2.5 mm) high and/or less frequent than 2 pedestals per 100 sq. ft. 0 or 3	Pedestals are mostly between 0.1 to 0.3 inches (2.5 to 8 mm) high and/or have a frequency of 2 to 5 pedestals per 100 sq. ft. 6	Pedestals are mostly between 0.3 and 0.6 inches (8 to 15 mm) high, and/or have a frequency of 5 to 7 pedestals per 100 sq. ft. 9	Pedestals are mostly between 0.6 to 1 inch (15 to 25 mm) high, and/or have a frequency of 7 to 10 pedestals per 100 sq. ft. 11	Pedestals are mostly over 1 inch (25 mm) high, and/or have a frequency of over 10 pedestals per 100 sq. ft. 14
FLOW PATTERNS	None, or if present, less than 2 percent of the surface area shows a flow pattern in which water flows over the ground surface for a distance at least 10 linear feet. 0 or 3	Between 2 and 10 percent of the surface area shows a flow pattern in which water flows over the ground surface for a distance of at least 10 linear feet. 6	Between 10 and 25 percent of the surface area shows a flow pattern in which water flows over the ground surface for a distance of at least 10 linear feet. 9	Between 25 and 50 percent of the surface area shows a flow pattern in which water flows over the ground surface for a distance of at least 10 linear feet. 12	Over 50 percent of the surface area shows a flow pattern in which water flows over the ground surface for a distance of at least 10 linear feet. 15
RILLS depth	Rills, if present, are mostly less than 0.5 in. (13mm) deep 0 to 2	Rills are mostly 0.5 to 1 in. (13mm to 25mm) deep. 3	Rills are mostly 1 to 1.5 in. (25mm to 38mm) deep. 4 to 5	Rills are mostly 1.5 to 3 in. (38mm to 76mm) deep. 6	Rills are mostly 3 to 6 in. (76mm to 152mm) deep. 7
RILLS frequency	Rills, if present, are generally found at intervals over 15 ft. 0 to 2	Rills, if present, are generally found at intervals over 10 ft. 3	Rills, if present, are generally found at intervals over 5 ft. 4 to 5	Rills, if present, are generally found at intervals between 2 to 5 ft. 6	Rills, if present, are generally found at intervals between 0 to 2 ft. 7
GULLIES depth	Gullies, if present, less than 2 percent of the channel bed and walls show active erosion. 0 to 2	Between 2 and 5 percent of the channel bed and walls show active erosion. 3	Between 5 and 10 percent of the channel bed and walls show active erosion. 4 to 5	Between 10 and 50 percent of the channel bed and walls show active erosion. 6	Over 50 percent of the channel bed and walls show active erosion. 7
GULLIES frequency	Gullies, if present, make up less than 2 percent of the area. 0 to 2	Gullies make up between 2 to 5 percent of the total area. 3	Gullies make up between 5 to10 percent of the total area. 4 to 5	Gullies make up between 10 to 50 percent of the total area. 6	Gullies make up greater than 50 percent of the total area. 7
SOIL MOVEMENT	Depth of deposits around obstacles is between 0 and 0.1 inches (0 to 2.5 mm). 0 or 3	Depth of deposits around obstacles is between 0.1 and 0.2 inches (2.5 to 5mm). 5	Depth of deposits around obstacles 0.2 and 0.4 inches (5 to 10 mm) 8	Depth of deposits around obstacles is between 0.4 and 0.8 inches (10 to 20 mm). 11	Depth of deposits around obstacles is over 0.8 inches (20 mm). 14

Record of Decision
Butte Priority Soils Operable Unit
Silver Bow Creek/Butte Area NPL Site

U.S. Environmental Protection Agency, September 2006

Part 3: Responsiveness Summary



Responsiveness Summary

Contents

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Introduction

This Responsiveness Summary is Part 3 of the Record of Decision for the Butte Priority Soils Operable Unit (BPSOU). The purpose of the Responsiveness Summary is to present the U.S. Environmental Protection Agency's (EPA's) response to significant public, stakeholder, and responsible party comments on the Proposed Plan in accordance with 40 CFR 300.430(f)(3)(F) and Section 117(a) and (b) of CERCLA. The public outreach process used to encourage comment and participation on this decision is presented in Section 3 of the Decision Summary of this ROD.

This Responsiveness Summary consists of three sections and a data CD, as follows:

- **Section 1 - Comments from the General Public.** Provides a brief overview of the number of comments by topic received from the general public (i.e., excluding responsible party and Agency comments). The remainder of Section 1 is organized by comment topics and subtopics. Comment summaries are provided and followed by EPA's response. Tables at the beginning of each topic further summarize the number of comments received, as well as the "Index ID" assigned to the individual comments (see below).

- **Section 2 - Comments from Responsible Parties.** Provides responses to comments submitted by the responsible parties (Atlantic Richfield, Butte-Silver Bow, and the Railroad Group).

- **Section 3 - Comments from Agencies.** Provides responses to comments submitted by the Agencies (Montana DEQ, U.S. Fish and Wildlife Service, and the State of Montana Natural Resources Damages Program).

- **Categorized Comment Record.** A data CD is provided that includes the Responsiveness Summary Comment Index (Excel spreadsheet) and scanned Adobe Acrobat Reader (PDF) files of the original comments. Each comment submittal and individual comment was assigned an Index ID representing the original letter and the individual comment. For example, the Index ID 85.3 would refer to the third comment from letter 85. The comments were then categorized in to topics and subtopics. These Index ID numbers are included in the tables of Section 1, so that each comment summary and response is traceable to the individual comments identified in the letters.

Section 1

Comments from the General Public

Section 1 Comments from General Public

In total, 1,321 individual comments were identified in comment submittals from the general public. These also include comments from the public meetings. This total includes any substantive comments that were hand-written on pre-made comment post cards. The pre-printed comment cards were tallied separately. The following table summarizes the comment totals by overall topic.

Overall Topic	Number of Comments (General Public Only)
Air Quality	7
General Comments (very generalized)	22
Granite Mountain Memorial Area	7
Groundwater (general)	19
Lower Area One	93
Parrott Tailings/Metro Storm Drain	163
Residential Metals	217
Comments directed Site Wide	505
Solid Media/Waste Left in Place	55
Superfund Procedural Issues	159
Surface Water – General	26
Surface Water – Storm Water	48
Total	**1,321**
Pre-Printed Comment Cards	356

Section 1 of this Responsiveness Summary is organized by subsections on these overall topics. Similar topics were grouped together due to the large number of comments received. At the beginning of each subsection, a table with a breakdown summarizing the topics and subtopics is presented along with totals and comment identification numbers. Following the table, a brief summary of the comment subtopic is presented and EPA's response is provided in *italic font*.

Comments submitted by the PRPs and other regulatory agencies are presented in Sections 2 and 3 and are not included in the above totals.

An electronic copy of the comment index spreadsheet is included with this responsiveness summary, along with scanned pdf files of the comment letters received. The comment index spreadsheet shows how comments were grouped into topics and subtopics and can be used to trace an individual comment to its source.

1.1 Air Quality

Comment Topics, Comment Totals, and References

Topic	Subtopic		Number of Comments	Comment ID references
Overall Topic: Air Quality			7	
Air Quality Monitoring Inadequate	A	Characterization is Inadequate	5	70.64, 70.106, 108.12, 124.29, 124.35
Air Quality Concerns Outside the Scope of the BPSOU Remedy	A	Out of Scope	2	75.138, 108.7

Air Quality Monitoring is Inadequate/More study should be done

A. ***Characterization is Inadequate:*** Additional air quality studies are needed to better understand potential health threats related to blowing particulates from mining areas.

EPA Response: *There are air standards for 10-micron particulate matter (PM-10). Based on air quality data, EPA determined that unreclaimed source areas were not a significant source of PM-10 emissions, even prior to any of the reclamation actions in the OU (PM-10 is an appropriate screening tool to determine if a potential air quality problem exists due to particulate matter air transport from unreclaimed source areas.) Further, contaminants of concern, such as lead, accounted for a fraction of the total particulate matter emanating from unreclaimed source areas. The PM-10 data from the various stations around Butte showed that particulate concentrations in Butte are quite low, with no exceedances of the annual 50 microgram per cubic meter ($\mu g/m^3$) standard since 1987. Only one exceedance of the daily 150 $\mu g/m^3$ standard has been noted since 1989. Any high particulate levels have been primarily associated with smoke from wood burning, road dust, and vehicle exhaust. EPA concluded early in the scoping of the RI/FS that airborne transport of COC-bearing particulates within the BPSOU does not pose a significant threat to human health or the environment (for additional information see Section 3.1, Butte Priority Soils Operable Unit, Phase II RI Report, April 2002). EPA did perform air monitoring of the Granite Mountain Memorial Area for a one-year period to reconfirm the analysis contained in the earlier screening, and the results indicated there were no elevated levels of or exceedances of heavy metals during the air sampling.*

Air Quality Concerns outside the Scope of the BPSOU Remedy

A. *Out of Scope*: The commenters are concerned about the dust pollution from the crusher and concentrator in Butte and impacts from windy events from active mining OU, west Butte area, and Opportunity ponds.

EPA Response: Sources of air pollution from the concentrator, crusher and active mining area are not under the Superfund responsibilities under the BPSOU remedy. The State of Montana is the regulatory authority for the active mining operation and has a permit in place for the active mining area. Air quality associated with sources west of Butte will be addressed under Superfund jurisdiction as part of the West Side Soils Operable Unit. Opportunity Ponds is addressed by Superfund as part of the Anaconda Smelter Superfund site.

1.2 General Comments

Comment Topics, Comment Totals, and References

Topic	Subtopic		Number of Comments	Comment ID references
Overall Topic: General Comments			**22**	
General Comment	A	General Opposition	5	102.5, 107.26, 107.27, 111.3, 114.1
Environmental justice	A	Concerned about Health Effects/Risks	2	20.3, 20.4
	B	Public Education/ Technical Communication	3	18.1, 18.2, 18.3
Proposed Plan	A	Inconsistencies in the Proposed Plan	6	1.24, 1.28a, 1.29, 1.30, 3.19, 3.23
Public Involvement	A	Public Involvement/ Technical Communication	1	35.8
Unrelated Topic	A	Out of Scope	5	12.1, 34.1, 64.1, 80.2, 120.3

General Comment

A. ***General Opposition Expressed:*** Five different comments were received in general opposition to the proposed remedy that were not easily categorized. One commenter wondered if EPA would feel differently if its employees lived in the area. Others expressed concerns about the credibility and veracity of EPA.

EPA Response: EPA has considered these comments. EPA has based its remedy decision on the facts and analysis contained in the site documents and the BPSOU administrative record, and on the requirements of the Superfund law, its implementing regulations, and its guidance.

Environmental Justice

A. ***Concerned about Health Effects/Risks:*** Health is directly related to income for a number of reasons (given in the comment). These income related health problems are particularly evident in children (studies cited).

EPA Response: The Selected Remedy will be administered equally at all residential properties without regard to income. EPA has focused its initial efforts at addressing human health risks from Superfund contamination on homes with children and pregnant women, and will continue to prioritize efforts for these types of residential properties.

B. ***Public Education/Technical Communication:*** EPA has discriminated against the poor by not providing easily understood information (public involvement was conducted by engineers and technically trained people who, in the opinion of the commenter, find it difficult to communicate with the public) and by giving their concerns less credibility.

EPA Response: EPA takes community involvement seriously. Efforts were made to distribute information as effectively and clearly as possible and without discrimination based on economic status. The ROD contains the details of the community involvement efforts, which exceeds the requirements for community involvement contained in the Superfund law and NCP. Formal complaints about EPA's environmental justice efforts at this site were evaluated and formally addressed by EPA's Environmental Justice office in communications dated August 2, 2004 and August 23, 2005. These responses are incorporated by reference.

Proposed Plan

A. ***Inconsistencies in the Proposed Plan:*** The Proposed Plan contains contradictory positions, assertions, and recommendations. In 1986, EPA identified BPSOU as site because people were living among sources of toxic mine waste but now the preferred alternative does not speak to the level of toxicity in the remaining waste. The proposed plan indicates that ingestion of soils and dust is a primary exposure pathway yet, in other parts of the proposed plan, EPA maintains that there are no exposure pathways (e.g., attic dust). If arsenic in soils, indoor dust, and surface water has been determined to pose a human health risk, why is EPA not cleaning up contaminated soils and indoor dust? Regarding operation and maintenance, the proposed plan states that if materials are removed, less O&M will be required and there will be no need for future programs to address contaminated solid media. Yet, the Proposed Plan rejects these alternatives that are clearly more in line with the Superfund mandate to clean up sites.

EPA Response: EPA's proposed plan does not state that there are no exposure pathways ever at BPSOU. However, unless there is an exposure pathway for the attic dust to be accessed or for dust from attics to get into the home, there is no human health risk associated with the attic dust. The proposed plan states that if there is an exposure pathway of attic dust into the living areas of a home, the BSB Residential Metals program will address the dust. Secondly, EPA has been and will continue to address contaminated soil and indoor dust (if an exposure pathway exists). EPA has done extensive reclamation of the storm water drainages and the floodplain of the BPSOU to address human health and environmental risks associated with surface water. And finally, the agency agrees that less O&M is required with total removals but has concluded that total removals in the BPSOU are not practicable.

Public Involvement

A. ***Public Involvement/Technical Communication:*** Engineers/scientists are more comfortable talking with other engineers/scientists and are not good at talking to the general public.

EPA Response: Superfund issues involving a site as complex as BPSOU are challenging to communicate to the public. Recognizing this, EPA facilitated the establishment of the Citizens Technical Environmental Committee (CTEC). CTEC is a group of volunteer citizens who work with EPA, the State of Montana, responsible parties, and others to involve the local community in clean-up decision-making process. EPA also presented several newspaper articles that were written for the general audience and which explained the various issues presented in remedy selection.

Unrelated Topics

A. *Out of Scope Comments*: One letter was a commentary directed toward Butte-Silver Bow's position on the proposed plan and not to EPA's proposed plan. Another comment was about the Bi-Mart store in Anaconda. A concern was raised regarding the transport of tailings across "Anaconda/Opportunity State Lands," which were not relevant to the BPSOU. A suggestion was made to double the size of Horseshoe Bend plant and dewater the Berkeley Pit so that mining could be resumed. Another suggested that the Butte hot-mix plant on Montana Street near I-15/90 exit be moved away from its current location.

EPA Response: EPA acknowledges these comments but states for the record that they are not within the scope of the Proposed Plan for the BPSOU.

1.3 Granite Mountain Memorial Area

Comment Topics, Comment Totals, and References

Topic	Subtopic		Number of Comments	Comment ID references
Overall Topic: Granite Mountain Memorial Area			7	
Air Monitoring	A	Concerned about Health Effects/Risks related to Air Quality	2	105.3, 123.60
Extent of Removal	A	For Removal/More Removal Needed	1	123.53
Walkerville Institutional Controls and Zoning	A	Walkerville Roads and Zoning	1	105.9
Reclamation	A	Type of Reclamation needed/Comments on Plan	2	56.15, 123.61
Redevelopment	A	Commenter Supports Reclamation/ Redevelopment Plan	1	70.82

Air Monitoring at the GMMA

A. *Concerned about Health Effects/Risks related to Air Quality:* One commenter would like to know where the air monitors are located for the GMMA and another suggests that if air monitoring shows a risk, then the dumps within Granite Mountain Memorial should be cleaned up.

EPA Response: *Three air monitoring stations were installed surrounding the proposed GMMA. EPA oversaw air monitoring of the Granite Mountain Memorial for a one-year period and the results indicated there were no elevated levels of or exceedances of heavy metals during the air sampling.*

Extent of Removal at the GMMA

A. ***For Removal***: Commenter supports more removals and less "interpretive features" at the Mountain Con, Bell, Diamond, and Grayrock mines.

EPA Response: *Based on the air quality data collected in the GMM area and the limited access of these areas, the EPA supports the development of the GMM Interpretive Area and has included this in the ROD. EPA will carefully oversee the review and development of the plans for this area to ensure that human health and the environment are fully protected.*

Institutional Controls

A. ***Walkerville Roads and Zoning***: Walkerville roads that are in the GMMA are planned to be closed, but Walkerville does not want them closed.

EPA Response: *EPA will work cooperatively with the Town of Walkerville regarding road use and road closures within its jurisdiction.*

Granite Mountain Memorial Reclamation

A. ***Type of Reclamation needed/Comments on Plan:*** Two commenters felt that the road to the memorial should be paved. The area west of the memorial should be reclaimed and the area east of the memorial should be left "as is".

EPA Response: *The road to the GMMA will be paved. Areas exceeding lead and arsenic concentrations for recreational areas will be reclaimed.*

Granite Mountain Memorial Area and Redevelopment

A. ***Commenter Supports Reclamation/Redevelopment Plan***: EPA was commended for its recognition in the Proposed Plan of ARCO and BSB's cleanup plan for the Granite Mountain Memorial Interpretive Area.

EPA Response: *EPA acknowledges the comment.*

1.4 Groundwater

Comment Topics, Comment Totals, and References

Topic	Subtopic		Number of Comments	Comment ID references
Overall Topic: Groundwater			**19**	
Capture and Treatment	A	Capture Effectiveness	2	65.7, 123.33
	B	Design Criteria of Capture System	2	112.35, 112.36
	C	Meeting WQB-7 Standards in Silver Bow Creek	2	65.17, 112.23
	D	Monetary Compensation for Lost Groundwater Resource	1	124.51
	E	Specific Concerns Over the Treatment of Mixed MSD and LAO Waters	3	67.2, 67.3, 67.31
	F	Lime Treatment and Protectiveness of Human Health and the Environment	1	3.59
Characterization	A	Need More Groundwater Monitoring at the Clark Tailings	1	65.21
Extent of Removal	A	Commenters Generally for Removal (groundwater in general)	2	65.8, 112.25
	B	Waste Left in Contact with Groundwater	1	100.57
General Comments	A	Writing Off the Aquifer is a Violation of the Public Trust Doctrine	1	5.10
	B	For Groundwater Restoration	2	70.66, 83.5
	C	Commenter Opposes the Remedy for MSD	1	85.6

Capture and Treatment

A. *Capture Effectiveness*: The commenters were concerned about the effectiveness of groundwater capture systems. One commented that the flux of ground water exiting the OU is poorly quantified and should be revisited. Another commented that additional groundwater interception and extraction wells should be used to capture groundwater below MSD and LAO

EPA Response: EPA, with the involvement of BSB, CTEC, MBMG, DEQ and PRP Group prepared a technical memorandum on the flux of groundwater in the area of where groundwater exits the OU. The memorandum used a mass balance analysis that concluded that over 90 percent of the groundwater flux of the alluvial aquifer is captured by the groundwater interception system. Even though this suggests that the existing groundwater capture is effective, the Selected Remedy will require the installation of a

series of groundwater monitoring wells across the alluvial aquifer at the boundary between BPSOU and the Streamside Tailings Operable Unit to confirm that the capture system is effective. Further additional measures to control groundwater discharge to Silver Bow Creek will be implemented between MSD and LAO if, following removal of in-stream sediments, groundwater is found to adversely affect surface water quality.

B. ***Design Criteria of Capture System:*** The groundwater collection system needs to be well thought out based on a good understanding of groundwater movement and designed using state-of-the-art technologies that remove arsenic as well as heavy metals such as copper.

EPA Response: *EPA agrees. The groundwater interception and capture systems at Lower Area One and Metro Storm Drain are based on the simple principle that water moves from higher pressure areas toward lower pressure areas, or more simply stated; water flows downgradient. There is a good understanding of the potentiometric surface of groundwater at the BPSOU. The groundwater interception systems are installed at the lowest area of the groundwater gradient so the groundwater will naturally discharge into the collection system. The results from monitoring the groundwater and the improvement in surface water quality appear to demonstrate that the collection system is effective, and this will be carefully examined in remedial design.*

C. ***Meeting WQB-7 Standards in Silver Bow Creek:*** Two similar questions were raised regarding the ability of lime treatment to meet surface water ARARs (e.g., for copper) and the desire to avoid ARAR waivers if surface water standards cannot be met.

EPA Response: *The treatment system described in the ROD will be designed to meet ARARs. Additionally, surface water in Silver Bow Creek will meet WQB-7 standards during base flow and wet weather run-off conditions through the careful implementation of the ROD. The Selected Remedy will include a storm water management program based on the continued implementation of best management practices to improve surface water quality during wet weather run-off. EPA does not anticipate the need to waive treatment discharge or surface water standards.*

D. ***Monetary Compensation for lost groundwater resource***: The Proposed Plan should have explained how owners of groundwater rights within the proposed groundwater control area (TI zone) would be compensated for the cost of hooking up to and using city water.

EPA Response: *Compensation may be appropriate directly from the responsible parties at this site. EPA's role is to ensure human health is protected by the enactment, via other regulatory agencies, of appropriate and lawful institutional controls.*

E. ***Specific Concerns over the Treatment of Mixed MSD and LAO waters***: A commenter submitted an assessment of the proposed Colorado Tailings Treatment Lagoons (CTTL) for treating the combined flows from LAO and MSD.

His report noted MSD water should be similar enough to LAO water that they should be easy to treat together if the CTTL were expanded.

EPA Response: *The Selected Remedy proposes combining the LAO and MSD water before lime treatment in a fully designed lagoon treatment facility. EPA agrees that LAO and MSD waters are similar in nature and can likely be treated effectively with this technology. The results at the CTTL have demonstrated that LAO and MSD water can be mixed and treated at the same facility with the same technology.*

F. ***Lime Treatment and Protectiveness of Human Health and the Environment***: Reliance on lime abatement will not remove these threats, is not protective of human health and the environment, and will create its own problems.

EPA Response: *There is no feasible way to immediately eliminate the need to capture and treat contaminated ground and surface water in Butte. Lime treatment of metals-contaminated water is standard practice. EPA evaluated a wide range of water treatment technologies. At this point in time, lime treatment was found to be the only reliable, cost-effective process for treating these volumes of metals-contaminated water. This is driven by the VOLUME of water that must be treated, not the water chemistry alone.*

Characterization

A. ***Need more groundwater monitoring at the Clark Tailings***: There needs to be more characterization of the Copper Mountain Ball Fields to determine if the groundwater is contaminated.

EPA Response: *Groundwater is contaminated under the Clark Tailings. The Clark Tailings was remediated along with the old Butte-Silver Bow landfill as part of a corrective measures assessment under the State Solid Waste Program. The Clark Tailings area is covered under an approved Solid Waste Program groundwater monitoring program and is included in an approved groundwater control area. Appropriate monitoring and reporting is occurring under that program and permit.*

Extent of Removal

A. ***Commenters generally for Removal (groundwater in general)***: One commenter opposes the use of treatment in perpetuity instead of waste removal at a facility that will continue to pollute the headwaters of the Clark Fork. Another said that while ground and surface water must be collected and treated in the foreseeable future, removal is required so that treatment has some chance of succeeding.

EPA Response: *EPA has concluded that it is technically impracticable to remove all sources of contamination to the alluvial aquifer at BPSOU, and that large-scale removal actions in the MSD area do not meet the Superfund remedy selection criteria. In addition to discrete sources of waste such as the Parrott Tailings, there are other diffuse waste sources throughout the alluvial floodplain. Even if these sources of contamination could be removed, the groundwater would continue to be contaminated by the gradual release of residual contaminants from the matrix of the alluvial aquifer, and would still require treatment. Based on this conclusion, EPA's Selected Remedy includes interception of*

contaminated groundwater and treatment. EPA's experience with the current groundwater collection and treatment system indicates that surface water in the headwaters of the Clark Fork will be protected. EPA will take careful measures, through its enforcement efforts, to ensure that treatment in perpetuity, if needed, will be maintained and backed by appropriate financial assurances.

B. ***Waste left in contact with Groundwater:*** Waste left in contact with groundwater does not protect human health and the environment.

EPA Response: *The groundwater interception and treatment system in concert with institutional controls such as groundwater control areas will protect human health and the environment by preventing human exposure pathways and ensuring that surface water meets or exceeds appropriate standards.*

General Comments

A. ***Writing off the aquifer is a violation of the Public Trust Doctrine***: The plan to write off groundwater and the aquifer are contrary to the public trust doctrine because it permanently alienates a public resource from public use and enjoyment.

EPA Response: *The Superfund law specifically grants EPA the ability to waive ARARs, under the conditions and criteria listed in the statute. See section 121(d) of CERCLA, 42 U.S.C. §9621(d). The public trust doctrine is not incorporated into the Superfund law.*

B. ***For Groundwater Restoration:*** Commenter thanked DEQ and Natural Resource Damage people for supporting clean water and working for a better remedy than what's been proposed by the EPA. Another felt that all contaminated groundwater needs to be actively restored to the best level possible and that it was outrageous that contaminated groundwater will not be restored or even attempted to be restored.

EPA Response: *As stated in other responses to comments on the subject of restoring groundwater quality, EPA has concluded that it is not technically practicable to restore the groundwater in Butte to pre-mining quality. The groundwater in Butte is not generally used for domestic purposes and the alluvial aquifer has very low production, both of which combine to make an expensive attempt to return the groundwater to its beneficial uses a poor alternative. See the final Technical Impracticability Evaluation (EPA 2006) and EPA's response to comments on the draft Technical Impracticability Evaluation (EPA 2006), which are incorporated herein by reference, for additional information and analysis of this issue.*

C. ***Commenter opposes the remedy for MSD:*** The proposed plan for the MSD area is inadequate with respect to long-term effectiveness and permanence, and does little to reduce the toxicity, mobility, or volume of wastes. There are too many uncertainties and inadequate information to conclude that the aquifer cannot be remediated in a reasonable time frame. The bulk of contaminant transport typically occurs in more hydraulically conductive units, and if the relative volume of contaminated water in the fine layers is small relative to transport in the coarse

layers, and if the diffusion process is sufficiently slow, dilution may be sufficient to result in groundwater that meets standards.

EPA Response: *As previously stated, the groundwater collection and treatment system selected in the ROD will be carefully designed and evaluated, and generally has proven to be an effective and implementable alternative to address groundwater contamination at the BPSOU. The groundwater remedy will control the mobility and reduce the toxicity of contaminants in groundwater. EPA's experience with the groundwater interception and treatment system at LAO reduces the uncertainties associated with the selected alternative. EPA acknowledges contaminant transport is accelerated in more hydraulically conductive units. However, due to the heterogeneous nature of the alluvial aquifer, residual contaminants will remain in the less conductive units for long periods that will preclude the beneficial use of the groundwater. EPA will continue to collect additional information on the hydrologic system and the effectiveness of the Selected Remedy.*

1.5 Lower Area One

Comment Topics, Comment Totals, and References

Topic	Subtopic	Number of Comments	Comment ID references
Overall Topic: Lower Area One		**93**	
Capture and Treatment	A General Comment	1	58.1
	B Aesthetics of LAO Treatment Facility	1	67.25
	C Groundwater Capture Effectiveness at LAO	3	124.1, 124.3, 124.4
	D Sludge Management	1	67.23
Conventional Lime Treatment	A Commenter Opposes a Conventional Lime Treatment Plant	7	70.127, 70.141, 70.142, 70.144, 70.145, 70.146, 70.147
	B Commenters Support a Conventional Treatment Plant	4	71.30, 85.1, 123.40, 123.58
	C Commenter Concerned About Performance of Lime Treatment Plant	1	112.6
	D Sludge Management	3	67.20, 67.21, 67.22
Development of Alternatives	A No Innovative Technologies Were Considered	2	70.68, 133.14
Extent of Removal	A Removal of Accessible Wastes	6	3.34, 99.13, 100.41, 100.42, 123.38, 123.57
General Comments	A Commenter Acknowledges Work Already Done at LAO	1	108.6

Comment Topics, Comment Totals, and References

Topic		Subtopic	Number of Comments	Comment ID references
Overall Topic: Lower Area One			**93**	
Treatment Lagoons	A	Treatment Lagoon Aesthetics	2	70.38, 70.143
	B	Comments Supporting Treatment Lagoons	4	70.39, 70.49, 70.20, 84.3
	C	Community Acceptance	2	70.5, 71.7
	D	Costs Overestimated	1	67.6
	E	Costs Underestimated	1	67.7
	F	Design Criteria for Treatment Lagoons	1	67.38
	G	General Comment	1	98.6
	H	Operations and Maintenance	7	67.24, 67.26, 67.27, 67.29, 67.34, 67.37, 70.20
	I	Perceived Data Gap	2	65.10, 112.11
	J	Performance – Arsenic	4	67.13, 67.30, 100.44, 112.7
	K	Performance – Cold Weather	3	67.12, 100.43, 107.20
	L	Performance – During Maintenance	3	67.16, 67.19, 100.46
	M	Treatment Lagoons Performance – General Concerns	18	56.13, 65.6, 67.1, 67.5, 67.8, 67.9, 67.10, 67.11, 67.14, 67.33, 70.34, 70.35, 100.48, 107.21, 112.3, 112.4, 123.39, 124.23
	N	Treatment Lagoons – Sludge Management	14	67.4, 67.15, 67.17, 67.18, 67.32, 67.35, 67.36, 70.36, 70.37, 100.45, 100.47, 107.2[illegible] 107.23, 112.5

Capture and Treatment

A. ***General Comment:*** The plan to build a water treatment facility and only address water contamination is not adequate.

EPA Response: *EPA has determined that the groundwater at BPSOU cannot be returned to its beneficial uses in a reasonable time period and would be technically impracticable to achieve. See EPA's response 1.4, General Comments, B. above for additional explanation. Therefore, the selected alternative includes the capture and treatment of the groundwater in the alluvial aquifer so that it does not adversely affect Silver Bow Creek and protects the headwaters of the Clark Fork River basin.*

B. ***Aesthetics of LAO Treatment Facility:*** Neither treatment lagoons nor conventional treatment would be aesthetically pleasing, but the industrial nature of the area may not justify aesthetic enhancements.

EPA Response: *The primary priority of the treatment technology employed to treat groundwater will be to achieve discharge standards in the effluent discharge. However, efforts will be made to design and construct a lagoon treatment facility that will be functional and aesthetically pleasing.*

C. ***Groundwater Capture Effectiveness at LAO***: Concern was raised that the groundwater capture effectiveness, without the removal of contaminant sources at LAO and MSD, may not be sufficient. More monitoring wells are needed west of LAO to establish that contaminated groundwater is not leaving the BPSOU and impairing Silver Bow Creek. Contingency plans for LAO and MSD groundwater contamination should be developed, as suggested in the Proposed Plan.

EPA Response: *EPA with the involvement of BSB, CTEC, MBMG, DEQ and PRP Group prepared a technical memorandum on the flux of groundwater in the area where groundwater exits the OU. The memorandum used a mass balance analysis that concluded that over 90 percent of the groundwater flux of the alluvial aquifer is captured by the groundwater interception system. Even though EPA believes groundwater capture is effective, the Selected Remedy will require the installation of a series of groundwater monitoring wells across the alluvial aquifer at the boundary between BPSOU and the Streamside Tailings Operable Unit to confirm that the capture system is effective. Contingency plans will be developed as warranted should the remedy not function as intended.*

D. ***Sludge Management***: In general, sludge removal/handling would likely be much easier and less disruptive for a conventional treatment plant. The feasibility study compared sludge dewatering and handling processes for the treatment lagoons and the conventional treatment plant, indicating no cost advantage either way.

EPA Response: *Treatability studies are continuing to provide additional information on the operation and maintenance (O&M) of the treatment lagoons. This information will be used to further evaluate the O&M of the treatment lagoons, and these issues will be carefully evaluated and monitored, as described in the ROD.*

Conventional Lime Treatment

A. ***Commenters Oppose a Conventional Lime Treatment Plant***: A lagoon system of treatment is what is needed - not a conventional lime treatment system. Give us a few years to prove that the newly expanded system will work. There is no rationale for EPA's selection of conventional lime treatment. The treatment lagoons are better for many reasons, and we have long-term O&M data to prove it. The lagoon system will meet the most stringent standards for arsenic, cadmium, copper, lead, and zinc while conventional treatment may not. The lagoon system uses less lime and will not need flocculants or other chemicals needed by the conventional system. The lagoon system will have less sludge to deal with than the conventional lime treatment system. The lagoon system is better able to deal with upsets than conventional treatment, given the large size and retention time. The lagoon system is less expensive than conventional treatment.

EPA Response: *The Selected Remedy includes use of a lagoon treatment system. The system will undergo careful scrutiny during remedial design. The handling and disposal of sludge will be carefully monitored and evaluated, as described in the ROD.*

B. ***Commenters Support a Conventional Lime Treatment Plant***: Several commenters felt a conventional lime treatment plant was preferable to treatment lagoons due to unproven performance over the long term and potential failures during extended cold weather and major runoff events.

EPA Response: *The Selected Remedy proposes that a fully designed lagoon system be used to treat groundwater. Treatability studies are continuing for the purpose of providing additional information on the effectiveness, operation and maintenance of treatment lagoons.*

C. ***Concerned about performance of a conventional lime treatment plant***: No evidence exists that conventional lime treatment will remove enough metals to meet water quality standards.

EPA Response: *Conventional lime precipitation technology is a widely known and standard technology effective at removing metals and contaminants similar to those at BPSOU from water. The Horseshoe Bend Treatment plant is a local example of the use of conventional lime treatment for the removal of metals from water. Initial data from the existing lagoon treatment system indicates that lime treatment in this system can meet discharge standards.*

D. ***Sludge Management:*** A conventional treatment plant would have advantages over lagoon treatment regarding sludge handling (e.g., managed so that the sludge would be adequately dewatered for handling). Also its operation would not be affected by sludge removal. A conventional treatment plant would produce considerably less volume of high-density solids than the treatment lagoons.

EPA Response: *EPA acknowledges that the handling and disposal of sludge is a major issue to be addressed in remedial design. The ROD is written to reflect this concern and to require stringent evaluation of this issue in remedial design.*

Development of Alternatives

A. ***No Innovative Technologies were considered:*** Conventional lime treatment and lagoons are nineteenth century technologies that don't work. We need to find something better. The treatment lagoons at LAO should be removed and replaced with a facility that uses innovative cleanup technologies and possibly resource recovery methods.

EPA Response: *As stated above, conventional lime precipitation technology is widely known to be effective at removing metals and contaminants similar to those at BPSOU from water. Just because the treatment technique has been used for over a century does not mean it is not a viable option – the effective metal precipitation reactions are the same then as they are now. The Horseshoe Bend Treatment plant is a local example of the use of conventional lime treatment for the removal of metals from water. Further, EPA evaluated a wide range of water treatment technologies during the FS process.*

Extent of Removal

A. ***Removal of Accessible Wastes***: Commenters state that a significant quantity of material was left behind at LAO and is not covered by infrastructure or the slag walls and should be removed to the maximum practical extent, including waste less than 10 feet above groundwater in the BPSOU.

EPA Response: *EPA acknowledges that waste remains at LAO below the excavation limit established during the design of the project. EPA disagrees that the remaining waste at LAO should be removed. The removal of the remaining waste would not return the groundwater to its beneficial uses. It would disrupt the reconstruction of Silver Bow Creek and the groundwater interception and treatment system that has been very effective in controlling the impact of contaminated groundwater on the environment including Silver Bow Creek. The removal of the remaining waste would have negligible benefits and would not eliminate the need to continue to collect and treat groundwater. See EPA's response to 1.4, General Comments, B. above for additional explanation.*

General Comments

A. ***Commenter Acknowledges Work Already Done at LAO:*** A large source area (Colorado Tailings) was reduced and water and air quality were improved.

EPA Response: *1.2 million cubic yards of waste and contaminated soil were removed from LAO and a groundwater collection and treatment system was constructed. The water quality in Silver Bow Creek has improved as a result of this work and other work at BPSOU by a factor of 10.*

Treatment Lagoons

A. ***Treatment Lagoon Aesthetics***: The lagoons are much more aesthetically pleasing than the conventional system of tanks and metal buildings would be. This is important, given that they are visible from the interstate, trails, and Centennial Avenue.

EPA Response: *EPA agrees that treatment lagoons may have an advantage from an aesthetic standpoint, and has included this system, appropriately designed, in the Selected Remedy.*

B. ***Comments Supporting Treatment Lagoons:*** The lagoons are already in place and using them would save millions of dollars over installing and operating a conventional lime treatment system. EPA should identify lime treatment via a lagoon system in the ROD. As far as the lagoons and treatment position at LAO; if lagoons prove out and as long as we can make it as lush as possible and be maintained properly, let's move forward. The lagoon system can and does meet the cleanup levels of Superfund. The wetland lagoon system is better than the conventional lime treatment specified in the plan. It is better from a management and aesthetics standpoint.

EPA Response: *EPA agrees with this comment, and has included the lagoon treatment system, appropriately designed, in the Selected Remedy.*

C. ***Community Acceptance:*** Atlantic Richfield needs to prove to the county that the treatment lagoon system meets the county's five criteria for the water treatment system: 1) Must meet WQB-7 standards, 2) provide aesthetics, 3) allow maximum reuse of LAO, 4) ensure the facility is practical to maintain and operate, and 5) provide a trust fund to operate and maintain the facility in perpetuity.

EPA Response: *EPA believes that an appropriately designed lagoon system can meet WQB-7 discharge standards. Other issues raised by this comment are issues that are relevant to the county/AR relationship. EPA fully supports maximum reuse of the area.*

D. ***Costs Overestimated***: Both long-term and O&M costs of the treatment lagoons are expected to be lower than for conventional treatment.

EPA Response: *EPA agrees with this comment.*

E. ***Cost Underestimated:*** The FS did not include effluent monitoring and monitoring report preparation in O&M costs for the treatment lagoons, but did include them for the conventional lime treatment plant.

EPA Response: *The on-going treatability studies and post-ROD remedial design efforts will be designed to fill this need.*

F. ***Design Criteria for Treatment Lagoons***: BSB has not seen any designs for the system and is not comfortable trusting Atlantic Richfield that the design is adequate.

EPA Response: *The final design of the treatment lagoons is beyond the scope of the RI/FS. The costs for treatment lagoons were presented on a conceptual basis. EPA agrees that complete information on the costs of treatment lagoons were not available when the proposed plan was released to the public. The on-going treatability studies and future remedial design efforts for treatment lagoons are expected to provide better information to estimate the cost to operate and maintain treatment lagoons.*

G. ***General Comment:*** Both a lime treatment plant and limed lagoons should be used for treatment redundancy.

EPA Response: *Operation and maintenance plans will be required regardless of the technology used to treat groundwater. These plans will address circumstances such as a disruption in the normal operation of the treatment facility due to power outages, acts of nature, etc. However, EPA will not require both types of treatment facilities be employed at the same time to address operational failures.*

H. ***Operations and Maintenance:*** The treatment lagoons are portrayed as a low cost, low maintenance system, but anecdotal evidence indicates the system is not maintenance free and should not expected to be. BSB has not seen any O&M plans for the system and is concerned that the lagoons will require some sort of

unforeseen maintenance over and above the amount paid by Atlantic Richfield to operate the system.

EPA Response: *The on-going treatment lagoon treatability studies and future remedial design efforts will be focused on providing information that will allow EPA and BSB to evaluate the O&M issues.*

I. ***Perceived Data Gap:*** Commenter notes that no baseline data from the existing lagoon effluent has been made public and questions whether EPA should be willing to accept them as a permanent remedy without this information.

EPA Response: *The treatment lagoon system, including the effluent, has been thoroughly monitored. Data are available in the administrative record.*

J. ***Treatment Lagoons performance - Arsenic:*** Commenters expressed concern that arsenic may be a potential long term problem for the treatment lagoons. Arsenic could leach from the sediment, as currently happens at the Warm Springs Ponds. There is plenty of evidence that such a treatment facility will not remove arsenic and that in fact it might actually increase arsenic levels.

EPA Response: *Fortunately, arsenic concentrations in the untreated groundwater are not excessive and are typically below 10 µg/L. Based on the results EPA has observed in the effluent from the treatment lagoons, it does not appear that the commenters' concern will manifest itself. Arsenic that settles in the treatment cells will be removed to a repository and should not result in any problems similar to that described in the comments.*

K. ***Treatment Lagoons Performance - Cold Weather:*** Treatment lagoons are untested during extended cold weather - a truly cold winter has not occurred since the system began operation. Scientific literature casts serious doubt on such engineered systems in our cold climate.

EPA Response: *Cold weather performance is among EPA's concerns with respect to the treatment lagoon technology. This and other issues must be thoroughly evaluated during remedial design. Initial data from the lagoons indicate effectiveness during cold weather.*

L. ***Treatment Lagoons Performance - During Maintenance***: Taking one of the lagoon systems offline for maintenance will require careful operation to ensure adequate treatment during the shortened retention time. Removing sludge from the lagoons may result in an inadvertent exposure of tailings beneath the lagoons, potentially interfering with water treatment. They system's performance should be demonstrated if some of the lagoons are closed for maintenance.

EPA Response: *The commenters raise several good points regarding the operation of a treatment lagoon system. The on-going treatability studies and future remedial design efforts must address these O&M issues before treatment lagoons for treatment of groundwater will be fully approved, as stated in the ROD.*

M. ***Treatment Lagoon Performance - General Concerns:*** Comments about treatment lagoon performance included the following: 1. Discharge won't meet water quality standards; 2. The current lime dosage system is unreliable; 3. There is little margin for error between achieving metals removal and allowing enough residence time for the pH to drop to less than 9.5; 4. The ponds have insufficient surge capacity to handle water from a significant storm event; 5. The system does achieve treatment standards, even with upsets; 6. The PRP has not provided data that show the system is as effective as a conventional treatment plant; 7. There is no detailed O&M plan for the lagoons; 8. The ponds will be an eyesore and do not guarantee effectiveness.

EPA Response: *First, the treatment lagoons have never been proposed for the long-term treatment of storm water. Storm water is addressed as part of a comprehensive storm water management program that relies heavily on Best Management Practices. Treatability studies that have been conducted on the treatment lagoons have demonstrated that they will likely be satisfactory in meeting discharge standards. In fact, the treatment lagoons employ the same chemical process (lime precipitation) as conventional lime treatment in removing contaminants of concern. EPA concerns about treatment lagoons have mainly focused on issues of O&M. The ponds do not operate on the scale of the Warm Springs Ponds and retention times, flows and volumes are much more controlled. Comparisons between the two are not useful. As stated in the responses above, on-going treatability studies and future remedial design efforts will provide answers to the commenters' concerns. Finally, with proper landscaping, the treatment lagoons can be made to be visually appealing and many consider that to be one of the advantages of treatment lagoons over conventional treatment facilities.*

N. ***Treatment Lagoons - Sludge Management***: Issues related to sludge - transportation, removal, handling, volume, disposal - are not adequately addressed.

EPA Response: *EPA agrees that additional study and evaluation regarding sludge from the lagoon system is critical, and this is required in the ROD. EPA's primary aim is to approve a treatment technology that meets discharge standards while being efficient to operate and maintain.*

1.6 Parrott Tailings/ MSD

Comment Topics, Comment Totals, and References

Topic	Subtopic	Number of Comments	Comment ID references
Overall Topic: Parrott Tailings		**163**	
Aquifer Restoration/ Cleanup	A Agency Coordination	4	3.46, 110.3, 133.11, 133.23
	B Commenter Supports Plan	1	70.45
	C Comparison to Benefits of Other Removal Actions	2	100.23, 107.19
	D Compliance with ARAR's	1	110.2
	E Feasibility/Technicality Impracticability	2	100.14, 123.26
	F General Question	1	133.26
	G Monetary Compensation for Lost Resource	1	107.18
	H Comments Concerning Aquifer Cleanup Timeframe	5	100.16, 100.28, 112.9, 112.15, 124.31
Capture and Treatment	A Capture Effectiveness	10	65.22, 99.12, 100.20, 100.26, 100.27, 100.37, 112.8, 123.29, 123.30, 123.37
	B Design Criteria – Concerned About Higher Flows in Non-Drought Years	1	100.19
	C General Comment – Explaining the MSD Capture System	1	70.26
	D Long-Term Effectiveness of MSD Subdrain	1	133.32
Characterization	A Comments Concerning Aquifer Hydrogeology	10	99.1, 99.3, 99.5, 100.1, 100.2, 100.3, 100.4, 112.16, 112.31, 123.25
	B Sources of Contamination in the MSD	4	99.4, 100.6, 100.18, 123.24
	C Contaminant Transport in the MSD Aquifer	14	99.2, 99.7, 99.8, 99.9, 100.7, 100.8, 100.15, 100.17, 100.53, 100.54, 100.55, 123.23, 123.27, 123.31
	D Ground Water Flow Rates	6	70.19, 100.05, 100.9, 100.12, 100.13, 112.14
	E Characterization in the MSD Inadequate	13	30.2, 62.1, 62.2, 65.20, 70.79, 70.118, 70.119, 83.6, 99.6, 123.22, 123.36, 124.9, 124.10
	F Out of Scope – Comments Were Not Specifically on the Proposed Plan	2	100.10, 100.11
Cost of Removal	A Removal Costs Overestimated	3	65.13, 112.17, 124.12
Development of Alternatives	A Little Difference Among Alternatives	1	124.6
Evaluation of	A Compliance With ARAR's	1	3.76

Comment Topics, Comment Totals, and References

Topic	Subtopic	Number of Comments	Comment ID references
Overall Topic: Parrott Tailings		**163**	
NCP Criteria	B Evaluation/Weighing of Cost	1	1.21
	C State Acceptance	1	65.11
Extent of Removal	A Comments Against Removal in the MSD	10	70.76, 70.77, 70.78, 70.87, 70.115, 70.116, 70.128, 70.148, 70.149, 84.2
	B Commenter Needs More Information	3	70.117, 71.25, 98.2
	C Community Acceptance	2	70.6, 71.8
	D Comments for Removal	27	56.12, 65.4, 70.10, 71.29, 70.137, 71.31, 71.45, 75.189, 75.221, 77.2, 81.2, 100.21, 100.29, 102.8, 107.17, 109.4, 118.3, 123.34, 124.13, 133.2, 133.12, 133.15, 136.2, 3.33, 3.40, 3.75, 5.9
	E For Removal of Accessible Wastes	15	70.129, 98.3, 99.11, 100.24, 102.9, 107.16, 108.25, 110.1, 118.2, 123.21, 123.35, 123.55, 123.56, 124.8, 133.33
	F Concerns About Meeting Water Quality Standards in Silver Bow Creek	1	70.67
	G Waste in Contact With Groundwater is Unacceptable	1	100.22
General Comment	A Clark Fork River Headwaters/Downstream Recontamination	2	70.71, 71.32
	B EPA Ignores Comments	1	65.12
	C General Comments About Removal/MSD Evaluation	4	80.1, 100.30, 100.31, 133.27
	D Violation of the Public Trust Doctrine	3	5.8, 5.13, 5.14
	E Specific Changes to the Proposed Plan	1	22.4
NRD Claim	A Technical Record	1	71.22
Unrelated Topic	A Out of Scope	2	100.38, 100.40
Waste Left in Place	A Reducing Infiltration	2	100.25, 108.26
Water Quality	A Concerned about meeting water quality standards in Silver Bow Creek	2	108.10, 112.18

Aquifer Restoration/Cleanup

A. *Agency Coordination*: Since the distinction between remediation and restoration is artificial in practice, the NRDP, EPA, MDEQ, BSB should pursue joint planning for remediation and restoration of the area. Restoration and reclamation should be

completed simultaneously. Whenever possible, NRD restoration and CERCLA reclamation should be conducted simultaneously.

EPA Response: *EPA's role under the Superfund law is to select and implement response actions in accordance with the statute and its regulations. EPA has done that in this ROD and will use maximum efforts to ensure appropriate implementation of the ROD. EPA will coordinate remedy implementation efforts with natural resource damage restoration efforts by the State to the extent practicable.*

B. ***Commenter Supports Plan:*** Commenter agrees that the aquifer beneath the MSD cannot be restored within a reasonable time frame even with a total removal.

EPA Response. *EPA agrees. No further response needed.*

C. ***Comparison to Benefits of other Removal Actions***: Post-removal data from LAO should be used to predict aquifer cleanup in the MSD; groundwater at LAO began to clean up in a few months during dewatering and excavation. Data show benefit from removals along SBC, so why won't waste removal benefit in the case of the Parrott Tailings area?

EPA Response: *Groundwater data collected following the removal action at LAO continues to show exceedances of groundwater standards. Review of the data collected since removal does not show any statistical trend that can be used to evaluate whether the alluvial aquifer will clean up to the extent that it could be used for beneficial purposes. EPA acknowledges that the removal of contaminant sources contribute over time to an improvement in groundwater quality, but the benefit of reducing contaminate levels must be evaluated against the cost, effectiveness, and implementability of the proposed removal action. In other words, it does not matter if the groundwater concentrations are 1,000 times higher than the water quality standard or 10 times higher than the standard – the water still cannot be used. This is especially profound at BPSOU since the improvements made in the groundwater quality are not anticipated to be significant enough to meet water quality standards. EPA performed these evaluations in the Feasibility Study and concluded that removal was not the most effective and implementable alternative to address groundwater. EPA's Selected Remedy for groundwater includes capturing and treating the groundwater to protect receiving waters, implementation of groundwater control areas and other institutional controls to protect public health, and a comprehensive monitoring program to evaluate the effectiveness of the remedy. See EPA's response to comments on the draft TI Evaluation (EPA 2006) for additional information on this topic.*

D. ***Compliance with ARARs:*** At a minimum, water bodies should be fishable and swimable, if feasible. Silver Bow Creek can be reclaimed; hence ARARs dictate that this must be done.

EPA Response: *The objective of the Selected Remedy for BPSOU is to restore Silver Bow Creek to a viable fishery and to meet water quality standards in Silver Bow Creek during base flow and storm water run-off. EPA believes this is possible through capture and treatment of the groundwater in the MSD and that removal of the Parrott Tailings is not necessary. Silver Bow Creek has been reconstructed through LAO and the remainder of*

Silver Bow Creek from LAO to slightly upstream of the confluence with Blacktail Creek will be reconstructed under the Selected Remedy.

E. ***Feasibility/Technical Impracticability:*** The conclusion that aquifer restoration is not possible was based on no data collected from this operable unit. EPA did not collect any data to show that cleanup of the alluvial aquifer is not feasible or technically practicable.

EPA Response: *See EPA's response to comments on the draft TI Evaluation (EPA 2006) for a complete response to this comment.*

F. ***General Question***: Why was the section of Silver Bow Creek located in Butte cleaned to a lower standard and different standard than the rest of the creek and why is there a pipeline to Montana Street rather than discharging water into Silver Bow Creek?

EPA Response: *Silver Bow Creek located in Butte will be cleaned-up to meet surface water quality standards under the Selected Remedy. It will meet the same standards that have been established for the Streamside Tailings Operable Unit. The pipeline you reference is the Horseshoe Bend Treatment Plant Effluent Discharge Pipeline. The effluent discharge pipeline may discharge treated water from the Horseshoe Bend Treatment Plant into Silver Bow Creek near the confluence of the Metro Storm Drain and Blacktail Creek. The discharge location was established under the Mine Flooding Operable Unit Consent Decree to allow for the larger dilution capacity provided by Blacktail Creek at the point of discharge.*

G. ***Monetary Compensation for lost resource***: Having been impacted by the mine and other wastes, the use of the alluvial aquifer is being denied to the citizens of Montana and they should be compensated on a gallon for gallon basis for the duration of time it is denied to them and the compensation should be at market rates.

EPA Response: *There is a Natural Resource Damages claim filed against ARCO by the State of Montana for damage to the groundwater resource. The type of claim described in this comment is outside of EPA's remedial jurisdiction or scope under the Superfund law.*

H. ***Comments Concerning Aquifer Cleanup Timeframe***: No data were collected to test the hypothesis of the importance of adsorption/desorption in contamination of aquifer materials. This hypothesis should be tested. Removing the Parrott Tailings would at least ensure that the aquifer might clean itself up over some measurable unit of time, while no removal ensures the aquifer will only clean up over geologic time. Removing the Parrott Tailings would lead to a relatively short-term recovery of groundwater resources. The travel times stated in the Focused Feasibility Study are too slow and references to the Parrott Tailings not being a major source of contamination to the Metro Storm Drain are false.

EPA Response: *Leaching tests were performed on aquifer materials for the Phase II RI for the Area One Operable Unit (completed in 1990 by CH2M Hill and Chen Northern). EPA also relied on the body of scientific information on the behavior of metals in the subsurface. EPA used site data and the current scientific understanding of the behavior of metals in the subsurface, to conclude that residual contaminants of concern are likely to remain in the groundwater for over 100 years. In part, this conclusion was drawn using estimated groundwater travel times WITHOUT any attenuation of contaminants due to adsorption/desorption processes. If the most conservative estimates of typical retardation coefficients are used (i.e., allowing for the fastest travel of contaminants in the aquifer matrix), contaminant travel times are in the hundreds of years. EPA believes that site-specific tests to develop retardation coefficients representative of the aquifer would have shown even greater retardation (i.e., even slower contaminant travel times). The groundwater flow rates EPA used to analyze the potential for groundwater quality to be restored in a reasonable period of time were based on the pump tests results for the MSD area.*

EPA has never advocated that the Parrott Tailings are not a major source of contamination to the MSD. EPA assumes the commenter is referencing EPA's conclusion in the Focused Feasibility Study that the plume associated with the Parrott Tailings is stagnant and has a low hydraulic gradient. In addition, the predominant flow path is downward. Due to these characteristics, the plume associated with the Parrott Tailings has not expressed itself in surface water in MSD. Please see EPA's response to comments on the draft TI Evaluation (EPA 2006) for additional information on this topic.

Capture and Treatment

A. ***Capture Effectiveness***: The groundwater collection and treatment systems need to be well thought out and designed using state-of-the-art technologies. A groundwater model is required to determine whether or not all of the flow in the Metro Storm Drain area is being captured. At least 15 monitoring well nests should be drilled and sampled at first seasonally, and then yearly, to track contaminants down and across the flow path in the area. Placing a catchment system parallel to valley gradient is a horrible design where much of the polluted water will not be collected and will end up bleeding heavy metals into Silver Bow Creek. If the Parrott Tailings (and related sites, such as Diggings East, North Side, etc.) are not removed, then the following steps are needed: impermeable caps, another subdrain parallel to Blacktail Creek, more monitoring wells, and a better understanding of the system.

EPA Response: *The existing groundwater collection system at LAO and MSD has been designed and installed based on a clear understanding of the groundwater flow patterns and hydraulic gradients. Data collected at the site demonstrate that the system is performing well and EPA objectives generally are being met. The remedial design process will continue to examine these issues, and additional monitoring wells may be added. EPA has three on-going monitoring programs for surface water and groundwater. The Selected Remedy includes a comprehensive monitoring program to address all media. EPA disagrees that a groundwater model is required.*

EPA agrees with the commenter that wells will be required as part of the final global monitoring program to collect information on the effectiveness of the groundwater collection system and the volume and flow patterns for groundwater.

EPA disagrees with the notion that a collection system parallel to the valley gradient is a poor design. The essential requirement for the design of a groundwater collection system is that the groundwater gradient is toward the collection structure. The hydraulic control channel and other hydraulic controls at LAO have been demonstrated to be effective in capture of the flux of groundwater through the area. In fact, the system has been demonstrated to capture over 90 percent of the groundwater flux that leaves BPSOU.

B. ***Design Criteria - Concerned about higher flows in non-drought years:*** Well hydrographs show that water levels have fluctuated by many feet; presently we are in drought and yet the flow rate in the MSD subdrain is higher than was predicted, what will happen in wetter years?

EPA Response: *The collection and treatment system has the capacity to handle flows up to approximately 1,500 gpm. Even though the volume of water from MSD is approximately 400 gpm, this is still a relatively low flow rate and even if the flow rate doubles, it will not be a significant change to operate and maintain the system.*

C. ***General Comment - Explaining the MSD capture system***: The groundwater from the storm drain is being captured and pumped to LAO for treatment, so storm runoff water will not get involved with that water.

EPA Response: *The commenter is correct. The subdrain to capture groundwater discharge in the area of the Metro Storm Drain is separated from stormwater by a synthetic impermeable membrane. The impermeable membrane is buried under the Metro Storm Drain channel bottom and prevents surface flow in the channel from entering the collection drain.*

D. ***Long-Term Effectiveness of MSD Subdrain***: The proposed "French Drain" solution will eventually require millions of dollars in future cleanup as it will eventually fail; the current French Drain is running to capacity and will not handle much additional water; the cement walkway constructed under Harrison Avenue is subject to occasional flooding.

EPA Response: *The use of a subdrain to collect water is not a unique solution and EPA expects it to be effective. Issues of capacity and similar issues will be carefully examined and addressed during remedial design. In addition, the collection pipe and rock drain can be cleaned out via built in cleanout access structures, or, replaced relatively inexpensively as most of the expensive excavation work would not need to be redone. These are part of the anticipated costs to operate and maintain the remedy. The system is not running to capacity. The system was designed to operate with an average flow of about 450 gpm, but ranging between 90 gpm and 630 gpm.*

Characterization

A. *Comments concerning Aquifer Hydrogeology*: Disagrees with characterization of aquifer hydrostratigraphy in the RI report and focused feasibility study; the alluvial aquifer is more homogenous than heterogeneous. Aquifer tests (slug and pump tests) were insufficient and relied too much on results from shallow aquifer units. Water level fluctuations show that groundwater is moving from the Parrott tailings. Wells and borings used only represent the shallow portion of the aquifer and do not represent the rest of the aquifer, thus, the upper surface is characterized but the aquifer is not. The predominance of fine-grained units in the shallow wells has been inappropriately confused with the deeper wells, which show a more coarse-grained nature. The aquifer is more homolithic than heterolithic. EPA assertion that the "past flow system" affects current hydrogeochemistry of the aquifer is unsubstantiated and purely hypothetical. EPA's knowledge of the SBC aquifer is inadequate when it comes to choosing a remediation alternative and EPA simply does not know enough to refute MBMG's conclusion that a relatively short-term recovery of the aquifer is likely. Hydrology of the Parrott Tailings needs to be better characterized. Water table fluctuations show significant quantities of water move through Parrott Tailings. EPA has not properly characterized the aquifer hydrogeology.

EPA Response: *EPA disagrees with the comment. The alluvial aquifer is heterogeneous. Lithologic, hydrogeologic, and chemical data are available from approximately 60 monitoring wells located within the MSD Area. These wells are distributed across the MSD area and range in depth from 11 feet to 268 feet below ground surface (bgs). Groundwater elevation and water chemistry data have been obtained from many of these wells on numerous occasions dating back to the mid-1980s and, as a result, sufficient hydrogeologic and chemical data are available to understand flow paths and contaminant distribution and to make remedial decisions regarding the potential to cleanup the shallow and deeper portions of the aquifer. Further, lithologic data obtained from borings in the MSD area clearly show that the aquifer is heterogeneous. The lithology of the aquifer was described by the Natural Resource Damage Program (January 1995) as follows:*

> Grain size in the alluvium ranges from clay to gravel and is often poorly sorted. Aerially continuous layers of a given lithology are most often restricted to a few hundred feet. Competent clay layers are often encountered in areas associated with the floodplain(s) of Silver Bow Creek and Blacktail Creek. Several wetland areas that have been filled with mine waste are also evident on the floodplain. The sandy clay layers are likely to act as local aquitards or aquicludes.... The composition of the alluvial aquifer includes gravel, sand, silt, and clay and is generally not laterally continuous or correlatable.

Lithologic logs for wells completed in the MSD area, including both shallow and deep wells show interbedded gravel, sand, silt, and clay. Aquifer test data available from constant rate pumping tests demonstrate that more permeable units (sand and gravel) are not laterally continuous. The comment implies that characteristics of the higher permeability units are representative of all or most of the alluvial aquifer within the MSD. This is not the case. In fact, hydraulic conductivity (permeability) values estimated from

nine pumping tests performed on wells completed in the alluvial aquifer within the MSD area range from 1.34 to 32 feet per day (ft/day), with a median of 3.9 ft/day and an average value of 8.8 ft/day. This suggests that the aquifer is heterogeneous and, more significantly, the aquifer as a whole has low permeability and little capacity to yield significant quantities of groundwater to wells. Further, severely contaminated groundwater is not limited to preferential flow paths within the aquifer (higher permeability zones) and zones of preferential flow within a heterogeneous system exacerbate the problems associated with aquifer remediation. Aquifer cleanup times are controlled by diffusion-limited transport of contamination from lower permeability zones to more permeable units. In other words, the time required for aquifer cleanup will be controlled by the lower permeability units and not the higher permeability units.

The Parrott Tailings deposit is situated on a groundwater divide. Hydrologic gradients and groundwater flow directions radiate away from the divide horizontally, vertically, and in directions between horizontal and vertical. Very high concentrations of metals in groundwater at depths exceeding 150 feet directly beneath the Parrott Tailings indicate that the vertical component of flow is significant and that contamination emanating from the tailings is impacting the deeper portions of the aquifer.

There is no argument that the groundwater sink associated with the Berkeley Pit controls groundwater flow paths in the upper MSD. Prior to excavation of the Berkeley Pit, groundwater flow paths through and beneath the Parrott Tailings were different than they are today. This is not hypothetical. The FFS points out that hydraulic gradients and groundwater flow paths observed today are not consistent with what was present in the past and that the distribution of contaminants in the aquifer observed today is in part, a relic of the past flow system. Please see EPA's response to comments on the draft TI Evaluation (EPA 2006) for additional information on this topic.

B. ***Sources of Contamination in the MSD:*** The Focused Feasibility Study (FFS) concluded, without analysis, that the contamination discharging to the lower MSD came from the North Side and Diggings East Tailings and it did not evaluate the Parrott Tailings as a likely source for the contamination. Parrott Tailings were suggested as the likely source of contamination to the MSD in earlier EPA documents based on the results of the 2004 drilling program. New MBMG wells suggest that overlooked contamination at the intermediate depth of the aquifer, should be confirmed with more wells as directed by groundwater modeling. The FFS did not consider Parrott Tailings as contaminant source, but concluded that the North Side and Diggings East Tailings were the source without analysis.

EPA Response: *EPA disagrees with the notion that the Focused Feasibility Study for MSD does not recognize the Parrott Tailings as a source of contamination. EPA has never stated that the Parrott Tailings are not a major source of contamination to the MSD. The Focused Feasibility Study for MSD concludes that the plume associated with the Parrott Tailings is stagnant and has a low hydraulic gradient. In addition, the predominant flow path is downward. Due to these characteristics, the plume associated with the Parrott Tailings has not significantly contributed* ***metals loads*** *to surface water in MSD. The Focused Feasibility Study for MSD concludes that the Diggings East is a significant*

loader of metals to MSD because the groundwater travel times for the Parrott Tailings plume do not allow it to be a significant source and the proximity of the Diggings East Tailings to where loading is clearly shown to be occurring in the Metro Storm Drain. The Selected Remedy includes a comprehensive monitoring and data gathering requirement that will address some of the data needs suggested by the commenter. Please see EPA's response to comments on the draft TI Evaluation (EPA 2006) for additional information on this topic.

C. ***Contaminant Transport in the MSD aquifer***: The data used to determine contaminant transport in the MSD aquifer is flawed because the maps of the plumes are wrong and because MBMG column tests suggest that metals desorb relatively rapidly, making the plume more mobile. Additionally, the investigations failed on several fronts: data collected during dewatering at LAO that showed that the aquifer began to clean up in a few months during dewatering and excavation wasn't considered; the FFS did not fully consider the importance of acid-generation in Parrott Tailings material; FFS analysis of groundwater flow and contaminant transport is inadequate for the purpose of remedial alternative selection; the technical approach used in the FFS does not comply with advanced technologies and methods of using groundwater modeling; vertical and horizontal delineation of contaminant plume and characterization of aquifer materials was not carried out; acid generation by waste materials was not addressed in the FFS and PP. The following new investigations that would answer several questions should be conducted: column leach tests should be performed so that conclusions can be made that are representative of the entire aquifer system; acid generation in the tailings needs to be understood before concluding that aquifer cannot be cleaned up in a reasonable time-frame; 3-D groundwater flow modeling incorporating geochemical modeling should be used; more sophisticated models should be used to determine, in conjunction with additional characterization, exactly what geohydrological and geochemical process are at work. Finally, reclamation should include removing acid generating wastes under Alternative 5b, which would raise the pH and make contaminants less mobile.

EPA Response: *The MBMG column tests showed that metals desorb slowly, not rapidly, as suggested by the reviewer. The results of the CCE column test showed that after about 38 pore volumes had been passed through the column (when the test was terminated), cadmium concentrations were still above the WQB-7 criteria of 5 ug/L. In addition, the column tests were, by design, a best case scenario. In order to get water to pass through the columns without placing the system under pressure, a large amount of sandy subsamples were packed in the column along with a few clumps of clay subsamples. Because MBMG chose not to conduct batch studies, low permeability clays could not be tested. The clay layers were shown in the XRF testing to have the highest metals concentrations and are likely to leach much slower than the sandy sediments used in MBMG's column study. Therefore, the existing results are skewed toward the higher permeability, more leachable sediments, and even these best-case results indicate at least 38 pore volumes would be required to flush cadmium from the aquifer.*

EPA acknowledges that COC concentrations in groundwater at LAO decreased after the removal action. However, groundwater concentrations remain well above human health standards. It does not matter if the concentration is 100 times greater than the standard or three times the standard – the groundwater still exceeds standards and will require control, capture, and treatment for the foreseeable future. Further, for the contaminant range expected in the BPSOU alluvial aquifer, the treatment process and treatment costs vary negligibly with concentration. In other words, treating slightly less contaminated water does not result in a significant savings in lime requirements. Treatment costs are much more dependent on flow rate and long term O&M of equipment.

The FFS did not focus on the acid generating potential of the Parrott Tailings because the evaluation of the groundwater system beneath and down-gradient of the Parrott Tailings showed that the existing groundwater contamination from previous acid mine drainage could not be easily removed and the aquifer could not be restored to beneficial uses within a reasonable period of time. The existing groundwater contamination has had over 100 years to work its way into and through low permeability layers, which can not be removed by pump and treat in a short period of time. Therefore, even if 100 percent of the Parrott Tailings could be removed (which we do not believe is realistic) the aquifer still could not be restored to beneficial uses within a reasonable period of time. The acid generating potential of the tailings is not relevant, as even complete removal of the tailings will not restore the aquifer to beneficial uses.

The reviewer's conclusion that additional column studies should be performed fails to recognize that the main data gap in terms of leaching data is for the lower permeability materials, which can not be easily performed using column tests. While more column data could be useful, the main data need is for batch leaching tests.

EPA believes that the current understanding of the hydrogeological and geochemical processes is adequate to make a remedial decision. Acid mine drainage and adsorption processes are well understood. At the fundamental level, the groundwater remedy is control, capture, and treatment. EPA believes that groundwater and contaminant transport modeling is an academic exercise that will not provide information that would change EPA's remedy for groundwater. In fact, just stating that groundwater control, capture, and treatment will be used, without giving any further detail, is adequate for a record of decision. The methodology is typically left for the post-ROD remedial design phase. Additional data, if necessary, can be obtained during remedial design. If future monitoring indicates performance issues, and technical experts believe that a groundwater transport model would be useful, this could be done in the future. The ROD will not be delayed for further study or modeling. Please see EPA's response to comments on the draft TI Evaluation (EPA 2006) for additional information on this topic.

D. ***Groundwater Flow Rates***: MSE reviewed the plan and finds that there is not sufficient data to support the claims made relative to the flows and natural flushing as claimed by ARCO. New wells installed in 2004 indicate groundwater movement was underestimated and the pump test used in FFS was biased low. Using a single hydraulic conductivity value, rather than geometrically averaging the available data, resulted in an inappropriate travel time calculation with too

low a linear velocity. Hydraulic conductivity increasing in downstream direction is unnecessary, as data from previous investigations exist. Disagree with strong vertical component of flow in upper MSD suggested in FFS and to reconcile this disagreement, a groundwater flow model is essential. Migration of pollutants from Parrott Tailings toward SBC is much more rapid than EPA believes.

EPA Response: *The alluvial aquifer in the MSD Area is heterogeneous with respect to both the grain size of the materials that compose the alluvium and the rate of groundwater flow within the aquifer. Assuming that the hydraulic properties of a single unit (i.e., the higher permeability unit encountered by the new wells installed in 2004) are representative of the entire aquifer is not appropriate. Further, lower permeability units will ultimately control groundwater flow rates and contaminant movement within the aquifer. The hydrogeologic analysis performed in the RI and the FFS did not base permeability estimates on a single pump test. In fact, all pump tests were considered to estimate ground water flow rates throughout different portions of the aquifer. The ground water flow rates estimated were supported by a water balance evaluation that derived the volume and rate of groundwater flow from the MSD based on hard flow measurements made in Silver Bow Creek and from the ground water collection system in Lower Area One. EPA is confident that groundwater flow and contaminant loads estimated for the MSD are not significantly underestimated based upon a long record of groundwater flow measurements made downgradient in Lower Area One.*

Groundwater flow analyses for the alluvial aquifer in the MSD Area has been performed numerous times by different evaluators representing different parties including EPA, DEQ (formerly MDHES), Montana Bureau of Mines and Geology, Montana NRDP, and ARCO. Analyses presented by all parties consistently show the groundwater divide in the upper MSD (e.g., Figure 2-5, MNRDP, 1995), and describe the downward vertical gradient in the Upper MSD. The Butte Groundwater Injury Assessment Report (pages 2-16 and 2-21; NRDP 1995) described the flow in the Upper MSD as follows:

> A downward groundwater gradient exists in the City-County shop complex (wells GS-41, GS-42, GS-10, GS-43), while an upward gradient exists southwest of Harrison Avenue (wells GS-35, GS-9, GS-11, GS-31) (CH2M Hill and Chen Northern 1990 Fig. 3-51). The downward gradient may be caused by: a high permeability zone at depth; a dewatered bedrock system below the saturated alluvial groundwater system, leakage from the unlined process ponds at the previous Weed Concentrator, or the downward gradient could simply be the normal pattern in a recharge area.

A numeric groundwater flow model of the alluvial system surrounding the Berkeley Pit was developed as part of the Butte Mine Flooding Operable Unit RI/FS. Conclusions drawn from this modeling effort are consistent with the flow system described in the BPSOU RI Report and FFS. Please see EPA's response to comments on the draft TI Evaluation (EPA 2006) for additional information on this topic.

E. ***Characterization in the MSD Inadequate***: The EPA's characterization of the waste in the MSD area, particularly the Parrott Tailings area is flawed for reasons

ranging from insufficient data to poor conceptual site models. More characterization of the Parrott Tailings is needed to confirm/refute MBMG findings. Hydrogeologic data from new wells appear to refute conclusions made by EPA, yet it appears that the decision to not remove the tailings has already been made. The site characterization is inadequate to understand how the groundwater regime behaves, how the contaminant transport happens, and to understand the extent of contamination. Methods used for characterization of the groundwater are 50 years old and modern tools exist such as groundwater modeling, transport modeling, and geochemical modeling. Unless a modeling investigation shows that the alluvial aquifer will not recover, contaminants should be removed

EPA Response: *EPA disagrees with the notion that there is insufficient data to characterize the waste in the MSD area including the Parrott Tailings. The extent of the Parrott Tailings is well known. EPA has a good understanding of the nature and extent of waste sources in the MSD. EPA also understands the fundamentals of the groundwater flow and gradient at MSD. There has been no dispute about the fact that the groundwater at MSD is severely contaminated. The differences have been over the effectiveness and implementability of a removal action on the scale. EPA is confident in the evaluation of the alternatives for MSD performed in the Focused FS for MSD. That evaluation was based on numerous sources of data including data from studies conducted during previous remedial investigations.*

A summary of the type and quantity of data used for the Remedial Investigation, Feasibility Study, and Focused Feasibility Study are listed below:

- *Logs from about 70 wells and 74 soil borings to characterize the geometry and lithology of the aquifer and the character and extent of wastes in the MSD.*
- *Hydraulic conductivity (permeability) determined from constant rate pumping tests at 9 different wells (including observation wells) and from single well permeability tests (slug tests) at 25 different wells.*
- *Several hundred chemical analyses for surface and subsurface soil samples and impounded tailings.*
- *Synoptic/seepage data (flow and chemistry) of groundwater discharge (base flow) to the MSD channel for the evaluation of contaminant source areas in the MSD.*

EPA did not refuse to use the data from the MBMG study of the MSD alluvial aquifer. EPA agrees with the findings of the MBMG study that there are areas of preferential groundwater flow in the upper limits of the alluvial aquifer. In fact, EPA recognized the heterogeneous nature of the alluvial aquifer in the Remedial Investigation Report and predicted areas of higher groundwater flow. Nevertheless, pump tests still suggest a relatively low rate of groundwater movement. EPA disagrees with the conclusion reached by the MBMG that the more rapid movement of groundwater in the coarser members of the alluvial aquifer will lead to restoration of groundwater quality in a short period of time

because it totally ignored the recovery of groundwater quality in the finer grained members of the aquifer. In fact, EPA believes that the data from MBMG further support EPA's position that it will require in excess of 100 years for groundwater quality to be restored. Specifically, EPA believes that the preferential flows in the coarser materials will lead to more limited flow in the finer materials that will result in contaminants remaining in the finer grained members of the aquifer for a longer period. Please see EPA's response to comments on the draft TI Evaluation (EPA 2006) for additional information on this topic.

F. ***Out of Scope - Comments were not specifically on the Proposed Plan***: The WET report (*WET July 2004. Technical Review Comments For: Focused Feasibility Study of the Metro Storm Drain; CDM February 2004, and Upper Silver Bow Creek Investigations, MBMG 2004*) does not reconcile the discrepancy that with the greater value for hydraulic conductivity, dissolved metals should have moved farther and faster than observed field data seem to indicate. Clarifies statements in the WET report regarding effective porosity and contaminant retardation.

EPA Response: *EPA agrees with this comment.*

Cost of Removal

A. ***Removal Costs Overestimated***: EPA's costs estimate of $37 million to remove the Parrott Tailings appears to be a gross overestimate. According to Montana NRDP, the cost of removing the Parrott Tailings would about half of EPA's cost estimate - approximately $18 million. Unit costs of waste removal are too high and use of cost estimates from ARCO is a conflict of interest.

EPA Response: *The cost estimates in the FFS for removal of the Parrott Tailings were done in accordance with the latest EPA guidance (A guide to Developing and Documenting Cost Estimates during the Feasibility Study, July 2000). In cases where site-specific cost information was not available, standard cost estimation references (e.g., Means) were used. Site-specific information was sought on removal costs because it was believed that costs derived from Means were too high for the Butte area. Therefore, site specific costs were obtained from Atlantic Richfield based on their experience of doing remediation in the infrastructure-laden, urban environment of Butte. Atlantic Richfield provided different costs based on hauling materials from different portions of Butte up to the Butte Mine Waste Repository. Atlantic Richfield's cost estimate was significantly lower than those derived from Means. Additionally, the costs provided by Atlantic Richfield were scrutinized before use in the FFS. EPA believes that the $18 million cost cited by the commenter is too low, and cannot comment further without additional detail on how that cost was derived.*

Development of Alternatives

A. ***Little Difference among alternatives:*** Alternatives should be considered as individual elements rather than site wide (several examples cited).

EPA Response: *EPA did consider each individual element of the six site-wide alternatives in deciding on the Selected Remedy. EPA acknowledges that the six site-wide alternatives*

contained similar elements. This is due partially to the years of knowledge and experience EPA has gained about the nature of the response actions that work best at the BPSOU site as a result of completing numerous past response actions in Butte. In other words, alternatives that were known to not be effective based on previous site-specific experience were eliminated early in the alternative evaluation process.

Evaluation of NCP Criteria

A. ***Compliance with ARARs***: The pollution prevention principle/precautionary principle are ARARs for the Parrott Tailings

EPA Response: *ARARs are defined in CERCLA and the NCP. EPA, in close consultation with DEQ, identified ARARs for the BPSOU in accordance with CERCLA and the NCP. The pollution prevention principle/precautionary principle is not a promulgated standard or criteria within the meaning of CERCLA and the NCP.*

B. ***Evaluation/Weighing of Cost***: By misapplying the cost criteria, EPA is willing to write off an aquifer and groundwater.

EPA Response: *EPA applied the cost criteria in accordance with the NCP and EPA guidance in evaluating the alternatives against the nine NCP criteria. The decision on the alluvial aquifer was not solely based on cost. It was also based on the technical impracticability of restoring groundwater standards as discussed in the responses above, and on the use of the other remedy selection criteria. Please refer to the section of the ROD that applies the cost criteria for each alternative against the nine NCP criteria.*

C. ***State Acceptance***: The Montana Bureau of Mines, the State of Montana, and independent consultants all agree that removing the Parrott Tailings would greatly contribute to the long-term health of Silver Bow Creek; ARCO has worked frantically to cover these tailings in recent months and EPA is willing to credit the ARCO cover-up as a permanent remedy.

EPA Response: *EPA acknowledges that there is disagreement on EPA's evaluation of the removal of discrete waste sources in the Metro Storm Drain area. EPA agrees that the removal of Parrott Tailings would contribute to the improvement of water quality in the alluvial aquifer. However, without addressing the other waste sources and the residual contaminants in the matrix of the aquifer, the groundwater would still not meet groundwater quality standards. The groundwater collection and treatment systems constructed at LAO and in the Metro Storm Drain will protect the water quality and health of Silver Bow Creek. EPA has no knowledge of AR's efforts in recent months to cover tailings anywhere in the Silver Bow Creek or Metro Storm Drain floodplain.*

Extent of Removal

A. ***Comments against Removal in the MSD***: Removing the waste is unnecessary because water treatment still will be needed; there is no risk to human health if the waste is left; removal would endanger public safety; the decision to leave waste has precedence; and removal would cause significant disruption to area

businesses. We can tear up all of the upper Harrison Avenue business district and maybe not get all of the source material; because of this, enough residual contamination would remain such that ARCO will still have to treat water in perpetuity. The science is clear and the decision is consistent with many other remedial actions throughout the country. Removal of the tailings would be a major disruption to our business; we don't want our business torn up and disrupted just on the chance that things might get better way out in the future.

EPA Response: *EPA acknowledges the points made by the commenters.*

B. ***Commenters need more information:*** Does not know whether it is better to remove the tailings or leave them in place because we do not have enough information to make such a multimillion-dollar decision. In the absence of further information, would like the tailings to be removed. The Parrott Tailings have not been adequately defined. There is so little agreement between EPA and MBMG over the amount of tailings to be removed that to make a decision now is foolish and frightening.

EPA Response: *EPA disagrees with the notion that there is insufficient data to make a remedy decision for the Metro Strom Drain (MSD) area. EPA has a good understanding of the nature and extent of waste sources in the MSD. EPA also understands the fundamentals of the groundwater flow and gradient at MSD. There has been no dispute about the fact that the groundwater at MSD is severely contaminated. The differences have been over the effectiveness and implementability of a removal action on the scale that would be required to restore groundwater quality. EPA is confident in the evaluation of the alternatives for MSD performed in the Focused FS for MSD, the Proposed plan, and the ROD. Those evaluations were based on numerous sources of data including data from studies conducted during previous remedial investigations. Additionally, EPA is confident of the analysis contained in the TI Evaluation and EPA's response to comments regarding the Draft TI Evaluation document. A summary of the type and quantity of data used for the Remedial Investigation, Feasibility Study, and Focused Feasibility Study are listed below:*

- *Logs from about 70 wells and 74 soil borings to characterize the geometry and lithology of the aquifer and the character and extent of wastes in the MSD.*
- *Hydraulic conductivity (permeability) determined from constant rate pumping tests at 9 different wells (including observation wells) and from single well permeability tests (slug tests) at 25 different wells.*
- *Several hundred chemical analyses for surface and subsurface soil samples and impounded tailings.*
- *Synoptic/seepage data (flow and chemistry) of groundwater discharge (base flow) to the MSD channel for the evaluation of contaminant source areas in the MSD.*

C. ***Community Acceptance:*** Six criteria for EPA to meet were provided earlier by the county concerning the remedy for groundwater. This includes a trust fund for

operation, maintenance, and management of remedies. These six criteria are: 1) Mandate the use of cost effective, community acceptable measures if additional removals are done, 2) Mandate that all contaminated groundwaters be collected and treated at a central facility and made available to BSB for beneficial reuse, 3) Mandate that a series of groundwater monitoring wells be installed to accurately define and characterize the current size, shape, and location of the contaminated groundwater plumes... in the event it is determined that the plumes are beginning to spread, the ROD must mandate additional remedial actions, 4) If no waste is removed, it is incumbent on EPA to stipulate the loss of use of the aquifer to the Butte community and the State of Montana must ensure that any and all compensation from NRD for this area be set aside for use solely in Butte, 5) The ROD must mandate that sufficient resources be made available to properly manage and maintain the resource and remedy in perpetuity, and 6) The final result of any remedy implementation must be aesthetically pleasing and return the SBC channel to as natural state as possible.

EPA Response: *EPA acknowledges BSB's concerns associated with their acceptance of the MSD groundwater collection system. EPA has considered these criteria in the remedy selection process for the BPSOU. EPA's post ROD enforcement efforts will also consider BSB's concerns to the extent practicable.*

D. ***Comments for Removal:*** Commenters expressed various opinions supporting removal of the Parrott Tailings. Most expressed the need to be conservative – to remove them just in case they could be a source of contamination later. Additionally, some commenters felt that the scope and method to remove these wastes is feasible and affordable and, contrary to common perception is minimally invasive to infrastructure other than the city-county shop complex. Some believed that EPA should err on the side of caution and remove the tailings because there is not enough data to prove that they should be left in place. Some also felt that it did not make sense to leave waste in place at the headwaters of Silver Bow Creek at the source but then spend a hundred million downstream. Other commenters felt that Silver Bow Creek should be reconstructed along the historical Silver Bow Creek Channel into a quality creek suitable for recreation and other human uses and that EPA has an obligation to make every attempt to restore the water in Silver Bow Creek and the Metro Storm Drain to a beneficial public use.

EPA Response: *One objective of the Selected Remedy for BPSOU is to restore Silver Bow Creek to a viable fishery and to meet water quality standards in Silver Bow Creek during base flow and storm water run-off. Silver Bow Creek has been reconstructed through LAO and the remainder of Silver Bow Creek from LAO to the confluence with Blacktail Creek will be reconstructed under the Selected Remedy. EPA believes the water in Silver Bow Creek will be restored under the Selected Remedy to its beneficial uses. This can be accomplished in a permanent manner without the removal of the Parrott Tailings.*

EPA evaluated the removal of the Parrott Tailings in the Feasibility Report and the Focused Feasibility Report for MSD, as well as in the Proposed Plan and the ROD, and concluded that removal was not the most effective and implementable alternative to

address groundwater. EPA's Selected Remedy for groundwater includes capturing and treating the groundwater to protect receiving waters, implementation of groundwater control areas to protect public health, and a comprehensive monitoring program to evaluate the effectiveness of the remedy.

EPA has concluded that it is technically impracticable to restore the aquifer to ARAR standards. In addition to discrete sources of waste such as the Parrott Tailings, there are other discrete waste sources throughout the floodplain including the Diggings East, the North Side Tailings, the lower MSD tailings, tailings associated with the slag walls, and tailings under the municipal sewage treatment plant. Throughout the entire floodplain there are diffuse waste sources. EPA has encountered contaminated solid media throughout the floodplain during Superfund construction activities Even if it were feasible to remove these sources of contamination, the groundwater would continue to be contaminated by the gradual release of residual contaminants from the matrix of the alluvial aquifer. Based on this conclusion, EPA's Selected Remedy includes interception of contaminated groundwater and treatment.

EPA disagrees that the Selected Remedy will lead to contamination of Silver Bow Creek and the Clark Fork River downstream. EPA's experience with the current groundwater collection and treatment system indicates that surface water in the headwaters of the Clark Fork will be protected.

The Parrott Tailings are covered by several feet of overburden. The land covering the Parrott Tailings is utilized currently as a baseball field, City/County Shop Complex, parking lot for the Civic Center, etc. Because of the way the tailings are covered by infrastructure, it is almost impossible for the Parrott Tailings in their current location to enter the surface water system. The threat posed by the Parrott Tailings is from the leachate that EPA believes will be controlled by the groundwater capture and treatment systems at LAO and MSD.

EPA's response to comment B immediately above responds to the issue of the adequacy of the data.

E. ***For Removal of Accessible Wastes:*** Removing accessible material under the county shops (Alternative 5b) is a reasonable solution that is likely to permanently solve the groundwater contamination problems. Alternative 5b is the best solution for long term remediation of water quality in the creek.

EPA Response: *Alternative 5b was evaluated in the Focused Feasibility Study for MSD. EPA concluded that the removal of accessible contaminant sources would not restore groundwater quality because non-discreet waste sources throughout the floodplain would continue to release contaminants to the alluvial aquifer and residual contamination in the matrix of the aquifer would also continue to contaminate groundwater. Alternative 5b is not a cost-effective alternative. Alternative 5b is also difficult to implement due to the infrastructure that would be affected including roads, county buildings, businesses, etc. Alternative 5b also poses undesirable socio-economic impacts on Butte.*

F. ***Concerns about meeting Water Quality Standards in Silver Bow Creek:*** Parrott Tailings must be removed in order to see trout restored throughout Silver Bow Creek.

EPA Response: *EPA disagrees. The groundwater collection and treatment system at LAO and MSD will prevent the leachate from the Parrott Tailings from impacting surface water. This is demonstrated by the water quality data from Silver Bow Creek that generally meets surface water quality standards during base flow. With the implementation of the full ROD, including the storm water management program, Silver Bow Creek will meet water quality standards that will support a viable fishery.*

G. ***Waste in Contact with Groundwater is unacceptable:*** Leaving waste in the floodplain or an area of a fluctuating groundwater table will continue to affect human health and the environment.

EPA Response: *The groundwater flux in the groundwater system at BPSOU is being collected and treated before discharge back to Silver Bow Creek. This will control the adverse effects of groundwater on the environment. To control the effect of contaminated groundwater on human health, a controlled groundwater area such as that for the Clark Tailings will be established for both the alluvial and bedrock aquifers.*

General Comment

A. ***Should call the MSD the headwaters of Silver Bow Creek:*** Call it the headwaters of Silver Bow Creek - that's what it is. It's not an open sewer or a storm drain. Calling it that implies that it is okay to leave it polluted. I'd like to see the water that used to be in Silver Bow Creek, and that's in Dixie Creek and that's in Yankee Doodle Creek, diverted in a pipeline and placed into Silver Bow Creek. It's not the Metro Storm Drain - call it what you want, but it's the Silver Bow Creek and it should be reestablished as it should be.

EPA Response: *The original Silver Bow Creek channel has been obliterated by mining activity. Referring the Metro Storm Drain as "upper Silver Bow Creek" or in other terms would be confusing at this point in the process, as many maps identify the Metro Storm Drain as such. In addition, while the Metro Storm Drain follows the approximate course of the former Silver Bow Creek channel from the existing concentrator to Blacktail Creek, this section of the creek does not have a water-use classification specified by the State of Montana. Maintaining the use of "Metro Storm Drain" will help avoid confusion when applying water quality standards in Silver Bow Creek.*

B. ***EPA ignores comments***: EPA ignored MBMG study on Parrott Tailings and migration of pollutants from the Parrott Tailings toward Silver Bow Creek is much more rapid than EPA believes; removal of Parrott Tailings would lead to a relatively short recovery of the groundwater resources; EPA's desire to leave the Parrott Tailings is driven by a flawed study by its contractor. Review conducted by EPA's own experts repeatedly state that knowledge of the alluvial aquifer is inadequate when it comes to choosing a remediation alternative.

EPA Response: *EPA did not ignore the MBMG study of the MSD alluvial aquifer. EPA agrees with the findings of the MBMG study that there are areas of preferential groundwater flow in the upper limits of the alluvial aquifer. In fact, EPA recognized the heterogeneous nature of the alluvial aquifer in the Remedial Investigation Report and predicted that areas of higher groundwater flow would be present. Nevertheless, pump tests still suggest a relatively low rate of groundwater movement. EPA disagrees with the conclusion reached by the MBMG that the more rapid movement of groundwater in the coarser members of the alluvial aquifer will lead to restoration of groundwater quality in a short period of time because it totally ignored the recovery of groundwater quality in the finer grained members of the aquifer. In fact, EPA used the data from MBMG to further support EPA's position that it will require in excess of 100 years for groundwater quality to be restored. Specifically, EPA believes that the preferential flows in the coarser materials will lead to more limited flow in the finer materials which will result in contaminants remaining in the finer grained members of the aquifer for a longer period. Please see EPA's response to comments on the draft TI Evaluation (EPA 2006) for additional information on this topic.*

C. ***General Comments about Removal/MSD Evaluation:*** Rather than only intercepting the flow of the contaminated aquifer, the area of concern should be actively leached; leaching can be accelerated by in-situ oxidation of the reservoir followed by acid leaching; pilot testing could prove viability of these techniques. The lack of defendable scientific work on the MSD area speaks to the lack of scientific oversight. EPA should appoint an independent group of scientists to rectify competing opinions on site characterization and remedial options. Why is EPA removing the same tailings in Missoula and not in Butte?

EPA Response: *The demonstrated success of the passive groundwater collection and treatment system argues against an active and costly high O&M system. As stated in previous responses, EPA does not agree that there is a lack of adequate scientific evaluation of the alluvial aquifer at BPSOU. EPA did obtain an independent opinion on the evaluation of the alluvial aquifer from EPA's technical groundwater research team in Ada, Oklahoma. EPA is also very confident that the analysis and evaluation performed by EPA's experts was objective and unbiased.*

EPA is not removing all the tailings at Milltown. By removing about one-third of the tailings at Milltown, it was determined that groundwater contamination would be reduced to a point where groundwater could be used for human consumption. EPA determined that this is not the case in Butte due to a dramatically different hydrogeological setting in the MSD.

D. ***Violation of the Public Trust Doctrine***: The proposed plan for the Parrott Tailings and Metro Storm Drain violates the Public Trust Doctrine. The EPA's uncertainty argument surrounding the Metro Storm Drain and the Parrott Tailings is contrary to the Public Trust Doctrine. The EPA's "uncertainty" argument violates CERCLA, SARA, Public Trust Doctrine as well as the legally mandated Precautionary Principle.

EPA Response: *EPA is unsure what is meant by the "uncertainty" argument. EPA's analysis of the groundwater issue is explained in detail in the TI Evaluation and EPA's response to comments on the draft TI Evaluation document. The Selected Remedy is in full compliance with CERCLA (as amended) and the NCP.*

E. ***Specific changes to the Proposed Plan:*** Commenter suggests numerous modifications to the Proposed Plan, particularly concerning groundwater monitoring and removal of the Parrott Tailings (extensive investigation of unknowns; peer review if there is disagreement; extraction wells, followed by trenches and/or removal of wastes, if standards still not met; and automatic triggers).

EPA Response: *The Selected Remedy accomplishes much of what is suggested in this comment. The Selected Remedy includes a comprehensive monitoring program. The Selected Remedy includes meeting performance standards for discharge waters and Silver Bow Creek. Groundwater collection and treatment systems for LAO and MSD are already installed and operating. The performance of the remedial action selected for BPSOU is reviewed on a regular basis by EPA. Monitoring data will be reviewed in technical meetings on an annual basis. EPA conducts a formal 5 year review which involves public participation. If performance monitoring indicates that the project objectives are not being met, EPA, in consultation with the State, will determine what action is necessary. The action decided on cannot be predicted at this time, however, all the options included in your comment would be considered.*

EPA does not plan to conduct further formal site investigation beyond the evaluation and analysis that will occur as part of the comprehensive surface water and groundwater monitoring process. EPA does not believe further delay of a remedial decision is warranted. Please see EPA's response to comments on the draft TI Evaluation (EPA 2006) for additional information on this topic.

NRD Claim

A. ***Technical Record:*** The basic premise of the outstanding NRD claim is very consistent with what the Proposed Plan lays out. It is stated that they hoped that the PP would keep the Parrott Tailings in place, and that's what caused the residual claim to be what it was as far as restoration activities.

EPA Response: *EPA acknowledges the comment.*

Unrelated Topic

A. ***Out of Scope***: Concerned that costs for reconditioning the treatment lagoons along the MSD not considered. Are costs for the ongoing work at the LAO ponds potentially applicable to the MSD ponds as well?

EPA Response: *Groundwater collected in the MSD subdrain will be treated in the same facility as the groundwater collected at LAO. The wetland demonstration project that the commenter is referring to at MSD is not a treatment lagoon. It was a demonstration of*

passive wetland treatment of base flow in MSD. The demonstration project has been decommissioned and the area will be reclaimed as part of the ROD.

Waste Left in Place

A. ***Reducing Infiltration***: If the Parrott Tailings and other wastes are left in place, impermeable caps (such as pavement or drains under ball fields) should be installed to reduce infiltration. Control of local recharge and reduction in groundwater flow through wastes is important.

EPA Response: *EPA agrees with this comment and will consider plans to reduce the potential for infiltration over the Parrott Tailings area during remedial design.*

Water Quality

A. ***Concerned about meeting water quality standards in Silver Bow Creek:*** If the Parrott Tailings are not removed, can WQB-7 standards be consistently met? EPA's proposed remedy ensures SBC will be a permanently impaired stream.

EPA Response: *The adverse effect of contaminated groundwater on water quality in Silver Bow Creek will be controlled by the groundwater collection and treatment systems at LAO and MSD. As demonstrated by the improvement in water quality in Silver Bow Creek from the capture and treatment of groundwater at LAO and MSD, EPA is confident that WQB-7 standards in Silver Bow Creek will be met.*

1.7 Residential Metals

Comment Topics, Comment Totals, and References

Subtopic	Subtopic	Number of Comments	Comment ID references
Overall Topic: Residential Metals		**217**	
Attic and/or Interior Dust	A Action Levels	7	7.23, 77.1, 97.2, 99.16, 102.4, 102.7, 132.9
	B Coordination among Agencies:	3	134.12, 134.13, 134.14
	C Attic Dust Should be Removed	47	3.49, 3.102, 5.48, 7.15, 7.33, 65.3, 65.23, 70.24, 70.30, 70.57, 70.94, 70.95, 70.97, 70.99, 70.100, 70.101, 70.134, 71.24, 83.10, 85.5, 89.6, 91.1, 91.2, 91.3, 91.4, 91.5, 91.6, 91.7, 94.1, 98.5, 101.9, 107.2, 109.3, 110.10, 112.38, 118.1, 121.2, 123.16, 124.26, 124.30, 124.32, 124.41, 124.49, 129b.16, 132.7, 134.15, 135.5
	D Attic Dust not Characterized	14	7.31, 7.32, 62.3, 70.85, 101.1, 101.2, 101.3, 101.4, 105.12, 107.7, 108.4, 112.37, 123.66, 124.34
	C Concerned about Health Risks	16	7.30, 70.89, 71.50, 73.8, 73.10, 75.62, 75.97, 76.2, 98.4, 101.6, 101.7, 107.5, 112.12, 129b.4, 129b.10, 136.1
	E Economic Effects	3	1.36h, 7.24, 129b.11
	F Environmental Justice	11	1.27d, 1.36b, 1.36g, 3.77, 3.105, 7.19, 7.25, 7.28, 82.2, 110.9, 137.1
	G Funding	9	70.91, 70.96, 71.35, 134.1, 134.2, 134.3, 134.5, 134.16, 134.17
	H General Comment	1	124.50
	J Libby, Montana Precedent	4	1.36j, 3.104, 7.27, 75.220
	K Zonolite (out of scope)	3	75.118, 75.120, 107.8
	L Exposure Pathways	40	1.27a, 1.27b,1.27c,1.31, 1.36c, 1.36d, 1.36e, 1.36f, 1.36i, 1.36k, 1.36l, 2.1, 3.13,3.22,.7.18, 7.20, 7.21, 7.22, 7.26, 70.109,70.110, 70.111, 70.112, 70.113, 82.1, 99.14, 101.5, 102.1, 102.3, 107.4, 112.13, 112.39, 124.36, 132.6, 134.4, 134.7, 134.8, 134.9, 134.10, 134.11
	M Property Resale: Disclosure of Contamination/ Remediation	4	70.69, 101.8, 101.10, 112.40
	N Property/Landowner Liability	2	99.15, 107.6
	O Public Trust Doctrine Violated	1	5.15
	P Human Health Risk Assessment Flawed	3	3.103, 7.16, 107.3
	Q Time frame for cleanup	4	71.42, 102.2, 123.17, 134.6

Comment Topics, Comment Totals, and References

Subtopic	Subtopic		Number of Comments	Comment ID references
Overall Topic: Residential Metals			**217**	
General Comment	A	Suggested Changes to Proposed Plan	1	22.2
Human Health Risk	A	Residential Metals Action Levels	6	124.37, 132.10, 132.11, 132.12, 132.13, 132.14
	B	Health Effects/Risks at Unreclaimed Areas	1	123.52
	C	Lead Risk Assessment Flawed	1	132.8
Institutional Controls	A	General Comment	1	71.36
Multipathway Lead Abatement Program	A	Against Non-Targeted Sampling	1	70.83
	B	Funding	2	107.9, 124.25
	C	General Comment	1	132.1
	D	Lead Paint	1	117.4
	E	Protectiveness of Human Health	1	132.2
	F	Public Education/ Technical Communication	1	132.20
	G	Support for the BSB Lead Program/ Multipathway Program	8	3.43, 70.3, 70.50, 70.130, 71.21, 108.3, 110.8, 133.24
	H	Time frame of Residential Remediation Program	4	132.3, 132.4, 132.18, 132.19
Soils and/or Interior Attic Dust	A	Characterization	1	132.5
	B	Concerned about Health Effects/Risks	2	56.1, 75.218
	C	Economic Effects	1	129b.6
	D	For Removal	7	1.36a, 3.27, 3.28, 58.8, 70.92, 75.166, 117.2
	E	Property Resale: Disclosure of Contamination/ Remediation	1	132.17
	F	Reclamation Needed	1	70.102
	G	Risk Assessment Flawed	1	3.36
	H	Time Frame	2	129a.5, 129b.5

Attic and/or Interior Dust

A. *Action Levels*: Not having a definitive action level for contaminated dust mandates the use of the Precautionary Principle. The dust cleanup levels are set 10 times higher than other locations. EPA should include lead paint and airborne dust in its remedial goals. The health standard for risk assessment should be raised above 1 in 10,000 to at most 1 in 100,000. Risk level of 1 in 10,000 is assigned a passing grade. Butte action levels are higher than those at the Tacoma Smelter site. Arsenic remedial goals should be developed so no Butte residents have an elevated risk of cancer from arsenic exposure.

EPA Response: *Our understanding of the Precautionary Principle is that proponents claim we don't know enough about the health effects of a chemical and, hence, should remediate ALL of it, just to be safe. EPA strongly disagrees, especially for lead, arsenic, and mercury. We have an abundance of data from both human and animal studies that look at the systemic, reproductive, developmental, neurological, and cancer-causing potential of these inorganics. We know the adverse effects that are associated with these inorganics and the dose levels and exposure pathways at which these effects occur. We also have an abundance of information on how people are or could be exposed via soil, water, air, produce, etc. contaminated with these inorganics. As a result, we can quantitate how much lead, arsenic, or mercury a person could be exposed to through various media and we can quantitate the probability of an adverse effect occurring. We can also reverse those calculations and quantitate concentration levels in media which are safe. We agree that there is some variability and/or uncertainty associated with those estimates. People differ in their physiology and behavior, sampling and analytical results vary, multiple chemicals can interact in competitive or synergistic ways, etc. However, that variability and uncertainty is recognized both qualitatively and quantitatively in the risk assessment process. Conservatism is incorporated into the risk assessment process to ensure that cleanup levels are protective of the reasonably maximum exposed individual and the most susceptible member of the population to the effects of that contaminant. Conservatism is also applied in the risk decision making process via the risk decision criteria. For example, the background rate for coming down with cancer in the U.S. is now 1 in 3 or 0.3. EPA recommends that no site should have contamination which exceeds a 0.0001 (and many times even lower) chance of cancer for the most highly exposed, most sensitive person. So the position that we don't have enough information to make an informed risk or remediation decision and therefore need to remove everything is contrary to standard EPA Superfund practices.*

The action levels developed for the BPSOU were based on site specific information. In site specific calculations, the cumulative risks are calculated for an individual on the basis of chronic exposures, using reasonable maximum exposure (RME) assumptions by combining a statistically sound, arithmetic average, exposure-point concentration with reasonable conservative values for intake and duration. Estimates for risk for current and reasonably anticipated future land uses and potential future ground water and surface water used, without institutional controls, are done as well. The risk analysis will clearly identify the population, or sub-group (e.g., highly exposed or susceptible individuals), for which risks are being evaluated.

The BPSOU Baseline Human Health Risk Assessment for Arsenic determined that the sub-population of concern would include individuals with a protein deficient diet, as they may not be able to methylate arsenic to the less toxic form. The toxicity factors developed for arsenic are intended to be protective of any sensitive subpopulations. In addition, the toxicity factor for cancer is based on the conservative assumption that any level of arsenic can result in a cancer risk. Therefore it is assumed that any sensitive subpopulations of concern should be protected by the toxicity factors used in this specific risk analysis.

In short, EPA's action levels are conservative, safe, and consistent with the law and EPA guidance. Site-specific data account for differences with other sites' action levels.

B. ***Coordination among Agencies***: Smelter dust cleanup should be coordinated among the various government agencies and lenders to keep the burden on property owners and residents to a minimum.

EPA Response: *The Butte Silver Bow Lead Abatement Program tests properties in the BPSOU at no cost to the property owner. If it is determined that a property needs to be remediated, the Lead Abatement Program contracts out the work or completes the work using program personnel. As the ROD notes, EPA intends to continue this program, with some modifications, post ROD. Cleanup costs should not be borne by home owners and residents.*

C. ***Attic Dust should be Removed***: Attic dust removal prompted 47 comments from people who favored such action. People expressed concerns that the EPA's plan doesn't adequately protect human health and that the agency isn't properly applying the Pollution Prevention Principle. Many said all homes should be tested and if any contamination were found, it should be removed. Some advocated further studies, while others said EPA's test methods and cleanup logic were flawed. Some also said they were concerned the current cleanup system discriminates against the poor. Commenters also said they disliked the Proposed Plan, others felt the Preferred Alternative is inadequate, and a few said the exposure pathways are either misunderstood or mischaracterized. Many expressed concerned that building remodeling projects are creating hazardous situations for workers and residents and that the attic dust is causing problems when selling property. In general, commenters strongly supported removal of all contaminated dust from any home in the BPSOU.

EPA Response: *Our understanding of the Precautionary Principle is that proponents claim we don't know enough about the health effects of a chemical and, hence, should remediate ALL of it, just to be safe. EPA strongly disagrees, especially for lead, arsenic, and mercury. We have an abundance of data from both human and animal studies, which look at the systemic, reproductive, developmental, neurological, and cancer-causing potential of these inorganics. We know the adverse effects that are associated with these inorganics and the dose levels and exposure pathways at which these effects occur. We also have an abundance of information on how people are, or could be exposed, via soil, water, air, produce, etc. contaminated with these inorganics. As a result, we can quantitate how much lead, arsenic, or mercury a person could be exposed to through various media and we can quantitate the probability of an adverse effect occurring. We can also reverse those calculations and quantitate concentration levels in media which are safe. We agree that there is variability and/or uncertainty associated with those estimates. People differ in their physiology and behavior, sampling and analytical results vary, multiple chemicals can interact in competitive or synergistic ways, etc. However, that variability and uncertainty is recognized both qualitatively and quantitatively in the risk assessment process. Conservatism is incorporated into the risk assessment process to ensure that cleanup levels are protective of the reasonably maximum exposed individual and the most susceptible member of the population to the effects of that contaminant. Conservatism is also applied in the risk decision making process via the risk decision criteria. For example, the background rate for coming down with cancer in the U.S. is now 1 in 3 or 0.3. EPA*

recommends that no site should have contamination that exceeds a 0.0001 (and many times even lower) chance of cancer for the most highly exposed, most sensitive person. So the position that we don't have enough information to make an informed risk or remediation decision and therefore need to remove everything is baseless, and contrary to standard EPA Superfund practices.

The risk assessment quantitatively evaluated resident contact with attic dust and evaluated the likelihood that the attic dust was contributing arsenic, lead, or mercury to the living space house dust. The evaluation found that exposures to attic dust were below EPA's levels of concern for both cancer and non-cancer effects for all likely users, based on a detailed use survey done in conjunction with ATSDR. The evaluation also found that the attic dust was not a significant contribution source to the inorganic levels measured in the living space house dust. The evaluation found that in the unusual situation where attics became actual living spaces or were significantly altered through remodeling which caused significant releases to living spaces, unacceptable risk was present. In these instances, the ROD requires prompt cleanup of attic dust to eliminate this risk.

The dust in attics in Walkerville and a few throughout the BPSOU have been sampled for lead, mercury and arsenic. Smelter emissions are a likely partial source for these contaminants, but other sources are possible. A number of homes had elevated levels of all three contaminants of concern. The analytical results from the attic dust sampling for lead, arsenic and mercury can be found in the Baseline Human Health Risk Assessment document for Walkerville. We expect other houses in the BPSOU, which are near former smelters or mine waste dumps, to have similar levels. We did not do a comprehensive, BPSOU wide sampling effort because this wasn't necessary to complete the RI/FS or to select a remedy.

The attic dust was analyzed for total arsenic, which includes all inorganic and organic forms, including trivalent arsenic. According to Dr. John Drexler, Professor of Geochemistry at UC Boulder, in an oxidizing environment, like the BPSOU pathways of concern, approximately 99 percent of the arsenic present would be in the pentavalent valence state. The presence of trivalent arsenic would be minimal, if at all. Examples of an oxidizing environment would be surface soil, surface waters, house dust, etc. Basically, any media where oxygen is present is an oxidizing environment.

At the beginning of the risk assessment process for Walkerville, a blood lead and urinary arsenic testing program was set up by the County Health Department and EPA for residents of Walkerville. There were no elevated levels of arsenic found in the individuals who participated in the study. We haven't received any reports of elevated levels of inorganic arsenic in the urine samples from medical doctors in the Butte area. However, that does not mean there have been no reported cases. Still, the Agency has not received notification of arsenic contamination in individuals. This supports EPA's overall human health risk assessment for the BPSOU site.

D. ***Attic Dust not Characterized***: Some people expressed doubt that the attic dust was properly characterized and others felt that more study, including further

tests, was needed before any decisions were made about removal. Others asked why dust that was found to be contaminated wasn't always removed.

EPA Response: *The dust in attics in Walkerville and a few throughout the BPSOU have been sampled for lead, mercury and arsenic. Smelter emissions are a likely partial source for these contaminants, but other sources are possible. A number of homes had elevated levels of all three contaminants of concern. The analytical results from the attic dust sampling for lead, arsenic and mercury can be found in the Baseline Human Health Risk Assessment document for Walkerville. We expect other houses in the BPSOU, which are near former smelters or mine waste dumps, to have similar levels. We did not do a comprehensive, BPSOU wide sampling effort because this wasn't necessary to complete the RI/FS or to select a remedy.*

E. ***Concerned about Health Risks of Attic Dust:*** Commenters expressed concern that the smelter dust in homes had not been adequately characterized and that baseline data to determine health risks had not been collected. Additionally, many said they were concerned about the health of those living in homes with contaminated dust and the health of those who undertake remodeling projects in those houses. Some asked how a person's health is affected if the dust is not removed.

EPA Response: *The risk assessment quantitatively evaluated resident contact with attic dust and evaluated the likelihood that the attic dust was contributing arsenic, lead, or mercury to the living space house dust. The evaluation found that exposures to attic dust were below EPA's levels of concern for both cancer and non-cancer effects for all likely users, based on a detailed use survey done in conjunction with ATSDR. The evaluation also found that the attic dust was not a significant contribution source to the inorganic levels measured in the living space house dust. The evaluation found that in the unusual situation where attics became actual living spaces or were significantly altered through remodeling which caused significant releases to living spaces, unacceptable risk was present. In these instances, the ROD requires prompt cleanup of attic dust to eliminate this risk.*

F. ***Economic Effects of leaving Attic Dust in place:*** Pathway argument is contrary to the principles of Superfund Redevelopment Initiative and the Superfund Land Revitalization Action Agenda because it limits or precludes future productive land uses and redevelopment of sites contaminated with toxic attic dust. The pathway of exposure approach will be a permanent drag on the economic revitalization of the Butte Hill. If the smelter dust is not completely removed, how will that affect the economic health of the area (i.e., money spent on hospital stays means less spent on other areas, such as restaurant visits, etc.)?

EPA Response: *A cleanup program under the ROD will address attic dust contamination in the BPSOU. If a pathway of exposure or remodeling occurs, the program will remediate contaminated attic dust from a property. Because there is a plan to address attic dust, this should not have adverse economic impacts.*

G. ***Attic Dust and Environmental Justice***: Several people said EPA's approach to contaminated attic dust cleanup violates the principles of environmental justice. Specifically, that approach makes low income residents bear an unfair burden, uses an incorrect pathways argument, relies on an inadequate citizen education approach, and places the burden of cleanup on the residents. The remedy for attic dust relies on renters or owners to initiate cleanup. The approach relies on renters or owners being able to predict use of their attics, putting the responsibilities for cleanup on property owners.

EPA Response: *If a pathway of exposure exists or remodeling occurs, the ROD program will remediate contaminated attic dust from a property, regardless of the economic status of the residents. Claims regarding EPA's compliance with environmental justice principles were addressed by EPA environmental justice specialists in two reports dated August 2, 2004 and August 23, 2005, both of which are incorporated by reference.*

H. ***Funding Attic Dust Cleanup:*** Those commenting said that EPA has underestimated the cost of cleaning up contaminated attic dust. Several said most residents cannot afford to pay the cost and said a redevelopment trust fund should be established to help people pay for cleanup.

EPA Response: *BSB provided the Agency with actual costs of attic dust removal under BSB's Lead Abatement Program, and these were used to estimate the cost of cleaning up attic dust. If there is a direct exposure pathway of attic dust to a living space or a property owner is remodeling, the ROD program will remediated the attic dust at no cost to the property owner.*

I. ***General Comment:*** House dust should be clarified to mean smelter/mining-related contaminated dust.

EPA Response: *Smelter emissions are a likely partial source for these contaminants, but other sources are possible. Lead in interior house dust may be from lead based paint.*

J. ***Cleanup precedent in Libby, Montana:*** EPA removal actions in Libby, Montana warrant addressing contaminated attic dust in Butte. The Libby Cleanup precedent would warrant addressing contaminated attic dust in Butte. Compared to Libby, the poor in Butte would receive an inferior cleanup. Do we have another "Libby" in Butte?

EPA Response: *There are significant differences in the health effects between asbestos in Libby amphiboles and attic dust in Butte. In Libby, estimated excess cancer risks caused by airborne asbestos fibers from disturbance of the material exceeded EPA's acceptable risk range. In Butte, estimated risks from exposure to attic dust are not likely because there is not a complete exposure pathway in most circumstances. EPA concluded in Libby that source materials such as soil and soil-like media, dust, and vermiculite that contain asbestos are a likely source of ongoing release of hazardous fibers to air and human recipients. In light of evidence of human asbestos exposure and the associated increase in human risk in Libby, EPA took the appropriate steps there to reduce or eliminate exposure*

pathways to these materials to protect area residents and workers. In Butte, EPA concluded that the risks from inhalation of contaminants of concern was at least 10 times less than the risks associated with the ingestion of contaminants of concern in soils and dust. Therefore, the residential cleanup in Butte focuses on preventing the ingestion of contaminated solid media, including residential soils and indoor dust.

K. ***Zonolite:*** We have Zonolite in our attic, who is responsible? Is the company that makes it responsible? Have attic dusts been characterized to establish what they potentially contain, including building materials such as Zonolite?

EPA Response: *Removal of Zonolite insulation in Libby is a unique circumstance and removal of these materials will not be implemented in Butte. EPA's long standing advice on Zonolite and other asbestos-containing materials is to leave it alone. If it must be disturbed, it is recommended that the homeowner contact a professional service to have it tested and, if necessary, removed.*

L. ***Attic Dust Exposure Pathways***: The issue of exposure pathways to attic dust prompted 40 comments from the members of the public, all of whom found reason to disagree with EPA's stance. Most said the agency has used flawed logic to develop its approach, while many others said the agency simply misunderstands or mischaracterizes exposure pathways. A number of people said EPA's position is contrary to Superfund law, state regulations, and the Pollution Prevention Principle. Some said the EPA's position that there is no exposure pathway is wrong and a few noted that any planned institutional controls will not keep people from being exposed. Many said the effects of remodeling homes on pathways was not thoroughly considered and that there are no laws preventing people from creating pathways by disturbing dust in their attics. Some commenters said the EPA's stance unfairly affects the poor and generally abandons people to cleanup their own homes. One person asked that further studies be conducted.

EPA Response: *Under the BSB Lead Abatement Program, sampling is collected both from attics and interior living spaces. If there is lead, arsenic and mercury in the attic dust and the interior dust, then a direct pathway for exposure is present. If there is only lead in the interior dust, this indicates that there is a potential for the presence of lead based paint. EPA recognizes that remodeling or structural conditions of a property can introduce attic dust into the interior living space. If a property owner is planning to conduct remodeling activities or there are exposure pathways from structural problems, the ROD program will remediate the dust in attics.*

EPA's Walkerville Baseline Risk Assessment did take in to account the exposure of workers in attics with contaminated attic dust. Workers can work in an attic for 80 days and an 8 hour work day without an increased health risk.

M. ***Property Resale - Disclosure of Contamination/Remediation***: Commenter urges attic dust testing regardless of whether people want them cleaned up, with results going into the deed; otherwise potential buyers will never know if it is safe. Since one woman allowed her attic to be tested, she now must disclose the results to

potential buyers, thus decreasing property value. Simple statement declaring property has been cleaned up should be attached to property deeds. While a cleanup is underway, data on the metals and arsenic levels within each home should be recorded as part of the deed for that property.

EPA Response: *EPA will consider the commenter's idea concerning testing programs for attic dust as part of the ROD program. If a property is remediated, the work plan and detailed work activities will likely be attached to the deed in the BSB courthouse as part of the ROD's institutional controls program.*

N. ***Property/Landowner Liability***: Where demolition will be required during a remodeling project, building owners should not incur any costs presented by the dust abatement. Are the property owners liable if they have not cleaned up the attic dust and then exposed a contractor to it?

EPA Response: *The ROD program will remediate dust in attics at no cost to the property owner. The Human Health Risk Assessment states that a person could work in an attic with contaminated dust for 8 hours a day for 80 days without an increased health risk, so liability should not be an issue in the situation described by the commenter.*

O. ***Public Trust Doctrine Violated***: The EPA's lack of pathways of exposure argument is contrary to the public trust doctrine.

EPA Response: *EPA is confident that the remedy has been prepared in accordance with NCP requirements for environmental justice. See other response regarding environmental justice and the Public Trust Doctrine.*

P. ***Human Health Risk Assessment Flawed:*** The health risk assessment for arsenic did not consider the health risks posed by trivalent arsenic contaminated dust. The 1997 Health Risk Assessment for arsenic and subsequent health studies for Butte Priority Soils does not specifically and directly consider trivalent arsenic found in Butte attics. Technical conclusions of EPA are grossly in error in assessing potential hazards to home occupants.

EPA Response: *The attic dust was analyzed for total arsenic, which includes all inorganic and organic forms, including trivalent arsenic. According to Dr. John Drexler, Professor of Geochemistry at UC Boulder, in an oxidizing environment, like the BPSOU pathways of concern, approximately 99 percent of the arsenic present would be in the pentavalent valence state. The presence of trivalent arsenic would be minimal, if at all. Examples of an oxidizing environment would be surface soil, surface waters, house dust, etc. Basically, any media where oxygen is present is an oxidizing environment.*

Q. ***Timeframe to cleanup residential metals/attic dust:*** Any place that has contamination above the action level must be cleaned up in a reasonable time frame; not many people think that 30 years is a reasonable time frame; that's not an aggressive remedy to protect people in this community. The indoor dust cleanup program should be expedited to be completed in 5 to 10 years with

identified priority areas addressed first. Most families won't be able to have their homes cleaned, particularly if the EPA plan to clean 30 homes a year is put in place.

EPA Response: *The timeframe for addressing residential metals is being shortened to 15 years, with assessment of all properties within 8 years. High priority properties will be addressed first, if a multipathway program is agreed upon during remedial design. EPA believes this timeframe is a reasonable compromise because a certain amount of time is needed to sample all homes in Butte and address them comprehensively if warranted. It will also allow BSB to take the time necessary to remediate the homes and yards in a conscientious manner that is customized to the individual circumstances of the property owners.*

General Comment

A. ***Suggested Changes to Proposed Plan:*** Commenter proposes a comprehensive, aggressive, and proactive remediation program for residential soil and indoor dust contamination; this includes: addressing major sources of contamination, cleanup of lead regardless of source, sampling of all yards, indoor living spaces, and attics, redefine the "pathway of exposure", providing an educational and public awareness program, forming three citizen committees, conduct peer review of Imagine Butte data, revise the action levels to be comparable with other Superfund sites, and reduce the cleanup time frame.

EPA Response: *The Residential Metals Abatement Program does address all sources of arsenic, lead, and mercury contamination, and will sample all residential properties, including indoor living spaces and attics when there is a direct exposure pathway. The Program will include an educational and public awareness program. The Agency has reviewed the Imagine Butte data with the aid of the ATSDR. The arsenic and lead action levels for the BPSOU were determined using site specific data and are consistent with the Agency's national guidance. The Residential Abatement Program will be implemented in a 15 year time frame (with assessment to be completed within 8 years), if a comprehensive approach is adopted, or a shorter time frame (approximately 3 years) if the comprehensive program is not adopted.*

Human Health Risk

A. ***Residential Metals Action Levels***: Lead RGs need to be more conservative of human safety. Lead RGs should consider direct ingestion of lead paint by children and revised accordingly based on information from appropriate reference areas. Lead RGs should consider lead in Butte's drinking water since the average lead concentration is 1.7 times the national average. Lead RGs should consider site-specific airborne lead concentrations. Lead RGs should consider remediation of various lead sources in a 10-year time frame. Lead RGs should not use site-specific bioavailability factors, but should use generic values.

EPA Response: *The IEUBK Model for lead was used to assess children's exposure to lead and to calculate remediation goals for lead in soil. The IEUBK Model integrates exposures to lead from water, air, diet, soil, dust, maternal contribution, etc. to estimate exposure*

(and risk) and to calculate the PRGs. The PRGs for lead in soil do take into account the lead in water, air, diet, and (indirectly via house dust) paint and are protective given the current levels of lead in those non-soil sources at Butte. Site-specific lead bioavailability data were carefully reviewed and accepted for use by EPA experts. This is consistent with EPA guidance regarding risk assessment.

B. ***Concerned about Health Effects/Risks at unreclaimed areas:*** Vacant lots are unreclaimed and are unfenced; children use the lots as informal play areas, yet none are posted for toxics or heavy metals concerns.

EPA Response: *Vacant lots that have elevated metals in the soils are remediated under the BSB Lead Abatement Program. There have been several sampling programs that have sampled playgrounds, play areas, mine dumps, and vacant lots to determine if contaminated soil is present at these sites. Many have been remediated - especially those used by children. All vacant lots with contaminated soil will be remediated.*

C. ***Lead Risk Assessment Flawed:*** The lead RGs for soil and dust in Butte residences were developed without consideration of several critical sources (drinking water, airborne lead, and paint ingestion) of lead exposure and may not be protective of children's health; reevaluation of lead RGs is needed.

EPA Response: *The comment is incorrect. The IEUBK Model for lead was used to assess children's exposure to lead and to calculate preliminary remediation goals for lead in soil. The IEUBK Model integrates exposures to lead from water, air, diet, soil, dust, maternal contribution, etc. to estimate exposure (and risk) and to calculate the PRGs. The PRGs for lead in soil do take into account the lead in water, air, diet, and (indirectly via house dust) paint and are protective.*

Institutional Controls

A. ***General Comment:*** What are the institutional controls you would impose on homeowners?

EPA Response: *Institutional controls (ICs) will include documentation added to the property's chain of title describing all remediation work completed on the property by the BSB Lead Abatement Program. Other ICs may be developed, such as waste disposal requirements if waste or contamination is unearthed. EPA will work cooperatively with local authorities to develop careful and balanced ICs.*

Multipathway Lead Abatement Program

A. ***Against non-targeted sampling of all properties***: The programmatic approach to lead abatement in Butte has been recognized nationally; EPA proposes changes to that program in the Proposed Plan combining long-term and short-term aspects that are not consistent or appropriate.

EPA Response: *The Lead Abatement Program is successful. The addition of the site-wide sampling and remediation of contaminated properties will enhance the present on-going lead abatement program.*

B. ***Funding Concerns:*** If attic dust is removed, it has been noted that ARCO will withdraw funding from the lead program; that sounds like a not-so-veiled threat. Commenter supports the proposal for an improved lead abatement program if the program will perform comprehensive testing in a 3-year time frame and if abatement of contaminated dust is performed in all areas of the home affected by contaminated dust, however, they are concerned that the program should be funded beyond 30 years.

EPA Response: *The BSB Lead Abatement Program will include attic dust remediation if there is a direct exposure pathway in the living space of a property. The Lead Abatement Program is successful. The addition of the site-wide sampling and remediation of contaminated properties will enhance the present on-going lead abatement program. The Program will be implemented in a 15-year time frame.*

C. ***General Comment***: The entire document that was submitted is a proposal for a lead abatement program.

EPA Response: *These general comments from CTEC are addressed in EPA's other responses to the lead abatement program.*

D. ***Lead Paint:*** Requests that EPA include lead paint and airborne dust in its lead RGs.

EPA Response: *The IEUBK Model for lead was used to assess children's exposure to lead and to calculate preliminary remediation goals for lead in soil. The IEUBK Model integrates exposures to lead from water, air, diet, soil, dust, maternal contribution, etc. to estimate exposure (and risk) and to calculate the PRGs. The PRGs for lead in soil do take into account the lead in water, air, diet, and (indirectly via house dust) paint and are protective.*

E. ***Protectiveness of Human health:*** Combining remediation of lead contaminated soil and dust with lead-based paint abatement will reduce total lead exposure.

EPA Response: *EPA agrees with this comment.*

F. ***Public Education/Technical Communication:*** Commenter suggests several elements of public outreach program: explanation that property owners are not responsible for clean up costs or liable for past exposure to contaminants; requesting cleanup will have tangible health benefits; documentation of cleanup measures performed be provided; recognition that BSB County is doing the testing and cleanup, not a federal agency; explanation of the potential risks and health effects of arsenic and metals to adults children; use of slogans so that the community understands that the future will be healthy and prosperous; description of the contaminated indoor dust; describe Butte mining history and how soils and residences became contaminated; and establishment of a trademark that people can associate with the lead abatement program.

EPA Response: *EPA believes a well defined Public Education program is very important to the success of the Lead Abatement Program. Many of these comments have merit. The Public Education program will be developed as part of the Lead Abatement Program.*

G. ***Support for the BSB Lead Program/Multipathway Program:*** Commenters strongly support the lead program and the multipathway approach devised by EPA.

EPA Response: *EPA concurs with the above comments and believes the Lead Abatement Program is successful. The addition of the site-wide sampling and comprehensive remediation of contaminated properties will enhance the present on-going lead abatement program.*

H. ***Timeframe of Residential Remediation Program:*** Long-term concerns will need to be programmatically addressed throughout the BPSOU for as long as 30 years into the future. Lead abatement program actions should be implemented as soon as possible. Lead abatement program should actively seek homes to remediate and not rely on property owners to initiate the remediation process. Commenter suggests a schedule for residential remediation of 100 houses per year, which should provide for a goal of a 10-year cleanup. Lead abatement should be funded for 30 years.

EPA Response: *The BPSOU site-wide sampling program will help identify and target the properties that need remediation. It is EPA's intention to ensure that the continued lead abatement program will be properly funded and the remediation completed in a timely manner, as now provided in the ROD.*

Soils and/or Interior Attic Dust

A. ***Characterization:*** Comprehensive residential testing needed for soil and dust contamination in the greater Butte area and must not be limited to the boundary of the BPSOU.

EPA Response: *The boundaries of BPSOU incorporate the bulk of homes located near mining centers in Butte. Attic dust in homes outside the BPSOU is included in the BPSOU ROD and will be addressed by the residential cleanup program.*

B. ***Concerned about Health Effects/Risks:*** When they bought their house 10 years ago they weren't aware they would be exposed to heavy metals; there was never any mention to us that if we grew vegetables that we should have our soils tested, or that our pets may be bringing metals-laden soil into our house, or to check the dust in our attic and walls before remodeling. Feels the houses in their area have not been taken care of properly by EPA. Need to perform comprehensive long-term assessments of public health.

EPA Response: *All homes in the BPSOU will be tested and those that need to be addressed will be cleaned up. If commenter has a concern about property remediation, BSB*

County or EPA should be contacted. EPA encourages and supports long-term health assessments.

C. ***Economic Effects***: A public-health oriented cleanup could help create jobs and could help make area homes more energy efficient.

EPA Response: *EPA agrees with this comment. The primary objective of testing and cleanup of homes in the BPSOU is to reduce or eliminate risk from contamination.*

D. ***For Removal***: Rather than use the multi-pathway approach to address residential contamination, it would be more congruent with Superfund law to simply identify areas contaminated with arsenic and remediate them. The ROD should stipulate clearly and unambiguously that all residential properties should be sampled and yards and indoor dusts above action levels should be remediated - the impetus for initiation of this process should not be the owner or renter. Inside dust should be removed and lawns should be replaced. Wants clean up of all the houses - not just the ones that have children living there. Toxins and carcinogens in the soils and houses in Butte must be removed and taken somewhere else and stored.

EPA Response: *The ROD requires that all residential areas be sampled and cleaned up over a certain time period. It is EPA's intention to work with the PRPs and BSB to incorporate this approach into a multi-pathway program. The major advantage of the multi-pathway program is that it addresses contaminant sources (e.g., lead paint and lead pipes) which would not normally be included in a Superfund cleanup. This program is anticipated to have very positive impacts on health because it addresses more exposure pathways. Public health professionals support the multi-pathway approach for this reason. The program will also have a greater flexibility to address problems unique to individual homes.*

E. ***Property Resale - Disclosure of Contamination/Remediation***: A certificate should be issued following residential remediation (yards and/or house) describing sample results for a residence, the details of remediation performed, and recognition that the house is safe for occupation.

EPA Response: *EPA agrees that documenting the work performed at a residence to be a critical step in the process. EPA will work with BSB County to develop the format in which information such as this will be provided to the homeowner.*

F. ***Reclamation needed***: I don't have children, so don't really have much of a chance of getting my yard cleaned; but there is high lead; children end up playing in the lead dust that is seeping out of the hillside from my house; this should be taken care of.

EPA Response: *Under the BSB lead abatement program, homes with sensitive populations are being addressed immediately. All other homes in the BPSOU will be sampled and remediated if necessary. If the commenter has an immediate concern, the BSB lead abatement program should be contacted.*

G. ***Risk assessment flawed:*** The original Human Health Risk Assessment is insufficient and remedy selection cannot be based on a fatally flawed human health risk assessment; the human health risk assessment that was prepared for indoor/attic dust is also inadequate.

EPA Response: *EPA uses conservative approaches in all of its risk assessments, and the risk assessments were done in accordance with the NCP and EPA guidance by experienced EPA risk assessors. ATSDR participated with EPA on many aspects of the risk assessments. In addition, several site-specific exposure studies have been conducted in Butte to ensure that risks have been properly assessed. EPA is confident that its risk assessments and resulting action levels and triggers are fully protective of human health.*

H. ***Time frame***: Commenter disagrees that a 30-year timeline is acceptable for remediating residential areas on the Butte Hill; 20 years is more acceptable. An uncompromising, swift public-health oriented cleanup offers the people of Butte an excellent chance of for future growth.

EPA Response: *The Proposed Plan time frames have been shortened in the ROD. Systematic sampling of all BPSOU residential properties would be completed within an eight year time frame and properties demonstrated to have contamination above action levels would be addressed within that 15 year period. These time frames have the potential to be shorter because the most recent activities have focused on historical mining areas and other residential properties are likely to have lower contaminant concentrations.*

1.8 Comments Directed Site Wide

Comment Topics, Comment Totals, and References

Subtopic	Subtopic		Number of Comments	Comment ID references
Overall Topic: Comments Directed Site Wide			**505**	
ARCO/BSB Agreement	A	General Comments	13	63.1, 70.2, 71.1, 71.2, 71.3, 71.4, 83.13, 86.2, 92.1, 92.6, 92.7, 93.2, 127.1
Characterization	A	Funding	1	76.1
	B	Inadequate Characterization	1	100.51
	C	Wetlands	2	88.1, 131.1
Cost of Removal	A	Evaluation/Weighing of Cost	2	3.73, 107.14
Development of Alternatives	A	Protectiveness of Human Health and the Environment	1	3.60
Ecological Risk	A	For Removal	2	65.15, 112.19
Environmental Justice	A	Attic Dust Should Be Removed	1	90.2
	B	Concerned about Health Effects/Risks	5	5.20, 20.5, 20.6, 58.4, 70.29
	C	Economic Effects	3	5.19, 58.6, 79.1
	D	EPA did not account for Environmental Justice	30	3.39, 3.51, 5.43, 7.1, 7.2, 9.1, 20.2, 26.4, 27.1, 27.3, 28.1, 28.2, 28.3, 29.1, 53.1, 53.2, 53.3, 55.1, 55.2, 70.18, 71.12, 71.13, 71.14, 71.15, 71.16,.71.17, 71.18, 71.33, 71.43, 113.1
	E	Evaluation/Weighing of Cost	1	90.1
	F	General Comment – Documents on Environmental Justice	4	37.1, 39.1, 40.1, 42.1
	G	Public Trust Doctrine Violated	2	5.4, 5.18
Evaluation of NCP Criteria	A	Community Acceptance	1	57.3
	B	Compliance with ARARs	5	3.52, 3.53, 5.46, 5.49, 21.1
	C	Evaluation/Weighing of Cost	3	1.12, 32.2, 59.2
	D	For Removal	1	112.26
	E	Long Term Effectiveness and Permanence	5	1.19, 3.3, 5.16, 27.5, 90.8
	F	Reduction of Toxicity, Mobility and Volume	8	1.9, 1.11, 1.17, 1.18, 3.4, 3.24, 3.31, 32.1
	G	Short Term Effectiveness	1	124.7
	H	Specific Comment	1	3.25
	I	State Acceptance	1	77.3
Extent of	A	Against Removal	1	119.2

Comment Topics, Comment Totals, and References

Subtopic	Subtopic		Number of Comments	Comment ID references
Overall Topic: Comments Directed Site Wide			**505**	
Removal	B	For Removal	26	1.33, 3.14, 3.41, 3.48, 5.11, 5.42, 5.44, 5.45, 5.47, 7.17, 7.51, 33.13, 33.23, 35.10, 58.2, 58.9, 59.1, 75.139, 75.168, 75.178, 78.2, 83.7, 107.10, 107.13, 128.2, 129a.6
	C	Long Term Effectiveness and Permanence	1	124.45
	D	Separation between waste and ground water	3	99.10, 123.28, 123.32
	E	Waste in contact with Groundwater	3	65.19, 83.9, 112.30
General Comment	A	Action Levels	1	135.6
	B	Aesthetics	2	98.7, 119.7
	C	Bankruptcy Risk	2	29.2, 29.3
	D	Clark Fork River Headwaters/Downstream Recontamination	2	106.2, 100.56
	E	Commenter needs more information	7	60.2, 60.4, 70.21, 70.54, 70.55, 108.1, 108.2
	F	Commenter Opposes	30	3.6, 3.18, 5.50, 17.1, 17.2, 17.3, 57.2, 58.3, 60.1, 70.14, 70.28, 70.73, 70.138, 71.28, 71.44, 71.47, 71.49, 77.4, 78.1, 78.3, 104.1, 105.1, 111.1, 112.1, 112.2, 129b.1, 133.1, 133.6, 135.1, 135.2
	G	Commenter Supports	16	70.32, 70.33, 70.51, 70.52, 70.53, 70.114, 70.122, 71.19, 71.23, 84.1, 86.1, 87.1, 93.1, 103.1, 119.1, 126.1
	H	Concerned about Health Effects/Risks	13	70.84, 74.3, 96.2, 97.4, 100.59, 106.1, 107.25, 111.2, 112.27, 117.1, 121.1, 129b.13, 135.4
	I	Cost Underestimated	2	70.86, 70.136
	J	Design Criteria	1	83.2
	K	Economic Effects	6	61.3, 81.5, 96.3, 106.3, 133.3, 135.3
	L	Funding	1	136.4
	M	General Comments on the Extent of Removal	19	56.9, 56.10, 61.4, 70.31, 75.197, 95.1, 96.1, 112.20, 112.41, 113.2, 129b.3, 129b.9, 133.5, 133.7, 133.22, 133.28, 133.29, 136.3, 136.5
	N	Long-Term Effectiveness and Permanence	3	83.1, 112.28, 133.9
	O	Much Work Already Done	5	70.27, 70.4, 70.43, 70.93, 70.133
	P	Out of Scope	3	71.38, 75.15, 75.206
	Q	Perceived Data Gap	5	107.1, 108.14, 124.11, 124.28, 129b.14
	R	Public Education/ Technical Communication	1	56.3

Comment Topics, Comment Totals, and References

Subtopic	Subtopic		Number of Comments	Comment ID references
Overall Topic: Comments Directed Site Wide			**505**	
	S	Public Trust Doctrine Violated	9	5.1, 5.2, 5.3, 5.5, 5.6, 5.12, 5.17, 5.23, 5.41
	T	Suggested Changes to Proposed Plan	4	22.1, 22.6, 22.7, 25.1
	U	Timeframe	14	57.4, 75.183, 75.186, 75.187, 75.191, 75.192, .75.198, 75.199, 75.204, 75.211, 75.215, 75.222, 75.224, 105.13
Human Health Risk	A	Action Levels	33	56.5, 70.58, 70.135, 71.26, 71.27, 71,37, 71.39, 92.3, 92.5, 97.1, 97.3, 104.5, 105.5, 108.5, 116.1, 117.3, 123.4, 123.5, 123.6, 123.8, 124.14, 124.15, 124.16, 124.17,124.18, 124.21, 124.22, 124.38, 124.39, 124.42, 129a.1, 132.15, 132.16
	B	Arsenic	7	46.1, 48.1, 52.1, 56.4, 56.6, 56.7, 56.8
	C	Bioavailability Studies	7	23.1, 24.5, 31.13, 36.1, 102.6, 124.19, 124.20
	D	Cadmium	2	47.1, 52.2
	E	Cadmium and Mercury	1	70.61
	F	Concerned about Health Effects/Risks	16	51.1, 56.2, 70.108, 71.41, 71.48, 74.1, 90.5, 90.6, 90.9, 92.4, 122.3, 122.4, 129a.2, 129b.7, 129b.8, 129b.12
	G	Environmental Justice	16	3.10, 15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 15.8, 15.9, 15.11, 15.12, 24.1, 24.2, 24.3, 24.4
	H	Lead	6	49.1, 50.1, 52.3, 122.1, 122.2, 122.5
	I	Mercury	2	45.1, 52.4
	J	Much Work Already Done	2	70.44, 70.56
	K	Out of Scope	2	70.60, 90.7
	L	Protectiveness of Human Health	4	3.32, 3.47, 59.3, 128.1
	M	Public Trust Doctrine Violated	3	5.27, 5.34, 5.40
	N	Risk Assessment Flawed	45	1.28b, 3.12, 3.54, 3.55, 3.56, 5.28, 5.29, 5.30, 5.31, 5.32, 5.33, 5.35, 5.36, 5.37, 5.38, 5.39, 7.29, 15.10, 20.7, 26.1, 26.2, 26.3, 27.2, 31.1, 31.2, 31.3, 31.4, 31.5, 31.6, 31.7, 31.8, 31.9, 31.10, 31.11, 31.12, 31.14, 31.15, 38.1, 41.1, 43.1, 44.1, 123.1, 123.2, 123.7, 123.46
Institutional Controls	A	Funding	1	133.34
	B	IC's Hamper Redevelopment	3	3.71, 5.24, 129a.3
	C	Long Term Implementability and Effectiveness of ICs	11	3.58, 3.67, 3.68, 3.69, 3.70, 3.72, 3.74, 54.1, 54.2, 70.23, 83.11

Comment Topics, Comment Totals, and References

Subtopic	Subtopic		Number of Comments	Comment ID references
Overall Topic: Comments Directed Site Wide			**505**	
	D	Minimize IC's	9	1.34, 3.30, 3.42, 5.25, 5.26, 104.3, 110.6, 110.11, 124.44
	E	Walkerville Zoning/Roads	1	105.11
Long Term Operations and Maintenance	A	BSB responsible for program or O&M	1	3.17
	B	Funding	2	56.16, 129b.15
NRDP	A	Funding	4	70.8, 70.9, 71.11, 81.1
	B	Remediation vs. Restoration	1	70.46
Public Involvement	A	EPA Disregards Comment	1	133.4
	B	EPA Limits Comment	1	75.121
	C	Public Education/ Technical Communication	2	56.11, 70.132
	D	Disappointed by Public Meeting	2	109.1, 129b.2
Redevelopment	A	Aesthetics	1	70.88
	B	Brownfields	9	70.120, 70.121, 71.10, 115.14, 115.15, 126.7, 126.8, 126.9, 127.8
	C	Commenter Supports Redevelopment	3	70.42, 70.81, 119.6
	D	Economic Effects of Redevelopment	6	3.37, 56.17, 61.2, 70.13, 70.123, 96.4
	E	Redevelopment Funding	4	70.90, 70.98, 70.131, 84.4
	F	Land Use	6	1.27e, 3.45, 70.139, 83.12, 124.40, 133.20
	G	Specific Comment	1	84.5
Unrelated Topic	A	Out of Scope	1	75.200
Waste Left in Place	A	Commenter Supports	4	70.7, 70.22, 70.124, 71.9
	B	Consistency with other Clark Fork River Sites or similar NPL sites	1	70.47
	C	Economic Effects	3	58.7, 100.60, 107.24
	D	Protectiveness of Human Health and the Environment	7	1.26, 3.1, 3.57, 35.9, 110.4, 65.2, 89.1

ARCO/BSB Agreement

A. *General Comments:* The BSB Chamber of Commerce strongly supports the Settlement Agreement between ARCO and the Butte-Silver Bow government for the BPSOU. BSB urges EPA to reconsider our position paper, submitted last October, on the cleanup of BPSOU. BSB took a positive, proactive approach and prepared its own version of what we wanted to see in EPA's preferred remedy; it was laid out in great detail and approved by the Council of Commissioners in October 2004. BSB entered into preliminary negotiations with ARCO to achieve a

preliminary understanding of our roles under the ROD; we presented a proposed settlement sheet to the council of commissioners; it is BSB's intention that the alternative assurances from ARCO will complement EPA's remedy. Three critical programs were obtained in these negotiations: continuing the lead poisoning prevention program (including attic dust), long-term capitol improvement program to repair/replace all municipal storm water systems in the BPSOU, and a significant redevelopment trust fund to assist with the impacts of leaving waste in place. Overall BSB believes EPA's preferred remedy is a positive step in many right directions and is consistent in many ways with the BSB position; we urge EPA to consider, and reconsider, the details of our proposal. The Butte/Silver Bow/ARCO agreement needs to be modified to exclude the first five years after future reclamation and cleanup of a site, or date of agreement, with ARCO being liable and fully responsible for immediate and near term fixes, i.e., they can't buy their way out of poor design and past work.

EPA Response: *EPA will not comment on the settlement agreement that is being negotiated by BSB and ARCO. EPA appreciates the general support for the Selected Remedy expressed by the commenters. EPA considered BSB's position paper during the evaluation and analysis of the Selected Remedy. EPA supports the county's efforts to obtain the long-term funding described in the comment, and will work with the PRPs and BSB to implement the Selected Remedy fully, in ways that support land reuse and workable implementation plans.*

Characterization

A. ***Funding:*** Wants funding for hand-held measurement equipment to allow Habitat for Humanity personnel and volunteers to identify material as contaminated without having to wait for the county or EPA to sample.

EPA Response: *The BSB lead abatement program has all the necessary sampling equipment and training to conduct scientific sampling in the BPSOU.*

B. ***Inadequate Characterization:*** BPSOU has not been adequately characterized using the best available technology; decisions are being made without having a sufficient understanding of the extent and volume of wastes as well as their contribution to groundwater and surface water pathways.

EPA Response: *The BPSOU has been extensively studied. Two phases of the remedial investigation have been concluded for BPSOU. There is a very large database for the BPSOU, compiled over more than 15 years. A thorough Feasibility Study was completed that evaluated numerous technologies for solid and water media. In addition, EPA has extensive experience in selecting response actions for large mining sites with high volumes of low toxicity waste, like those found in Butte. The site characterization performed at BPSOU is consistent with the NCP.*

C. ***Wetlands***: A four-step wetlands evaluation protocol was developed for all Clark Fork River sites for no net loss of wetlands. Only Step 1 (Wetland Delineation and Functional Evaluation) has been completed at the BPSOU, but remedy-related

impacts were not evaluated. ARCO needs to evaluate remedy-related impacts. Steps 2, 3, and 4 remain to be completed. The analysis of wetland impacts and a more refined wetland mapping effort should be conducted in a combined Step 2/3, during remedial design, prior to remedy implementation. Confirmation of impacts would be done after completion.

EPA Response: *The Clark Fork River sites are all included in the program for achieving no net loss of wetlands except for the Streamside Tailings OU. Streamside Tailings is not included because the State is responsible for meeting the no net loss standard at that OU. The Wetland Delineation and Functional Evaluation step has been completed for BPSOU, as noted by the commenter. The remaining steps will be completed during remedial design. The other sites are in various stages of completion of the four-step process. EPA is committed to completing the four-step process for all applicable sites, and is confident that there will be no net loss of wetlands.*

Cost of Removal

A. ***Evaluation/Weighing of Cost***: EPA should weigh true costs of long term ICs and O&M against cost options that would remove the contaminants completely. ARCO is avoiding normal costs of doing business - the wastes should be cleaned up.

EPA Response: *The cost analysis compares the present worth of alternatives, including the cost of ICs and of operation and maintenance. When reviewing the cost estimates, EPA scrutinized how these long-term costs were accounted for. No attempts have been made to exclude O&M costs to make one alternative score higher than another.*

Development of Alternatives

A. ***Protectiveness of human health and the environment***: In-situ treatment, in general, will not remove these threats and is not protective of human and the environment.

EPA Response: *In-situ treatment was eliminated as a technology for treating any of the kinds of waste sources at the BPSOU. This was primarily due to low effectiveness and the time it would take for this technology to complete a cleanup. The capping of wastes, with effective and well-vegetated soil covers, is an effective cleanup for BPSOU and is a protective component of the Selected Remedy.*

Ecological Risk

A. ***For Removal:*** Other Montana communities, such as Helena and Missoula, have abundant wildlife in their urban areas; Butte should be no different. Proposed remedy should include removal of environmental hazards that impair ecological function.

EPA Response: *The Selected Remedy will improve the urban environment and promote better wildlife habitat. Habitat along the Silver Bow Creek corridor has been substantially improved by past response actions. Additional improvements will be made in the portion of*

Silver Bow Creek from the area of Blacktail Creek down to Lower Area One. The capping or removal of waste throughout Butte by past response actions has led to improved vegetative cover and improved habitat. EPA's rationale for not performing a formal terrestrial environmental risk assessment for the urban BPSOU area is described in the September 1999 Scoping Document for the Baseline Ecological Risk Assessment (BERA) and in the final meeting summary for the BPSOU Ecological Technical Assistance Group (ETAG) meeting on October 26, 1999 (letter transmitted on January 7, 2000). The rationale from this meeting summary is as follows:

> *Ron Bertram makes the statement that the BERA is not going to address terrestrial risks. He reminds the group that per the last ETAG meeting, the United States Fish and Wildlife Service (USFWS) and the Montana Fish, Wildlife and Parks (MFWP) personnel were tasked to provide a list of threatened, endangered and sensitive (TES) terrestrial species that could be at risk as a result of contamination at the BPSOU. EPA did not receive any information from the USFWS. MFWP submitted a letter on November 24, 1997 that summarized results of a search of the Natural Heritage Program database for TES plant and animal species that may occur in the vicinity of Butte, MT. The MFWP letter is attached to this meeting summary. The search provided only one species (Prebble's Shrew) that may reside within the BPSOU. Based upon this information, and the fact that the BPSOU is small in area and is an urban setting, EPA determined that an assessment of terrestrial risks is not warranted at the BPSOU.*
>
> *The consensus among ETAG members was that future revisions to the text for the BPSOU BERA will include a discussion of EPA's rationale for excluding terrestrial risk evaluation from the BERA.*

Environmental Justice

A. ***Attic Dust should be removed***: Environmental justice issues cannot be met by a stretched out cleanup of the attics of affected homes. Redevelopment monies from ARCO come to the site in lieu of a prompt cleanup of poisons that threaten the health of youngsters from low income families.

EPA Response: *Human health risks to children, low income families, and others are addressed in the ROD's requirements for yard, house, and attic cleanup. The BPSOU site-wide sampling program will help identify and target the properties that need remediation. It is EPA's intention to ensure that the continued lead abatement program will be properly funded and the remediation is completed as soon as possible. The major advantage of the multi-pathway program is that it addresses contaminant sources (e.g., lead paint and lead pipes) which would not normally be included in a Superfund cleanup. This program is anticipated to have a great positive impact on health at BPSOU, and is supported by public health experts. The program will also have a greater flexibility to address problems unique to individual homes.*

B. ***Concerned about Health Effects/Risks***: Because there is a causal relationship between economic disparity and poor health, the proposed plan would worsen the health problems of the poor who generally live in the boundaries of the

BPSOU. It is clear that low-income residents living within the Butte Priority Soils site experience severe health problems in comparison to the non-poor (studies cited). Many of the harmful effects of heavy metals occur at low-dose levels (studies cited). Low-income residents are especially negatively affected. Illnesses have resulted from this contamination and are a burden to our hospital; many families suffering from these illnesses have not insurance; the charity volume at the hospital is astronomical in this community.

EPA Response: *The ROD's action levels for cleanup are protective and conservative for all residents, including low-income residents. All homes in the BPSOU will be tested and those that need to be addressed will be cleaned up.*

C. ***Economic Effects***: By leaving significant amounts of waste on the Butte Hill, the proposed plan makes worse the economic disparity between those on the hill and those on the flats. Low-income residents cannot relocate and are forced to suffer the consequences of poor health and an afflicted economy. Plan hurts low income families; please consider the children and provide funding for the cleanup in Butte.

EPA Response: *EPA strongly disagrees that the plan hurts low income families. All homes in the BPSOU will be tested and those that need to be addressed will be cleaned up, regardless of location or economic status, and adequate funding shall be provided for the residential metals program. The capping of wastes on the hill has been effective in providing a protective barrier to wastes, and capping is compatible with economic or recreational development. Implementation of the ROD will be done with an awareness of the need for re-use and redevelopment of remediated areas, where possible.*

D. ***EPA did not account for Environmental Justice:*** Thirty comments were received on environmental justice as it applies to the BPSOU remedy in general. Twenty seven of these 30 comments were submitted by one commenter. The comments stated EPA did not promote or achieve it in its decision. Some comments said the EPA violated its mandate to ensure environmental justice at the BPSOU. Others said EPA should use the Precautionary Principle and the Principle of Pollution Prevention to make its decisions at the site because doing so would ensure environmental justice is achieved.

EPA Response: *EPA disagrees. EPA Region 8 personnel, who specialize in evaluating environmental justice issues, completed a thorough review of the BPSOU to ensure that the agency had complied with EPA guidance and requirements for environmental justice. The findings of Region 8 clearly state that all requirements have been met. These findings, dated August 2, 2004 and August 23, 2005 are incorporated herein by reference, and are included in the BPSOU administrative record.*

E. ***Evaluation/Weighing of Cost:*** EPA must not massage its cleanup decision to reflect a deal negotiated between the county and ARCO, but must stay with the integrity of making a cleanup occur that will be in the best interests of the poor

who live within the Superfund site, not the interests of economic development and fattened bureaucracy at the county.

EPA Response: *EPA has selected a remedy for BPSOU in accordance with CERCLA, the NCP, and EPA guidance. The settlement negotiations between BSB and ARCO had no bearing on the evaluation and analysis EPA performed in arriving at the Selected Remedy.*

F. ***General Comment***: Commenter submitted four documents on environmental justice for EPA consideration.

EPA Response: *See comment D above and its response.*

G. ***Public Trust Doctrine Violated:*** Failing to follow the Public Trust Doctrine violates Environmental Justice. By not adhering to the Public Trust Doctrine the EPA is denying environmental justice to Butte.

EPA Response: *EPA is confident that the remedy has been prepared in accordance with EPA guidance and requirements regarding environmental justice, as described above. The Selected Remedy complies with CERCLA and the NCP, and does not violate the Public Trust Doctrine.*

Evaluation of NCP Criteria

A. ***Community Acceptance:*** This plan will affect residents forever, so EPA must take into account what citizens want; in Opportunity, the residents input about mine waste was meaningless.

EPA Response: *Public input is a critical step in the remedy selection process. EPA considered all the comments received during the public comment process before making a final decision on the appropriate remedial action for the BPSOU. For example, the timeframe for addressing residential soil and dust contamination was shortened from 30 to 15 years.*

B. ***Compliance with ARARs***: The Precautionary Principle and the Principle of Pollution Prevention are in effect ARARs for the BPSOU based on Montana Supreme Court decisions. These ignored ARARs need to be considered in the RI/FS remedy selection process. The Principle of Pollution Prevention and the Precautionary Principle/Rule (citations given) were incorrectly ignored as ARARs by the Preferred Remedy; this is a serious failure that warrants declaring the Proposed Plan null and void.

EPA Response: *ARARs identification for the BPSOU was done in cooperation with the State DEQ, and in strict accordance with the NCP. The Precautionary Principle and the Principle of Pollution Prevention are not promulgated standards – a requirement for classification as an ARAR.*

C. ***Evaluation/Weighing of Cost:*** The cost of removing Parrott tailings, a pro-active indoor dust program, and removing contaminant source areas is not "grossly excessive" yet EPA eliminated these alternatives based on cost; there is a

contradiction here. By definition the failure to consider long-term effectiveness, permanence, and reduction of toxicity, mobility, and volume of contaminants through treatment in the proper, legally mandated manner leads to the conclusion that the cost criterion was improperly applied. The law says EPA must find a remedy that protects human health and the environment and then find the most cost effective method of implementing that remedy.

EPA Response: *EPA did not eliminate any alternatives based solely on cost. All the alternatives were evaluated in the Feasibility Study using the nine NCP criteria that include overall protection of human health and the environment, compliance with ARARs, long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, short-term effectiveness, implementability, cost, community acceptance, and State acceptance. Based on an evaluation of all the nine criteria, including cost, EPA chose the BPSOU Selected Remedy.*

D. ***For Removal***: Only removal of wastes meets EPA's threshold and balancing criteria.

EPA Response: *EPA disagrees with the commenter that only the removal of wastes meets the threshold and balancing criteria. The Selected Remedy meets all CERCLA and NCP criteria. The Selected Remedy achieves substantial risk reduction and scored higher on short-term effectiveness, implementability, and cost-effectiveness. While removal may have certain advantages, the Selected Remedy achieved a higher overall evaluation because, in part, of its relative effectiveness and lower cost.*

E. ***Long-Term Effectiveness and Permanence:*** The EPA preferred alternative does not provide for a permanent remedy. EPA admits that there are significant permanence problems with caps and institutional controls. Nowhere in CERCLA is there a preference for leaving waste in place untreated as called for by EPA's preferred alternative for Priority Soils. There are long-term efficacy and effectiveness problems associated with the preferred alternatives due to waste left in place. EPA used to talk about permanence of cleanup, but now waters it down to "long-term effectiveness"; EPA should honor the intent of Congress or explain why in the Responsiveness Summary.

EPA Response: *The Selected Remedy for solid media includes a comprehensive range of actions that together provide an effective and permanent remedial solution for a site that is characterized by high volume, low toxicity waste. A comprehensive, thorough, operation and maintenance program is required by the Selected Remedy to assure that the Selected Remedy is protective and maintained over the long-term. The O&M program will employ the BRES which is a comprehensive evaluation tool that establishes performance standards for reclaimed areas. Any benefits of total removal would be offset by high short-term risks and costs associated with a removal of this magnitude.*

F. ***Reduction of Toxicity, Mobility and Volume***: The Preferred Alternative violates the preference for treatment and removal of waste with a waste-in-place remedy. EPA has developed a remedy that does not reduce toxicity, mobility, or volume of

waste, does not provide a permanent solution, and relies on caps and institutional controls. Justification is not provided for why the preferred alternative deviates from the NCP preference for treatment or removal over waste left-in-place. The Proposed Plan fails to reduce the toxicity, mobility, and volume of contaminants; it uses no innovative technologies; it uses no treatment. Superfund policy gives primacy to treatment and removal of waste using innovative technology; yet the Proposed Plan ignores the mandate for treatment and removal by leaving waste in place and relying on caps and institutional controls. It seems abundantly clear in the NCP that you cannot have a remedy that does not reduce toxicity, mobility, and volume of contaminants.

EPA Response: *BPSOU is characterized by vast quantities of low toxicity mining wastes and contaminated soils. Active treatment for metals contamination in solid media was screened out as a potential option for solid media fairly early in the process. The mining wastes and contaminated soils at BPSOU were determined to constitute a relatively low long-term threat, thus eliminating the need or expectation for extensive treatment of solid media. Collection and treatment of groundwater, and the potential to treat surface (storm) water if necessary, has been included in the Selected Remedy. The ROD contains a detailed explanation of EPA's compliance and CERCLA and NCP remedy selection criteria in Section 13.*

G. ***Short-Term Effectiveness***: Risk to workers during removal action should not reduce score for protection of human health.

EPA Response: *Hazards faced by construction workers and the public during large-scale construction projects are considered primarily in the evaluation of alternatives under the implementability and short-term effectiveness criteria, in accordance with EPA guidance.*

H. ***Specific Comment***: The numerical ranking used in evaluation of alternatives is totally arbitrary and capricious; the numerical ranking gives the appearance of scientific certainty in a misplaced and deceptive manner.

EPA Response: *The evaluation of alternatives used at the BPSOU site employs a system of assigning a numerical score to each of the nine criteria. This was done to assist the remedy decision makers and the public in comparing and evaluating cleanup alternatives. The scoring provides some objectivity to the process, as a general aid. In the final remedy selection process, EPA did not rely on numerical scores, but rather did the weighing and balancing of criteria required by the NCP.*

I. ***State Acceptance***: EPA ignored MBMG and DEQ regarding characterization of the local aquifer.

EPA Response: *Studies conducted by the MBMG and DEQ going all the way back to the 1980s were used in the Phase II Remedial Investigation (RI) Report for BPSOU. The predominant data set used to complete the RI Report were data collected under the direction of DEQ. There are differences in the interpretation of the data, but that is not because EPA ignored MBMG and DEQ. Numerous technical meetings attended by EPA, DEQ, and MBMG were held to discuss the data and the differences of interpretation. EPA*

did not ignore DEQ or MBMG opinions at any point in the RI/FS or remedy selection process.

Extent of Removal

A. ***Against Removal:*** Previous comments in favor of full removal are unrealistic; the effects on Butte would not be good.

EPA Response: *EPA acknowledges the comment and agrees that a total removal of wastes at BPSOU is not practical.*

B. ***For Removal:*** The current plan does not meet remedial objectives as well as removal and treatment of wastes would. The plan does not meet the requirements of the Precautionary Principle, nor the Pollution Prevention Principle. Complete removal of the Parrott tailings and all attic dust is the only plan that ensures the economic recovery of Butte and the health of its citizens.

EPA Response: *BPSOU is characterized by vast quantities of low toxicity mining wastes and contaminated soils. Although certainly in need of remediation, the mining wastes are not highly toxic or mobile. The Selected Remedy for solid media includes a comprehensive range of actions that provide an effective and permanent remedial solution for a site that is characterized by high volume, low toxicity waste. Benefits of total removal are offset by the high short-term risks and costs that would be associated with a removal of this magnitude, among other things. Removal and treatment of wastes on a scale that would be required for BPSOU is not standard practice.*

The Selected Remedy which relies heavily on engineered caps to contain and limit exposure to waste source materials has been successfully employed as a standard practice at mining sites with high volume, low toxicity wastes. With the O&M required by the Selected Remedy, EPA believes the Selected Remedy will reduce or eliminate residual risk, protect human health and the environment, provide a protective level of permanence, and otherwise comply with ARARs.

C. ***Long Term Effectiveness and Permanence:*** The commenter disagrees with the scoring of waste removal alternatives and believes that alternatives that call for source waste removal, including removal of buried waste in the MSD, should score higher for this criterion (long term effectiveness and permanence).

EPA Response: *The scoring system did score removal of waste materials highly under the long-term effectiveness and permanence criteria, but due to the ubiquitous contamination in the aquifer, partial removals with groundwater capture and treatment are not more effective than no removal with groundwater capture and treatment. The scoring and evaluation of the various alternatives for the long-term effectiveness and permanence criteria was done correctly.*

D. ***Separation between Waste and Groundwater:*** The separation between wastes and ground water should be considered for all decisions. The criterion of 10 feet separation between waste and ground water should be used site wide.

EPA Response: *EPA agrees. Where waste has been actively moved under Superfund activity, EPA has applied the relevant ARARs regarding separation of placed waste and the groundwater. EPA notes that wastes will be removed at Lower Railroad Yard Site No. 1. However, in cases such as the MSD where removal would not accomplish ARARs and it is appropriate to leave waste in place, the ARAR standard does not apply.*

E. ***Waste in Contact with Groundwater:*** Wastes left in place in the flood plain and aquifer, even if capped, are unacceptable. All mill tailings and mine waste need to be removed from contact with surface and ground water.

EPA Response: *EPA has determined that removal of all wastes in the BPSOU flood plain is technically impracticable due to large volumes of wastes and infrastructure constraints. Other alternatives are being implemented to protect human health and the environment.*

General Comment

A. ***Action Levels***: The EPA should establish higher standards for acceptable levels of metals in soil and water.

EPA Response: *Conservatism is incorporated into the risk assessment process to ensure that cleanup levels are protective of the reasonably maximum exposed individual and the most susceptible member of the population as to the effects of that contaminant. Conservatism is also applied in the risk decision making process via the risk decision criteria. The NCP requires that remediated sites should not have contamination levels which exceed a 0.0001 or 10^{-4} (and many times even lower) chance of cancer for the most highly exposed, most sensitive person. The action levels for BPSOU represent a 0.00001, or 10^{-5}, chance of cancer, and also provide for safe levels of non-cancerous risk. The action levels are protective.*

B. ***Aesthetics:*** EPA and the PRPs have made Butte cleaner and more aesthetically pleasing. Reclamation has changed the appearance of the town and Butte looks like an exciting place to have a business and raise a family; there are green rolling hills, fun recreational facilities, and so much more.

EPA Response: *EPA agrees with the commenter that the aesthetics in Butte have improved through reclamation.*

C. ***Bankruptcy Risk:*** The best clean up is to remove the wastes now and not rely on ARCO to do long-term monitoring & maintenance; it is too risky, given the incentive for bankruptcy. The commenter includes a 12-page discussion of the nature of the common good, corporations, the role of government, causes of the problem, the power of U.S. corporations, relationship of economic power to political power, corporate liability, and bankruptcy (including Montana examples).

EPA Response: *EPA has undertaken an eighteen year enforcement action against ARCO, under the case styled US v. ARCO, to establish ARCO's liability for cleanup at the BPSOU and elsewhere in the Clark Fork Basin. ARCO has used its resources to contest*

these actions, but EPA has continued the litigation at great expense. EPA has selected remedial and other response actions at Butte and elsewhere in accordance with the NCP response selection criteria, which are derived from our elected Congress' direction found in statute. EPA will continue to use its enforcement authorities aggressively to ensure ARCO's compliance with CERCLA and full response action implementation.

D. ***Clark Fork River Headwaters/Downstream Recontamination:*** Butte is at the headwaters of the Clark Fork River. Waste left in place at the headwaters of the Clark Fork River jeopardizes all the reclamation work performed below. Extensive cleanup is needed for environmental restoration of the Clark Fork River basin headwaters and to beautify Butte.

EPA Response: *EPA agrees on the importance of an effective cleanup in Butte. The Selected Remedy is designed to return Silver Bow Creek to a viable fishery and protect the Clark Fork River over the long term from harmful waste releases in Butte. There are ways to accomplish these objectives without complete removal of all wastes in the "headwaters".*

E. ***Commenter needs more information:*** Commenters believe that the plan is so complicated that reasonable people cannot determine if this is an appropriate cleanup. Current documents are too unwieldy and long. Commenters believe there is a need for scientific consensus regarding the proposed plan's long-term effectiveness. Because the experts are divided, the public cannot rely on the experts for guidance and thus cannot fairly evaluate the proposed plan. They would like a concise document summarizing the protection of human health and the environment (past, present and future) to show the progress that has been made and to clarify what is envisioned in the future.

EPA Response: *The BPSOU is a very large, complex superfund site. The scope of the clean-up is so large that EPA recognizes that it is difficult to become familiar with all the information available on the site. Butte has been studied extensively for the past 20 years. There are data reports on air, soils, surface water and groundwater. These studies were used in the compilation of the Remedial Investigation Report for BPSOU. A Feasibility Report has been completed including a Focused Feasibility Study of MSD. Human health and environmental risks have been evaluated and assessed for each pathway of exposure to contaminants of concern. In an effort to provide information to the public, EPA prepared the BPSOU proposed plan carefully, and worked to make it readable and clear for the average reader. EPA also published regular newspaper columns to explain issues related to the proposed plan. In addition, EPA supported citizen work groups, funded a Technical Assistance Grant, and conducted numerous public information meetings. EPA does not agree that there is a need for the preparation of additional documentation on the site. Instead, EPA believes it is in the best public interest to move toward a final record of decision.*

EPA acknowledges that there are disagreements on the interpretation of some of the data. EPA could not reach consensus with the many experts involved with the site. EPA did consider the wide range of technical opinions, and presented its position as clearly and as carefully as possible.

F. *Commenter Opposes:* Comments in this group generally expressed negative opinions on the proposed plan, but did not necessarily cite specific reasons. Some examples included:

- The plan is based on flawed assumptions and should be abandoned.
- The plan is inadequate. It is a minimalist approach and Butte deserves more than the plan outlines.
- The fact that ARCO agrees with the plan proves that it is insufficient.
- The commenters generally express opinions that the plan will not be protective of human health, the environment, and economic recovery.
- The plan does not keep contaminants in place during normal precipitation, mass movement, or earthquakes.
- The proposed plan is a "band-aid aspirin cleanup" when reconstructive surgery is needed.

EPA Response: *EPA disagrees that the proposed plan is unworkable. EPA has conducted successful response actions at Butte and other Superfund sites that have employed the same technologies and engineering solutions.*

Despite the opposition to the preferred alternative expressed by some commenters, EPA believes the Selected Remedy protects human health and the environment, complies with ARARs, and is otherwise in compliance with CERCLA and the NCP. EPA has explained in previous responses that the Selected Remedy is effective, implementable and provides permanence. ARCO has supported some aspects of the plan and opposed others. At a cost of over $100 million, the Selected Remedy is not fairly characterized as a "band aid".

G. *Commenter Supports:* The plan is sensible and protective of human health. Commenters are confident of EPA's and the PRP's long-term commitment to Butte-Silver Bow. Plan is protective of human health and the environment and is more comprehensive than any remedial plan seen or heard of in previous experience in this area; leaving wastes in place in common place through many areas of the world and is sensible. The O&M fund guarantees maintenance in the future and the redevelopment fund adequately compensates residents for damaged resources.

EPA Response: *EPA agrees with the comments.*

H. *Concerned about Health Effects/Risks*: Commenters are concerned about possible human health effects of waste left in place. They are also concerned about combined or connected effects of attic dust, yard contamination, Berkeley Pit, and other sites around Butte. A thorough clean-up would eliminate health risks to residents, especially children and future generations. Concern is expressed that

future managers may make poor decisions if waste is left in place, leaving residents at risk, whereas complete removal would remove that risk.

EPA Response: *EPA has carefully considered and evaluated the human health risks in Butte, including cumulative risks. Through the previous response action work, nearly all source areas exceeding action levels have been addressed. The lead abatement program has addressed approximately 600 homes, many of which were a high priority. Under the remedy, many more Butte homes will be sampled and cleaned up. The Selected Remedy incorporates the systematic sampling of all homes in the BPSOU and includes a targeted component that prioritizes sampling and remediation for affected or sensitive citizens. Wastes left in place can be safely managed to prevent risk, and will be systematically evaluated for protectiveness through the Butte Reclamation Evaluation System. The BSB metals abatement program will ensure permanent evaluation and O&M activities for residential properties.*

I. ***Cost Underestimated:*** One commenter expressed concern that costs would be much higher ("...It's the government and the remedy is going to cost twice as much as it is estimated"). A second commenter was concerned that the funding was only costed out for 100 years; it needs to be forever.

EPA Response: *All costs were estimated in accordance with EPA guidance. Any costs developed by Atlantic Richfield were reviewed for consistency with EPA guidance and adjusted or changed by EPA as appropriate. In the feasibility study, the objective is to estimate the cost for each alternative using the same methods so that the alternatives can be fairly evaluated against each other. However, cost estimates are based on conceptual engineering estimates and actual design and construction costs may be different. Costs are not calculated for an indefinite period of time, such as forever under EPA guidance, because of the time value of money and discounting. EPA guidance suggests a discount rate of seven percent be used over the actual timeframe of the project. However, it was decided instead to use a three percent discount factor so that future costs were not as strongly discounted in the present value analysis. A 100-year period of analysis was selected because at a discount rate of 3 percent, the incremental present worth cost beyond this time becomes insignificant. The discount factor at 100 years is 0.052. For example, if a cost of $1,000,000 were anticipated in year 100, the present value of this cost would only be $52,000. When comparing alternative costs in the tens or hundreds of millions of dollars, these future costs beyond 100 years are insignificant by comparison.*

J. ***Design Criteria***: The Butte Superfund program has been flawed from the beginning with the lack of specific defined requirements and standards, established design criteria, or engineering and construction implemented to provide a reasonable assurance of cleanup.

EPA Response: *EPA disagrees with the commenter's assessment. Requirements and standards have been defined since the implementation of the first cleanup actions and refined as the cleanup process continued. Butte is somewhat unique in that a large number of Expedited Response Actions were carried out prior to reaching the final decision point that we are at today. Lessons learned from each succeeding response action were applied to*

the next one, and the detailed design criteria were improved continuously (e.g., revegetation specifications). On occasion, work from previous actions was "redone" to meet the newer, refined design criteria.

K. ***Economic Effects***: Commenters express concern that unless wastes are entirely removed, Butte will suffer from a stigma which will stifle the economy and prevent economic recovery. The Butte Hill, as a center of urban population and regional infrastructure, is especially in need of complete removal of wastes. For Butte to progress economically, it can't drag the "millstone of Superfund stigma" around its neck.

EPA Response: *Completion of the ROD is a major milestone in the Superfund process and lessens uncertainty about the final cleanup plans for the BPSOU. This should help economic development. The Superfund activities at the BPSOU have and will continue to address the human health and environmental concerns at the site, and will be done in ways that promote land re-use and economic development. Educating the public of the cleanup activities will facilitate in the economic growth of the Butte area.*

L. ***Funding***: ARCO should have to pay for fixing cleanup solutions that fail.

EPA Response: *Under CERCLA authority and EPA practice, the PRPs will remain liable for remedy implementation and long-term O&M.*

M. ***General Comments on the Extent of Removal***: These comments expressed that Butte should be cleaned up as thoroughly as possible and as soon as possible, not over the course of 30 years. Butte should have a full opportunity to recover economically. Encourages agencies to give Butte the same chance given to Milltown and Missoula to prosper and redevelop. Attic dust and storm sewer repairs should be part of the decision and are the responsibility of ARCO. Butte-Silver Bow should be compensated for loss of infrastructure caused by mine waste runoff. Why was a restoration plan prepared for the Clark Fork and Big Blackfoot River and not for the Butte Hill? How can the decision be made to leave waste in place in Butte and Anaconda when Russ Forba of the EPA publicly states these wastes are "far more toxic than the tailings being removed from the Milltown Dam"? If the plan does not work sufficiently, what safeguards are going to be put in place to the next round of cleanup?

EPA Response: *EPA has selected a final remedy that protects human health and the environment, meets ARARs, and otherwise complies with CERCLA and the NCP. Much of the remedy has already been completed and most of the remainder of the remedy will be implemented in much less than 30 years. EPA has shortened the cleanup timeframes for residential abatement activities, in response to community concerns.*

The replacement of the storm water sewer infrastructure is not under Superfund jurisdiction.

The selection of a remedial action for BPSOU by EPA is a separate process than preparation of restoration plans. The restoration process, including compensation for lost

use and restoration planning, is under the jurisdiction of the State of Montana Natural Resource Damage Program.

The comment by Russ Forba refers to the relative characteristics of the Milltown waste in comparison to the waste at the Opportunity Ponds near Anaconda where the Milltown wastes are being deposited. It does not change the fact that the wastes in Butte are low toxicity.

EPA conducts a five-year review of Superfund remedies in most circumstances. If they are not performing up to established standards, EPA can take additional response actions to mitigate problems. In addition, EPA requires that remedy implementers meet clear standards and are accountable for successful remedy implementation, through its enforcement actions.

N. ***Long-Term Effectiveness and Permanence:*** ARCO's only goal is to spend the minimum possible to avoid fines and penalties and to get as much relief from future liabilities as possible; the only supporters of the proposed approach are those who will directly benefit monetarily; everyone else is hoping EPA will take the lead to protect them. The remedy can only be considered temporary. The remedy must be permanent and effective.

EPA Response: *EPA believes the Selected Remedy ranks high in long-term effectiveness and permanence. The Selected Remedy also requires a comprehensive O&M program that employs the BRES as a tool to ensure remedies are maintained at a high standard of performance for the long-term. There are many who support the Selected Remedy, and some who do not. EPA will act in the public interest to select and implement the remedy in accordance with the law.*

O. ***Much Work Already Done***: Commenters express gratitude towards the EPA, ARCO and Butte-Silver Bow County for the work that has already been completed. The work already done has been complete, permanent and competent. EPA should implement the more aggressive cleanup that local health officials recommend.

EPA Response: *EPA acknowledges these comments. EPA supports a multi-pathway residential metals abatement program that includes remediation of non-mining related sources of lead contamination. This approach is supported by local health authorities.*

P. ***Out of Scope***: Why did the original Anaconda Stack Plume OU not extend further to include at least the BPSOU? We have arsenic-laden dust in attics in houses here in Anaconda; these also should be decontaminated. Concerned about dust particles, diesel fumes (e.g., Berkeley), and vapor from pit water.

EPA Response: *The Selected Remedy will address attic dust at BPSOU if a pathway of exposure exists or if remodeling of the home is to occur which would create a pathway of exposure, regardless of the dust's origin. The active mine must meet certain air quality standards that are enforced by the State of Montana. Vapors from the Berkeley Pit were*

not evaluated under the Mine Flooding Operable Unit because the contaminants of concern do not vaporize with the water.

Q. ***Perceived Data Gap***: There is a lack of data regarding how the plan will affect human health. Until it can be proven that no effect will be had on human health, the wastes should be removed. All documents should be available for public review at the Montana Tech Library.

EPA Response: *The Remedial Investigation Report and Feasibility Study Report (RI/FS) for BPSOU are the basis for formulating and evaluating the preferred alternative for BPSOU. The RI/FS is based on extensive data sets for air, surface water, ground water, and soils. Data were also collected on the contamination in residential areas including the interior of homes. The data were used to complete human and environmental risk assessments. EPA believes that sufficient data have been collected and evaluated to support a remedial decision for BPSOU. The Library at Montana Tech and the EPA office in Butte are official document repositories and the documents that provide the primary basis for EPA's remedial decision were provided at each of these locations. There are additional documents in EPA's record center in Helena, and these are available to the public. It is just not feasible to provide all documents on BPSOU at the document repositories.*

R. ***Public Education/Technical Communication:*** Information and science involved are confusing, which causes worry.

EPA Response: *BPSOU is a large complex superfund site. Data on air, surface water, ground water, and soils have been collected for approximately 20 years. The data have been presented and evaluated in numerous documents produced by the PRPs, DEQ, and EPA. EPA understands that individuals who are not directly involved in the process on a daily basis will have concern about whether the PRPs and agencies involved are making the correct decision. The PRPs and agencies use scientists and engineers who are experienced in working on complex sites. EPA has enormous experience working on Superfund issues in Butte. The success of EPA's past response actions should assure the public that EPA can be counted on to select an effective remedy, and to see it implemented in an effective way.*

S. ***Public Trust Doctrine Violated***: EPA's plan violates the Public Trust Doctrine, which is mandated by CERCLA, SARA, and other federal statutory laws. The plan to leave waste in place, untreated, is contrary to the Public Trust Doctrine. The preferred alternative convolutes CERCLA and the Public Trust Doctrine in that it would leave vast amounts of waste in place untreated and unremediated, permanently threatening public health and the environment. Therefore, the plan should be declared null and void and should be redone in order to regain the public's trust. Institutional controls violate the Public Trust Doctrine.

EPA Response: *The Selected Remedy is in compliance with CERCLA and the NCP. CERCLA and the NCP do not require all waste to be removed, and most Superfund sites employ a combination of removal and waste left in place, as does the BPSOU remedy. This does not violate the Public Trust Doctrine, and the Public Trust Doctrine is not*

incorporated into CERCLA. Institutional controls are supplemental response actions that are described in the NCP. EPA has selected appropriate ICs for the BPSOU cleanup.

T. ***Suggested Changes to Proposed Plan:*** Wastes should not be left in place, but EPA will not agree to this, so the commenter proposed changes to the existing plan that EPA should agree to. Engage in long-range, formal planning; develop vision, goals, objectives, and activities to complete restoration/reclamation; choose removal unless there is compelling evidence to do otherwise. The revisions have many advantages, including: increased protectiveness, automatic triggers, true cost-effectiveness, indoor dust addressed, environmental justice, faster implementation, preventative approach, permanence, etc. Additional arguments are made in support of the suggested changes to the Proposed Plan (lists 44 reasons why this approach is better).

EPA Response: *EPA does consider public comment on the Proposed Plan, and factors these comments into the Record of Decision (ROD). EPA acknowledges the need for long-range planning and comprehensive monitoring. EPA has gone through a formal process that establishes remedial action goals and objectives. These goals and objectives are located in Section 3.0 of the Feasibility Study Report. The ROD has selected a remedy that will meet those goals and objectives. The planning of the remedial action does not occur until after the ROD is released and will be documented in the remedial design documents. Careful remedial design will fulfill most of the concerns you have expressed in your comments.*

U. ***Timeframe:*** What is a "reasonable time frame"? Do not take 100 years to do this cleanup. Butte should get a 10 year clean up like Missoula is getting at Milltown Dam. Five commenters specifically suggested cleanup within 10 years. Four commenters stated 30 years is too long.

EPA Response: *There is no simple answer to the question of when remedial action at BPSOU will be completed and EPA has not set a deadline for completion of the remedial action at BPSOU. Some components of the preferred alterative such as treatment of contaminated water will operate in perpetuity. The ROD does require that activities addressing human health protection at residences be completed within 15 years, if done comprehensively. Conversely, EPA considers many of the past removal actions have contributed towards the remedy at the BPSOU. For example, past response actions have been far more successful in improving the water quality in Silver Bow Creek than was anticipated. The final construction on Silver Bow Creek will occur after enforcement actions for the BPSOU ROD. In addition, the operation and maintenance of the Selected Remedy is required by the NCP for as long as the need exists. EPA will periodically evaluate the performance of the remedy and make recommendations on the need for additional actions. Milltown's groundwater is expected to be cleaned up in 10 years. Butte's alluvial aquifer cannot be cleaned up in any reasonable time frame because of site specific differences in the hydrogeology between the two sites.*

Human Health Risk

A. *Action Levels*: Thirty three comments were received concerning action levels for soil, drinking water, air, dust, etc. The primary concerns were that the action levels for lead and arsenic are too high to be sufficiently protective of human health and were based on incomplete science. Commenters do not understand why Butte has higher action levels for arsenic and lead than other Superfund sites. Given that lead exists in paint, soil, drinking water, air, soil, and dust, lead action levels and remedial goals should be revised downward. Commenters express concern about synergistic effects of contaminants and multiple exposure pathways.

EPA Response: *EPA believes the action levels are protective. We have an abundance of data from both human and animal studies that look at the systemic, reproductive, developmental, neurological, and cancer-causing potential of the contaminants found at Butte. We know the adverse effects that are associated with these inorganics and the dose levels and exposure pathways at which these effects occur. We also have an abundance of information on how people are or could be exposed via soil, water, air, produce, etc. contaminated with these inorganics. As a result, we can quantitate how much lead, arsenic, or mercury a person could be exposed to through various media and we can quantitate the probability of an adverse effect occurring. We can also reverse those calculations and quantitate concentration levels in media which present no unacceptable risk. We agree that there is some variability and/or uncertainty associated with those estimates. People differ in their physiology and behavior, sampling and analytical results vary, multiple chemicals can interact in competitive or synergistic ways, etc. However, that variability and uncertainty is recognized both qualitatively and quantitatively in the risk assessment process. Conservatism is incorporated into the risk assessment process to ensure that cleanup levels are protective of the reasonably maximum exposed individual and the most susceptible member of the population to the effects of that contaminant. Conservatism is also applied in the risk decision making process via the risk decision criteria. EPA recommends that no site should have contamination which exceeds a 0.0001 (and many times even lower) chance of cancer for the most highly exposed, most sensitive person. So the position that we do not have enough information to make an informed risk or remediation decision and therefore need to remove everything is not correct, and contrary to standard EPA Superfund practices.*

The action levels developed for the BPSOU were based on site specific information. This explains why cleanup levels for Butte are different than other sites. In particular, clear scientific evidence was developed which showed Butte contaminants to be less bio-available than wastes at other sites. In site specific calculations, the cumulative risks are calculated for an individual on the basis of chronic exposures, using reasonable maximum exposure (RME) assumptions by combining a statistically sound, arithmetic average, exposure-point concentration with reasonable conservative values for intake and duration. Estimates for risk for current and reasonably anticipated future land uses and potential future ground water and surface water used, without institutional controls, are done as well. The risk analysis will clearly identify the population, or sub-group (e.g., highly exposed or susceptible individuals), for which risks are being evaluated.

The BPSOU Baseline Human Health Risk Assessment for Arsenic determined that the sub-population of concern would include individuals with a protein deficient diet, as they may not be able to methylate arsenic to the less toxic form. The toxicity factors developed for arsenic are intended to be protective of any sensitive subpopulations. In addition, the toxicity factor for cancer is based on the conservative assumption that any level of arsenic can result in a cancer risk. Therefore it is assumed that any sensitive subpopulations of concern should be protected by the toxicity factors used in this specific risk analysis.

B. ***Arsenic:*** Please consider the toxic effects of arsenic such as that found at Butte Priority Soils (document attached). General description of arsenic trioxide (document attached). Please consider the ATSDR - Public Health Statement Arsenic (document attached). What does EPA know about trivalent arsenic and other heavy metals and how they affect people who have heavy, long term exposure? Does EPA really know what level of exposure to arsenic is safe? Has anyone tested the soil in unaffected areas to see what "normal" levels of naturally occurring arsenic in the area are? Has information about normal levels of arsenic been published?

EPA Response: *The BPSOU Baseline Human Health Risk Assessment for Arsenic determined that the sub-population of concern would include individuals with a protein deficient diet, as they may not be able to methylate arsenic to the less toxic form. The toxicity factors developed for arsenic are intended to be protective of any sensitive subpopulations. In addition, the toxicity factor for cancer is based on the conservative assumption that any level of arsenic can result in a cancer risk. Therefore it is assumed that any sensitive subpopulations of concern should be protected by the toxicity factors used in this specific risk analysis.*

The attic dust was analyzed for total arsenic, which includes all inorganic and organic forms, including trivalent arsenic. According to Dr. John Drexler, Professor of Geochemistry at UC Boulder, in an oxidizing environment, like the BPSOU pathways of concern, approximately 99 percent of the arsenic present would be in the pentavalent valence state. The presence of trivalent arsenic would be minimal, if at all. Examples of an oxidizing environment would be surface soil, surface waters, house dust, etc. Basically, any media where oxygen is present is an oxidizing environment.

During the soil screening study conducted in 1988, background samples were collected in areas surrounding the Butte site. Background arsenic concentrations (1 mile outside of the site) ranged from 40 to 306 parts per million in soils.

There are a number of reports available that provide background concentrations of arsenic and metals in areas around the BPSOU. These can be found in the administrative record for the site.

C. ***Bioavailability Studies:*** Because of the problems with the bioavailability study (six reasons are cited in letter), it's conclusions regarding bioavailability should be discarded and the assumption made that the lead, arsenic, and mercury is bioavailable and remediation levels should reflect this bioavailability.

Bioavailability values relied on animal testing, there are crucial differences between animal species and humans that can affect the outcome and may not accurately assess human lead uptake. Bioavailability and bioaccumulation were not accounted for in the human health risk assessments. Swine and monkeys do not live in Butte, human health surveys, hospital data, and health department monitoring should be used instead. Further studies that address bioavailability to dust from smelter and mill sources are recommended.

EPA Response: *The scientific method to conduct bioavailability studies is to use animal testing. EPA acknowledges there are differences between animal species and humans. To conduct the bioavailability studies, EPA had to first evaluate which animals were the most similar to humans (e.g., swine were chosen over rats). EPA's experienced risk assessors, at all levels, determined that the evidence produced regarding bioavailability was valid and should be used in the BPSOU risk assessments. The commenter wants EPA to use health survey data more extensively. There are problems associated with using health surveys, hospital data, and health department monitoring. Once EPA completed the human health risks assessments, EPA requested the assistance of the CDC and ASTDR to determine if there were unexplored exposures of heavy metals to the residents in the BPSOU. A human health study was conducted by these groups and no elevated levels of arsenic, mercury, or lead were detected in the human participants of this study. EPA believes that the residential metals program in the Selected Remedy will address human health and environmental concerns associated with metals in the BPSOU in a fully protective manner.*

D. ***Cadmium:*** Please consider the health effects of cadmium present at Butte Priority Soils (document attached). Please consider the ATSDR - Public Health Statement for Cadmium (document attached).

EPA Response: *The Preliminary Baseline Risk Assessment for BPSOU (EPA 1991) determined that the levels of cadmium in the BPSOU did not pose a human health risk. Thus, specific cleanup levels for cadmium in soils are not included in the ROD. The lead and arsenic levels, and cleanups that result from these action levels, should reduce cadmium levels in soils further.*

E. ***Cadmium and Mercury***: Would like to see data on the level of cadmium in local food and bioaccumulation of mercury in the local food chain.

EPA Response: *EPA believes that these studies were outside the scope of the Superfund activities in the BPSOU. As noted above, the cadmium levels in the BPSOU did not pose a human health risk. There is a cleanup level for mercury in the ROD. When elevated levels of mercury have been found, they have been addressed, and they will continue to be addressed in the BPSOU.*

F. ***Concerned about Health Effects/Risks***: Commenters are also concerned about potentially elevated rates of cancer and other afflictions in Butte. There is not enough focus on human health in the cleanup. The proposed financial plan sets the relative importance of human health versus other parts of the cleanup at $12.9 million to $56.9 million over 30 years. The top priority is to protect human health.

Health risks will diminish the quality of life in Butte. More research should be done to understand synergistic effects of contaminants (" COCs have not been adequately researched for adverse synergism, even though an EPA epidemiologist said they had been"), as well as human health effects on children in schools and rental homes. It is sad that after 25 years of investigation, EPA admits that we don't know if toxics left my mining and smelting in this community are making people ill.

EPA Response: *EPA completed baseline risk assessments for heavy metals associated with the BPSOU. Based on those studies, EPA developed the action levels to protect human health and the environment (see additional EPA responses in this section).*

Because human health was the primary focus at the BPSOU, the waste dumps and residential areas posing immediate health concerns were addressed under expedited response actions. The estimated Selected Remedy costs presented in the proposed plan do not include the costs from the last eighteen years of remediation in the BPSOU, which included addressing over 200 mine waste dumps and over 600 homes.

G. ***Environmental Justice***: The proposed plan fails to provide consideration of issues related to environmental justice and increases the toxics burden borne by low-income residents. The poor are at greater risk from pollution due to both physiological and socio-economic factors, including occupation and access to health care. Poor residents of Butte will not receive equal protection from contaminants. The BPSOU Health Risk Assessments were inherently and structurally biased against the poor. The human health risk assessments failed to consider the compromised health of the poor and the cumulative and synergistic effect of metals on the poor. The human health risk assessments were not "Community Based Health Risk Assessments" as defined and mandated by EPA. The human health risk assessments are inherently linked to the application of the cost criterion of Superfund which disparately affects the poor. Therefore, the proposed plan should be declared null and void.

EPA Response: *The commenter is incorrect. The remedy for BPSOU does not discriminate based on income or where someone lives. The remedy addresses all properties equally. The human health risk assessments are community based health risk assessments as defined and mandated by EPA. EPA has provided detailed responses to environmental justice complaints in two reports dated August 2, 2004 and August 23, 2005, both of which are part of the BPSOU administrative record and are incorporated herein by reference*

H. ***Lead***: Please consider the toxic effects of lead found at BPSOU (document attached). Please consider the Analysis Paper: Impact of Lead-Contaminated Soil on Public Health. (document attached). Please consider ATSDR - Public Health Statement Lead (document attached). EPA apparently is unaware of an article "Toxic Lead and Violence" from Rachel's Environment & Health News, August 2004 (article attached); this information should be used to help make decisions regarding the BPSOU. In light of the data in this article, the cleanup level for lead

in Butte's soils should be dramatically lowered. EPA should review the information in "Toxic Lead and Violence" from Rachel's Environment & Health News #797.

EPA Response: *EPA has considered the scientific data available for lead. EPA's risk assessors are confident that the risk assessments are thorough and conservative, as explained in responses above, and that the cleanup levels in Butte are fully protective of human health.*

I. ***Mercury:*** Please consider the serious health effects of mercury exposure at BPSOU (document attached). Please consider ATSDR - Public Health Statement Mercury (document attached).

EPA Response: *EPA has considered the scientific data available for mercury. EPA's risk assessors are confident that the risk assessments are thorough and conservative, as explained in responses above, and that the cleanup levels in Butte are fully protective of human health.*

J. ***Much Work Already Done***: There has been a tremendous amount of scientific study and remediation to address the most pressing human health issues on an expedited basis. ARCO looks forward to continuing that work. Has concerns about COCs, but basically things improved on virtually all fronts; the Lead Abatement Program has made wonderful progress.

EPA Response: *No further response required.*

K. ***Out of Scope***: Concerned about risks from active mining; everyday inversions and big wind storms move contaminants into the community. EPA should have listed crystalline silica as a contaminant of concern at the BPSOU; it is considered carcinogenic.

EPA Response: *The active mine activities are outside the scope of the BPSOU. Active mine issues are regulated by the State of Montana. While crystalline silica may be a carcinogen and be present in the air in the BPSOU, the silica is most likely a result of sanding of streets and thus its presence is probably not a direct result of past mining and smelting activities. Therefore is not a contaminant of concern for the BPSOU.*

L. ***Protectiveness of Human Health***: Apply a proactive, preventative, comprehensive approach to eliminate the source of contamination identified as contributing to chronic and acute health problems. We should not wait for direct causal evidence of specific health harms before we engage in an aggressive cleanup of the site. EPA should make sure that it protects the health of the residents of Butte and ensure the community has a bright economic future. Area should be cleaned to the highest level of safety; Butte's citizens are not safe under the proposed cleanup plan.

EPA Response: *Past reclamation activities and the Selected Remedy were designed to address these concerns. EPA's mission is to assure the protection of human health and the*

environment in Butte. The BPSOU action levels were conservatively developed and provide a high level of safety.

M. ***Public Trust Doctrine Violated***: Using the human health risk assessment at the BPSOU site violates the public trust doctrine. Contrary to the Public Trust Doctrine, the risk assessment placed the burden of proving health harms on those affected by the contaminants at the site.

EPA Response: *EPA disagrees with this comment. The risk assessment does not place the burden of proving health harms on those affected by the contaminants at the site. The risk assessment looks at validated toxicity and exposure information, and helped provide the necessary information to develop action levels that are protective of human health and the environment at the site. Risk assessment done in this way is the standard practice for Superfund Sites, and is supported by the National Academy of Science, and many other experts in this field. Doing risk assessment in a scientific manner does not violate any provision of CERCLA or the Public Trust Doctrine.*

N. ***Risk Assessment Flawed:*** Forty five comments were received on risk assessments. The Human Health Risk Assessment does not accurately portray health risks in Butte. Risk assessment is a subjective, arbitrary, and discretionary political process, rather than an objective and scientific activity; as such it cannot guarantee that the public health will be protected. A health risk assessment does not exclude the bias and prejudice of those doing the study. A risk assessment does not guarantee that significant reduction of pollution will occur in the environment. The BPSOU risk assessment extensively used best judgment and estimates instead of data to minimize the health risks. Because the risk assessment used arbitrary and capricious "uncertainty factors", the conclusions of the risk assessment are arbitrary and capricious. Peer review of the risk assessment said it was flawed, yet the EPA rejected that peer review. The risk assessments do not consider effects on fetuses, infants, or low-income residents, nor risks due to synergism, antagonism, trivalent and inorganic arsenic, among other things. The health effects on children were not considered in the human health risk assessments (document attached concerning health effects such as learning disabilities, reduced IQ, and destructive, aggressive behavior and their link to exposure to toxic chemicals in their environment). Other studies have disagreed with the results of the risk assessment. The risk assessment was scientifically unsound and should be redone to include Imagine Butte information, state cancer profiles, and trivalent arsenic.

EPA Response: *EPA disagrees with these comments. EPA has an abundance of data from both human and animal studies, which look at the systemic, reproductive, developmental, neurological, and cancer-causing potential of the contaminants of concern in Butte. We know the adverse effects that are associated with these inorganics and the dose levels and exposure pathways at which these effects occur. EPA also has an abundance of information on how people are, or could be exposed, via soil, water, air, produce, etc. contaminated with these inorganics. As a result, EPA risk assessors can quantitate how much lead, arsenic, or mercury a person could be exposed to through various media and we can quantitate the probability of an adverse effect occurring. We can also reverse those calculations and*

quantitate concentration levels in media which are safe. EPA agrees that there is some variability and/or uncertainty associated with those estimates. People differ in their physiology and behavior, sampling and analytical results vary, multiple chemicals can interact in competitive or synergistic ways, etc. However, that variability and uncertainty is recognized both qualitatively and quantitatively in the risk assessment process. Conservatism is incorporated into the risk assessment process to ensure that cleanup levels are protective of the reasonably maximum exposed individual and the most susceptible member of the population to the effects of that contaminant. Conservatism is also applied in the risk decision making process via the risk decision criteria. For example, the background rate for coming down with cancer in the U.S. is now 1 in 3 or 0.3. EPA recommends that no site should have contamination that exceeds a 0.0001 (and many times even lower) chance of cancer for the most highly exposed, most sensitive person. In short, the human health risk assessments, and the action levels that result from those assessments for arsenic, lead, and mercury, are sound assessments, based on a solid body of data and done in accordance with guidance.

The attic dust was analyzed for total arsenic, which includes all inorganic and organic forms, including trivalent arsenic. According to Dr. John Drexler, Professor of Geochemistry at UC Boulder, in an oxidizing environment, like the BPSOU pathways of concern, approximately 99 percent of the arsenic present would be in the pentavalent valence state. The presence of trivalent arsenic would be minimal, if at all. Examples of an oxidizing environment would be surface soil, surface waters, house dust, etc. Basically, any media where oxygen is present is an oxidizing environment.

Institutional Controls

A. ***Funding:*** A trust fund of more than $100 million must be established in the Consent Decree to provide for proper future cleanup and eventual costs associated with institutional controls.

   EPA Response: *EPA acknowledges the concern expressed in the comment to provide the financial security to complete, operate and maintain the future superfund clean-up obligations. EPA will take careful measures, through its enforcement efforts, to ensure the remedy will be backed by appropriate financial assurances.*

B. ***IC's Hamper Redevelopment***: Substantial indirect costs associated with IC's due to limitations on how a site may be used and it does not mesh with EPA's redevelopment initiative. The institutional controls being considered limit productive land uses and greatly compromise the property rights of the owners to use their land as they determine. Solid proof exists that the redevelopment of the Butte Hill will be almost impossible if institutional controls like caps are employed.

   EPA Response: *EPA disagrees. Redevelopment has played a significant role in the development of the Selected Remedy for the BPSOU. EPA has worked with a number of different parties to ensure that redevelopment activities have occurred with the remediation of properties on the Butte Hill. For example, the Tullamore Subdivision was built on an existing mine waste dump. Remediation activities and redevelopment*

activities at this site enabled the development of a safe, healthy, residential housing development. Developers can work with the BSB Planning Department to determine if a reclaimed area (e.g., vegetated) can be developed (not every reclaimed area can be redeveloped because of existing mine shafts and stability concerns). Institutional controls, if properly designed and implemented, can make redevelopment efforts work better and more efficiently.

C. ***Long Term Implementability and Effectiveness of ICs***: Reliance on institutional controls will not remove these threats and is not adequately protective of human health and the environment. What are the number and kind of institutional controls proposed to keep the caps from being broken and recontamination from occurring? The implementation of Institutional Controls is likely to diminish over time. Their implementation is subject to the financial resources and personnel in local government. Institutional memory loss is an important factor. Legal, social and political pressures can limit the effectiveness of ICs. ICs need to become part of construction permitting process.

EPA Response: *As part of the Selected Remedy, EPA has developed the Butte Reclamation Evaluation System to ensure reclaimed areas meet federal and state standards to protect human health and the environment. The BRES system is not an IC, but is part of a comprehensive program for ensuring that waste caps are protective over the long term. Furthermore, BSB has a program in place to routinely verify that the caps are intact, and this type of IC is a useful supplement to the engineered caps that are part of the Selected Remedy The O&M of the reclaimed areas will be funded to ensure long-term viability of the programs. In addition, BSB maintains a sophisticated Geographic Information System (GIS) database that stores analytical data, reclamation activities, and long-term O&M of each of the reclaimed sites. This system will ensure long-term institutional knowledge of the programs. The BSB planning and permitting process is another useful long-term IC. In short, ICs are not being used in isolation, but are being used as part of the overall remedy, in accordance with the NCP and EPA guidance. EPA agrees that ICs need to be carefully developed, monitored, and funded to be successful.*

D. ***Minimize IC's***: The proposed plan relies too heavily on ICs, which place an undue burden on local government and don't promote productive land uses. The use of ICs should be minimized. ICs are contrary to the Superfund mandate for preference for treatment over restricted land use. The EPA has admitted that ICs don't work, so they should not be used in the BPSOU. The EPA should do its job and force the PRP to remove all the waste.

EPA Response: *ICs help protect the engineered remedy from being comprised by non-superfund authorized activities. EPA believes the proposed, limited ICs for the BPSOU are consistent with other actions taken by EPA at sites which are characterized by high volumes of low toxicity waste. EPA will use engineering controls to the extent feasible, but ICs are a logical component of any remedial action on the scale of that proposed for BPSOU. ICs can work, and will be used appropriately at the BPSOU.*

E. ***Walkerville Zoning/Roads***: Walkerville is not subject to BSB zoning ordinances; the Town of Walkerville will not have the EPA forcing zoning on the town.

EPA Response: EPA acknowledges that Walkerville is not subject to BSB zoning ordinances. EPA and the PRPs will work with the Town of Walkerville on IC development and use.

Long-term Operations and Maintenance

A. ***BSB responsible for program or O&M:*** The remedy relies too heavily on local government to implement the proposed plan.

EPA Response: EPA will hold all PRPs responsible for implementation of the remedy selected in the ROD in accordance with the Superfund law. Implementation issues will be addressed after the ROD is issued, in enforcement proceedings under CERCLA.

B. ***Funding***: There should be enough funding and controls to make sure cleanup lasts forever. Butte must have absolute assurance that sufficient resources are available to operate, maintain, and if necessary, reconstruct or enhance caps, water collection, and water treatment in the long term. ARCO should review and recalculate the funds it proposes to place in trust for cleanup.

EPA Response: As stated above, EPA has procedures for assuring that PRPs can financially carry out the completion, operation and maintenance of the Selected Remedy.

NRDP

A. ***Funding:*** The county requests that any resource damages which occurred in Butte be specifically earmarked for restoration projects in Butte and Butte alone. Elected leaders should keep in mind distinction between Remedy (Superfund Cleanup) and Restoration (above and beyond Superfund). NRD funds will not last if Superfund does not provide an adequate cleanup.

EPA Response: EPA does not have jurisdiction over the use of NRDP funds. EPA cannot address the commenter's concerns regarding earmarking. EPA's remedy is in compliance with CERCLA and the NCP, and is adequate.

B. ***Remediation vs. Restoration***: It is important to keep remediation and restoration separate and distinct; remediation is intended to address human health and the environment; the NRD program is a litigation-based program that seeks monetary damages for supposed injury to natural resources.

EPA Response: EPA agrees. No further response is required.

Public Involvement

A. ***EPA Disregards Comments***: Every ingredient that was necessary to implement a responsible cleanup for the BPSOU has been articulated many times over to the EPA by concerned citizens over the past several years; for whatever reason, EPA has totally ignored this input; public input means nothing to the EPA.

EPA Response: *Public input is a critical step in the remedy selection process. EPA considered all the comments received during the public comment process before making a final decision on the appropriate remedial action for the BPSOU.*

B. ***EPA Limits Public Comment***: Listen to the technical review committee; they are a public voice on this issue that has the residential know-how needed to offer alternatives; I feel I attended meetings only to have the EPA marginalize our public input; this must change.

EPA Response: *EPA has encouraged public involvement and public comment. EPA ran a series of newspaper columns before the Proposed Plan was released to explain key concepts and processes. EPA extended the comment period. EPA had two formal public meetings to ensure that everyone had an opportunity to comment if they wished to do so. EPA funded and attended the technical review committee meetings and disagrees that it marginalized the input provided by the work group.*

C. ***Public Education/Technical Communication:*** EPA needs to start a comprehensive education program about lead abatement and how to reduce exposure to mine waste; the program should include an air quality program and cleanup of homes. This is a complex site and it is hard for the average citizen to understand; people should call CTEC for an impartial and objective idea of what's going on.

EPA Response: *EPA agrees with this comment. EPA will work with BSB to develop a comprehensive education program in conjunction with the ongoing lead abatement program.*

D. ***Disappointed by Public Meeting:*** Public meeting was dominated by ARCO and its contractors; good points were also raised by citizens and CTEC. At the January 25, 2003 public meeting mostly ARCO supporters talked and they did not discuss health issues, showing they were more interested in saving ARCO money than promoting a good cleanup.

EPA Response: *Two formal public meetings were sponsored by EPA. The meetings were open to anyone wishing to provide comment. EPA placed time limits on the oral presentation of comments at the public meetings but did not place any restrictions on the nature or subject of the comments.*

Redevelopment

A. ***Aesthetics:*** Redevelopment is hampered by the ugliness of the mining legacy; we have a great opportunity to dramatically improve the aesthetics of our community; we have a tough time selling the community to prospective businesses because of the aesthetics; keep aesthetics as a high priority when the decisions come down.

EPA Response: *EPA agrees and aesthetics will be taken into consideration during remedial design.*

B. ***Brownfields:*** The redevelopment of the abandoned Brownfield areas benefits the entire community, particularly the uptown area. Redevelopment of this area as well as the entire area east of Arizona St to Continental Drive will be a win-win situation for the community. An EPA expert in Brownfield redevelopment should be stationed in Butte and EPA should establish a high priority for Brownfield redevelopment grants in the ROD. A meaningful Redevelopment Trust Fund from ARCO must be established for the Butte community.

EPA Response: *Redevelopment is important to EPA. EPA will work with the community, BSB government, and others to incorporate redevelopment where it is consistent with the ROD.*

C. ***Commenter Supports Redevelopment***: MERDI has worked with EPA and ARCO on redevelopment projects like East Mercury Street, Belmont head frame, and the new central activities facility; if we all continue to work together, we can redevelop these areas; the key is having the funding. There has been much redevelopment work done, such as Copper Mountain Sports complex, Belmont Area, uptown Rails to Trails; the projects are good for the community and are examples of what can be done in the future. Projects completed thus far are a wonderful addition to the community.

EPA Response: *No further response is required.*

D. ***Economic Effects of Redevelopment***: Butte's economic redevelopment may be hampered by clean up needs and lingering myths and stigmas. The Superfund Redevelopment Initiative and the Superfund Land Revitalization Agenda should be fully implemented. Butte Hill is especially in need of a full cleanup because it is in the midst of urban population and a substantial infrastructure connected to the region.

EPA Response: *Redevelopment has played a significant role in Superfund activities on the Butte Hill. EPA agrees that remediation of the Butte Hill is necessary and this will aid overall economic development in Butte. EPA believes that the Selected Remedy accomplishes this.*

E. ***Redevelopment Funding***: We support the BSB notion of a redevelopment trust fund to cover unknown companion costs. A redevelopment trust fund is critical element to help with loan guarantees and matching funds for homeowners; based on the current EPA plan, most people will be ending up cleaning up their own homes themselves at their own nickel. It is clear that money is needed for redevelopment; redevelopment money should not be held hostage as a tradeoff between having a really comprehensive cleanup and having this redevelopment money; ultimately, Butte needs both. A redevelopment trust fund should be administered by the citizens of Butte-Silver Bow for storm drain improvements and the Department of Health's lead and attic programs.

EPA Response: *EPA has procedures for assuring that PRPs can financially carry out the completion, operation and maintenance of the Selected Remedy. The storm drain*

improvements and residential metals abatement program are not redevelopment programs, but are part of the Selected Remedy. However, EPA supports BSB efforts to establish a redevelopment trust fund.

F. ***Land Use:*** The Pathways approach is contrary to the Superfund Redevelopment Initiative and the Land Use Action Agenda in that it will result in large areas of Butte Hill being permanently removed from potential reuse and redevelopment. The "reasonable anticipated future land uses" specified in the RAOs need to be clarified to include community accessible open space, construction of buildings, parks, roads, and revegetation with native species including trees. The potential for future land use should be considered when selecting cleanup solution; placing a cap on an area basically has the same effect as placing a fence around the area.

EPA Response: *EPA disagrees. Redevelopment has played a significant role in remediation at the BPSOU. For example, the Tullamore Subdivision was built on an existing mine waste dump. Remediation activities and redevelopment activities at this site enabled the development of a safe, healthy, residential housing development. Developers can work with the BSB Planning Department to determine if a reclaimed area (e.g., vegetated) can be developed (not every reclaimed area can be redeveloped because of existing mine shafts and stability concerns). The need for a pathway of exposure to be present is standard EPA risk assessment practice and does not permanently remove anything from reuse. Under the ROD's attic cleanup plan, if an attic has an exposure pathway, it will be cleaned up. Future land users can include all of the uses listed in the comment. EPA will consider reasonable future land use for a given area when remedial design is implemented.*

G. ***Specific Comment:*** With EPA (especially Sara Sparks), MERDI has made real progress on several redevelopment projects (specified) in Butte using private dollars with no help from NRD.

EPA Response: *No further response required.*

Unrelated topic

A. ***Out of Scope:*** Remove hot mix plant (BSB) clean area on South Montana Street.

EPA Response: *The appropriate location for the BSB hot mix plant is a local issue which is outside the purview of EPA's mission.*

Waste Left in Place

A. ***Commenter Supports:*** The county supports the waste-in-place remedy, but a meaningful level of redevelopment trust funds must be established to restore, redevelop, and enrich the Butte community. Butte-Silver Bow County supports the proposed plan so long as fair compensation is provided for acceptance of a damaged resource. Fair compensation includes enhanced appearance of damaged areas, infrastructure improvement, enhanced business opportunities, and support of O&M.

EPA Response: No further response required. Compensation and redevelopment funds are outside of EPA's remedy selection role under CERCLA.

B. ***Consistency with other Clark Fork River Sites or similar NPL sites:*** EPA's plan to leave waste-in-place is consistent with the remedies across the rest of the CFR Basin;

EPA Response: EPA agrees that leaving waste in place is consistent with other CFR remedies.

C. ***Economic Effects***: The community and city as a whole suffers an economic stigma that endures in perpetuity if these pollutants and toxins are NOT completely removed. Waste left in place will be an impediment to the economic future and growth in Butte. Perpetual management of hazardous waste gives a select few good jobs while economic development is hampered in the rest of the community.

EPA Response: Leaving waste in place is a common practice at sites like Butte where there are large volumes of waste scattered over a large area. EPA does not believe the areas where waste is being left in-place will prevent redevelopment. There are numerous examples where waste is left in place that have been very successfully redeveloped such as Clark Park and the golf course in Anaconda.

D. ***Protectiveness of Human Health and the Environment***: Proposed Plan fails to protect in an adequate manner human health and the environment by leaving waste in place. Leaving toxic mine wastes in-place is not protective of human health and the environment; leaving waste in place untreated and unremediated will be a perpetual threat-in-place. The reliance on capping will not remove these threats. Waste will be left in place at various sites scattered over our backyards. Waste in place policy has never made sense in an urban area, but has been entrenched so opposing it seems futile.

EPA Response: EPA believes that the Selected Remedy does adequately protect human health and the environment by leaving waste in place. First, it is impracticable to remove all of the mine waste from the Butte Hill. Furthermore, capping of mine waste is a standard engineering practice to address large volumes of low toxicity waste. Capping waste in place has been successful at BPSOU and elsewhere, and will continue to be carefully implemented and monitored at BPSOU.

1.9 Solid Media/ Waste Left in Place

Comment Topics, Comment Totals, and References

Topic	Subtopic	Number of Comments	Comment ID references
Overall Topic: Solid Media/Waste Left In Place		**55**	
BRES	A Supports BRES Program	4	70.63, 85.2, 108.8, 123.45
Ecological Risk	A Terrestrial Risk	2	104.6, 105.6

Comment Topics, Comment Totals, and References

Topic	Subtopic		Number of Comments	Comment ID references
Overall Topic: Solid Media/Waste Left In Place			**55**	
		Assessment		
Environmental Justice	A	Concerned about Health Effects/Risks of Waste Left in Place	1	7.37
	B	Economic Effects	3	7.4, 33.8, 100.49
Extent of Removal	A	Against Removal	3	70.41, 119.3, 119.4
	B	For Removal	4	3.50, 70.72, 109.2, 129a.4
General Comments	A	Long Term Effectiveness and Permanence	2	104.7, 105.7
	B	Suggested changes to the Proposed Plan	1	22.3
Institutional Controls	A	Funding	1	98.1
	B	General Comment	1	70.74
	C	ICs hamper redevelopment	2	105.10, 110.12
Liability	A	Economic Effects	5	3.11, 3.98, 3.100, 5.21, 5.22
	B	Local Government Liability	1	3.97
	C	Property/Landowner Liability	11	3.99, 3.101, 33.14, 33.15, 33.16, 33.17, 33.18, 33.19, 33.20, 33.21, 33.22
Long Term Operations and Maintenance	A	BSB Responsible for Program or O&M	2	89.5, 123.44
	B	Funding	4	89.4, 100.39, 123.65, 124.24,
Railroad Beds	A	Reclamation Needed along Railroad Beds	4	30.1, 104.4, 105.4, 123.54
	B	Reclamation Specifications along Railroad Beds	4	123.18, 123.19, 123.48, 133.18
Reclamation	A	Commenter Supports Reclamation	1	112.29
	B	Fire Hazard at Reclaimed Areas	2	123.41, 123.51
	C	Long Term Effectiveness and Permanence	3	3.65, 75.142, 133.16
	D	Much Reclamation Work already Done	2	70.59, 70.80
	E	Operation and Maintenance	3	75.102, 75.120, 123.42
	F	Protectiveness of Human Health and the Environment	4	3.64, 3.78, 3.96, 74.2
	G	Reclamation Needed (specific areas)	13	3.35, 90.4, 123.9, 123.10, 123.11, 123.13, 123.14, 123.15, 123.49, 123.50, 123.59, 123.62, 123.64
	H	Reclamation Specifications	21	1.7, 1.10, 3.29, 56.14, 60.3, 61.1, 70.25, 75.179, 83.4, 83.8, 89.2, 89.3, 100.58, 112.33, 123.3, 123.43, 123.63, 124.27, 133.19, 133.37, 135.7

Comment Topics, Comment Totals, and References

Topic	Subtopic	Number of Comments	Comment ID references
Overall Topic: Solid Media/Waste Left In Place		**55**	
	I Reduction of Toxicity Mobility and Volume	2	3.63, 3.66
Redevelopment	A Economic Effects	14	3.79, 7.5, 7.6, 7.52, 33.1, 33.6, 33.7, 33.10, 33.11, 34.2, 100.50, 100.52, 107.12, 110.5
	B Land Use	1	119.5

BRES

A. *Supports BRES program:* BRES is a wonderful plan for make sure the caps and their integrity hold. We support the use of BRES, but think vegetation should be upgraded to be more diverse. The focus should be on non-invasive species with binding root mass. Provisions for localized areas with greater fill material depth should be made. In areas where caps erode, an option should exist for removal of waste materials. Believes BRES is a great monitoring program. The Working Group fully supports EPA's mandatory inclusion of the BRES.

EPA Response: *EPA agrees with the comments. The BRES that is included in the ROD has been revised to include the use of diverse and native species in the revegetation of reclaimed areas to the extent that the species are compatible with the engineering objectives of the remedial action.*

Ecological Risk

A. *Terrestrial Risk Assessment:* EPA did not assess terrestrial risk at the BPSOU; there has been wildlife on the north end of the OU; this is just one case of EPA not listening to the public.

EPA Response: *The BPSOU is primarily an urban environment that does not provide a significant environment for sensitive terrestrial organisms. The Selected Remedy will improve the urban environment and promote better wildlife habitat. The capping or removal of waste throughout Butte by past response actions has led to improved vegetative cover and improved habitat. The most significant environmental threat identified in Butte was to the aquatic environment. For that reason, EPA focused the ecological risk assessment on the aquatic environment.*

In addition, EPA requested that both the state and federal wildlife agencies identify sensitive flora and fauna that might inhabit the terrestrial Butte ecosystem. No sensitive flora or fauna were identified by these agencies. EPA's rationale for not performing a formal terrestrial environmental risk assessment for the urban BPSOU area is described in the September 1999 Scoping Document for the Baseline Ecological Risk Assessment (BERA) and in the final meeting summary for the BPSOU Ecological Technical Assistance Group (ETAG) meeting on October 26, 1999 (letter transmitted on January 7, 2000). The rationale from this meeting summary is as follows:

Ron Bertram makes the statement that the BERA is not going to address terrestrial risks. He reminds the group that per the last ETAG meeting, the United States Fish and Wildlife Service (USFWS) and the Montana Fish, Wildlife and Parks (MFWP) personnel were tasked to provide a list of threatened, endangered and sensitive (TES) terrestrial species that could be at risk as a result of contamination at the BPSOU. EPA did not receive any information from the USFWS. MFWP submitted a letter on November 24, 1997 that summarized results of a search of the Natural Heritage Program database for TES plant and animal species that may occur in the vicinity of Butte, MT. The MFWP letter is attached to this meeting summary. The search provided only one species (Prebble's Shrew) that may reside within the BPSOU. Based upon this information, and the fact that the BPSOU is small in area and is an urban setting, EPA determined that an assessment of terrestrial risks is not warranted at the BPSOU.

The consensus among ETAG members was that future revisions to the text for the BPSOU BERA will include a discussion of EPA's rationale for excluding terrestrial risk evaluation from the BERA.

Environmental Justice

A. ***Concerned about Health Effects/Risks***: There are has been no consideration of the effects of waste-in-place on low-income citizens.

EPA Response: *EPA has carefully considered and evaluated the human health risks for all citizens in Butte. Conservatism is incorporated into the risk assessment process to ensure that cleanup levels are protective of the reasonably maximum exposed individual and the most susceptible member of the population to the effects of that contaminant. Conservatism is also applied in the risk decision making process. Through the previous response action work, nearly all source areas exceeding action levels have been addressed. The lead abatement program has addressed approximately 600 homes, many of which were low income residents. The Selected Remedy incorporates the systematic sampling of all homes in the BPSOU and includes a targeted component that prioritizes sampling and remediation for affected or sensitive citizens. Environmental justice complaints were examined by EPA environmental justice specialists and answered in letters dated August 2, 2004 and August 23, 2005, both of which are incorporated by reference.*

B. ***Economic Effects***: Economic development and the future of Butte may be hindered by leaving waste in place. The proposed waste-in-place remedy will preclude future economic development in the area and place an unfair environmental regulation burden on the poor. A greater proportion of low-income residents live in BPSOU and any remedy that lessens property values, decreases income from property, and makes it more difficult to sell property would have a disproportionate and discriminatory effect on low-income citizens.

EPA Response: *Waste left in place is a common practice at sites like Butte where there are large volumes of waste scattered over a large area. EPA does not believe the areas where waste is being managed in-place will prevent redevelopment. There are numerous*

examples where waste is left in place that have been very successfully redeveloped such as the Copper Mountain Complex and the Tullamore subdivision.

Extent of Removal

A. ***Against Removal:*** Short-term risks from waste removal outweigh the long-term risks of leaving waste in place; leaving wastes in place will also help with future use and redevelopment of Butte. The community has not taken the true effects of total removal into consideration (cites personal accident with heavy equipment). Material has to be capped and dealt with wherever it is moved.

EPA Response: *EPA agrees that short term risks are important factors to consider when making remedial decisions, and believes that it has considered this factor appropriately in selecting the remedy for BPSOU.*

B. ***For Removal***: The Pollution Prevention Principle/Standard warrants removing waste-in-place as part of the priority soils remedy. An 18-inch cap will not stand up to a tree, the roots go too deep. Any remedy that calls for the use of caps surrounded by wire fencing that leaves waste in place where people are living in close proximity is inappropriate. One commenter disagrees with Butte-Silver Bow government that a waste-in-place remedy is acceptable contingent upon "extras". Redevelopment money should be spent on removal.

EPA Response: *EPA believes that the Selected Remedy protects human health and the environment and is conducive to redevelopment of capped properties. The BRES that is included in the ROD has been revised to include the use of diverse and native species in the revegetation of reclaimed areas to the extent that the species are compatible with the engineering objectives of the remedial action.*

General Comment

A. ***Long-Term Effectiveness and Permanence***: Mine waste was moved to "temporary" disposal areas in residential settings and then EPA made these sites permanent (2 comments).

EPA Response: *It was necessary to classify the disposal areas as "temporary" until completion of the record of decision. EPA carefully examined whether the two locations were appropriate for waste repositories, and concluded that they were.*

B. ***Suggested Changes to Proposed Plan:*** Suggest a proactive and aggressive remediation program for any and all sources of contamination such as waste dumps, including: caps, BRES, one cap repair only, encapsulation if repair fails, innovative treatment for wastes in place, mine waste to repository, etc.

EPA Response: *Most of the suggestions in this comment are requirements included in the BRES performance standard. "Treatment" of wastes in place is not excluded if it is necessary to stabilize the waste/prevent leaching.*

Institutional Controls

A. ***Funding***: The capped solid media in upland areas are still a risk to human health; as long as institutional controls are honored, the caps can be maintained, but if those caps fail, we may not have resources to handle the contamination that may result in the future.

EPA Response: *The proposed remedy has developed the BRES to ensure there is a program in place to maintain the caps. Furthermore, BSB has a program in place to routinely verify that the caps are intact. Under the Selected Remedy, the O&M of the reclaimed areas will be funded to ensure long-term viability of the programs. In addition, BSB maintains a sophisticated Geographic Information System (GIS) database that stores analytical data, reclamation activities, and long-term O&M of each of the reclaimed sites. This system will ensure long-term institutional knowledge of the programs. IC's will be part of the BSB planning and permitting process.*

B. ***General Comment***: ICs are a farce and are nothing but a cover up for EPA failing to do their job; EPA made two "temporary repositories" up gradient of houses in Walkerville permanent.

EPA Response: *It was necessary to classify the disposal areas as "temporary" until completion of the record of decision. EPA carefully examined whether the two locations were appropriate for waste repositories, and concluded that they were. The use of ICs in the Selected Remedy is limited and appropriate, and fully consistent with CERCLA and the NCP.*

C. ***IC's Hamper Redevelopment***: IC's and deed restrictions could be used to block redevelopment on so called reclaimed sites; requests that the types of ICs, how they are put in place, who would enforce them, and their legal mechanisms be put out for public comment. IC's should only be used when it is not technically possible to reclaim the land to productive use.

EPA Response: *EPA disagrees. Redevelopment has played a significant role in the development of the proposed remedy for the BPSOU. EPA has worked with a number of different parties to ensure that redevelopment activities have occurred with the remediation of properties on the Butte Hill. For example, the Tullamore Subdivision was built on an existing mine waste dump. Remediation activities and redevelopment activities at this site enabled the development of a safe, healthy, residential housing development. Developers can work with the BSB Planning Department to determine if a reclaimed area (e.g., vegetated) can be developed (not every reclaimed area can be redeveloped because of existing mine shafts and stability concerns). ICs will be used to strengthen the active remediation components of the Selected Remedy, and should assist redevelopment if properly designed.*

Liability

A. ***Economic Effects:*** Proposed Plan fails to address, in a proper manner, the Superfund liability issue. Waste in place will be a perpetual and permanent drag

on economic development because of the liability issues relating to and adhering in a waste in place solution for priority soils. Toxic liability precludes economic development. Given the CERCLA and SARA liability scheme, the proposed waste in place remedy for BPSOU will preclude future economic revitalization of the area. As long as waste is left in place, liability will be left in place, which will hinder economic growth.

EPA Response: *EPA's post-ROD enforcement efforts will be designed to ensure that PRPs remain liable for CERCLA remediation efforts for the long term. Redevelopment has occurred at Butte in conjunction with waste-in-place response actions. EPA supports efforts to combine redevelopment with remedy implementation.*

B. ***Local Government Liability***: The superfund liability scheme applies to local government as well as to private entities; the courts treat local government just like any other PRP; there is no distinction between government PRPs and private PRPs.

EPA Response: *No further response required.*

C. ***Property/Landowner Liability:*** The proposed plan to leave waste in place leaves property owners liable. In effect, Superfund imposes a government lien on all contaminated properties; such a lien is an encumbrance on future use and disposal of the property. Heavy metals left in place are a toxic tort waiting to happen. Owner liability includes tenants as well as local governments. Protections for prospective purchasers are difficult to establish. Lending banks have been held liable for the cost of cleanup. The only permanent feature of a waste-in-place remedy is liability.

EPA Response: *Superfund does not impose an automatic lien on all properties. Home owners and lenders are generally protected from Superfund liability by EPA guidance and recent amendments to CERCLA.*

Long-Term Operations and Maintenance

A. ***BSB Responsible for Program or O&M***: Final solution must ensure local control and ensure that the people of Butte have ready access to suitable expertise. BSB must have a major role throughout remediation and reclamation and be fully funded to meet the objectives of O&M activities.

EPA Response: *At this point in the remedy selection process, EPA does not determine the role of one PRP differently than another. EPA holds all PRP's equally accountable under the joint and severable liability provisions of the superfund law. BSB and ARCO are free to negotiate an allocation agreement that may include defining the obligations of the PRPs. EPA agrees that local implementation with long term O&M is preferable to many other implementation plans.*

B. ***Funding***: The remedy needs to include substantial funding to maintain reclamation caps and replace failed ones. A system needs to be put in place for

maintenance of the caps and must include funding in perpetuity and provide for unforeseen problems. Need fully funded Land Management Program to track and control all activities regarding maintenance, ownership, and redevelopment of Butte's Superfund areas.

EPA Response: *The BRES document, included with the ROD, describes a comprehensive O&M evaluation and program for wastes left in place. The post-ROD enforcement actions under CERCLA will address long term responsibility and funding for ROD implementation.*

Railroad Beds

A. ***Reclamation needed along Railroads***: The remediation plan currently in place along the railroad does not adequately clean up existing contamination. Contaminated materials are visible and are being spread by wind and storm water at several locations. Ryan Road was a part of the North Pacific Railroad, but it has not been reclaimed. At one time the EPA said the Ryan Road railroad bed was a concern, and then later said it was not a concern. More work is needed along the railroad walking trail to reduce contact with waste. Young adults, children, and animals are disturbing the integrity of the caps so wastes should be removed or the caps should be fortified.

EPA Response: *Contamination associated with Ryan Road was sampled under the FSUA and there were no elevated levels of metals or arsenic associated with the waste. All elevated levels of waste associated with the walking trail have been addressed. There will be a long term operation and maintenance plan for the railroad beds addressed under Superfund to ensure the integrity and long term viability of these caps.*

B. ***Reclamation Specifications along Railroads***: Cellular confinement should be removed and slopes laid back and reclaimed. Significant areas of honeycomb structures are exposed; these sites will require continuing and long-term maintenance. The failing cellular confinement is not protective of human health or the environment, and these sites are aesthetically displeasing. Instead 3:1 slopes, coversoil, and revegetation should be used. Wastes should be removed from steep slopes and contaminated materials should be removed from problem areas. The railroad reclamation with shale rock along Iron Street from Dakota Street to Main Street should be removed and reclaimed properly.

EPA Response: *Cellular confinement was selected as the response action for railroad beds based on federal regulations for construction and maintenance of active railroad lines. Active railroad lines cannot have live vegetation growing near the tracks due to the potential for the vegetation to catch on fire. The cellular confinement referenced in the comment will be evaluated under the BRES and repaired if necessary. The reclamation work along Iron Street from Dakota Street to Main Street has been done properly and the BSB Historic Preservation Officer recommended the shale for historic preservation of the railroad line.*

Reclamation

A. ***Commenter Supports Reclamation***: The commenter believes the caps over waste are effective for dumps outside of the floodplain.

EPA Response: EPA agrees. No further response required.

B. ***Fire Hazard at reclaimed areas:*** Homeowners are concerned that reclaimed areas seeded with grasses may present a fire hazard and that reclamation plans should include funding for fire protection. In areas where homes are present, the commenters suggest that either irrigation, or planting species that do not dry out should be considered for fire prevention.

EPA Response: EPA acknowledges this comment. In recent years, BSB has started to mow many of the reclaimed areas adjacent to residential properties to prevent fire hazards. Under long-term operation and maintenance, these types of activities will continue and reduce the fire hazards associated with reclaimed areas.

C. ***Long-Term Effectiveness and Permanence of reclamation***: The commenters generally expressed opinions that the extensive use of caps throughout the BPSOU does not provide a permanent remedy. The commenters believe that areas remediated under prior emergency cleanup actions are insufficient and should be reexamined or revisited and then cleaned up as appropriate.

EPA Response: The Selected Remedy adequately protects human health and the environment by leaving waste in place. First, it is impracticable to remove all of the mine waste from the Butte Hill. Furthermore, capping of mine waste is a standard engineering practice to address large volumes of low toxicity waste. Reclaimed areas were evaluated to determine if they met ARARs and remedial objectives in the Response Action Summary Document produced by EPA during the RI/FS, and almost all caps were found to meet these requirements. Based on the study, sites that did not meet the ARARs will be readdressed under the ROD. Furthermore, the Butte Reclamation Evaluation System will be implemented to evaluate reclaimed areas and ensure they meet ARARs.

D. ***Much Reclamation Work Already Done:*** The commenters noted that they are glad to see the tailings and mine dumps reclaimed ("rode bike on tailings as a kid; they were fun but toxic") and that people need to see these improvements. Over 180 acres and 400 sites have been cleaned up and with ongoing maintenance they are confident the reclaimed areas will be protective over the long term.

EPA Response: EPA agrees. No further response required.

E. ***Operations and Maintenance of reclaimed areas***: The commenters expressed concerns about ongoing maintenance of reclaimed areas and that significant maintenance and removal may be necessary. Suggestions included: 1) a provision established for ongoing weed control; 2) immediately fence contaminated areas to keep vehicles from stirring up dust; 3) require that vegetation be continually maintained so sediment is not allowed to leave capped areas.

EPA Response: *Long-term O&M will be required for the reclaimed areas. The O&M will include weed control and maintenance of vegetation at these sites. However, much of the reclaimed area is privately owned and fences were erected only at the property owner's request.*

F. ***Reclamation is not Protective of Human Health and the Environment***: Opinions were expressed in several letters that caps do nothing to clean up a site and that the extensive use of caps would not be protective of human health and the environment and that a remedy is needed that makes the site clean and free of contamination. The commenter also asserts that caps and revegetation do not meet the nine Superfund criteria and are not protective of human health and the environment.

EPA Response: *EPA disagrees. The engineered soil caps are an EPA approved remediation technology. Waste left in place is a common practice at sites like Butte where there are large volumes of waste scattered over a large area.*

EPA's decision concerning the use of the nine criteria and the selection of the BPSOU remedy is explained in detail in the Proposed Plan and the ROD. EPA has correctly applied the nine criteria in the BPSOU remedy selection process.

G. ***Reclamation Needed:*** These comments expressed general concerns or desires that additional reclamation is needed. Two comments listing specific areas needing reclamation were submitted by individual residents. In addition, the Citizen's Working Group submitted a list of specific locations where they believe additional reclamation is needed. These comments are bulleted below:

- Unreclaimed sites with contaminated soils should be cleaned up because it is unprotective of human health and the environment for the Agency to take the position that large volumes of exposed waste are acceptable.

- One concern is the southeast end of the Anselmo Mine yard where timbers were treated with arsenic. The commenter feels ARCO did a "volunteerism" type of cover, that EPA should review this area and solicit public comment on the cleanup of it.

- The Lexington Mine/Walkerville baseball field/Lexington Terrace area needs more work; the waste needs to be stabilized and the sites re-contoured.

- Waste should be removed at the Timber Butte mill site; if the cap fails, toxic materials will move downhill into a residential area.

- Waste removal is preferred at the Mountain Con, Bell Diamond, and Grayrock area. They prefer cleanup at the Atlantic, Josephine, and Sister sites so the aesthetics of the road to the GMMIA are conducive to heavy tourism traffic. They suggest paving Alexander Street to the GMMIA, thus facilitating the redevelopment potential of the GMMIA.

- All mine yards in the BPSOU should be reclaimed and retaining their historical value should be a secondary goal.

EPA Response: *EPA appreciates these thoughtful comments, and will attempt to use some of these concepts in remedial design. Reclamation on the upland areas of the Butte Hill can be triggered in two ways: 1) arsenic and/or lead concentrations exceed human health action levels, or, 2) storm water runoff from the site would eventually carry metals-laden sediment to Silver Bow Creek, putting aquatic life at risk. Nearly all sites in the BPSOU that have posed a human health risk due to exceedances of arsenic and/or lead concentrations have been removed or reclaimed and only a small handful of sites posing human health risks remain; these will be reclaimed.*

For the GMMA, soil sampling was performed in the area and only one area exceeded the lead action level – this area will be reclaimed. Because storm water in the GMMA eventually drains to the Berkeley Pit, there is no threat to Silver Bow Creek. However, improvements will be made to the area (improving access, interpretive trails, fencing off physically dangerous areas such as steep slopes, mine shafts, etc.).

All reclaimed sites will be monitored for compliance with the reclamation standards specified in the Butte Reclamation Evaluation System. Through operations and maintenance, every site will be inspected once every few years to ensure cap integrity. These inspections check for criteria such as the condition of the vegetation, exposed waste, evidence of erosion, etc. If a cap does not meet these reclamation standards, some sort of remedial action will be taken to repair the cap.

Additional reclamation at sites requested by BSB were included in the ROD after consultation with BSB and DEQ.

H. ***Reclamation Specifications:*** Commenters expressed general concerns about the long-term stability of reclamation caps used in the BPSOU. They expressed concern that caps will eventually fail, are a potential contaminant source in the future, and thus are not an acceptable long-term solution. There were comments that caps had already failed. More specifically, commenters were concerned about the specifics of the reclamation standards used in the BPSOU. Some believed that innovative technologies were not used and that the BRES would be used in lieu of using self-sustaining reclamation practices. They were also concerned that storm water runon/runoff was not considered in the design, and that the caps required unrealistic IC's forever. Most of the comments expressed that the caps should meet specific reclamation criteria that are different than what has been used, such as deeper soils, a more natural appearance, more biodiversity, ability to support woody species, including shrubs and trees.

EPA Response: *The engineered soil caps are an EPA approved remediation technology. Many of the soil caps in Butte are over 15 years old. There has not been a cap failure in the BPSOU during this time. There has been a yearly Operation and Maintenance program to oversee the soil caps. The standard for the type and amount of vegetation at these sites were developed by a number of different parties including the Reclamation Research Unit at Montana State University in Bozeman. The design of the caps did include storm water*

runon/runoff concerns. The caps, after full BRES evaluation and corrective action where necessary, will comply with ARARs of the State of Montana.

I. ***Reduction of Toxicity, Mobility and Volume:*** The extensive use of caps does nothing to reduce the toxicity and volume and mobility of contaminants. Caps violate the superfund mandate for treatment over containment.

EPA Response: *The commenter is correct that caps do not reduce the toxicity and volume of the waste itself. However, the caps drastically reduce the mobility of the contaminants. The caps provide a barrier between humans and the waste, thereby reducing the toxicity. The superfund mandate for treatment over containment only applies if the waste can be treated. With high volumes of low toxicity waste, treatment is simply not advisable – contaminant concentrations are not high enough for a treatment process to remove the contaminants. Some of the caps have incorporated lime or limestone in areas with low pH that lessen the potential for phytotoxicity. Further, when small volumes of highly toxic waste (e.g., if mercury was found, or if the wastes failed TCLP tests) the waste was either sent to a hazardous waste treatment facility or was capped to ensure protection of groundwater in addition to providing a surface barrier.*

Redevelopment

A. ***Economic Effects***: Commenters expressed concerns that leaving waste in place would be a permanent economic drag on the Butte Hill/impair economic revitalization. They are concerned that future development will be hindered because of the liability that remains and because IC's limit the potential future use of the property. Several commenters specifically cited the fact that BiMart decided not to develop property in Anaconda because contamination was found, implying a similar scenario could happen in Butte. One commenter specifically stated that EPA failed to consider the Superfund Redevelopment Initiative and the Land Revitalization Land Initiative Action Agenda.

EPA Response: *The soils caps are an approved EPA remediation technology and are used at many Superfund sites throughout the country. The Agency has worked with a number of private business and local government on redevelopment projects on these reclaimed sites. EPA has previously responded to the comment regarding the Superfund Redevelopment Initiative and the Land Revitalization Initiative, and has demonstrated that the Selected Remedy is fully compatible with these initiatives. The situation with BiMart in Anaconda was unfortunate, and BiMart's decision involved issues other than contamination at the site, which was cleaned up immediately after it was discovered.*

B. ***Land Use***: Three people commented that capping of mine waste does not preclude future redevelopment or other productive land uses and said that the cleanup project must accommodate and promote beneficial reuse and development of reclaimed properties ("might as well cap the waste here and reuse the property").

EPA Response: *EPA agrees.*

1.10 Superfund Procedural Issues

Comment Topics, Comment Totals, and References

Topic	Subtopic		Number of Comments	Comment ID references
Overall Topic: Superfund Procedural Issues			**159**	
Development of Alternatives	A	No Innovated Technology Considered	1	3.61
	B	No Difference Among Alternatives	1	105.8
Environmental Justice	A	Compliance with ARARs	1	27.6
	B	EPA did not account for Environmental Justice	3	7.3, 35.2, 35.7
	C	EPA Disregards Comments	1	19.9
	D	Past Response Action Sites	1	3.81
	E	Public Involvement	18	3.82, 7.34, 7.35, 7.36, 7.53, 7.54, 10.3, 10.4, 11.4, 19.1, 19.2, 19.3, 19.5, 19.6, 19.7, 19.8, 20.1, 27.4
Evaluation of NCP Criteria	A	Community Acceptance	8	1.4, 1.8, 1.13, 1.16, 1.25, 3.7, 3.26, 7.42
	B	Compliance with ARARs	8	1.15, 3.2, 3.15, 3.91, 3.92, 4.11, 4.12, 4.13
	C	Evaluation/Weighing of Cost	9	1.23, 3.5, 3.38, 5.7, 35.1, 35.3, 35.4, 35.5, 35.6
	D	Long-Term Effectiveness and Permanence	3	1.20, 1.22, 1.32
	E	Specific Comment	2	1.1, 1.35
	F	State Acceptance	5	1.2, 1.6, 1.14, 3.8, 3.20
Public Involvement	A	EPA Disregards Comments	11	6.1, 7.39, 7.48, 7.49, 7.50, 19.4, 57.1 70.75, 104.2, 105.2, 137.2
	B	EPA Limits Public Comment	22	1.3, 3.83, 3.84, 3.85, 3.86, 3.87, 3.90, 7.40, 7.41, 7.44, 7.45, 7.46, 7.47, 16.1, 16.2, 16.3, 70.15, 70.104, 70.105, 70.107,70.140, 71.34
Public Meeting	A	EPA Disregards Comments	7	8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7
	B	Public Involvement at the public meetings	8	10.1, 10.2, 11. 1, 11.2, 11.3, 70.1, 71.40, 71.46
RASD	A	Federal Location Specific Requirements	3	3.93, 4.14, 4.15
	B	Land Use	2	7.11, 33.4
	C	Past Response Action Sites	24	3.16, 3.21, 3.44, 3.80, 3.94, 3.95, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10,.4.16, 4.17, 4.18, 4.19, 4.20, 4.21, 70.16, 110.7
	D	Public Involvement	3	7.38, 7.43, 90.3
Redevelopment	A	Economic Effects	2	33.9, 34.3
	B	Land Use	15	1.5, 3.9, 3.88, 3.89, 7.7, 7.8, 7.9,7.10, 7.12, 7.13, 7.14, 33.2, 33.3, 33.5, 70.17
	C	Specific Comment	1	3.62

Development of Alternatives

A. *No Innovative Technology:* The RI/FS is inadequate in its consideration of treatment technologies for BPSOU contaminants.

EPA Response: EPA disagrees. A broad spectrum of technologies was evaluated for each media of concern in the initial screening phases of the RI/FS process. The results of early screening of technologies are documented in the administrative record, in compliance with the NCP.

B. *No Difference Among Alternatives*: Alternatives 2 through 5 have the same action for soil; there is no difference in the soils actions; the EPA sold out to the principal potentially responsible party.

EPA Response: The alternatives presented in the FS and Proposed Plan were assembled in accordance with the NCP and EPA guidance, without regard for PRP preferences.

Environmental Justice

A. *Compliance With ARARs*: Montana EPA ignored environmental justice as an ARAR; this failure is particularly discriminatory to low-income citizens.

EPA Response: Environmental justice is not an ARAR, as that term is defined in CERCLA and the NCP. EPA's compliance with environmental justice policies is documented in EPA letters dated August 2, 2004 and August 23, 2005, which specifically respond to complaints on this issue.

B. *EPA Did Not Account for Environmental Justice:* The Montana Office EPA's position on the "soils" portion of the BPSOU violates the principles of environmental justice. It places a disproportionate liability, land use, and health burden on the poor, and did not provide them with meaningful opportunities for public participation. The cost effectiveness issue affects whether or not citizens of Butte will be afforded environmental justice in terms of the BPSOU decision. Montana EPA made no effort to reach out and include the poor in decision making - this violates environmental justice.

EPA Response: The EPA disagrees with this comment as shown in EPA's responses to environmental justice complaints described above. The Agency has met all environmental justice concerns associated with the BPSOU. The Selected Remedy addresses contamination for all residents of Butte and Walkerville.

C. *EPA Disregards Comments*: The proposed Plan and Preferred Remedy for Butte Priority Soils should be thrown out and a new Proposed Plan conducted in accordance with EPA's rules for public participation and environmental justice.

EPA Response: See the responses to the immediately preceding comments.

D. *Past Response Action Sites*: Allowing the previous response action sites to get a "no further action" designation will mean that low-income citizens were excluded

from the final BPSOU remedy selection process and environmentally disenfranchised.

EPA Response: *EPA disagrees with this comment. There has been significant public participation over the last 18 years in the Superfund process. Public meetings were held in the neighborhoods affected by each Time Critical Removal Action conducted in the BPSOU. Public comments were accepted on these actions and addressed by EPA.*

E. ***Public Involvement:*** In separate submittals, one commenter repeatedly expressed concerns that there have been no meaningful opportunities for public participation; there has been a failure to follow public involvement mandates specifically applicable to low-income citizens, and no proactive attempts to include low income citizens in the decision-making process. Some of the specific examples given are presented below:

- On the EPA citizens work group, low income residents of the priority soils area are grossly underrepresented, if they were represented at all. Only five percent of the citizens advisory group are low income people.
- A proactive campaign must be undertaken to include and provide meaningful public participation explicitly for low-income citizens.
- The pathways of exposure approach to attic dust must be abandoned because it places a disparate health burden on low-income citizens.
- The January. 25th public meeting was at variance with the EPA's environmental justice policy.
- Neither the public nor the poor were involved or considered in the development and execution of TCRA and emergency response actions. Low-income citizens had no role in the RI/FS process or in the development of the Proposed Plan.
- The poor have been substantively discriminated against by the actions of the Montana Office of EPA. The Montana Office of EPA uses an incorrect conceptualization of the meaning of the term public.
- The plan substantially discriminates against low-income citizens living within the BPSOU and denies them equal protection under the law.

EPA Response: *EPA disagrees with these comments. The EPA takes public participation very seriously. Hundreds of public meetings have been held over the years in specific neighborhoods and other locations throughout the BPSOU to actively seek public participation in the Superfund process. EPA placed ads in both the local newspaper and the free newspapers in the Butte area. Notices about Superfund meetings in Butte were sent home with school children. Radio and television notices were broadcast to inform the public of both public meetings and Superfund activities in the BPSOU. The BSB lead abatement program educated all participants, including low income participants, of the dangers of heavy metals, especially lead, to children in the BPSOU. Additionally, the lead*

program provided residents of Butte and Walkerville educational packages concerning health effects of heavy metals in residential areas. The EPA funded both a Citizen's Advisory Group (CAG) and a Citizens Technical Environmental Committee (CTEC) in Butte to oversee Superfund activities and educate the public. The agency went well beyond the mandated public notice and meetings under the Superfund law to ensure that the public was aware of the Agency's activities at this site.

Evaluation of NCP Criteria

A. ***Community Acceptance***: In several submissions, one commenter expressed the opinion that EPA has largely ignored public comments, input, and opinions on the Proposed Plan. Public input should influence the decision making process and should be considered on all alternatives; however, EPA pre-supposed the waste-left-in place remedy and did not appropriately consider public input. The commenter believes EPA's efforts have been put into selling the plan, not to soliciting public input.

EPA Response: *EPA considered seriously all public comments on the Proposed Plan, and has responded to these comments in this Responsiveness Summary. EPA exceeded the requirements for number of formal public meetings and in the length of the comment period on the Proposed Plan.*

B. ***Compliance With ARARs***: In several submissions, one commenter asserted that the proposed remedy does not comply with ARARs. Some specific examples included:

- EPA has ignored Precautionary Principle and Principle of Pollution Prevention ARARs.
- It fails to meet unwaived ARARs and is at variance with Montana State law.
- Why are not the most up to date ARARs used in the process?

EPA Response: *As noted previously, the Precautionary Principle and the Principle of Pollution Prevention are not promulgated, specific standards or criteria, and therefore are not ARARs within the meaning of CERCLA and the NCP. The ARARs that were identified for the FS were current at the time. The final list of ARARs attached to the ROD is up to date. EPA's waiver of federal and state groundwater standards is done in compliance with CERCLA and the NCP, as explained in more detail in Section 13 of the ROD.*

C. ***Evaluation/Weighing of Cost:*** In several submissions, one commenter asserted that EPA did not evaluate cost appropriately and that the Proposed Plan gives too much weight to cost and too little weight to protecting human health and the environment. The commenter believes that the Montana EPA office misconstrued and misapplied the cost effectiveness criterion by confusing cost effectiveness with cost benefit analysis and that Montana EPA's approach to developing a preferred alternative made cost savings inordinately important. The commenter

also asserted that the waste in place/capping remedy is a short-term, inexpensive, and impermanent remedy; EPA selected it because it was cheaper than a permanent alternative.

EPA Response: *All costs were estimated in accordance with EPA guidance. EPA applied the cost effectiveness criteria in the remedy selection process in accordance with the NCP and EPA guidance, and did not confuse cost effectiveness with cost benefit.*

D. ***Long-Term Effectiveness and Permanence***: Contrary to Superfund Law, wastes will be left in place unaddressed, untreated, and unremediated. The use of caps and institutional controls are not permanent. EPA's preferred alternative relies on passive remedies such as caps over waste-in-place and institutional controls. Institutional controls are not a substitute for cleanup of a site and should not substitute for more active measures such as removal.

EPA Response: *The commenter is incorrect in stating that the wastes that are left in place have been unaddressed, untreated, and unremediated. Leaving waste in place is a common practice at sites like Butte where there are large volumes of waste scattered over a large area. ICs are supplemental to the engineered and vegetated caps, and are intended to provide protection of public health and the environment. ICs also help protect the engineered remedy from being comprised by non-superfund authorized activities. EPA has applied the long-term effectiveness and permanence criteria to the BPSOU remedy selection process correctly, in accordance with CERCLA and the NCP.*

E. ***Specific Comment:*** The Preferred Alternative does not have support of the public, DEQ, or the NRDP. The discussion of the criteria (state and community acceptance) on Page 35 of the Proposed Plan is not accurate and is at variance with the law.

EPA Response: *In the comments and partial Proposed Plan concurrence from DEQ, there is broad and substantial support for the Selected Remedy. EPA acknowledges that the NRDP program and DEQ have differences with the groundwater component of the Selected Remedy, but they have not been unsupportive of the other components of the Selected Remedy. Public comments have supported much or all of the Proposed Plan in some instances, and in other instances have not supported all of the Proposed Plan. BSB local government generally supports the Proposed Plan.*

In regard to the discussion of the nine evaluation criteria on page 35 of the Proposed Plan, EPA has reviewed what is stated on that page and did not find any inaccuracies or points that are in variance with the law.

F. ***State Acceptance***: The commenter asserted that EPA rejected the positions of DEQ and the NRDP rather than seeking agreement, particularly on the Parrott Tailings.

EPA Response: *EPA, DEQ and NRDP have had numerous discussions and corresponded in writing extensively on the issue of the characterization of the alluvial aquifer and the appropriate remedy for groundwater at BPSOU. The administrative record has extensive documentation that is contrary to the comment that EPA is simply rejecting*

the State's position on the alluvial aquifer out of hand. EPA has carefully considered the State's position and has given its rationale and reasoning for its own position. The TI Evaluation and EPA's Response to Comments on the draft TI Evaluation (May 2006) contain EPA's most recent and most detailed consideration of and response to the State's comments.

Public Involvement

A. ***EPA Disregards Comments:*** Several commenters asserted in general that EPA has ignored public comments throughout the RI/FS process, which violates the public involvement mandate of the agency.

EPA Response: *EPA did not limit the scope or subject of comments on the BPSOU Proposed Plan. EPA did not ignore public comment, and has considered and responded to all significant public comment on the Proposed Plan. EPA has met the requirements in the NCP for considering public comments. In fact, EPA exceeded the requirements for number of formal public meetings and in the length of the comment period.*

B. ***EPA Limits Public Comment***: EPA did not follow proper procedure to considering public input in the decision making process. For example, the development of the Proposed Plan failed to provide for meaningful and adequate public participation as required under Superfund law. Input of local government as the main indicator of public concerns and main source of public input into decision-making process is not supported by Superfund Law. The Metro Storm Drain project (subdrain) was never afforded the opportunity for meaningful public involvement. EPA has unilaterally declared certain issues as off the table for efficacious public discussion.

EPA Response: *EPA disagrees with these comments. The EPA takes public participation very seriously. Numerous public meetings have been held over the years in specific neighborhoods and other locations throughout the BPSOU to actively seek public participation in the Superfund process. EPA placed ads in both the local newspaper and the free newspapers in the Butte area, which explained key concepts and issues regarding the Proposed Plan. Notices about Superfund meetings in Butte were sent home with school children. Radio and television notices were broadcast to inform the public of both public meetings and Superfund activities in the BPSOU. The EPA funded both a Citizen's Advisory Group (CAG) and a Citizens Technical Environmental Committee (CTEC) in Butte to oversee Superfund activities and educate the public. The agency went well beyond the mandated public meetings under the Superfund law to ensure that the public was aware of EPA's activities and could comment on these activities and proposals. Nothing was "off the table" for the site during the remedy selection process.*

Public Meeting

A. ***EPA Limits Public Comment:*** The commenter asserted that a five minute limitation for speaking at a public meeting is excessively constraining to the possibility of effective public input for several reasons. There is no basis in the

rules, regulation, policies, procedures or guidance documents governing public input and setting a five-minute time limit. A 10 minute time limit was suggested.

EPA Response: *EPA placed a five minute limitation on the length of oral comment at the first formal public hearing in order to allow everyone a chance to give oral comment. The meeting was extended by approximately 80 minutes to accommodate as many people as possible. A second formal public meeting was held to provide additional opportunity for oral public comment and no time limit was enforced. All written comment was accepted without limitation.*

B. ***Public Involvement***. What special efforts were made by the EPA specifically to notify low-income residents of the BPSOU of the January 25th public meeting about cleanup in the BPSOU? What special efforts did the EPA make to encourage participation by low-income residents in the January 25th public meeting? Notice of the Jan. 25 meeting was in the newspaper, but many poor people can't afford the newspaper and it was very bureaucratic, so it wasn't very appealing to the poor. The Jan. 25th public meeting was held at a site and time that were not convenient for the poor. The Jan. 25th public meeting was in a format that may have intimidated the poor. One commenter was sorry there were not more people at the public meeting and observed that EPA did "a lot of advertising on the radio and I appreciate that..." Another commenter asked if there were any members of the "Butte-Silver Bow/ARCO Committee" at the public meeting and wanted them to make a comment and subject them to some questioning.

EPA Response: *Butte-Silver Bow and ARCO were represented at all the public meetings. Public meetings on the proposed plan are only for the purpose of receiving comment on the preferred remedy. EPA does not allow a question and answer spot in the format for taking official public comment.*

- *What special efforts were made by the EPA specifically to notify low-income residents of the BPSOU of the January 25th public meeting about cleanup in the BPSOU? Both public meetings (January 25 and March 15, 2005) were advertised using large display ads in the Montana Standard, the Butte Weekly, and the 'Round Town Review. The Butte Weekly and the 'Round Town Review are free newspapers available at grocery stores and other locations across the city. The Butte Weekly has a weekly circulation of over 10,000 copies. The meetings were also advertised on local radio (stations KBOW-AM / KOPR-FM Radio Station, KMSM-FM - MT Tech Radio station, and KXTL-AM / KMBR-KAAR – FM) and the public meeting was a topic of the monthly EPA educational "column" in the Montana Standard entitled – Superfund and You.*

- *What special efforts did the EPA make to encourage participation by low-income residents in the January 25th public meeting? The Superfund and You columns in the Montana Standard ran monthly throughout 2004 with the specific purpose of raising interest throughout the community and alerting the public to their opportunities for participation in the process through the public comment period. EPA also published a Proposed Plan fact sheet in December 2004 that encouraged the public to attend the public meeting. The*

fact sheet ran as an insert in both the Montana Standard and the free Butte Weekly (for a two-week period).

- *Notice of the Jan. 25 meeting was in the newspaper, but many poor people can't afford the newspaper and it was very bureaucratic, so it wasn't very appealing to the poor. As discussed in the answer to question 1, all advertisements were placed in both the Montana Standard, the 'Round Town Review, and the Butte Weekly (the last two are free newspapers). The ads were large-format with simple language, varying font sizes, and phone numbers for questions. Additionally, many members of the community who work with the disadvantaged DID see the ads and attended the meetings.*

- *The Jan. 25th public meeting was held at a site and time that were not convenient for the poor. EPA does not believe that the location or time of the first meeting had a significant impact on attendance. The January 25th meeting was held at the standard time for public meetings held by EPA in Butte – after working hours. This accommodates the schedules of the general populace. The original location was to be the Carpenters Union Hall, but a complaint was made that the hall did not meet the requirements for handicap accessibility. The meeting was subsequently moved to the Montana Tech Auditorium, less than half a mile from the original location.*

  The second public meeting (on March 15th) was held at the Elks Club (at the request of author of this question - who believed the Montana Tech Auditorium was not convenient for the poor). The meeting was heavily advertised in the newspaper and on the radio. Yet, attendance at that meeting was substantially less than at the first, and there were only a few people at the second meeting who were not also at the first meeting. As part of the public comment at the second meeting, one member of the community (who works as an advocate for the poor) stated "I am sorry this room is not packed. I know there was a lot of advertising on the radio trying to get people out to this, and I appreciate that, and I think it's wonderful on your part that you did that."

- *The Jan. 25th public meeting was in a format that may have intimidated the poor. Both meetings were held in the standard format for all EPA public meetings. Concerned citizens may provide their input at these meetings in two ways:*

  - *They may speak at the microphone, where they are recorded by the stenographer*
  - *They can turn in written comments in any format they choose to any of the EPA representatives at the meeting.*

  There is no "back and forth discussion" at the microphone that would cause people to feel intimidated, and speaking at the microphone is strictly voluntary and not necessary.

RASD

A. ***Federal Location-Specific Requirements***: The location specific requirements in the RASD are no substitute for the more complete and comprehensive criteria that would be part of a full RI/FS investigation of the Past Response Action sites.

EPA Response: *The RASD is a part of the Feasibility Study Report and serves the function of determining if past response actions need further evaluation for remedy*

selection. The RASD used current ARARs and remedial action objectives to determine if sites required further action. Additionally, EPA included a full FS analysis of a complete removal alternative that used all of the NCP remedy selection criteria and looked at redoing past removal actions. That alternative did not score highly under the criteria and was not selected.

B. ***Land Use***: The RASD does not consider future productive land uses or EPA directives regarding land use. This unique, hybrid RASD process was never designed to accommodate the productive land reuse requirements of the Superfund Redevelopment Initiative or the Land Revitalization Action Agenda.

EPA Response: *The RASD is a part of the Feasibility Study Report and serves the function of determining if past response actions need further evaluation for remedy selection. The RASD used ARARs and preliminary remedial action objectives to determine if sites required further action. Land reuse and redevelopment are not affected in any way by the decisions made in the RASD.*

C. ***Past Response Action Sites:*** The reevaluation of previous response actions was nothing more than a rewording and wordsmithing of the Draft RASD. EPA failed to reevaluate previous emergency response actions against the nine Superfund Evaluation Criteria. Whatever terminology one wishes to use, the fact is that these previous TCRA/ERA's do get a "free pass" into the final remedy. While using ARARs and PRGs and PRAOs may be well and good for a TCRA/ERA, they are insufficient to determine what should be the final remedy for a site as large and as complex as the BPSOU.

EPA Response: *The RASD was a useful and valid part of the RI/FS process. A detailed explanation of the rationale behind the RASD is contained in a letter dated February 5, 2004, which is incorporated herein by reference.*

D. ***Public Involvement:*** Using the RASD will pose an institutional barrier to efficacious and meaningful public involvement in the remedy selection process for BPSOU. The RASD review process violates EPA's public involvement process. Many areas were dealt with in a closed process as TCRAs; the public was told there would be a review and they would have an opportunity to comment prior to the ROD being issued; now this public review is not going to happen; new residents will never know the extent of the serious contamination issues.

EPA Response: *EPA had public meetings on all TCRA activities for the Butte Site. EPA documents such as data, action memoranda, and design plans were available and discussed at public meetings. A full removal scenario was included in the FS process, and its evaluation under the nine criteria was available for comment.*

Redevelopment

A. ***Economic Effects:*** If ever there was a Superfund site that called for the full implementation of the Superfund Redevelopment Initiative and Land Revitalization Initiative Action Agenda, it is the BPSOU.

EPA Response: *The Selected Remedy is compatible with the initiatives named in the comment. See EPA's letter dated September 15, 2004.*

B. ***Land Use***: The Proposed Plan does not consider future productive land uses and economic revitalization of the BPSOU per the Redevelopment initiative, Land Reuse Initiative, and Land Use Action Agenda; this failure violates the provisions of OSWER Directive 9355.07-04. The EPA document, "Promoting Redevelopment at the SBC/Butte Area superfund Site" is not a reuse plan at all - it is definitely not the comprehensive plan called for by the superfund redevelopment initiative or land revitalization action agenda. Saying, as Montana EPA does, that redevelopment is possible at a remediated site is not the same as systematically considering, as part of the remedy selection process, the possible future productive land uses for the site.

EPA Response: *The Selected Remedy is compatible with the initiatives named in the comment. EPA's fact sheet, described in the comment, provides extensive evidence of the large effort that has gone into redevelopment planning and implementation at the BPSOU. EPA will continue these efforts for the implementation of the Selected Remedy.*

C. ***Specific Comment***: The RI/FS process needs to give greater attention to the provisions of the Superfund Redevelopment Initiative.

EPA Response: *The Selected Remedy is compatible with the initiatives named in the comment. See EPA's letter dated September 15, 2004.*

1.11 Surface Water - General

Comment Topics, Comment Totals, and References

Topic	Subtopic		Number of Comments	Comment ID references
Overall Topic: Surface Water - General			**26**	
Extent of Removal	A	Meeting WQB-7 Standards in Silver Bow Creek	2	58.5, 112.24
	B	Removal of Streamside Wastes	1	110.13
General Comments	A	Aesthetics	1	133.35
	B	General Comment	1	133.30
In-Stream Flow Augmentation	A	Commenter Opposes	4	85.4, 100.33, 108.16, 124.46
Unrelated Topic	A	Out of Scope	4	110.14, 133.8, 133.13, 133.31
Water Quality	A	Clark Fork River Headwaters/Downstream Recontamination	2	65.1, 65.14
	B	For Removal	2	65.18, 112.32
	C	Meeting WQB-7 Standards in Silver Bow Creek	1	133.25
	D	Monitoring Stations	2	108.13, 124.43
	E	Restoration of Fishery	2	65.16, 112.21
	F	Water Quality Improvements	2	70.62, 108.9
	G	Water Quality Standards	2	112.22, 124.33

Extent of Removal

A. ***Meeting WQB-7 standards in Silver Bow Creek:*** Water quality in area river systems is at risk if tailings are not completely removed. To have any chance of meeting water quality standards in Silver Bow Creek, extensive removal of mine waste must be carried out.

EPA Response: *There has been significant water quality improvement in Silver Bow Creek already, and EPA expects this trend to continue. EPA has concluded that it is not possible to remove all sources of contamination to the alluvial aquifer at BPSOU. In addition to discrete sources of waste such as the Parrott Tailings, there are other diffuse waste sources throughout the alluvial floodplain. Even if these sources of contamination could be removed, the groundwater would continue to be contaminated by the gradual release of residual contaminants from the matrix of the alluvial aquifer. Based on this conclusion, EPA's Selected Remedy includes interception of contaminated groundwater and treatment by conventional lime precipitation. EPA's experience with the current groundwater collection and treatment system indicates that surface water in the headwaters of the Clark Fork will be protected under the Selected Remedy during base flow conditions. Further, the aggressive storm water program will be implemented to protect Silver Bow Creek from contaminated runoff from the Butte Hill.*

B. ***Removal of Streamside Wastes:*** Removal of soil contamination near streams benefits the streams, making it less likely that flood events will recontaminate areas cleaned up earlier.

EPA Response: *EPA agrees that removal of contaminated soil and sediment along the stream will lessen the impacts of seasonal high flows and flooding.*

General Comment

A. ***Aesthetics:*** The commenter wants a meandering channel for Butte's portion of Silver Bow Creek.

EPA Response: *A meandering channel was recreated in the portion of Silver Bow Creek that has been completed as a result of the LAO expedited response action. There are significant limitations for including meanders in the portion of Silver Bow Creek that is described in the ROD for removal and reconstruction below the confluence of Metro Storm Drain and Blacktail Creek (for example, the historic slag walls). For example, the channel is constrained by infrastructure (e.g., pipelines). EPA will work with all parties during remedial design to produce as many natural features and meanders in this area as practical.*

B. ***General Comment***: It is important to make all of the changes that are essential for a responsible cleanup; for example, "...if the tailings at the Parrott Tailings area are removed and a proper cleanup of Butte's portion of Silver Bow Crick is left in place, we lose."

EPA Response: *The Selected Remedy is a comprehensive total remedy in which each component of the remedy compliments the other components. For example, the removal and/or capping of the remaining waste sources, although not a part of the storm water management program, will contribute to improving storm water quality. The Selected Remedy includes the removal and reconstruction of the remaining portion of Silver Bow Creek that has not been remediated.*

In-Stream Flow Augmentation

A. ***Commenter Opposes:*** Several commenters expressed opposition to in-stream flow augmentation to dilute contaminants in surface water. It is nothing more than "dilution is the solution to pollution" and is not acceptable. Sources of contamination should be removed.

EPA Response: *If flow augmentation is employed to compliment the other components of the complete surface water remedy, the PRPs would be required to comply with all local, state, and federal laws pertaining to the use of the water, including having the legal right to use the water in this manner.*

Unrelated Topic

A. ***Out of Scope:*** Several commenters suggested that clean water above the Yankee Doodle Tailings/mine permit area should be diverted so that the water does not

become contaminated. They also suggested cleanup should start at the headwaters of Columbia Gardens Greek.

EPA Response: *The diversion of water above the Yankee Doodle Tailings is beyond the scope of the BPSOU remedy. Under the Selected Remedy, state surface waters within the BSPOU will be remediated to support a viable fishery and to meet ARARs.*

Water Quality

A. ***Clark Fork River Headwaters/Downstream Recontamination***: Commenters are concerned that the proposed remedy will guarantee that Silver Bow Creek will never meet water quality standards and that surface water and groundwater from the BPSOU are recontaminating the remediated creek downstream.

EPA Response: *Recent data from Silver Bow Creek in Butte shows that chronic water quality standards are currently being achieved in many flow conditions. The improvement in water quality is the result of past response actions and demonstrates that further response actions selected in the ROD will assure additional improvement in water quality. Based on these successes, EPA can report with a high degree of confidence that water quality standards will be fully met in Silver Bow Creek. In addition, the implementation of storm water measures proposed in the Selected Remedy will control releases of contamination from Butte to downstream receptors. EPA considers controlling releases of contamination from Butte as a primary remedial action objective of the Selected Remedy.*

B. ***For Removal***: To have any chance of meeting water quality standards in Silver Bow Creek, extensive removal of mine wastes must be carried out. If water quality (runoff and groundwater) from capped waste (such at the Colorado Tailings) does not meet standards, then mine waste should be removed.

EPA Response: *As a result of past response actions, chronic water quality standards are currently being achieved in many flow conditions in the portion of Silver Bow Creek that runs through Butte. This has been accomplished by a combination of source removal, capping waste sources in-place, capturing and treating groundwater, and diverting storm water to the Berkeley Pit. Based on the successes of past response actions and EPA's experience in Butte, EPA does not agree that extensive removal of mine waste is necessary.*

C. ***Meeting WQB-7 Standards in Silver Bow Creek:*** Why was the section of Silver Bow Creek located in Butte cleaned to a lower and different standard than the rest of the Creek?

EPA Response: *The portion of Silver Bow Creek that is located in Butte must meet the same water quality standards that all other Clark Fork River Superfund sites must meet. Currently, the portion of Silver Bow Creek in Butte meets chronic water quality standards during base flow conditions. The Selected Remedy includes a storm water management program that will address water quality during storm run-off conditions. If the storm water management program does not achieve the results desired, the Selected Remedy will require capture and treatment of storm water run-off to the extent practicable.*

D. ***Monitoring Stations***: One commenter suggested additional monitoring of Silver Bow Creek during base flow and high flows. Continuation of monitoring at the station below the Metro Sewer outfall and adding a point of compliance station upstream near Montana Street were suggested. More explanation is needed concerning monitoring of point source discharges and ensuring ARARs are met in surface water.

EPA Response: *The Selected Remedy requires the implementation of a comprehensive monitoring program that includes data collection for base flow and high flow. The sampling location below Metro Sewer fallout will be included as one of numerous sampling points in Silver Bow Creek. Point source discharges must meet ARARs, as will in stream water. Sampling points and protocols will be issues that will be given more detail in remedial design.*

E. ***Restoration of Fishery***: There is potential for restoring native species such as Westslope cutthroat trout to Silver Bow Creek. However, EPA's remedy will ensure that copper levels in Silver Bow Creek will be too high for Westslope cutthroat trout and will ensure fish habitats remain fragmented.

EPA Response: *EPA disagrees. Data currently show that the portion of Silver Bow Creek that runs through Butte is meeting chronic water quality standards for copper during many flow conditions, including base flow. The Selected Remedy includes a storm water management program that will address water quality during storm run-off conditions. If the storm water management program does not achieve the results desired, the Selected Remedy will require capture and treatment of storm water run-off to the extent practicable. EPA is confident that Silver Bow Creek will support a viable fishery following implementation of the Selected Remedy.*

F. ***Water Quality Improvements***: The progress in Silver Bow Creek has been wonderful and it should be documented in a summary report. Base flow is at or near water quality standards and wet weather flow quality has also improved.

EPA Response: *EPA acknowledges the comments and adds that with the recent capture and treatment of Metro Storm Drain water, the base flow in Silver Bow Creek meets chronic water quality standards.*

G. ***WQB-7 Standards in Silver Bow Creek:*** Current levels of copper in Silver Bow Creek at the lower end of LAO are chronically about 50 ppb (about 10 times the aquatic life standard); acute levels range far higher. It should clarify that the success of surface water cleanup in Butte affects the need for future operation of the Warm Springs Pond treatment system.

EPA Response: *Based on more recent data, copper levels in Silver Bow Creek are below chronic water quality standards in many flow conditions. The need for future operation of the Warm Springs Ponds is also dependent on the success of the Streamside Tailings remedial action. EPA believes surface water leaving Butte in Silver Bow Creek will achieve water quality standards following implementation of the Selected Remedy for BPSOU.*

1.12 Surface Water- Storm Water

Comment Topics, Comment Totals, and References

Topic		Subtopic	Number of Comments	Comment ID references
Overall Topic: Surface Water – Storm Water			**48**	
BMPs (Best Management Practices)	A	Commenter Opposes	4	70.4, 70.70, 70.103, 71.6
	B	Design Criteria	6	65.5, 83.3, 100.36, 108.21, 108.22, 108.23
	C	Detention/Retention Basins	4	100.35, 108.18, 108.19, 108.20,
	D	Supports BMP Program	3	70.125, 100.32, 108.15
	E	Time Frame	1	124.47
Characterization	A	Need Storm Water Monitoring Stations	2	70.65, 108.24
	B	Perceived Data Gap	4	65.9, 108.11, 112.10, 112.34
Extent of Removal	A	Removal of Streamside Wastes	1	124.48
General Comment	A	Action Levels	1	123.12
	B	Specific Comment on Proposed Plan	1	22.5
Liability	A	Local Government Liability	3	33.12, 107.15, 133.36
Reclamation	A	Storm Water Treatment	1	124.5
Storm Water Conveyances	A	Aesthetics	1	123.20
	B	Design Criteria	8	70.11, 70.12, 81.3, 81.4, 85.3, 123.47, 124.2, 133.21
	C	Detention/Retention Basins	1	133.17
	D	Diversion to the Berkeley Pit	1	107.11
	E	Funding	1	133.10
	G	Specific Comments	2	120.1, 120.2
Storm Water Treatment	A	Commenter Opposes	3	70.126, 100.34, 108.17,

BMPs

A. *Commenter Opposes:* BMPs are only part of the solution; BSB is seeking funding from ARCO for a long-term capital improvement system to repair and replace the municipal storm water systems within the OU. BMPs should be labeled "Bad Management Practices" that require perpetual treatment; if there is an issue with the storm drains, remove the drains and the source material; let's not be treating it for the rest of our lives and on to our grandchildren's lives, as well. BMPs come about through a compromise between people who are concerned for the environment and corporations who want to make sure their bottom dollar is protected; they are not adequate and just meeting BMPs is nothing to be proud of.

EPA Response: EPA is not a party to negotiations between BSB and ARCO on the funding of long-term capital improvements. EPA believes that BMPs, properly selected

and designed will be effective. EPA agrees that more permanent BMPs are preferable. BMPs have been a significant component of past response actions in Butte which have been very successful. BMPs include actions such as removal, capping, diversion of storm water to the Berkeley pit, and sedimentation basins. Surface water data have demonstrated that these BMPs have reduced metals concentrations in Silver Bow Creek by an order of magnitude. The sites identified for BMPs in the Selected Remedy are only an initial step in the BMP process. The ROD requires the collection of data during run-off events that will be used to identify additional sites for remedial action addressing storm water.

B. ***Design Criteria:*** Specific suggestions were submitted concerning the design criteria for BMPs and storm water conveyances. The engineering design needs to be based on PMP and PMF criteria, or other specific event, but no less than the 100-year design event. If channels/basins are sized for 25-year events, waste left in place should be protected from channel failures from larger events. All wastes-left-in-place should be protected against the 100-year event. Because the meteorology on the Butte Hill is different from the airport, a precipitation station should be established on the hill. Designs should not consider the 25-year event to be 2.2 inches in 24 hours, but rather 1.6 inches in 30 minutes.

EPA Response: *Storm water conveyances and BMPs constructed to date were generally designed for the 25-year event. In the design and construction of caps over waste left in place, storm water runon/runoff was considered, and this is a component that is evaluated not only in the Butte Reclamation Evaluation System, but also as part of the storm water BMP program. Additionally, sizing of storm water controls is sometimes limited physically by the amount of space available for the control. For example, there may be space to design a structure for the 10-year event, but not enough room for the 25-year event. In this case, most would agree that some control is better than no control at all. Precipitation data have been collected in uptown Butte, and EPA project scientists and engineers are aware of the difference between the meteorology near the airport and on the hill. Part of the surface water management plan will be the establishment of several precipitation stations at different points across the Butte Hill in order to aid in the interpretation of storm water data and in design of future storm water controls. EPA appreciates the suggestion of using 1.6 inches in 30 minutes for future designs because it is a better estimate of the typical summer thunderstorm, which is thought to be one of the largest storm water threats to water quality in Silver Bow Creek.*

C. ***Detention/Retention Basins***: Suggestions and concerns were expressed on the operation and maintenance of the storm water basins in the BPSOU. These included:

a. Dry basins that are cleaned out every year were suggested; "mucking out" would be a mess with wet basins

b. Wet basins may be a concern during mosquito season with West Nile Virus

c. Will basins be removed once the hill is cleaned?

EPA Response: *Sediment Basins 8 and 9 will be drained in a 2 week time frame. Other sediment basins may not drain as quickly. The sediment basins that have water in them for longer periods of time will be monitored for mosquitoes for West Nile Virus; if this becomes problematic, modifications will be made to the detention ponds to change the drainage time frame. The ponds help to control the amount of storm water that reaches Silver Bow Creek (i.e., they slow the water down so that all of the storm water does not enter Silver Bow Creek at once). Thus, these ponds have helped to reduce the flooding that was caused by the existing BSB storm water system and the flow in Silver Bow Creek. The ponds will remain as part of the Butte Hill storm water conveyance system.*

The ROD includes a comprehensive Operation and Maintenance plan. The plan will include a regular schedule for and details on the clean out of sedimentation basins. It will also include appropriate maintenance of storm water conveyance structures. The commenter is correct that the O&M plan for impoundments must consider the need for controlling mosquito populations in impoundments to prevent the spread of the West Nile Virus. Sedimentation basins are permanent components of the surface water management plan and are not likely to be removed.

D. ***Supports BMP Program:*** The BMP process has been done and is a tried and true process of cleaning up where you don't have an "end of pipe" discharge; it's hard to understand the system dynamics when you have waste coming in from all over town - so it takes time; monitoring data from the mid-1990s to present has shown vast improvements in storm water quality because reclamation has been shown to work. The proposed BMP program for controlling surface water quality has promise. Source control of wastes, sediment controls, detention/retention basins, rerouting of storm water, and removal of selected wastes have already improved water quality.

EPA Response: *EPA acknowledges this comment. No further response is required.*

E. ***Time frame***: The comment expressed concern that the phased approach will take too long to achieve remediation goals and that the storm water actions should meet ARARs sooner - not in decades.

EPA Response: *The BMP program is a graduated program that achieves its objectives in stages. Data are collected to determine where BMPs need to be implemented. The BMPs are implemented and then data are collected to measure their success. Additional BMPs may be required based on the analysis. If BMPs do not achieve the goals and objectives for surface water quality, storm water capture and treatment is then required by the ROD. This process will take several years, but EPA is confident, based on the success of past BMPs in Butte, that the program will be completed in less than 20 years.*

Characterization

A. ***Need Storm Water Monitoring Stations***: Suggestions were made for additional storm water monitoring stations: continue the station below Metro Sewer outflow, add a point of compliance station upstream near Montana Street, and additional monitoring stations at the Syndicate Pit and Missoula Gulch.

EPA Response: *The ROD requires the implementation of a comprehensive monitoring program that includes data collection for base flow and high flow. The sampling location below the Metro Sewer outfall is already included as one of numerous sampling points in Silver Bow Creek. There are plans for additional monitoring points in Silver Bow Creek and in Missoula Gulch – most of the locations suggested in the comment are currently being monitored.*

B. ***Perceived Data Gap***: Comments were submitted concerning the apparent lack of monitoring data for storm water and that available data have not been made public.

EPA Response: *EPA acknowledges that run-off data for areas of the Butte hill are inadequate. The lack of run-off data was a key factor in the formulation of the Storm Water Management Program that requires a period of monitoring to identify the areas where additional remedial action is required. One of the problems EPA has experienced in Butte is the constantly changing of run-off conditions resulting from the numerous removal actions that have been implemented over the past 15 years. The data sets for storm water run-off that were collected during the remedial investigation phase (mid 1990s) are no longer indicative of existing conditions because of the extensive reclamation. The Storm Water Management Program described in the ROD will require data collection to characterize current run-off conditions along with aggressive BMP selection and implementation.*

Extent of Removal

A. ***Removal of Streamside Wastes***: Visual inspection for contaminant source areas should be added to the surface water monitoring program and waste in contact with surface water should be removed.

EPA Response: *Visual inspection of waste materials in Butte is not always reliable. In EPA's experience, materials that appear to be rich cover soil have been shown to have extremely high metals content when analyzed. The sediment and streambank material along Sliver Bow Creek from the confluence of Blacktail Creek and Metro Storm Drain to Lower Area One will be removed under the Selected Remedy because these materials have been chemically analyzed in the past and show high levels of metal contamination.*

General Comment

A. ***Action Levels:*** Many "source areas" are below arsenic and lead thresholds, but are high in copper and zinc, among other metals, that severely impact aquatic life when runoff enters stream systems.

EPA Response: *The source areas that have elevated concentrations of copper and zinc and are conveyed to BSB's storm water system and Silver Bow Creek will be addressed as part of the ROD.*

B. ***Specific Comment on Proposed Plan:*** The commenter suggests rewording text on page 45 to reflect progressive use of source controls and triggers for removal if controls are ineffective.

EPA Response: *The comments received on the proposed plan and Selected Remedy are considered in the preparation of the final remedy decision which will be released to the public as the Record of Decision. The ROD now makes clear that removals and other means of source controls are part of the storm water "toolbox" and will be used if the data and site-specific setting indicate it is necessary.*

Liability

A. ***Local Government Liability:*** Why is Butte Silver Bow a PRP responsible for the mine waste as it pertains to storm water? It is ludicrous that Butte Silver Bow has been declared a PRP. In the future, the citizens of this great community may be required to fund millions of dollars in cleanup costs.

EPA Response: *EPA named BSB a PRP because of their involvement in the conveyance of contaminants of concern in the municipal storm water system.*

Reclamation

A. ***Storm Water Treatment***: More aggressive treatment of sources areas needs to be the first line of defense in any contingency plan; lime treatment of surface water runoff is an acceptable last resort for the contingency plan.

EPA Response: *EPA agrees, and the ROD emphasizes BMPs, including aggressive remediation of sources, before capture and treatment of storm water.*

Storm Water Conveyances

A. ***Aesthetics:*** Design of Missoula and Buffalo gulches should have considered aesthetics; a superior approach to runoff would include: planting gulch bottoms with trees, constructing channels with more naturalized stream beds, and creating a reclaimed gulch that becomes an attractive asset to the community.

EPA Response: *The design of the Missoula and Buffalo gulches was significantly influenced by the BSB government. Cement channels were installed at the request of BSB government. Trees and shrubbery can be added by BSB to the gulches for aesthetic purposes.*

B. ***Design Criteria***: The Buffalo Ditch is very ugly (one commenter described it as "one of the most glaringly offensive aesthetic remnants of the past remedial actions") and impediment to economic development; it is also too small to handle flows and threatens downstream reaches; upstream sites should be cleaned to a level that will allow elimination of this ditch. In Missoula Gulch, it is feared that storm events above 10-year threshold will undermine and destroy integrity of that concrete ditch. The remedy for this area should include planting the bottom with aspens, alder, cottonwood, and willow, and constructing channel as a more natural streambed. It is critical that all storm water conveyance channels be

properly designed, constructed, and maintained, and in particular, the structures should be better designed for the intense "gullywashers" which have destroyed structures. The entire storm water system in Butte should be examined and a plan developed to repair the system.

EPA Response: *The storm water conveyance channels designed in Buffalo and Missoula Gulches were designed using engineering and storm water control standards. The design of the Buffalo gulch was significantly influenced by the BSB government. The storm water in Buffalo Gulch is transported to the Berkeley Pit. This helps the BSB storm water system by reducing the amount of water that is transported by the system. Problems with overloading the existing downgradient storm water system have been significantly reduced by transporting the storm water in Buffalo Gulch and the Belmont diversion lower on the hill to the Berkeley Pit. Cement channels were installed at the request of BSB government. BSB may add trees and shrubbery to the gulches for aesthetic purposes.*

C. ***Detention/Retention Basins:*** Storm water ponds at Syndicate pit and Excelsior Street should be drained and cleaned up as originally proposed.

EPA Response: *EPA acknowledges the comment and will consider options to better manage the storm water in the Syndicate Pit during remedial design and the development of the site wide Operation and Maintenance Plan.*

D. ***Diversion to Berkeley Pit:*** If the EPA has allowed the construction of a storm water system that routes mine waste residual materials to the Berkeley Pit, then why can't mine wastes be excavated and placed in the Berkeley Pit?

EPA Response: *Placement of mining waste has been considered in the evaluation of clean-up actions under superfund. There are no laws or regulations that prevent placement of material in the Berkeley Pit. The primary consideration for placement of material in the Berkeley Pit is whether it is feasible relative to other options for waste disposal.*

E. ***Funding:*** One commenter suggested Butte should be compensated for the $40 million they were required to spend to upgrade the water system as required by EPA.

EPA Response: *Compensation for past actions by BSB are outside the scope of EPA's remedial decision-making authority.*

F. ***Specific Comments:*** The commenter believes a storm water ditch is improperly located on his property and that storm water runoff is improperly routed on to his property.

EPA Response: *During remedial design, EPA will meet with the commenter and review the run-off problems identified by the commenter.*

Storm Water Treatment

A. *Commenter Opposes storm water treatment:* These commenters do not support the proposal in the preferred alternative that storm water will be collected and treated in a dedicated water treatment facility if the BMP program does not meet water quality standards in Silver Bow Creek during storm events. The commenters state that storm water treatment could be impossible and that source control and a well funded monitoring program is a far more acceptable solution.

EPA Response: EPA acknowledges the challenges and certain limitations involved in capturing and treating storm water run-off in Butte. Ideally, the BMP program in concert with the other improvements that will occur with implementation of the Selected Remedy will achieve water quality standards in Silver Bow Creek without capture and treatment of storm water. However, EPA believes it is reasonable to require capture and treatment of a reasonable size run-off event as a contingency if the BMP program does not meet standards, and has included the potential for storm water capture and treatment in the Selected Remedy.

1.13 Responses to Comment Cards

EPA received pre-printed comment cards that were simply signed by the commenter and mailed to EPA. There were three different pre-printed comment cards and/or comment messages. To respond to these comments, EPA has reproduced the comments included on these cards and responded to them and included a tally of the number of cards submitted. If the commenter included an additional hand-written comment, these comments were categorized and included in the topics responded to in the previous sections.

	Comment Card Description	Number of Cards Submitted	Comment ID reference
A	White, 2 comment postcard	47	72.1 through 72.47
B	Blue, 2 comment postcard or same text sent via email	19	73.1 through 73.19
C, D, and E below contained exactly the same text, but on different styles of postcards			
C	Blue, 4 comment large postcard	202	75.093 through 75.294
D	White, 4 comment large postcard	11	75.082 through 75.092
E	White, 4 comment postcard, postage paid	77	75.001 through 75.077

Note: No comment cards assigned ID numbers 75.078 through 75.081

A. White, 2 comment postcard:

Because the Butte Priority Soils Superfund site encompasses the towns of Butte and Walkerville and sits at the headwaters of the Clark Fork watershed, it's critical that EPA officials make the following changes to the proposed plan for the area:

1. Remove smelter dust in buildings and residential homes to prevent any possible threat to human health. This program should be comprehensive, available to pre-1980 homes, and not limited to remodeling projects.

EPA Response: *Attic dust in homes throughout the BPSOU has been sampled for lead, mercury and arsenic. The EPA conducted a Human Health Baseline Risk Assessment to determine the risk associated with the dust in homes, in consultation with ATSDR. EPA has an abundance of data from both human and animal studies that look at the systemic, reproductive, developmental, neurological, and cancer-causing potential of these inorganics. The Agency knows the adverse effects that are associated with these inorganics and the dose levels and exposure pathways at which these effects occur. We have an abundance of information on how people are or could be exposed via soil, water, air, produce, etc. contaminated with these inorganics. As a result, we can quantitate how much lead, arsenic, or mercury a person could be exposed to through various media and we can quantitate the probability of an adverse effect occurring. We can also reverse those calculations and quantitate concentration levels in media which are safe. There is some variability and/or uncertainty associated with those estimates. People differ in their physiology and behavior, sampling and analytical results vary, multiple chemicals can interact in competitive or synergistic ways, etc. However, that variability and uncertainty is recognized both qualitatively and quantitatively in the risk assessment process. Conservatism is incorporated into the risk assessment process to ensure that cleanup levels are protective of the reasonably maximum exposed individual and the most susceptible member of the population in the effects of that contaminant. Conservatism is also applied in the risk decision making process via the risk decision criteria. For example, the background rate for coming down with cancer in the U.S. is now 1 in 3 or 0.3. EPA recommends that no site should have contamination which exceeds 0.0001 (and many times even lower) chance of cancer for the most highly exposed, most sensitive person.*

The risk assessment quantitatively evaluated resident contact with attic dust and evaluated the likelihood that the attic dust was contributing arsenic, lead, or mercury to the living space house dust. The evaluation found that exposure pathways to attic dust were not present in many homes based on a detailed use survey done in conjunction with ATSDR. The evaluation also found that the attic dust was not a significant contribution source to the inorganic level measured in the living space house dust. The evaluation found that in the unusual situation where attics become actual living spaces or were significantly altered through remodeling which caused significant release to living spaces, unacceptable risks were present. In these instances, the BSB Lead Abatement Program is currently addressing homes that are being remodeled or there is a direct pathway of exposure from the conversion to a living space. The ROD requires the continuation of this type of program.

2. Remove accessible mine, mill, and smelter waste along the historic Silver Bow Creek. I agree with the State of Montana that Alternative 5b is the best solution for long-term water quality in the creek.

EPA Response: *Alternative 5b was evaluated in the Focused Feasibility Study for MSD. EPA concluded that the removal of accessible contaminant sources would not restore*

groundwater quality because non-discreet waste sources throughout the floodplain would continue to release contaminants to the alluvial aquifer and residual contamination in the matrix of the aquifer would also continue to contaminate groundwater. Alternative 5b is not a cost-effective alternative. Alternative 5b is also difficult to implement due to the infrastructure that would be affected including roads, sidewalks, county shop buildings, parking lots, businesses, etc.

B. Blue, 2 comment postcard (or email):

Because the Butte Priority Soils Superfund site encompasses the towns of Butte and Walkerville and sits at the headwaters of the Clark Fork watershed, it's critical that EPA officials make the following changes to the proposed plan for the area:

1. Remove smelter dust in buildings and residential homes to prevent any possible threat to human health. This program should be comprehensive, available to pre-1980 homes, and not limited to remodeling projects.

EPA Response: *Attic dust in homes throughout the BPSOU has been sampled for lead, mercury and arsenic. The EPA conducted a Human Health Baseline Risk Assessment to determine the risk associated with the dust in homes, in consultation with ATSDR. EPA has an abundance of data from both human and animal studies that look at the systemic, reproductive, developmental, neurological, and cancer-causing potential of these inorganics. The Agency knows the adverse effects that are associated with these inorganics and the dose levels and exposure pathways at which these effects occur. We have an abundance of information on how people are or could be exposed via soil, water, air, produce, etc. contaminated with these inorganics. As a result, we can quantitate how much lead, arsenic, or mercury a person could be exposed to through various media and we can quantitate the probability of an adverse effect occurring. We can also reverse those calculations and quantitate concentration levels in media which are safe. There is some variability and/or uncertainty associated with those estimates. People differ in their physiology and behavior, sampling and analytical results vary, multiple chemicals can interact in competitive or synergistic ways, etc. However, that variability and uncertainty is recognized both qualitatively and quantitatively in the risk assessment process. Conservatism is incorporated into the risk assessment process to ensure that cleanup levels are protective of the reasonably maximum exposed individual and the most susceptible member of the population in the effects of that contaminant. Conservatism is also applied in the risk decision making process via the risk decision criteria. For example, the background rate for coming down with cancer in the U.S. is now 1 in 3 or 0.3. EPA recommends that no site should have contamination which exceeds 0.0001 (and many times even lower) chance of cancer for the most highly exposed, most sensitive person.*

The risk assessment quantitatively evaluated resident contact with attic dust and evaluated the likelihood that the attic dust was contributing arsenic, lead, or mercury to the living space house dust. The evaluation found that exposure pathways to attic dust were not present in many homes based on a detailed use survey done in conjunction with ATSDR. The evaluation also found that the attic dust was not a significant contribution source to the inorganic level measured in the living space house dust. The evaluation

found that in the unusual situation where attics become actual living spaces or were significantly altered through remodeling which caused significant release to living spaces, unacceptable risks were present. In these instances, the BSB Lead Abatement Program is currently addressing homes that are being remodeled or there is a direct pathway of exposure from the conversion to a living space. The ROD requires the continuation of this type of program.

2. Remove accessible mine, mill, and smelter waste along the historic Silver Bow Creek. I agree with the State of Montana that Alternative 5b is the best solution for long-term water quality in the creek.

EPA Response: *Alternative 5b was evaluated in the Focused Feasibility Study for MSD. EPA concluded that the removal of accessible contaminant sources would not restore groundwater quality because non-discreet waste sources throughout the floodplain would continue to release contaminants to the alluvial aquifer and residual contamination in the matrix of the aquifer would also continue to contaminate groundwater. Alternative 5b is not a cost effective alternative. Alternative 5b is also difficult to implement due to the infrastructure that would be affected including roads, county buildings, businesses, etc.*

C, D, and E. 4 comment postcards (as described above):

EPA Note: *The same set of four comments were produced on three different types of postcards which is why they are being addressed together.*

BUTTE DESERVES BETTER

TO THE EPA REGARDING THE PROPOSED PLAN FOR BUTTE PRIORITY SOILS:

Butte needs a REAL Clean Up!

- As headwaters of a great watershed, the historic Silver Bow Creek must be cleaned of mine, mill and smelter waste.

EPA Response: *EPA agrees on the importance of an effective cleanup in Butte. The Selected Remedy is designed to return Silver Bow Creek to a viable fishery and protect the Clark Fork River from waste sources in Butte. Recent data from Silver Bow Creek in Butte shows that chronic water quality standards are currently being achieved in many flow conditions. The improvement in water quality is the result of past response actions and demonstrates that further response actions proposed in the ROD will assure additional improvement in water quality. Based on these successes, EPA can report with a high degree of confidence that water quality standards will be met in Silver Bow Creek.*

- In addition, abatement of toxic smelter dust must be given highest priority, and not limited only to "special cases."

EPA Response: *The risk assessment quantitatively evaluated resident contact with attic dust and evaluated the likelihood that the attic dust was contributing arsenic, lead, or mercury to the living space house dust. The evaluation found that exposure pathways to attic dust were not present in many homes based on a detailed use survey done in conjunction with ATSDR. The evaluation also found that the attic dust was not a significant contribution source to the inorganic level measured in the living space house dust. The evaluation found that in the unusual situation where attics become actual living spaces or were significantly altered through remodeling which caused significant release to living spaces, unacceptable risks were present. In these instances, the BSB Lead Abatement Program is currently addressing homes that are being remodeled or there is a direct pathway of exposure from the conversion to a living space. The ROD requires the continuation of this type of program.*

- I agree with the State of Montana that Alternative 5b (p. 32) is the best solution with these additions:

EPA Response: *Alternative 5b was evaluated in the Focused Feasibility Study for MSD. EPA concluded that the removal of accessible contaminant sources would not restore groundwater quality because non-discreet waste sources throughout the floodplain would continue to release contaminants to the alluvial aquifer and residual contamination in the matrix of the aquifer would also continue to contaminate groundwater. Alternative 5b is not a cost-effective alternative. Alternative 5b is also difficult to implement due to the infrastructure that would be affected including roads, county buildings, businesses, etc. Alternative 5b also poses undesirable socio-economic impacts on Butte.*

- Action levels for toxic metals and metals dust must be comparable to other similar Superfund locations, not 10 times higher.

EPA Response: *EPA believes the action levels are protective. We have an abundance of information on how people are or could be exposed via soil, water, air, produce, etc. contaminated with these inorganics. As a result, we can quantitate how much lead, arsenic, or mercury a person could be exposed to through various media and we can quantitate the probability of an adverse effect occurring. We can also reverse those calculations and quantitate concentration levels in media which are safe. There is some variability and/or uncertainty associated with those estimates. People differ in their physiology and behavior, sampling and analytical results vary, multiple chemicals can interact in competitive or synergistic ways, etc. However, that variability and uncertainty is recognized both qualitatively and quantitatively in the risk assessment process. Conservatism is incorporated into the risk assessment process to ensure that cleanup levels are protective of the reasonably maximum exposed individual and the most susceptible member of the population in the effects of that contaminant. Conservatism is also applied in the risk decision making process via the risk decision criteria. For example, the background rate for coming down with cancer in the U.S. is now 1 in 3 or 0.3. EPA recommends that no site should have contamination which exceeds 0.0001 (and many times even lower) chance of cancer for the most highly exposed, most sensitive person.*

The action levels developed for the BPSOU were based on site specific information. In site specific calculations, the cumulative risks are calculated for an individual on the basis of chronic exposures, using reasonable maximum exposure (RME) assumptions by combining a statistically sound, arithmetic average, exposure-point concentration with reasonable conservative values for intake and duration. At BPSOU, site-specific bioavailability data were used, and this accounts for differences in action levels from other sites. Estimates for risk for current and reasonably anticipated future land uses and potential future ground water and surface water used, without institutional controls, are done as well. The risk analysis will clearly identify the population, or sub-group (e.g., highly exposed or susceptible individuals), for which risks are being evaluated.

- The clean-up timeframe for occupied buildings must be rapid and comprehensive.

EPA Response: *The timeframe for addressing residential metals is being shortened to 15 years, with assessment of all properties within 8 years. High priority properties (residences with the most sensitive populations, children 0-6 and/or pregnant woman) will be addressed first. EPA believes this timeframe is a reasonable compromise because a longer time is needed to sample all homes in Butte and address heavy metal contamination associated with a property. It will also allow BSB to take the time necessary to remediate the homes and yards in a conscientious manner that is customized to the individual circumstances of the property owners.*

- A program for indoor air quality must be developed to address pollution in pre-1980 buildings to stop the threat to human health and conform with laws and principles of environmental justice and allow for economic redevelopment.

EPA Response: *The risk assessment quantitatively evaluated resident contact with attic dust and evaluated the likelihood that the attic dust was contributing arsenic, lead, or mercury to the living space house dust. The evaluation found that exposure pathways to attic dust were not present in many homes based on a detailed use survey done in conjunction with ATSDR. The evaluation also found that the attic dust was not a significant contribution source to the inorganic levels measured in the living space house dust. The evaluation found that in the unusual situation where attics became actual living spaces or were significantly altered through remodeling which caused significant releases to living spaces, unacceptable risk was present. In these instances, the BSB Lead Abatement Program is currently addressing homes that are being remodeled or there is a direct pathway of exposure to the living space. The ROD requires the continuation of this type of program.*

The position to remove everything is baseless, and contrary to standard EPA Superfund practices. We have an abundance of data from both human and animal studies, which look at the systemic, reproductive, developmental, neurological, and cancer-causing potential of these inorganics. We know the adverse effects that are associated with these inorganics and the dose levels and exposure pathways at which these effects occur. We also have an abundance of information on how people are, or could be exposed, via soil, water, air,

produce, etc. contaminated with these inorganics. As a result, we can quantitate how much lead, arsenic, or mercury a person could be exposed to through various media and we can quantitate the probability of an adverse effect occurring. We can also reverse those calculations and quantitate concentration levels in media which are safe.

- Butte local government must have a major role throughout the clean-up, which must be fully funded to meet the above objectives.

EPA Response: *EPA agrees that local implementation with long term O&M is preferable to many other implementation plans.*

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Section 2

Comments from Responsible Parties

Section 2 Comments from Responsible Parties

These sections are formatted differently than Section 1. Because of the specific nature of the comments received from the PRPs that were not necessarily completely comparable with the general public's comments, EPA determined that they should be addressed separately. The comments submitted to EPA are presented in their entirety. EPA responses are presented in italic font.

2.1 Response to Atlantic Richfield Company Comments

Atlantic Richfield Company Comments
EPA Cleanup Proposal for
Butte Priority Soils Operable Unit

The Atlantic Richfield Company (AR) appreciates the opportunity to provide comments on the U.S. Environmental Protection Agency's (EPA) December 20, 2004 Superfund Program Cleanup Proposal (also identified herein as the Proposed Plan) for the Butte Priority Soils (BPS) Operable Unit (OU) of the Silver Bow Creek/Butte Area Superfund Site. As stated during verbal testimony at the January 25, 2005 public hearing, AR supports much of the Preferred Alternative presented in EPA's BPSOU Cleanup Proposal. The comments that follow provide additional rationale for those components of EPA's Preferred Alternative which AR supports. While AR generally supports the Preferred Alternative, there are certain elements of the Alternative which AR believes are inconsistent with Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the National Contingency Plan (NCP) and should be modified prior to final remedy selection in the Record of Decision (ROD). AR's comments are separated into general and detailed comments and include additional, attached, supporting information, as appropriate. Please note that where changes in language of the BPSOU Cleanup Proposal are suggested below, AR is requesting that any similar language in the ROD be modified consistent with the comment. AR understands that the Cleanup Proposal will not be modified, per se.

AR incorporates by reference into these comments those documents identified in Appendix A which AR previously has submitted to EPA. AR respectfully requests that these comments and all attachments be included in the Administrative Record for the BPSOU, and that EPA respond to these comments in the Responsiveness Summary to the ROD.

I. GENERAL COMMENTS ON THE BPSOU CLEANUP PROPOSAL

AR's submits the following general comments on the BPSOU Cleanup Proposal:

A. Discusses how and why certain components of the remedy, if modified from EPA's Cleanup Proposal, would be inconsistent with or more stringent than remedies implemented at other sites in the Clark Fork River Basin. Any such

determination would be inconsistent with CERCLA and the NCP and would be arbitrary and capricious.

B. Describes how EPA's Cleanup Proposal satisfies CERCLA Section 121 and the NCP criteria for remedy selection and why the Montana Department of Environmental Quality (MDEQ) position on the Parrott Tailings improperly advocates the state of Montana's natural resource damages restoration position under the guise of remediation.

C. Describes why copper concentrations, for purposes of meeting the applicable surface water quality standards for copper and other heavy metals of concern at BPSOU, should be measured using dissolved concentrations rather than total recoverable concentrations.

D. Discusses the groundwater portions of EPA's Cleanup Proposal and provides additional justification for EPA's plan to leave mine wastes in the Metro Storm Drain (MSD) corridor in place.

E. Explains why the Preferred Alternative should be modified to incorporate treatment lagoon technology for treatment of alluvial groundwater collected from the BPSOU.

F. Describes why EPA's proposal for non-targeted cleanups of residential yards and homes should be changed to the long-term, multi-pathway, programmatic approach based on the Lead Intervention and Abatement Program currently implemented by the Butte-Silver Bow Health Department, as modified to address non-living area residential space (e.g., attics) as appropriate to mitigate concerns within indoor living spaces.

G. Describes AR's position on other solid media components of the remedy including EPA's identification of sites requiring reclamation, previously reclaimed sites not granted "conditional, no further action" status and comments on the Butte Reclamation and Evaluation System (BRES).

H. Discusses AR's general support for the surface water components of the Cleanup Proposal with the exception of the potential requirement for storm water treatment and specific concerns regarding the identification of specific augmentation sources for surface water flows. AR provides justification for the elimination of the treatment requirement for storm water.

I Refutes allegations made by some that EPA's Cleanup Proposal violates EPA's regulatory process and ignores environmental justice concerns.

EPA Response: *EPA will respond to the above comments as they are presented in more detailed discussion in the text that follows*

A. To the extent that EPA's selection of a remedy for BPSOU is inconsistent with or more stringent than remedies implemented at other sites in the Clark Fork River Basin with conditions similar to the BPSOU, the selected remedy would be inconsistent with the NCP and would be arbitrary and capricious.

EPA Response: *EPA's selection of a remedy for the BPSOU is based on site specific information, including that the BPSOU is inhabited by over 30,000 residents. EPA considers many factors while developing and selecting a remedy for a site. These factors include, but are not limited to consistency with the NCP, ARARs, EPA policies and guidance, community input, and consistency with sites with similar contaminants Accordingly, differences among*

Clark Fork Basin remedial decisions do not somehow automatically indicate inconsistency with the NCP or an arbitrary decision. EPA considered these factors in the selection of the final remedy and the ROD if fully consistent with CERCLA and the NCP.

EPA's proposed remedy for the BPSOU is generally consistent with the remedies that EPA has selected at similar mining sites (discrepancies are noted later in General Comments C through H). The State of Montana and others, however, submitted comments that press EPA to select alternative remedies that are not consistent with the remedies employed at similar sites in the Clark Fork River Basin. If EPA ultimately selects inconsistent remedies, they may be subject to legal challenge.

CERCLA § 113(j) (3) permits a court to award relief if a challenged remedy is "arbitrary, capricious, or otherwise not in accordance with law." An agency's decision is arbitrary and capricious if "the agency relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise." Inland Empire Public Lands Council v. Glickman, 88 F.3d 697, 701 (9th Cir. 1996), citing Motor Vehicles Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co., 463 U.S. 29, 43 (1983). In the context of CERCLA, EPA's selection of a remedy is arbitrary and capricious if EPA meets any of the above-described criteria. United States v. Iron Mtn. Mines, Inc., 987 F. Supp. 1250, 1255 (E.D.Cal. 1997): and United States v. Burlington Northern Railroad Co., 200 F.3d 679, 689 (10th Cir. 1999). Factors that Congress intended EPA to consider when selecting the remedy under CERCLA are set forth in the NCP. (Iron Mtn. Mines at 1255). The court in Matter of Bell Petroleum Services, Inc., 3 F.3d 889, 905 (5th Cir. 1993) emphasized that "EPA must examine the relevant data and articulate a satisfactory explanation for its action including a rational connection between the facts found and the choice made, [and] in reviewing that explanation, we must consider whether the decision was based on a consideration of the relevant factors and whether there has been a clear error of judgment."

EPA's selection of a remedy for BPSOU would be arbitrary and capricious and inconsistent with the NCP if the facts show that the media, waste or conditions at BPSOU are the same as or similar to conditions at other sites within the Clark Fork River Basin, yet the remedy selected for BPSOU differs. "To show that the government's response action is inconsistent with the NCP, a defendant must demonstrate that the EPA acted arbitrarily and capriciously in choosing a particular response action to respond to a hazardous waste site." United States v. Hardage, 146 F.3d 1436, 1442 (10th Cir. 1992). If EPA selects a different remedy for BPSOU than the remedy it has selected at other Clark Fork River Basin sites to address substantially similar conditions and media, EPA must provide and support an explanation for why the Agency is evaluating and weighing the BPSOU remedy differently under the NCP remedy evaluation and selection criteria.

EPA Response: *EPA notes that the comment presents selective quotes from some case law which addresses the issue of arbitrary and capricious decision making, and EPA does not agree with AR's lengthy characterization of this issue. EPA also notes that any review of EPA's*

decisions would be based on the administrative record, and that substantial deference would be given to EPA's decision by a reviewing court. EPA also notes that CERCLA prevents judicial challenges to EPA's remedy in many cases, contrary to the implication of this comment. Finally, EPA notes with confidence that the BPSOU Selected Remedy is consistent with CERCLA and the NCP, and is not arbitrary and capricious

AR submits that there is no rational, plausible basis to select a different remedial approach for the remediation of similar media and conditions at the BPSOU site than at other Clark Fork River Basin Sites. A selection of a different remedy for conditions and media at the BPSOU that are substantially similar to other Clark Fork River Basin Sites would be directly contrary to the administrative record and evidence before EPA, and would be arbitrary and capricious.

EPA Response: *EPA's selection of a remedy for the BPSOU is based on site specific information, including that the BPSOU is inhabited by over 30,000 residents. EPA considers many factors while developing a remedy for a site. These factors include, but are not limited to, consistency with the NCP, ARARs, EPA policies and guidance, community input, and consistency with sites with similar contaminants. EPA considered all of these factors in the selection of the final remedy. EPA disagrees that any difference between the BPSOU ROD and other Clark Fork Basin RODs would automatically be found to be improper or arbitrary and capricious.*

EPA recognizes the benefits of consistency in remedy selection for sites having common characteristics. For example, the Agency has developed and implemented a "presumptive remedies" program. In nationwide guidance, EPA correctly observes that certain categories of sites have similar characteristics, such as types of contaminants present and impacts to environmental media, and that the presumptive remedies streamline site investigations and remedy selections by promoting and ensuring consistency in remedy selection under the NCP. *See Presumptive Remedy for Metals-in-Soil Sites*, OSWER Directive 9355.0-7FS (Sept. 1999); and *Presumptive Remedies Policy and Procedures*, OSWER Directive 9355.047FS (September 1993). EPA also notes that the presumptive remedy approach is consistent with all the requirements of the NCP, and in the site management principle of streamlining, *citing* 42 U.S.C. 300.430(a)(1)(ii)(C). *Id. See also*, EPA's *Overview of Presumptive Remedies* website summary (Presumptive remedies "ensure that similar remedies are used for similar types of contamination and allows cross-site comparisons. . . [t]he use of presumptive remedies advances the NCP remedy selection objectives in that they promote consistency in decision-making. . . [p]resumptive remedies are Superfund policy.") In developing the presumptive remedies program, EPA "evaluated technologies that have been consistently selected at past sites using the remedy selection criteria set out in the NCP." *Presumptive Remedies: Policy and Procedures.* EPA ensured that selected presumptive remedies protect human health and the environment and comply with applicable or relevant and appropriate requirements (ARARs), in accordance with the NCP. The Clark Fork River Basin sites have been extensively studied for over 20 years. EPA has selected remedies for these sites after evaluating the NCP remedy evaluation and selection criteria. The same rationale that underlies EPA's Presumptive Remedy policies, ensuring consistency in decision

making, applies to selecting remedies for the BPSOU in circumstances where media and conditions match those at other locations in the Clark Fork River Basin.

Comments regarding the proposed NCP specifically raised concerns that the site-specific remedy selection process resulted in nationally inconsistent remedies and selection of different remedies for sites with similar characteristics. *55 Fed Reg. 8724-25 (March 8, 1990).* EPA responded that, through implementation of program goals, management principles, and expectations delineated in the NCP; clarification of the remedy selection process; and development of guidance on expected remedies for specific types of sites and specific types of waste, (i.e., presumptive remedies), CERCLA decision-making is streamlined and greater national consistency in remedy selection is ensured. *Id. at 8725* Thus, EPA has underscored its intent to select the same remedies for sites with similar characteristics and conditions.

The table in Appendix B hereto, delineates each remedy component of the preferred alternative for BPSOU, identifies other sites located in the Clark Fork River Basin with the same or similar media, waste or conditions as BPSOU, and summarizes remedial components selected and implemented at those other sites that are consistent with the BPSOU preferred alternative component. The similarity of BPSOU with the other corresponding sites supports selection of consistent remedies.

EPA Response: *See the response above. The guidance and NCP preamble language cited by AR does not state that EPA cannot consider site specific information and site specific community concerns when making remedial decisions. BPSOU is unique among CFR basin sites and all conditions do not match other sites.*

Uplands sources of contamination of surface and storm water: The BPSOU preferred remedy proposes addressing uplands waste sources by leaving waste in place and capping with soil. This is consistent with remedies implemented for upland sources at Old Works/East Anaconda Development OU, Streamside Tailings OU, Warm Springs Ponds (Inactive) OU, Clark Fork River OU and Anaconda Regional Water, Waste and Soils (ARWW&S) OU. A remedy requiring source excavation and removal would be an inconsistent remedy selected for similar conditions, and would therefore be arbitrary and capricious.

EPA Response: *EPA considers many factors while developing a remedy for a site. These factors include, but are not limited to, consistency with the NCP, ARARs, EPA policies and guidance, community input, and consistency with sites with similar contaminants. EPA considered all of these factors in the selection of the final remedy. EPA notes that the Clark Fork River Basin RODs utilized both removal and in-place waste stabilization, based on site-specific factors.*

Residential Contamination Source Areas: The BPSOU preferred remedy is to monitor and clean-up residential yards and indoor dust with a programmatic approach, where such cleanup is determined necessary and if a specified set of criteria meant to protect a sensitive population are met. This is consistent with the remedy implemented for residential contamination source areas at OU3 of the Bunker Hill Mine and Metallurgy Complex Site. Where EPA's proposed remedy goes beyond a

programmatic approach and requires non-targeted sampling and cleanup of residential contamination, the remedy would be inconsistent with other remedies.

EPA Response: *The ROD, consistent with almost all RODs which address residential yard and home cleanups, sets forth an action level and requires the sampling of BPSOU yards and homes, and cleanup of those homes if action levels are exceeded The ROD outlines a way for this to be done in conjunction with a holistic, programmatic approach. EPA hopes to work with AR, BSB and Walkerville governments, and the BSB County Health Department to implement such an approach for the BPSOU. There is nothing arbitrary or capricious in this approach.*

Dedicated Development: The BPSOU preferred remedy for the Granite Mountain Memorial Interpretive Area (GMMIA) is reclamation of such areas and application of Institutional Controls (ICs) to ensure the dedicated development is protective for the long term. This is consistent with portions of the remedies implemented for public use areas in the Clark Fork River OU (Arrowstone Park), and Old Works/East Anaconda Development OU (golf course and flues) and Warm Springs Ponds (Active Area) OU (wildlife refuge).

EPA Response: *EPA acknowledges AR's unqualified support for this aspect of the ROD.*

Storm water: The BPSOU preferred remedy is the application of best management practices (BMPs) to minimize the potential for storm water runoff from the OU to degrade surface water quality in Silver Bow Creek such that water quality standards are not attained. This is consistent with remedies implemented for storm water runoff at Old Works/East Anaconda Development OU, Clark Fork River OU, ARWW&S OU and Streamside Tailings OU.

EPA Response: *EPA considers many factors while developing a remedy for a site. These factors include, but are not limited to, consistency with the NCP, ARARs, EPA policies and guidance, community input, and consistency with sites with similar contaminants. EPA considered all of these factors in the selection of the final remedy None of the sites identified above has conditions similar to the BPSOU*

Saturated Soils Left in Place: The BPSOU preferred remedy is to leave such soils in place and manage in onsite waste management units, as long as the soils are not in an active stream corridor. This is consistent with remedies implemented for saturated soils at Warm Springs Ponds (Active Area) OU, ARWW&S OU and Old Work/East Anaconda Development OU.

EPA Response: *The BPSOU ROD allows some wastes to remain in place, and requires other wastes to be removed. This combination of approaches is consistent with other remedies, but mostly is the correct decision for the BPSOU site, for the reasons explained in the ROD.*

Alluvial Groundwater Contamination: The BPSOU preferred remedy is to manage the contaminated groundwater in-place within a waste management area and to capture and treat the groundwater leaving the waste management area. This is consistent with Warm Springs Ponds (Active Area) OU.

EPA Response: *EPA considers many factors while developing a remedy for a site. These factors include, but are not limited to, consistency with the NCP, ARARs, EPA policies and guidance, community input, and consistency with sites with similar contaminants. EPA considered all of these factors in the selection of the final remedy. EPA does not consider BPSOU to mirror conditions at the WSP.*

Groundwater Use Controls: The BPSOU preferred remedy is restriction of use of groundwater within a waste management area or an area otherwise deemed not suitable for use. This is consistent with Montana Pole OU, Rocker OU, Streamside Tailings OU, ARWW&S OU, Milltown Reservoir Sediments Site, Warm Springs Ponds (Active Area) OU, Mine Flooding OU, and Clark Fork River OU.

EPA Response: *EPA considers many factors while developing a remedy for a site. These factors include, but are not limited to, consistency with the NCP, ARARs, EPA policies and guidance, community input, and consistency with sites with similar contaminants. EPA considered all of these factors in the selection of the final remedy.*

Institutional Controls: The BPSOU preferred remedy is application of zoning and permit requirements, deed restrictions, and other ICs to complement, protect and support various engineered remedies. This is consistent with numerous other sites in the Clark Fork River Basin, including Old Works/East Anaconda Development OU, Montana Pole Site, Rocker OU, Milltown Reservoir Sediments OU, Streamside Tailings OU, Warm Springs Ponds (Active Area) OU, Clark Fork River OU, and ARWW&S OU.

EPA Response: *EPA considers many factors while developing a remedy for a site. These factors include, but are not limited to, consistency with the NCP, ARARs, EPA policies and guidance, community input, and consistency with sites with similar contaminants. EPA considered all of these factors in the selection of the final remedy*

B. MDEQ is improperly advocating the State of Montana natural resource damages claim under the guise of CERCLA Remediation.

The BPSOU proposed plan for groundwater provides, in part, that the buried and partially saturated wastes including the Parrot Tailings, North Side Tailings, Diggings East Tailings and Lower MSD Tailings, will be managed in a waste management unit with appropriate groundwater monitoring and ICs to control the use of groundwater. EPA has determined that it is appropriate to apply an ARARs waiver based on the technical impracticability of meeting drinking water standards in the alluvial groundwater. Instead, the alluvial groundwater in the MSD will be captured with the existing subdrain system and routed to Lower Area One (LAO) for treatment before discharge to Silver Bow Creek

The Preferred Alternative for the MSD meets the requirements of CERCLA Section 121 and the NCP criteria for remedy selection. CERCLA and the NCP require EPA to identify a preferred remedial alternative based on numerous criteria including protection of human health and the environment, attainment of ARARs and cost

effectiveness. EPA has done so. The Preferred Alternative is protective of the environment (Silver Bow Creek) and human health. In contrast, Alternative 6, requiring total removal of all waste in the MSD with groundwater capture and treatment, would cost an estimated $130 million and still neither effectively clean up the aquifer nor achieve standards within a reasonable time-frame. EPA recognizes that even with total removal of the specified waste material the groundwater contamination well above standards will persist for long into the future (likely hundreds of years) for several reasons including the presence of secondary sources of contamination throughout the aquifer that can not be effectively removed.

EPA Response: *Comment noted*

EPA has developed a significant technical record that supports EPA's conclusion that the total removal alternative should not be the preferred remedy under CERCLA and the NCP remedy selection criteria.

MDEQ supports a remedy that involves substantial removal of buried tailings, including the removal of the former Parrott Tailings area and other "accessible" wastes in the MSD.

EPA Response: *The selected remedy for groundwater in the ROD is not total removal. However, the ROD does state the need for removal of waste material in areas of the lower MSD, the confluence, and the slag canyon based on location and contribution of metals to surface water in these areas. Furthermore, additional wastes could be removed if identified as contributing contaminants to storm water through the diagnostic sampling in the surface water management program*

MDEQ's position is essentially the same as the litigation position of the State of Montana in the natural resources damage action pending against AR and has not been supported by any definitive data or studies. In 1983, the State filed suit in federal court, seeking to hold AR liable for injury to natural resources in the Upper Clark Fork River Basin resulting from the release of mining wastes. In October 1995, the State Natural Resources Damages program (NRDP) published its Restoration Determination Plan for the Upper Clark Fork River Basin (NRDP, 1995).

EPA Response: *Comment noted.*

Among other things, the NRDP Restoration Determination Plan was premised on the assumption that the Parrott and MSD tailings would not be removed under the CERCLA Remediation Program, and thus determined that the Parrott and MSD tailings should be removed under the NRDP Plan to restore the alluvial aquifer resource. MDEQ, the state NRDP and most recently the Montana Bureau of Mines and Geology (MBMG), a technical consultant to NRDP, claim that removal of the MSD tailings would result in the restoration of groundwater in a "short" period of time (between 100 and 200 years), contrary to their previous position and the conclusions reached by the authors of many other studies and by EPA.

EPA Response: *Comment noted*

Because other sources of contamination would remain in place, the better reasoned studies conclude that the State's proposed remedy would not restore the groundwater to its baseline condition. *See EPA Response to Montana Department of Justice-Natural Resources Damages Program December 13, 2004 Letter* (EPA, 2005).

EPA Response: *Comment noted. See also EPA's TI Evaluation and EPA's Response to Comments on the draft TI Evaluation (June 2006) for a more complete explanation of EPA's rationale regarding this issue.*

MDEQ essentially is asking EPA to ignore the robust technical record and the requirements of CERCLA and the NCP, in order to implement the State's natural resource restoration plan. CERCLA prohibits this. EPA's role in the CERCLA remediation context is to select a remedy that protects human health and the environment from unacceptable risks posed by hazardous substances, and EPA's proposed remedy alternative achieves this goal.

EPA Response: *Comment noted.*

The natural resource Trustee's role under CERCLA is to consider whether the remedy will restore the groundwater to baseline conditions, and if not, to seek the appropriate measure of damages. AR is entitled to raise defenses available to it and resolve the State Trustee's claims through litigation or settlement of the State's pending NRD lawsuit.

EPA Response: *Comment noted*

EPA cannot lawfully select a remedy for the BPSOU that ignores the distinction between remediation and restoration and thereby deprive AR of its right to contest the trustees' restoration claims in court.

EPA Response: *EPA has not done so at this or any other Clark Fork Basin site. EPA's remedial decisions are its own, based on the response decision making authority given to EPA under CERCLA and the NCP.*

C. **For purposes of meeting the applicable surface water quality standards for copper at BPSOU, copper concentrations should be measured using dissolved concentrations rather than total recoverable concentrations.**

The Proposed Plan for BPSOU proposes compliance with Montana's Water Quality Bureau Circular No. 7 (WQB-7) standards as applicable or relevant and appropriate requirements (ARARs) for surface waters in Silver Bow Creek and the lowermost reach of Blacktail Creek. Montana WQB-7 standards for surface water are based upon the analysis of samples following a total recoverable digestion procedure, rather than the dissolved method which EPA recognizes better approximates the bioavailable fraction of metals. EPA recommends the use of dissolved metals concentrations to set and measure compliance with Water Quality Standards. *See e g. Prothro M G. 1993 Office of Water Policy and Technical Guidance on Interpretation and Implementation of*

Aquatic Metals Criteria. Memorandum From Acting Assistant Administrator for Water; USEPA. 1993. Interim Guidance on Interpretation and Implementation of Aquatic Life Criteria for Metals. Washington DC: Office of Science and Technology, Health and Ecological Criteria Division. The reason for this recommendation is that dissolved metals concentrations more closely approximate the toxicity of a metal in the water column than does total recoverable metals concentrations. Use of total recoverable metals methodology contrasts with these national recommendations from EPA and EPA's remedies for both the Clark Fork River OU and Milltown Reservoir Sediments OU of the Milltown Reservoir/Clark Fork River Site. At those sites, EPA has applied dissolved standards rather than total recoverable standards for copper. *See Clark Fork River OU ROD (EPA, 2004b), and Milltown Reservoir Sediments OU ROD (EPA, 2004a).*

For the Clark Fork River OU, EPA invoked a technical impracticability and partial cleanup waiver of the WQB-7 standard for copper, measured as a total recoverable constituent, and substituted Federal water quality criteria, measured as a dissolved component. The basis for this waiver and replacement is that modeling information developed during the Remedial Investigation (RI)/Feasibility Study (FS) demonstrated that none of the remedial alternatives could achieve the WQB-7 standard for copper (measured as a total recoverable constituent). Similarly, for Milltown Reservoir Sediments OU, performance standards for surface waters are applied based on the Federal water quality criteria for copper, and therefore the dissolved component. According to the ROD, EPA recognizes that surface water coming into Milltown Reservoir Sediments OU may not meet the State WQB-7 standard for copper (measured as a total recoverable constituent). Accordingly, final surface water quality standards for copper at the Milltown Reservoir Sediments OU reflect the standards established for the upstream Clark Fork River OU, i.e., dissolved concentration standards for copper under the Federal water quality criteria. EPA also invokes a temporary waiver of surface water quality ARARs during construction activities, applying the dissolved standard for copper.

EPA applied the dissolved copper standard at both the Clark Fork River OU and the Milltown Reservoir Sediments OU based, in part, upon upstream sources that impact surface water quality in the OUs, and the technically impracticability of meeting the total recoverable standard. Technical impracticability analyses were performed for Clark Fork River OU and applied to the Milltown Reservoir Sediments OU for the same surface water, with the same characteristics, that flows through BPSOU. The same site characteristics, technical basis, technical impracticability concerns and consistency require application of dissolved copper standards to surface waters at and migrating from the BPSOU.

EPA Response: *The waiver of the State's copper standard at the Clark Fork operable unit was included in the Clark Fork River OU ROD and referenced in the Milltown ROD by EPA because there was detailed modeling and analysis done to support those ROD's findings regarding the ability of the Clark Fork site ROD components to meet the total recoverable standard for copper. Here, there is no such analysis. In fact, the record indicates that the State's total recoverable standards can be met within Silver Bow Creek if the ROD is implemented fully Under the Clean Water Act, the State is given the option to enact State water quality standards that are more strict than federal standards CERCLA's ARAR*

provisions incorporate State and federal standards and make them requirements for a CERCLA remedy, unless a waiver is justified. At the BPSOU, there is no site specific basis to grant a waiver for surface water quality standards

D. The groundwater components of EPA's BPSOU Cleanup Proposal are generally appropriate and will be protective of Silver Bow Creek water quality.

AR agrees with EPA's proposed remedy for the groundwater component of the BPSOU Cleanup Proposal, with one exception. That exception is detailed in General Comment E, below. Simply stated, given EPA's primary goal of protecting the water quality in Silver Bow Creek, EPA is correct in its analysis that groundwater collection and treatment will be protective absent the large-scale removal of mine wastes in the MSD corridor. Additionally, AR emphasizes that there is no credible technical or scientific evidence that plausibly could lead one to believe that the alluvial aquifer under the BPSOU will attain water quality standards in the near or distant future even with a massive mine waste removal effort. Therefore, in the case of the BPSOU as described in detail below, when comparing remedial alternatives both with MSD mine waste removal and without, an alternative that captures and treats groundwater without mine waste removal is clearly comparatively better than alternative(s) contemplating any magnitude of removal, and should be selected as the proposed remedy.

AR understands that the MDEQ and the NRDP oppose EPA's stated remedy preference. As discussed in detail in General Comment B, above, AR does not believe, however, that the positions of those who oppose EPA's proposed remedy are based in the technical evaluation of NCP criteria or appropriate science. Appendix C presents the technical observations and calculations that form the basis of AR's position, summarized below.

1. *Mine Wastes in the MSD Corridor should not be removed as part of the groundwater component of the remedy*

EPA, in its Focused FS for MSD (CDM, 2004b), found that additional removal of buried tailings and contaminated soil in this area (including the total removal alternative) would not improve groundwater to the level needed to avoid long-term groundwater collection and treatment (>100 years). MDEQ makes the tenuous argument that removal of the Parrott Tailings and other named sources of metals that impact groundwater is the appropriate remedy. This approach would leave substantial amounts of contaminated material that would continue to impact groundwater and prevent attainment of groundwater standards within the aquifer forever. (CDM, 2004a). Groundwater and surface water data collected within the MSD area demonstrate that waste accumulations other than the Parrott Tailings (i.e., Diggings East and North Side Tailings) significantly impact groundwater quality (CDM, 2004a). Additionally, there is evidence of other potential sources of metals to groundwater than those identified in the project documents. For instance, the RI report (PRP Group, 2004) presents lithologic data from soil borings in the vicinity of the Civic Center that does not indicate the presence of mine waste. A representative of Pioneer Technical Services of Butte testified at the Public Hearing on the BPSOU

Proposed Plan on January 25, 2005, that soil borings logged by-Pioneer Technical Services during geotechnical investigations next to the Butte Civic Center, did identify mine tailings in the same vicinity.

Additionally, as presented in detail in Appendix C, AR firmly believes that technical analyses forming the basis of the MDEQ's stated position are flawed.

EPA Response: *Comment noted*

The MBMG analysis presented in the Draft Preliminary Data Summary Report for Upper Silver Bow Creek Investigation (MSD) (Metesh & Madison, 2004) utilizes aquifer parameters that are not representative of the entire aquifer, ignores the presence of secondary sources, and presents column test data that utilize coarse grained materials with low amounts of clay. In other words, their bench-scale studies emulate a coarse-grained, homogenous aquifer, while the real aquifer in the upper MSD is highly heterogeneous with multiple secondary sources. These factors cause the investigation to significantly underestimate the time frame to achieve cleanup levels.

EPA Response: *Comment noted Data collected by the MBMG were considered by EPA in the remedy selection process as explained in EPA's TI Evaluation and EPA's Response to Comments on the draft TI Evaluation (June 2006)*

NRDP states that more studies of the alluvial aquifer are warranted in order to make remedial decisions (MDOJ/NRDP, 2004). However, additional studies will not eliminate the uncertainties associated with the heterogeneous character of the aquifer and difficulties in predicting contaminant transport behavior. EPA continues to maintain that it will take an unreasonable period of time (>100 years) for the MSD alluvial aquifer to be restored to its beneficial uses, if it can be achieved at all (EPA, 2005). Studies as to the effectiveness of pump and treat systems in restoring groundwater quality to drinking water standards show that concentrations in groundwater decrease rapidly and then level off, in most cases, well above standards. Some reports concluded that aquifer restoration to MCLs is not technically feasible. The 1994 National Academy of Sciences report indicates that sites with heterogeneous and multiple layers with strongly sorbed contaminants, similar to the conditions of the MSD aquifer, rate a "3" out of 4 as most difficult to cleanup (CDM, 2004a).

EPA Response: *Comment noted.*

Since removal of the Parrott Tailings alone would not clean up the aquifer (EPA, 2005), large-scale removal in this area would entail unnecessary and disproportionately high risks and costs. The community should not be subjected to the short-term (safety) risks associated with removal, since it will not result in attainment of additional remedial objectives in the BPSOU or reduction of any long-term risk to human health or the environment. For example, even for the smallest material removal considered by EPA in the Focused FS (125,000 cubic yards from Diggings East and North Side Tailings Areas) over 6,000 truck round trips would be

required to transport the material to a disposal site. Regardless of the disposal site chosen, truck traffic would interact with local traffic, putting residents at risk of physical injury and increasing airborne particulate matter. In addition, there is a risk to workers performing the action. For example, using 2003 Mine Safety and Health Administration (MSHA) sand and gravel accident incidence rates, it is estimated that the risk of a construction fatality would be 1 in 2,630 for partial removal and 1 in 2,044 for total removal. This risk does not take into consideration demolition and reconstruction of buildings and infrastructure that may be required as a result of partial or total mine waste removal. The sand and gravel industry (and thus the incidence rate basis) does not generally include demolition or construction related work or work in urban areas. Incremental risks associated with demolition and reconstruction and public interaction would significantly increase the overall risk to the site workers and the public. Additional detailed information on the increased risk of removal of wastes in the MSD corridor is presented in Appendix C.

Total removal of wastes, as suggested by some, would require the removal of infrastructure critical to Butte's economy, including: Harrison Avenue (the main commercial corridor between lower and Uptown Butte), the main road from Uptown to East Butte (Continental Drive); the Butte sewage treatment plant; the Silver Lake Water Pipeline; and the local railroad (interrupting and probably causing temporary closures of the only remaining operating mine, which is one of the five largest employers in Butte, as well as other significant industries). Tourism, which the local economy relies heavily upon, would be affected by road and railroad closures and the removal of the Civic Center, the Chamber of Commerce/Visitor's Center, and the KOA Campground, which are all built on top of buried mine waste. One of the largest shopping centers, the Butte Town Center, would also be removed to reach buried mine waste beneath it. Homes in the MSD area also may be removed.

EPA Response: *The ROD does state the need for removal of waste material in areas of the lower MSD, the confluence, and the slag canyon based on location and contribution of metals to surface water in these areas Furthermore, additional wastes could be removed if identified as contributing contaminants to storm water through the diagnostic sampling in the surface water management program. EPA believes that short-term risks from these activities can be appropriately managed to prevent injury or death.*

Most comments that favored removal of waste did not advocate total removal as suggested in the comment above, but advocated removal of accessible wastes as described in Alternative 5b of the Focused Feasibility Study, which required removing the county shops.

Because Butte is a small town, such unnecessary disruptions and interruptions of this magnitude and duration could be very damaging to the local economy.

For all of the above described reasons, in conjunction with the detailed evaluation presented in Appendix C, AR strongly opposes further excavation of mine waste in the MSD or LAO areas. Requiring such further excavation would be arbitrary and capricious and entirely inconsistent with extensive technical support EPA has developed as the basis for its current remedy proposal, CERCLA remedy evaluation

in 40 C.F.R. § 300.430(e)(9)(iii) and remedy selection criteria in 40 C.F.R. § 300.430(f), and the mandate for cost-effective remedies in section 121(b) of CERCLA.

EPA Response: Comment noted.

E. **EPA's identification of 'conventional treatment' for groundwater should be changed to 'lime treatment' to allow the selection of treatment lagoons, once demonstrated to be effective.**

The rationale for EPA's identification of a new, conventional lime treatment plant for treatment of contaminated groundwater collected at the BPSOU is not provided in the BPSOU Cleanup Proposal. Although conventional treatment technology is very commonly used throughout North America, it may not be effective in meeting the stringent water quality standards for arsenic and other metals identified as contaminants of concern for the BPSOU. Lime treatment via treatment lagoons has been proven to meet the stringent water quality standards for BPOSU (Atlantic Richfield, 2004d) (Atlantic Richfield, 2002 to 2004). This has been demonstrated through extensive and ongoing treatability studies at LAO over the last six years. The wetland lagoon system uses lime addition in a similar manner to the conventional technology, but then utilizes lagoons, or wetland ponds, rather than concrete clarifiers, for the precipitation and settling of treatment solids from the water.

EPA Response: *EPA does not agree that primary operation and maintenance activities for wetland lagoon treatment are very similar to that for conventional treatment. EPA has selected the use of the treatment lagoons using lime treatment on a demonstration basis as described in the BPSOU ROD for the remedy for the groundwater treatment portion of the BPSOU ROD. EPA has made a decision to continue the use of the treatment lagoons at LAO. The lagoon system will be designed and constructed to meet EPA requirements. If at any time during the shakedown period or thereafter the system regularly fails discharge standards and cannot be adjusted or modified to meet standards, or if sludge removal, management, and disposal cannot be done in compliance with ARARs, with other criteria described in the ROD, and in a protective manner, a conventional treatment system shall be designed and built at the Lower Area One area, which shall utilize lime treatment technology to treat the captured contaminated water and meet all discharge standards*

In comparison to a conventional lime treatment plant, the Treatment Lagoons are preferable under the NCP remedy selection criteria of long-term effectiveness and permanence, short term effectiveness, implementability and costs.

EPA has previously stated its concern with operation and maintenance requirements for wetland lagoon treatment. However, all primary operation and maintenance activities associated with wetland lagoon treatment are very similar to that for conventional treatment, including: lime addition to adjust the pH to precipitate metals, handling of lime sludge and general maintenance and repair of the facility.

EPA Response: *EPA has selected treatment lagoons on a demonstration basis as the remedy for the groundwater treatment portion of the BPSOU ROD*

Indeed, AR believes that treatment lagoons are easier and less expensive to maintain, specifically because they:

- have less mechanical equipment requiring less maintenance and operating effort than conventional treatment systems, and
- are more efficient in their lime use and require only periodic sludge management.

EPA Response: *EPA has selected treatment lagoons on a demonstration basis as the remedy for the groundwater treatment portion of the BPSOU ROD.*

Appendix D presents detailed information for the treatment lagoons relating to performance, operation and maintenance and other issues of interest. Those areas include: performance; operation and maintenance requirements and effort, operational costs, land use and aesthetics of the treatment lagoon area. This information has been provided to EPA for its consideration in remedy selection.

It should be noted that the same decisions and evaluations proposed for the treatment lagoons would also have to be made for a new, conventional treatment system. For instance, conventional lime treatment plants have to handle and add dry lime to influent water, collect, remove and manage treatment sludges, maintain site equipment and monitor effluent quality.

EPA Response: *EPA has selected treatment lagoons on a demonstration basis as the remedy for the groundwater treatment portion of the BPSOU ROD.*

Selection of the conventional lime treatment technology is incompatible with EPA's primary goal of protecting the quality of Silver Bow Creek and allowing water in the creek to meet its beneficial uses. The treatment lagoon technology will also be more aesthetically pleasing because most of the area will be vegetated and will appear and, for the majority of the area, function like a natural wetland habitat.

EPA Response: *EPA has selected treatment lagoons on a demonstration basis as the remedy for the groundwater treatment portion of the BPSOU ROD.*

Additionally, the resulting conditions will be consistent with EPA's ARAR requirement for no net loss of wetlands as the replacement and enhancement of the previous existing (pre-mining) wetland in the LAO area is the preferred mitigation measure under Federal wetland regulations Also, the decision to implement conventional treatment will most likely result in the entirely unnecessary addition of over $4 million to the present value cost of the remedy.

EPA Response: *EPA has selected treatment lagoons on a demonstration basis as the remedy for the groundwater treatment portion of the BPSOU ROD*

Therefore, AR requests that EPA identify "lime treatment" for the groundwater treatment requirement in the BPSOU ROD rather than specifying that groundwater in LAO, Missoula Gulch, MSD and West Camp bedrock groundwater will be routed to a

"new conventional lime treatment facility" near LAO. This would be consistent with the BPSOU FS, which evaluated "lime treatment", and did not specify a treatment type, such as conventional treatment It would allow the performance of the newly expanded lagoon system (Atlantic Richfield, 2004b) to be evaluated both for water quality criteria and operations and maintenance considerations during a formal shakedown period to further confirm that the treatment lagoons are the most beneficial technology for BPSOU groundwater treatment. If, at that time, EPA agrees that treatment lagoons meet all requirements of the remedy, they can approve them as an appropriate design of the "lime treatment" technology for the groundwater remedy.

EPA Response: *EPA will require a design of the remedy as it is described in the BPSOU ROD, including the components regarding groundwater treatment. The design concepts described by AR in its comments would not be completely consistent with the ROD requirements regarding groundwater treatment.*

F. <u>EPA's Cleanup Proposal mischaracterizes and broadly overstates human health risks from lead and arsenic in soil and water and includes inappropriate provisions for non-targeted, non-targeted sampling and remediation of residential yards and attics instead of the more protective and cost-effective programmatic approach that has been implemented in Butte for many years.</u>

<u>1. EPA mischaracterizes human health risks from lead and arsenic in soil and water.</u>

The section of the BPSOU Cleanup Proposal titled 'Summary of Human Health Risk' (pages 21-23) presents EPA's summary of the findings of five risk assessments conducted over a period of ten years. In this section EPA repeatedly mischaracterizes the risk assessment findings as having identified broadly unacceptable risks from lead and arsenic in soil and water. Examples include, "At the (BPS)OU, risks from lead in mine waste were unacceptable. Mean soil lead levels in nearly 26 percent of residential yards could result in blood lead levels greater than 10 micrograms per deciliter (ug/dL)" and, "EPA also evaluated potential risks from arsenic in soils, interior house dust, and surface water. Results indicated that carcinogenic risks to residents were unacceptable."

A great deal of misinformation has circulated in the Butte community related to the BPSOU risk assessment process. The fact is that if EPA chooses a programmatic approach in the ROD to address potential impacts of metals in residential areas, it will be strongly supported by the best available science on lead and arsenic risks in the country. The assumptions made by EPA in its human health risk assessment for lead protect all populations, including young children, the elderly and pregnant women. The risk assessment process incorporated detailed data collected in Butte and input from community representatives, and the results are supported by the 1990 - 1991 community study conducted by the University of Cincinnati and the Butte-Silver Bow Health Department (BSBHD and UC, 1991). This joint study examined lead and

arsenic exposures in children and pregnant women from throughout Butte. The risk estimates and cleanup levels developed by EPA through this comprehensive risk assessment process ensure that even the most susceptible individuals in the Butte community are protected.

EPA's risk assessment findings (Baseline Human Health Risk Assessment for Lead, CDM 1994, Baseline Human Health Risk Assessment for Arsenic, CDM 1997, Draft Human Health Risk Assessment, Walkerville Residential Site, URS, 2001) for soils indicated that there were areas where concentrations of lead in soils might possibly result in unacceptable risk. However, even in these limited areas, biomonitoring data (e.g., testing of human blood lead levels) for Butte does not support the assertion of unacceptable risks. EPA does not mention the blood lead study by the Butte Silver Bow Department of Health and the University of Cincinnati (BSBI ID and UC, 1992) that found low lead risks. The blood lead study report concludes "The average blood lead level in children in Butte is quite low (G.M. 3.5 ug/dL). Ninety-five percent of all children tested are below 10.5 ug/dL. The average blood lead levels in pregnant women and nursing mothers are even lower (2.1 and 2.4 ug/dL, respectively). None exceeded 5.0 ug/dL. These levels are at, or below, current estimates for national average blood lead levels."

In contrast with the statements in the Proposed Plan, scientific evidence suggests cancer risks from arsenic in soil were generally not found to be unacceptable in residential areas. The 1997 BPSOU Baseline Human Health Risk Assessment for arsenic (CDM, 1997) found that cancer risks were within EPA's acceptable risk range for both central tendency and reasonable maximum exposures for all residential neighborhoods evaluated. Likewise, the 2003 Human Health Risk Assessment for Walkerville (URS, 2003) did not find any unacceptable cancer risk. This is in direct contrast to the statement in the last paragraph on page 21 of the BPSOU Cleanup Proposal which states, "EPA also evaluated potential risks from arsenic in soils, interior house dust, and surface water. Results indicated that carcinogenic risks to residents were unacceptable."

EPA Response: *EPA disagrees with part of this comment. First, we agree with AR's statement that the HHRAs for the BPSOU are some of the most detailed and best documented HHRAs conducted under the Superfund program. The HHRAs for the BPSOU relied on numerous scientific studies, performed both in Butte and nationwide. EPA evaluated the bioavailability of lead and arsenic in a scientific study of Butte soils to determine the amount of ingested lead and arsenic that might be absorbed into the body Additional studies were performed in Butte to measure lead levels in yard soil, house dust, home grown gardens, and air The results allowed EPA to calibrate the lead exposure model used in the HHRA to determine soil lead cleanup levels to reflect conditions observed in Butte and its residents. In addition, the BPSOU risk assessments evaluated arsenic risks in an appropriate and health protective manner. The cleanup levels set are based on detailed site-specific studies performed in Butte.*

The ROD requires all contaminated residential, commercial, and recreational areas in the BPSOU to be cleaned up, if contaminant levels at those sites exceed the action levels in the ROD. This approach is consistent with final Superfund remedies across the country and was

recommended by EPA's remedy review board. The Agency agrees that a comprehensive Multi-pathway Metals Abatement Program would be a useful part of the remedy However, because the Agency must meet the requirements of CERCLA, it is necessary to include the sampling and remediation of all contaminated residential properties in the BPSOU. The detailed lead and arsenic studies facilitated the design of the selected remedy to be effective and health protective, and to assure that all Butte residents are protected now and in the future.

In addition to lead, the HHRAs considered arsenic and other metals that might affect the population. All of these risk assessments were, in fact, community based risk assessments that incorporated both detailed data collected in the community, as well as having input from community representatives. For arsenic and the other metals, long term exposures throughout a lifetime are the primary concern, so the HHRAs considered exposures that start in childhood and continue into adulthood For both arsenic and cadmium, the toxicity criteria used to predict the potential for adverse effects are based on study populations that include women and children, and the risk estimates and cleanup levels include additional protective factors to ensure that even the most susceptible individuals in the population will be protected. This includes risk factors associated with multiple chemical exposures, poverty and compromised health status. In short, EPA's arsenic risk assessment did find risks beyond EPA's 10^{-6} target level for cancerous human health risk. The arsenic levels selected by EPA in the ROD represent an acceptable level of risk within the range required by the NCP. Residential, commercial, and recreational areas above these levels must be cleaned to reduce risks to acceptable, CERCLA-compliant levels.

This same section of the proposed plan also describes unacceptable risks associated with arsenic and lead in alluvial groundwater (first paragraph of page 22); however, this groundwater is not used as a drinking water supply. The proposed plan must make it clear that groundwater consumption is currently an incomplete exposure pathway with no current risks and that this has been the situation in Butte for the last 75 to 100 years since the Butte drinking water system has relied on nearby mountain and river sources for citizen's drinking water. Furthermore, other sections of the proposed plan indicate that the yield from the alluvial aquifer would be inadequate to serve as a drinking water supply for a city the size of Butte, a point that should be repeated in the health risk summary.

EPA Response: *There is an unacceptable risk at the BPSOU if groundwater is used as a drinking water source. The Proposed Plan is clear in stating that the alluvial groundwater in Butte is not currently used for drinking water purposes. The State classifies the alluvial aquifer as useable; however, EPA has waived groundwater ARAR standards in the alluvial aquifer and will require clear and enforceable institutional controls to permanently prevent drinking water use of the BPSOU alluvial aquifer*

<u>2. EPA's requirement for non-targeted, up-front sampling of all residential yards and attics would not be as effective in protecting the public and less cost effective as the proven programmatic approach implemented in Butte over the past decade.</u>

In its BPSOU Cleanup Proposal, EPA states on page 43 that, "To meet CERCLA requirements, the programmatic approach must provide for sampling of all residential properties within a reasonable time frame." However, as discussed above,

scientific investigations show soils in many residential areas of Butte have been shown not to pose unacceptable risks. Therefore, EPA can not support the need to sample all residential properties in an accelerated timeframe. A program that requires sampling of each and every residential property is unprecedented and has not been required at any other mining/smelter sites in the U.S. (e.g., Bunker Hill Idaho, California Gulch Colorado, etc.) and should not be required in the BPSOU.

It is not clear what EPA means by the phrase "reasonable time frame." However, AR firmly believes that the programmatic approach would actually achieve cleanup within EPA's "reasonable time frame" criterion, since it would remedy conditions that result in unacceptable risk as they occur. This approach would identify yard soils and other sources of metals at residences where sensitive populations, such as pregnant women or children, are exposed to unsafe levels of metals, and remediate those sources, as needed. Upon receiving notice that any attic or crawlspace areas would be characterized as a living space, or that a landowner expresses potential concern associated with indoor dust, this approach would sample those living space areas to determine whether those residents will be exposed to unsafe levels of metals, and it would remediate those areas, as needed.

The existing multi-pathway program performed by Butte-Silver Bow Health Department targets mining and other sources of lead contamination. AR has provided the funding needed to operate this program in the past, to address potential lead exposures resulting from mining and mineral processing waste. The program provides an additional benefit for the residents of Butte because it also seeks to sample and abate other potential lead sources

EPA's proposed plan states, "If an acceptable programmatic approach and agreement are not reached and fully funded, EPA's Preferred Alternative would instead include requirements for conventional sampling of all residential yards and indoor living areas and attics." (page 44) EPA's discussion and description of requirements for a "fully funded" program is inappropriate in the Proposed Plan. Discussions of funding assurance are more appropriately reserved for the Consent Decree.

Additionally, as part of a broader settlement of cleanup cost liability and allocation disputes, Butte-Silver Bow and AR have reached agreement in principle that would give Butte-Silver Bow funding for the implementation of a long-term, multi-pathway Lead Intervention and Abatement Program, including provisions to address attic dust, as necessary. This settlement agreement, embodied in the Term Sheet, attached in Appendix E, is still subject to approval by the Butte-Silver Bow Council of Commissioners. If approved as anticipated, the term sheet will be incorporated into a final agreement that will ensure that EPA's requirement for an "acceptable programmatic approach and agreement" is in place.

For these reasons, AR supports selection of a remedy that includes the existing targeted, multi-pathway Lead Intervention and Abatement Program for residential yards and homes where individuals are exposed to levels of metals above the action levels. In this manner, the public would be protected against metal contamination

from the multiple sources actually found in Butte residences. The program would ensure the cleanup of yards and residences under a targeted approach based upon use of testing for residence locations of sensitive populations and include sampling of multiple paths of exposure. AR does not support a non-targeted program involving sampling of all residences within the BPSOU and expedited cleanup in cases where the current residents are not exposed to unsafe levels of metals. If EPA selects a final remedy that requires a non-targeted sampling and expedited cleanup effort, AR will complete the cleanup necessary to remediate metals from mining and smelting sources, but AR will not volunteer to abate other potential sources of metal exposure that AR is not liable for under CERCLA. This may result in the elimination of long-term programs to abate other sources of metals exposure, and, ultimately, result in less protection for the residents of Butte.

EPA Response: *EPA understands the nature of AR's funding of the multi-pathway program This program targeted homes with children and pregnant women for comprehensive cleanup if arsenic and/or lead were above acceptable levels. This targeted approach made sense as an initial effort in Butte under EPA's CERCLA removal authorities, since these populations are the most vulnerable to lead contamination*

However, a final remedial decision, such as this ROD, must provide for a comprehensive and permanent cleanup for lead, arsenic, and mercury contamination in soils in the BPSOU. It is no longer sufficient to target cleanup efforts at homes with children or pregnant women only. Residents within the BPSOU deserve to have the mine waste contamination problems in their yards and homes addressed permanently, within a reasonable time frame. EPA's Remedy Review Board noted this requirement to EPA Region 8, and Region 8 agreed to include such a requirement. This comprehensive approach is consistent with most of EPA's Superfund remedies for Superfund sites containing contaminated properties. This approach is also consistent with EPA's Land Reuse and Revitalization initiatives and policies.

The ROD proposes a combination of the multi-pathway approach with a comprehensive approach. We hope to work with BSB County and the PRPs to design an expanded multi-pathway program that will accomplish yard and household dust contamination remediation within a 15-year time frame. This approach would build upon the public health benefits from the multi-pathway approach and ensure the program ultimately meets CERCLA's requirements for comprehensive cleanup

However, if such an approach cannot be agreed upon in post-ROD enforcement decisions, the PRPs will be required to implement a yard and indoor dust sampling program instead. The ROD requires this effort to be accomplished within a three-year time period.

The comment references "allocation" agreements among PRPs regarding a limited, multi-pathway approach. These agreements are, of course, not binding on EPA or DEQ. Any agreement among PRPs to implement the remedy will need to fully implement the Selected Remedy described in the ROD, not a remedy that AR wishes were selected instead

G. EPA's Preferred Alternative for non-residential solid media components of the BPSOU Cleanup Proposal is appropriate, permanent and consistent with reasonably anticipated future land use.

1. EPA has appropriately accepted past reclamation performed to defined standards.

EPA granted "Conditional, Limited No-Further Action" status to all but three of the previously reclaimed areas. AR supports EPA's position in the proposed plan which accepts almost all of the previously reclaimed, non-residential source areas in the BPSOU and supports installation of soil-vegetation caps over the remaining sites where appropriate action levels for human health are exceeded. Appendix F presents a summary list of the EPA-ordered actions in which over 170 sites have been previously reclaimed encompassing over 400 acres. AR has spent over $50 million on these reclamation efforts over the last 15 years. AR requests that EPA list all of the sites granted "Conditional, Limited No-Further Action" status in the ROD.

EPA Response: *The ROD does specify which sites are granted this status and which are not. EPA disagrees that only human health exceedances require additional capping and revegetation. As the ROD states, sites which contribute to storm water runoff or water quality violations are also subject to capping and revegetation requirements*

2. AR requests modification or clarification of three sites not granted "Conditional, Limited No-Further Action" status. AR requests that the Colorado Smelter Site be granted "Limited No-Further Action" status based on information previously provided by AR to EPA.

The three sites not granted "Conditional, Limited No-Further Action" status, include LAO, and the Colorado Smelter site and the Lower Railroad Yard Site 1. With respect to the Colorado Smelter site, EPA identified it as having the potential of having mine waste within 10 feet of groundwater in alleged violation of requirements for solid waste repositories. AR has evaluated available data for the Colorado Smelter Site and presented to EPA conclusive evidence that the groundwater table below the repository is well in excess of this requirement (Atlantic Richfield, 2004e). Therefore, AR requests that, in the ROD, the Colorado Smelter site be identified as attaining "Limited No-Further Action" status.

With respect to LAO, AR expects this site to be finalized consistent with discussions with Butte-Silver Bow and EPA which provide for wetlands to be reconstructed in the northwest portion of LAO, the currently reconstructed Silver Bow Creek to remain in place and the Butte Reduction Works area to be reclaimed partly as open space upland reclamation and partly as a utility service area associated with the groundwater treatment system at LAO. A graphic depiction of this plan is provided in Appendix D.

AR assumes EPA will work with Burlington Northern and other railroad companies, which are BPSOU PRPs, to address issues at the Lower Railroad Yard site.

EPA Response: *The Colorado Smelter Site was found to potentially be out of compliance with ARM 17.50.505 regarding location specific requirements for solid waste facilities. Additionally, the rationale for granting a variance did not sufficiently demonstrate the necessary substantive conditions for the variance found at § 75-10-206 Montana Code Annotated (MCA) regarding the requirement for adequate separation between waste materials and groundwater for this site. Subsequent to the evaluation performed in the Response Action Summary Document, an evaluation of the depth to groundwater beneath the repository at the Colorado Smelter Site suggests that that there may be adequate separation between the groundwater and the base of the wastes (> 10 feet) under most site conditions However, monitoring well control at the site is limited and data from the existing wells suggest that the depth to groundwater beneath the wastes in the repository may be less than 10 feet during exceptionally wet years when the groundwater table rises more than normal. The ROD requires further and more detailed evaluation of this issue before the final status of the Colorado Smelter repository and subsequent actions are determined. EPA has responded to comments from the railroad PRPs separately in this Responsiveness Summary. The remedy for the LAO area is described in the ROD*

3. AR generally supports EPA identification of the limited number of sites requiring post-ROD reclamation with several clarifications and comments.

EPA has identified six sites where concentrations of arsenic or lead in the soils are greater than appropriate human health risk action levels. These sites include:

- Goldsmith Dumps (Site 161)
- Arctic (Site 1530)
- Wake Up Jim (Site 1615)
- Small unnamed waste areas surrounding the Clark Mill Tailings repository
- Caledonia Street site
- Moose Dump (Site 12)

AR is prepared to design and implement the reclamation at these sites using appropriate engineering designs, similar to that used for past reclamation work in Butte which EPA has now accepted, as appropriate for the end land use and the specific conditions at each site.

EPA Response: *Comment noted These sites will be addressed as described in the ROD.*

AR believes that additional data is necessary for each site prior to finalization of the scope of reclamation required.

Goldsmith Dumps (Site 161) - This unreclaimed site is located on the far northwestern border of the BPSOU and is not located in a residential area. Because the one data point available shows lead concentrations above the Open Space/Recreational action level of 2,300 milligrams per kilogram (mg/kg) (actual sample concentration of lead = 2,680 mg/kg), AR agrees that there is a potential need for reclamation. However, the size of the site necessitates additional data to better define the extent and scope of reclamation. AR also notes that the site is located at the top of the Beef Straight Gulch drainage that flows to the west of the BPSOU and poses

little concern of contribution of metals to Silver Bow Creek through storm water given the distance to the creek and downstream topography.

Arctic (Site 1530) - Sample data for this small, unreclaimed site in uptown Butte showed that the soil lead concentration was 2,300 mg/kg, right at the open space/recreational action level and above the 1,200 mg/kg residential action level. Reclamation activities at this site should be preceded by additional data collection to better define the extent and scope of reclamation required.

Wake Up Jim (Site1615) - This site is located within the GMMIA. Any necessary reclamation of the Wake Up Jim site will be coordinated with the overall plan for reclamation and enhancements to be performed for the Granite Mountain Memorial Interpretive Area (GMMIA), as described below and presented in Appendix E-4 of the FS Report.

Small unnamed waste areas surrounding the Clark Mill Tailings repository - As has been previously discussed with EPA and Butte-Silver Bow, this site consists of undefined potential waste areas in a drainage area east of the old Clark Tailings (now the reclaimed and redeveloped Copper Mountain Park). Additional investigation to identify exactly where and what should be reclaimed is required, but in any event, the area of concern should be limited to the drainage area bounded by the existing sediment pond east of the park, the reclaimed park area to the west, the topographically high ground adjacent to the neighborhood to the east, and the road traversing below the old Clark Mill to the south.

Caledonia Street - This site is limited to a small (less than 20-foot by 20-foot) area directly adjacent to a storm sewer inlet on the north side of Caledonia Street next to the Anselmo site.

Moose Dump (Site 12) - This site is currently part of the area associated with the Montana Tech Mine Training Center, which has been leased from Montana Mining Properties. This site is not in a residential area and is located adjacent to the GMMIA in a drainage area where storm water runoff is routed to the Berkeley Pit. AR does not support reclamation of this site using Butte Standard Reclamation practice because it may be used as a disposal location in the future in association with the Mine Training Center. Data from two samples are available. Data from only one of the samples show lead concentrations above the open space/recreational action level. Arsenic concentrations in both samples were below even the residential action levels. Therefore, any reclamation would require additional sampling to characterize the concentration and distribution of metals at this site and provide information for appropriate design. If EPA does require some reclamation, the specific locations and methods should consider additional site-specific soil samples, the location of the site adjacent to the GMMIA and in a drainage routed to the Berkeley Pit and land use.

EPA Response: *Additional data collection may be appropriate. This will be determined in remedial design.*

4. AR generally supports EPA's description of post-ROD reclamation requirements for the GMMIA and the Syndicate Pit with clarifications.

Based on EPA's BPSOU Cleanup Proposal, AR supports reclamation of the GMMIA and Syndicate Pit areas assuming remediation in accordance with the preliminary designs presented in the appropriate appendices of the BPSOU FS Report.

GMMIA - Per the GMMIA Plan agreed to with Butte-Silver Bow, the GMMIA will be reclaimed in areas of public access. In other designated areas within the GMMIA, access will be limited and unreclaimed areas will be left to preserve the historical mining landscape. Historic interpretation and public amenities will be included in reclaimed areas of the GMMIA including picnic areas, walking trails and interpretive signage. Surface water runoff from the GMMIA will be routed to the Berkeley Pit such that it will not affect water quality in Silver Bow Creek. As agreed by Butte-Silver Bow and AR, the desired design options for the GMMIA are specified in Appendix E-4 of the FS (PRP Group, 2004).

Syndicate Pit -- Reclamation of the Syndicate Pit will be designed and performed in conjunction with use of the site by Montana Tech as a Mine Training Center and with its continued use as a sedimentation/retention basin. As agreed by Butte-Silver Bow and AR, the desired design options for the Syndicate Pit are specified in Appendix E-2 of the FS (PRP Group, 2004).

EPA Response: *Comment noted. These sites will be addressed as described in the ROD. Many of AR's comments here relate to remedial design issues, and remedial design decisions will be made in the post-ROD remedial design process.*

1. BRES should be modified slightly prior to finalization and publishing of monitoring and maintenance requirements for reclaimed areas in the ROD.

"Conditional, Limited No-Further Action" status sites, as well as sites to be reclaimed in the future are to be monitored and maintained via the BRES to protect the remedy. CDM and Montana State University's Reclamation Research Unit prepared a draft BRES for EPA in conjunction with MDEQ, Butte-Silver Bow, AR, and other PRPs as presented in Appendix E-6 the BPSOU FS (PRP Group, 2004). In accordance with previous discussions with the Agency, it is understood that the final BRES will be approved as part of the ROD and that any comments by AR will be considered prior to finalizing the BRES and issuance of the ROD.

EPA Response: *The BRES was developed as a collaborative effort among the BPSOU stakeholders. The process took over four years and included site visits and a calibration field study of the BRES process The BRES is a final document and will be used for the long term monitoring of reclaimed areas in the BPSOU*

AR is concerned that the BRES does not include provisions for termination of monitoring for those sites that are successfully reclaimed or redeveloped. Such provisions are included in other Montana statutory reclamation programs, such as the

Hard Rock Mining Reclamation Act program (MCA 82-4-301 et seq.) and the Open Cut Mining Act program (MCA 82-4-401 et seq.) and should be clearly articulated in the final BRES.

EPA Response: *The BRES incorporates both qualitative and quantitative analysis in the monitoring of source areas in the BPSOU. Because the source areas are actual caps for hazardous substances, perpetual monitoring and maintenance is required for the source areas. During the development of the BRES, the stakeholders determined that it is necessary to divide the sites into smaller polygons for evaluation and monitoring at the site. By dividing the sites into smaller areas, the site-specific success criteria can be accounted for. The Agency believes that the BRES does include flexibility to evaluate sites based on site specific conditions.*

In addition, AR is concerned that the BRES, as currently drafted, relies on subjective evaluation for a number of monitoring parameters that may result in unnecessary or inappropriate maintenance requirements where none are needed or not identifying appropriate maintenance issues when needed.

EPA Response: *The BRES incorporates both qualitative and quantitative analysis in the monitoring of source areas in the BPSOU. Because the source areas are actual caps for hazardous substances, perpetual monitoring and maintenance is required for the source areas. During the development of the BRES, the stakeholders determined that it is necessary to divide the sites into smaller polygons for evaluation and monitoring at the site. By dividing the sites into smaller areas, the site-specific success criteria can be accounted for. The Agency believes that the BRES does include flexibility to evaluate sites based on site specific conditions.*

Additionally, the draft BRES currently encourages subdivision of some reclaimed sites into smaller polygons for ongoing evaluations, at the discretion of the monitoring personnel, which could lead to excessive levels of review and evaluation for larger sites and unnecessary complications with respect to monitoring and maintenance. Although some subdivision of sites may be necessary to identify unique land uses or conditions, AR wishes to address and limit the potential for unnecessary and excessive activities resulting from the subjectivity currently built into the draft BRES.

EPA Response: *The BRES incorporates both qualitative and quantitative analysis in the monitoring of source areas in the BPSOU. Because the source areas are actual caps for hazardous substances, perpetual monitoring and maintenance is required for the source areas. During the development of the BRES, the stakeholders determined that it is necessary to divide the sites into smaller polygons for evaluation and monitoring at the site. By dividing the sites into smaller areas, the site-specific success criteria can be accounted for. The Agency believes that the BRES does include flexibility to evaluate sites based on site specific conditions.*

Finally, AR notes that the BRES does not include flexibility in terms of applying site-specific revegetation success criteria that take into account slope, aspect, land use, etc. Inclusion of such flexibility would allow the BRES to be applied more practically within the BPSOU. AR understands that its concerns related to the BRES will be heard in one or more technical meetings prior to EPA's publication of the ROD and that any appropriate modifications will be included in the ROD.

EPA Response: *The BRES incorporates both qualitative and quantitative analysis in the monitoring of source areas in the BPSOU. Because the source areas are actual caps for hazardous substances, perpetual monitoring and maintenance is required for the source areas. During the development of the BRES, the stakeholders determined that it is necessary to divide the sites into smaller polygons for evaluation and monitoring at the site. By dividing the sites into smaller areas, the site-specific success criteria can be accounted for. The Agency believes that the BRES does include flexibility to evaluate sites based on site specific conditions.*

6. Grading and capping of mine waste sites does not preclude future redevelopment or other productive land uses

As successfully demonstrated at a number of redeveloped mine sites in Butte, there are a variety of productive uses for previous mine waste areas that have been capped and reclaimed. To date, capped areas support 21,700 feet of walking and jogging trails, a 30-acre recreational complex (Copper Mountain Park), a high school gym and sports fields (Butte Central High School complex on Mercury Street), a Headstart Center (AWARE, Inc. on Mercury Street), 24 residential units (the Tullamore Subdivision), a new light industrial area (Kelley Mine and Parrott Shops on Anaconda Road), the Visitor Center on George Street, and numerous other facilities. AR is aware of public plans by private parties, including MERDI/Continental Public Land Trust and others, to redevelop additional areas in east uptown Butte. The Syndicate Pit is currently proposed to be used as the Montana Tech Underground Mine Training Center and existing reclamation plans take its intended land use into consideration. Some capped and uncapped areas are proposed to be included in the GMMIA, a site that illustrates historic mining practices and preserves the historic aspects of large-scale mining in Butte. AR supports all of these uses as appropriate for the BPSOU and believes that appropriate remediation promotes and facilitates these uses. Although EPA cannot and should not require redevelopment on previous or future reclaimed areas, AR strongly believes that future redevelopment of certain reclaimed properties can be performed wisely.

In support of the technical remedies, long-term ICs are needed to ensure that reclaimed areas where waste is left in place are used and developed in a safe manner. With funding from AR, Butte-Silver Bow operates a Geographic Information System (GIS). Additionally, AR has developed a comprehensive Reclamation Database with a GIS interface that will be transferred to Butte-Silver Bow in accordance with the terms of the proposed Butte-Silver Bow/AR settlement agreement. This system will be used in the future to track areas with waste, and areas that have been remediated with a cap or other remedy that requires long- term monitoring and maintenance. Appendix E, the proposed Settlement Term Sheet, and the anticipated Settlement Agreement between AR and Butte-Silver Bow, provides for full funding for operation and maintenance of areas previously reclaimed and anticipated to be reclaimed, GIS operation and implementation of other ICs. Through the anticipated ICs program, the Butte-Silver Bow Planning Department will control, through permitting and other ICs, the disturbance or redevelopment of the reclaimed properties, to ensure that previously capped mine wastes are not released to the environment in the future and any development is performed in a manner that is protective of human health and the environment.

In addition to the permitting and tracking controls, the proposed Settlement Term Sheet provides for expansion of the existing mine waste repository such that any mine waste excavated during future redevelopment of capped areas can be disposed at the repository. In addition, the Settlement Term Sheet provides that, upon the occurrence of certain events, AR will provide funds to BSB for use in redevelopment, including, providing assistance to developers to offset any increased cost associated with development of reclaimed areas or otherwise promote economic development within the BPSOU.

In addition to the anticipated requirements that Butte-Silver Bow ensure that future development occur in a manner that is protective of human health and the environment, AR has placed deed restrictions on many of the properties within the BPSOU where remediation has occurred or is anticipated to occur. Deed restrictions generally include the requirement to maintain the remedy, to further remediate the property if necessary at the time of future development, and to prohibit the drilling of wells for use as a potable water supply.

EPA Response: *EPA supports the redevelopment of reclaimed areas in the BPSOU. The Agency will work with the PRPs to develop a comprehensive IC's program to support the final remedy for the site. The Term Sheet is a private agreement, and EPA and DEQ are not bound by its terms*

H. <u>EPA's Proposed Remedy for surface water components generally are appropriate. However, potential future storm water treatment does not meet CERCLA Section 121 criteria and is inconsistent with requirements for urban storm water controls at other sites.</u>

<u>1. The BMP approach is the appropriate remedy for surface water components of the remedy.</u>

AR supports continued collection and management of storm water using BMPs. BMPs are the standard method for addressing storm water impacts to surface water under Clean Water Act programs nationally, and they have been used at numerous other NPL mining sites. The BMP approach to improvement of surface and storm water quality has been employed effectively at the BPSOU for more than a decade, and its future application is appropriate as part of the BPSOU remedy. This should include both engineering controls to reduce metals loading to Silver Bow Creek and the monitoring of improvement in Silver Bow Creek water quality. The extensive remedial or response actions performed at the BPSOU to date, including the LAO Expedited Response Action, the Storm Water Time Critical Removal Action (TCRA), portions of the Railroad Bed TCRA, reclamation of individual mine waste sites and the recent reclamation of the MSD channel and Missoula Gulch Bypass among other activities, have proven to reduce metals loads from storm water to Silver Bow Creek. This approach is sound, is cost effective and has proven to be effective and should be continued.

Significant improvements in both base flow and wet weather flow quality in Silver Bow Creek have been documented Improvements in base flow water quality,

measured during the extensive, routine monitoring performed over the past several years, are presented in ten quarterly monitoring reports (Atlantic Richfield Company, 2002 to 2004). Storm flows have also been monitored extensively and the results are published in annual storm water Data Summary and Interpretation Reports. Appendix G presents summary information showing improvements in both base and storm flow as a result of the BMP process as applied to the BPSOU This information is presented as graphics of in-stream concentrations of cadmium, copper and zinc measured during both base flow and storm flow sampling events over time. The time scale on the graphs extends from 1985 to the present. Data shown was collected at Monitoring Station SS-07 in Silver Bow Creek at the west end of the BPSOU.

MSD base flow has been perhaps the single largest metals load to the creek and has only recently been routed to LAO for treatment. Please note that monitoring data is not yet available for current conditions in which untreated MSD baseflow and sediments from the old MSD channel no longer flow directly into Silver Bow Creek. Additionally, until 2004, the MSD channel had previously contained large amounts of contaminated sediments carried by storm water to Silver Bow Creek. AR fully anticipates marked improvement in the water quality of Silver Bow Creek as a result of this recent action. Current estimates indicate that, after removal of untreated MSD baseflow from Silver Bow Creek, even before additional BMPs are implemented, exceedences of water quality standards in the creek, if any, would be marginal and would occur for periods of less than 20 days per year (during storm events).

EPA Response: *The Agency agrees that a comprehensive BMP program for storm water is an appropriate remedy for the BPSOU. However, it will be necessary to collect storm water analytical data to determine if the BMPs are meeting all water quality criteria. If the water quality criteria is not met with the BMP program, the Agency will order the treatment of storm water to reach these requirements. The ROD explains these storm water components of the Selected Remedy fully.*

2. Storm water sites identified by EPA in the BPSOU Cleanup Proposal are inappropriately identified for reclamation at this time.

In its BPSOU Cleanup Proposal, EPA identified 13 individual sites that are to be reclaimed because of supposed contributions to storm water contamination. The BMP process, identified by EPA as the primary component of EPA's storm water remedy in its Cleanup Proposal, is appropriate. However, none of the 13 sites have been identified by using the BMP approach. To the contrary, as discussed at numerous meetings and field visits for the 12 sites not including the Silver Bow Creek sediments, reclamation of these sites has little potential to improve the quality of storm water runoff to Silver Bow Creek, but instead were identified for reclamation because they are 'eyesores.'

EPA Response: *This is incorrect. The Agencies visited each site listed in the ROD in the field and it was determined that the storm water that leaves these sites flows into the BSB storm water system and the sedimentation could affect the water quality in Silver Bow Creek Because of this factor, these sites will be reclaimed as required by the ROD.*

Sediments, Streambanks and Overbank Deposits Along Upper Silver Bow Creek - These materials should be removed only if storm water monitoring indicates that their presence is contributing to exceedances of water quality standards in Silver Bow Creek. Data collected over the last few years in accordance with the Interim Monitoring Plans indicate that concentrations of contaminants of concern in Silver Bow Creek typically decrease from approximately the confluence of Blacktail Creek and the MSD to the western end of the BPSOU. These data are not indicative of significant in-stream loading from the sediments, streambanks or overbank deposits of Upper Silver Bow Creek. Following collection and treatment of the MSD base flow, further evaluation should be completed to determine if in-stream loading is in fact significantly impacting storm flow quality. *See also* AR's November 2004 Disclaimer and Comments on the Final FS which are incorporated herein by reference (Atlantic Richfield, 2004c).

EPA Response: *EPA disagrees. These sediments must be removed to prevent recontamination of Silver Bow Creek, and for other reasons, such as permanence and long-term effectiveness, as explained in the ROD and supported by the administrative record*

If, however, EPA determines, either now or as the result of future evaluation of data information consistent with the BMP approach, that removals are necessary, AR requests that EPA acknowledge in the ROD that the scope of any removal activities will necessarily be limited in depth and width because the stream corridor is narrow, there is an adjacent urban infrastructure and there is potential to destabilize or damage the historical slag walls.

EPA Response: *EPA disagrees. See above response. Any issue concerning the scope of removal activities will be addressed during remedial design, in a manner consistent with the ROD.*

Back Fill 007 (Site 65) - This is a small site (0.12 acres) located at the southeast corner of Excelsior and Empire Streets. It is located in the Missoula Gulch subdrainage of the BPSOU above two sediment basins such that any sediment with elevated metals concentrations from the site are controlled via the downgradient BMPs.

EPA Response: *Sedimentation from this site flows directly into the BSB storm water system. The BMP program is designed to address all sites that are adding metal laden sedimentation in the storm water system, therefore reducing the amount of metals flowing into Silver Bow Creek. The site shall be addressed as described in the ROD.*

Unnamed Dump (Site 148) - This is a 0.61 acre site located southwest of LAO and south of Interstate 90. EPA has identified the potential for storm water from the site to reach Silver Bow Creek via a culvert under the Interstate and railroad grades. However, concentration of copper and zinc from the one site sample are very low (69 mg/kg and 273 mg/kg, respectively). Given the tortuous drainage pattern for water from the site to reach the creek and the low concentrations of copper and zinc, AR does not support reclamation of this site.

EPA Response: *Storm water from this site flows directly to LAO and Silver Bow Creek. The BMP program is designed to address all sites that are or are likely to add metal laden sedimentation in to Silver Bow Creek. The number of sampling points on this dump are limited and there is a potential for higher levels of copper and zinc to be present at this site The site shall be addressed as described in the ROD.*

New and Mahoney Street - This is a small site located at the northwest corner of the recently redeveloped Butte Central High School athletic fields in an area previously reclaimed by the Montana Department of State Lands. In addition to the reclamation and redevelopment efforts, numerous BMPs have been implemented in this area and the site is located within the drainage captured by the Belmont Diversion so that storm water from the site is routed to the Berkeley Pit.

EPA Response: *The storm water from this site travels across residential property into the BSB storm water system. The site shall be addressed as described in the ROD.*

413 Boardman Street - This is a small site area north of Boardman Street and forms a small basin with no outlet. Additionally the site is located in the eastern portion of the Missoula Gulch subdrainage of the BPSOU above two sediment basins such that, even discounting the local topography that prevents drainage, any sediment with elevated metals concentrations from the site are controlled via the downgradient sediment basin BMP.

EPA Response: *This area has the potential to add sedimentation to the BSB storm water system. The BMP program is designed to address all sites that are or are likely to add metal laden sedimentation in to Silver Bow Creek, therefore reducing the amount of metals flowing into Silver Bow Creek. The site shall be addressed as described in the ROD.*

Jenny Dell (Site 33) - This site is located along Ryan Road in the northwest portion of the Missoula Gulch subdrainage. While the site is upgradient of residential properties, arsenic and lead concentrations in a sample from the site are well below residential action levels. The site is located above all three of the sediment basins in the subdrainage. Therefore, any sediment with elevated metals concentrations from the site are controlled via downgradient BMPs.

EPA Response: *This area has the potential to add sedimentation to the BSB storm water system. The BMP program is designed to address all sites that are or are likely to add metal laden sedimentation in to Silver Bow Creek, therefore reducing the amount of metals flowing into Silver Bow Creek The site shall be addressed as described in the ROD.*

Kelley Mine Yard Entrance - This site is located at the intersection of Copper, Wyoming and Anaconda Roads in the area of numerous reclamation activities/response actions and BMPs. Part of the site was previously reclaimed by Butte-Silver Bow and the site is located in the drainage of the Belmont Diversion. Therefore, any sediment with elevated metals concentrations from the site is routed to the Berkeley Pit and not to Silver Bow Creek.

EPA Response: *The storm water from this site travels across residential property into the BSB storm water system. The BMP program is designed to address all sites that are or are likely to add metal laden sedimentation in to Silver Bow Creek, therefore reducing the amount of metals flowing into Silver Bow Creek The site shall be addressed as described in the ROD.*

North Wyoming Street - This site is located where the Uptown Butte, Anaconda and Pacific (BAP) Railroad Line historically entered the Kelley Mine Yard in the area of numerous reclamation activities/response actions and BMPs. The BAP rail line has been reclaimed as part of the response actions for the Railroad Bed TCRA. Additionally, the site is located in the drainage of the Belmont Diversion. Therefore, any sediment with elevated metals concentrations from the site are routed to the Berkeley Pit and not to Silver Bow Creek.

EPA Response: *The storm water from this site travels across residential property into the BSB storm water system. The BMP program is designed to address all sites that are or are likely to add metal laden sedimentation in to Silver Bow Creek, therefore reducing the amount of metals flowing into Silver Bow Creek. The site shall be addressed as described in the ROD.*

800 North Main - This site is located at the intersection of Main and Buffalo Streets on the slope south of Buffalo Street at the upgradient end of the Buffalo Gulch subdrainage of the BPSOU. The property downgradient of this site has previously been reclaimed. AR does not support reclamation of this site under the BMP program because it is unlikely that it is impacting Silver Bow Creek's water quality, due to its small size and remote location from Silver Bow Creek.

EPA Response: *Sedimentation from this site flows directly into the BSB storm water system. The BMP program is designed to address all sites that are or are likely to add metal laden sedimentation in to Silver Bow Creek, therefore reducing the amount of metals flowing into Silver Bow Creek. The site shall be addressed as described in the ROD.*

North Corner of Granite and Arizona - This site is located in the drainage of the Belmont Diversion. Therefore, any sediment with elevated metals concentrations from the site is routed to the Berkeley Pit and not to Silver Bow Creek.

EPA Response: *The storm water from this site travels across residential property into the BSB storm water system. The BMP program is designed to address all sites that are or are likely to add metal laden sedimentation in to Silver Bow Creek, therefore reducing the amount of metals flowing into Silver Bow Creek. The site shall be addressed as described in the ROD.*

Green Mountain Shaft - EPA's Proposed Plan indicates that this site "will be addressed pursuant to the final design for the Granite Mountain Memorial Interpretive Area." This is appropriate as the site is within the GMMIA boundary. As such, any reclamation deemed appropriate within the context of the GMMIA design should not be related to potential impacts to Silver Bow Creek, as the GMMIA area drains to the Berkeley Pit.

EPA Response: *Comment noted*

424 North Washington Street - This is a small site located in the eastern portion of the Missoula Gulch subdrainage of the BPSOU above two sediment basins. Any sediment with elevated metals concentrations from the site is controlled via the downgradient BMPs.

EPA Response: *Sedimentation from this site flows directly into the BSB storm water system The BMP program is designed to address all sites that are or are likely to add metal laden sedimentation in to Silver Bow Creek, therefore reducing the amount of metals flowing into Silver Bow Creek. The site shall be addressed as described in the ROD.*

131 West Copper Street - This small site is located in the area of a number of reclamation activities/response actions and BMPs in the upper portion of the Buffalo Gulch subdrainage of the BPSOU. The yard adjacent to this site (west of house) has been reclaimed as it has a timber crib structure retaining the east slope of Montana Ave. located across the street. AR does not support reclamation of this site under the BMP program because it is unlikely that it is impacting Silver Bow Creek's water quality, due to its small size and remote location from Silver Bow Creek.

EPA Response: *Sedimentation from this site flows directly into the BSB storm water system. The BMP program is designed to address all sites that are or are likely to add metal laden sedimentation in to Silver Bow Creek, therefore reducing the amount of metals flowing into Silver Bow Creek. The site shall be addressed as described in the ROD.*

Therefore, identification of these 13 sites for reclamation is not appropriate and they should be removed from the ROD. As part of the Butte-Silver Bow/AR settlement agreement, AR and/or Butte-Silver Bow may choose to reclaim these sites separate from the Superfund process, but reclamation of any of these sites should not be required by EPA.

EPA Response: *EPA disagrees based on the site specific responses above. EPA and DEQ are not bound by the private allocation agreement referenced in the comment.*

3. Ten to 20 years may be required to fully implement and evaluate the BMP approach.

Because implementation of BMPs is an iterative process, ten to 20 years may be necessary to determine the efficacy of BMPs and whether new BMPs will result in improvement of water quality and/or attainment of surface water quality requirements in Silver Bow Creek. This timeframe for implementation, monitoring and evaluation is consistent with other similar Superfund sites and urban areas required to implement storm water BMPs.

EPA Response: *Comment noted.*

4. AR supports the use of in-stream flow augmentation as a method to improve the water flow and quantity of Silver Bow Creek. However, it is impermissible under CERCLA and would effect an unlawful taking of water rights without just compensation if EPA ordered the use of the Silver Lake water system or

treated effluent from the future water treatment system for the Mine Flooding Operable Unit for in-stream flow augmentation.

EPA's Proposed Plan provides that the addition of off-site water to improve surface water flow and quality in Silver Bow Creek might be necessary. The Silver Lake water system and treated effluent from the water treatment system for Mine Flooding OU are identified as potential sources of such in-stream flow augmentation. AR generally supports in-stream flow augmentation in this instance if necessary to supplement surface water BMPs to improve flow and quality characteristics of the water within Silver Bow Creek. However, potentially responsible parties should have flexibility to identify and secure the necessary water from whatever sources deemed appropriate. EPA's proposed plan mandates that water from these two privately-owned water sources be used to protect in-stream flows; such a mandate is not permitted by CERCLA, and constitutes an intrusion on private property rights that requires payment of just compensation pursuant to the Fifth Amendment of the U.S. Constitution.

CERCLA expressly limits EPA's authority to acquire property for use in implementing a remedy. CERCLA § 104(j) authorizes the President to acquire any property that is needed to conduct a remedial action by "purchase, lease, condemnation, donation or otherwise" only upon a determination that the property interest is "needed to conduct a remedial action under this chapter." 42 U.S.C. 9604(j). Because other water sources exist that can be used for augmenting Silver Bow Creek in-stream flow, water from the Silver Lake system and from Mine Flooding OU is not "needed" to conduct this component of the remedy.

In addition, it is axiomatic that a government taking of private property for a public purpose requires payment of just compensation to the property owner. Nollan v. California Coastal Comm'n, 483 U.S. 825, 831-32 (1987). A taking occurs whether by physical invasion of the private property or by virtue of a regulation that goes too far and diminishes the value of the property. Hendler v. United States, 952 F.2d 1364, 1373-74 (Fed. Cir. 1991), citing, Loretto v. Teleprompter Manhattan CATV Corp., 458 U.S. 419, 426 (1982) (physical taking); and First English Evangelical Lutheran Church v. Los Angeles County, 482 U.S. 304, 312 (1987) (regulatory taking). Requiring that Silver Lake system and Mine Flooding OU water be dedicated to in-stream flow augmentation constitutes a taking that requires just compensation, and CERCLA does not authorize EPA to take private property without payment to the owner.

For the same reasons, if EPA requires that treated effluent from the future water treatment system at Mine Flooding OU be dedicated to Silver Bow Creek in-stream flows, then this requirement would constitute a taking of water rights. As confirmed by the Mine Flooding OU Consent Decree, the treated water may be used for other water supply purposes, or discharged to Silver Bow Creek. Consent Decree, p. 30. Treated water is currently utilized in MR's mine operations. Thus, discharge of the treated water to Silver Bow Creek is required only if it is not utilized for other beneficial purposes. The Preferred Remedy for BPSOU potentially interferes with MR's and others water rights, and establishes a new use for treated water from the

Mine Flooding site - in-stream flow augmentation. This constitutes an unconstitutional taking of property rights without just compensation.

EPA Response: *The Selected Remedy does not specifically call for the use of Silver Lake or any other water for flow augmentation purposes It does leave the use of water augmentation as a possible remedy component if needed. The PRPs would be required to lawfully obtain such water rights, if needed. This is not a taking or a violation of CERCLA (the CERCLA provisions cited in the comment apply to federal government purchase of property, but do not apply to PRP efforts in this requirement).*

5. Storm water Treatment is not appropriate as a final future BMP even if storm water quality periodically exceeds appropriate water quality standards.

EPA's Cleanup Proposal for storm water from the BPSOU identifies using the BMP approach to identifying sources of contamination and taking appropriate corrective action. EPA further states, "If BMPs are not effective in achieving surface water quality standards in Silver Bow Creek, lime treatment of storm water runoff would be required." As discussed above, AR agrees that the BMP approach is the appropriate remedy for storm water with the exception that a final requirement of storm water treatment is not an appropriate remedy under CERCLA. Treatment of storm water is impracticable, not implementable, is not cost effective and may not be able to meet performance standards. In short, it would require the design and operation of a complex lime treatment system which would run only on an intermittent basis. Such a system would have to be capable of addressing minor, brief, and unpredictable events. AR strongly believes that such a system would not be capable of reliably treating storm water to appropriate standards. AR is not aware of any other NPL site located in an uncontrolled, urban setting that requires storm water treatment as part of the final remedy in similar circumstances. AR believes that this is because of the inability of such systems to operate appropriately on an intermittent basis. Even if one were to assume that a treatment system were put in place and managed to be operational on the necessary intermittent basis, the system must be designed with limits as to the amount of water that can be captured and treated as a result of the very limited areas at the base of the Butte Hill where catchment basins could be located. This would result in flows from very large storms overwhelming and bypassing the catchment system resulting in a periodically ineffective system and brief and infrequent excursion in water quality above aquatic life criteria.

Furthermore, even natural and non-impacted stream systems contain metals at concentrations above water quality standards during storm events. As a specific example, runoff data for the Denver metropolitan area was collected under an EPA-funded effort as part of their Nationwide Urban Runoff Program in 1980 and 1981. A similar storm water monitoring program in the same area was performed in 1992 and 1993. The results from these two monitoring programs are summarized in a report by Doerfer and Urbonas, "*Storm Water Quality Characterization in the Denver Metropolitan Area*" dated 1993. The study measured storm water quality from industrial, residential, commercial, and undeveloped land uses. The study found that storm water samples collected in both developed and undeveloped areas contained metals at concentrations exceeding water quality criteria. The same study found that in areas

with less than 20 inches of rainfall per year, metals concentrations exceed water quality standards in the vast majority of samples.

Because Butte has a semi-arid desert climate that receives an average of only 12.9 inches of rain a year, metal exceedences due to storm water in BPSOU appear to be inevitable. Over the last few years, sampling data show that these exceedences are brief, minor, and do not appear to have any adverse impact on aquatic life in Silver Bow Creek. A continued improvement to Silver Bow Creek's water quality is anticipated based on the improvements to the MSD and other BMPs implemented in the last few years. Therefore, AR believes that Silver Bow Creek will be able to maintain a healthy population of aquatic life despite these brief, minor exceedences. Finally, EPA's own ecological risk assessment found that it is not necessary to meet water quality standards at all locations and times in order to maintain healthy aquatic populations in Silver Bow Creek (EPA, 2001).

EPA also has acknowledged that numeric limitations are difficult to develop for storm water discharges due to the intermittent and variable flow and pollutant concentrations of storm water and its effect on the receiving water. *Qs & As for Interim Permitting Approach for Water Quality-Based Effluent Limitations in Storm Water Permits*, EPA, pp. 1-2 (issued by EPA to clarify the *Interim Permitting Approach for Water Quality-Based Effluent Limitations in Storm Water Permits*, 61 Fed. Reg. 43761 (Aug. 26, 1996).

Based on these data, AR believes that treatment is not appropriate for storm water from the BPSOU. Rather than attempting treatment, AR notes that earlier drafts of the FS Report included consideration of a Technical Impracticability (TI) evaluation for surface water, if BMPs alone do not meet the remedial goal of having surface water meet aquatic standards at all times, including during storm events. Subsequent EPA comments directed that references to such potential TI waivers be removed from the FS Report. AR requests that a TI evaluation be included as part of the storm water management process and specifically described in the ROD.

EPA Response: *EPA believes that a TI evaluation for storm water is inappropriate at this time Rather, the ROD requires the PRPs to focus on achieving compliance with ARAR standards, including water quality standards during the ROD implementation effort. If BMPs do not achieve significant compliance, the evaluation and implementation of capture and treatment is appropriate and consistent with EPA's current storm water regulations and policies.*

I. Complaints that EPA Violated the Principles of Environmental Justice, the Public Trust Doctrine and CERCLA, the NCP and CERCLA Guidance are Unfounded

AR understands that some have alleged that EPA has ignored environmental justice concerns in developing the BPSOU Cleanup Proposal. These commenters allege that EPA has not followed its own guidance concerning Environmental Justice in evaluating alternatives and identifying the Preferred Alternative. AR understands that at least one formal complaint may have been filed with EPA relative to this claim. AR also understands that at least one individual has commented that EPA has not

followed statutory and regulatory requirements, as well as appropriate guidance, in the development of the Preferred Alternative.

AR has been intimately involved in the process leading up to EPA's preparation of the Cleanup Proposal, and is confident that the proposed remedy has fully satisfied environmental justice considerations, was prepared in accordance with CERCLA and EPA guidance and did not violate the public trust doctrine. AR has prepared comments to these statements, which are presented in Appendix H.

AR also understands others have commented that EPA may have violated the public trust doctrine in the development of the proposed plan. The Proposed Plan was identified by EPA after careful consideration of the threshold, balancing and modifying remedy selection criteria contained in § 300.430(f)(1) of the NCP. The "public trust doctrine" is not a statutorily mandated requirement under § 121(b) nor is consideration of the public trust doctrine required by the NCP. Rather, CERCLA and the NCP set forth requirements that EPA must evaluate when considering remedial alternatives and selecting a remedy. Furthermore, public trust doctrine considerations are not "applicable or relevant and appropriate requirements" (ARARs).

EPA Response: *EPA agrees that it has followed EPA's environmental justice policies. EPA also agrees that the public trust doctrine is not an ARAR under CERCLA or the NCP, because it is not a specific, promulgated standard or criteria*

II DETAILED, LINE-BY-LINE COMMENTS

The following section presents specific comments to the information and language presented in the EPA BPSOU Cleanup Proposal. Where requests for changes to language are made, AR intends that changes would be made to similar language in the ROD. AR does not seek to revise the Proposed Plan.

1. Page 7

The figure on Page 7 identifying Areas of Past and Future Response Actions does not clearly distinguish between past and future actions. It is important for there not to be confusion about the location of ROD requirements and for the public to understand that the BPSOU is different than most Superfund sites in that many of the response actions at the BPSOU have been completed prior to the Proposed Plan and ROD. Appendix F summarizes response actions and remedial activities completed to date.

EPA Response: *EPA notes AR's comment The figure is an overview of the BPSOU and lacks specific detail on future site reclamation A more detailed figure will be used in the ROD*

2. Page 9, last paragraph and 10, first paragraph, Metro Storm Drain.

The text implies that the MSD was constructed for and by the Anaconda Copper Mining Company. The MSD should be identified as a man-made surface water conveyance constructed during the 1930s by the Federal government (Works

Progress Administration) to minimize flooding of the residential and commercial areas in that area of Butte.

EPA Response: *Comment noted. Similar text now includes additional historic information on the MSD*

3 Page 10, second paragraph.

This section would be more complete regarding the description of MSD if the urbanization of this part of Butte were more accurately described. It is suggested that the following text be inserted after the first sentence. "Since the MSD was constructed, urban development, both commercial and residential, has occurred on and near the area."

EPA Response: *Comment noted. The text has been altered to include additional historic information on commercial and residential development.*

4. Page 11, first full paragraph, Alluvial Aquifer/Groundwater, first sentence.

The alluvial aquifer in the Summit Valley is about 3.5 miles wide and 7 miles long and occupies an area of approximately 23 square miles. Estimates presented regarding the alluvial aquifer that extend far outside the BPSOU boundary are misleading and should instead be limited to the extent within the BPSOU.

EPA Response: *EPA believes that the information provided is accurate. The figures and maps provided in the RI/FS defines the alluvial aquifer in the Summit Valley. The figures and maps are the basis for the Proposed Plan and ROD figures and maps.*

5. Page 11, fourth full paragraph, last sentence.

The Proposed Plan incorrectly states, "Since the Lower Area One groundwater collection system began operation in 1998, the flux of alluvial groundwater that exits the upper Silver Bow Creek valley is less than 6 gallons per minute or approximately 10 acre-feet per year." According to Appendix B-8 of the RI and discussions on page 3-93 of the RI the groundwater that exits the upper Silver Bow Creek valley is predicted to be up to 6 gallons per minute of bedrock groundwater, not alluvial groundwater. The RI continues (page 3-93), "Flux calculations illustrate that the LAO ERA is effectively removing groundwater from the alluvial, weathered bedrock and upper competent bedrock lithologic units. The remaining, deep bedrock flux and estimated concentrations of contaminants were used to evaluate the potential groundwater metal loads." AR requests that the ROD clarify language regarding groundwater flux.

EPA Response: *Comment noted, EPA will clarify language regarding groundwater flux in the ROD*

6. Page 12, First full paragraph, Granite Mountain Memorial Area.

It should be made clear that the GMMIA is not in a drainage to Silver Bow Creek in addition to the statement that it is not in a residential area. These factors provide supporting rationale for the proposed remedy which leaves portions of the GMMIA unreclaimed to preserve the historic mining landscape.

EPA Response: *Comment noted The comment has been addressed in the ROD.*

7. Page 12, third full paragraph, Railroad Beds.

This paragraph implies that nothing has been done to address the elevated concentrations of arsenic and heavy metals in the railroad beds. A final sentence as follows should be added: "Prior Response Actions under the Butte Railroad Bed TCRA have reclaimed these rail lines and yards."

EPA Response: *The ROD includes additional information concerning the reclamation of the railroad beds in the BPSOU All railroad beds were not reclaimed under the Railroad Bed TCRA.*

8. Page 13, sixth full paragraph, Railroad Beds.

This paragraph indicates that sampling of railroad beds was conducted and that concentrations exceeded arsenic action levels but does not indicate that the Railroad Bed TCRA has been implemented to address the elevated concentrations. A final sentence as follows should be added: "Response Actions under the Butte Railroad TCRA removed or reclaimed the railroad beds identified with material above action levels."

EPA Response: *Comment noted. The ROD includes additional information concerning the reclamation of the railroad beds in the BPSOU.*

9. Page 14, second bullet in 6th paragraph, Groundwater Controls.

The ROD should make clear that the LAO ERA resulted in control of groundwater to prevent contaminated groundwater from entering Silver Bow Creek such that remedial goals for surface water can be met. AR assumes that the ROD will require this control be maintained as currently designed and monitored in accordance with the approved MSD monitoring plan (Atlantic Richfield, 2004a).

EPA Response: *The ROD contains language regarding the importance of groundwater capture at LAO*

10. Page 15, fourth full paragraph, Current Surface Water Quality.

With regard to surface water, the improvement in water quality is understated. Rather than simply stating, "Actions taken to date have improved base flow water quality in Silver Bow Creek; however, significant exceedences of water quality standards still occur under wet weather flow," the ROD should include text similar to the following: "Data from monitoring performed over the past four years show that baseflow water quality is at or near water quality standards. Wet weather flow water quality has also improved and is anticipated to improve further given recent BMPs implemented in the MSD and at other locations." The last paragraph on page 25 of the proposed plan and continuing onto page 26 provides some detail as to the significance of improvement for base flow. Similar improvement discussions for wet weather flows should be briefly presented in the ROD.

EPA Response: *EPA included graphs of the analytical data in the ROD recognizing the water quality improvements in surface water in the BPSOU. However, there are still exceedances of chronic and acute standards during base flow and wet weather flows, respectively. CERCLA remedies are required to comply with ARARs (unless a basis for an ARAR waiver is present).*

11 Page 16, fourth full paragraph, MSD.

ROD text should be clear that there are many sources of mine waste in the upper MSD that may be impacting groundwater in the area. Lithologic information presented in the RI, EPA's Focused FS and other documents demonstrate the presence of slag, waste rock and other potentially impacted fill material throughout the MSD area in addition to the Parrott Tailings. Secondary sources and deep contaminated alluvium also act as sources of contamination to MSD alluvial groundwater (Atlantic Richfield, 2004d). See also General Comment D.

EPA Response: *There is adequate information presented in both the proposed plan and ROD indicating the many source areas of mine waste in the MSD.*

12. Page 16, last partial paragraph, MSD.

"This subdrain captures most groundwater that formerly discharged to the Metro Storm Drain channel (baseflow) ..." This sentence should be reworded to be consistent with EPA's Focused FS indicating that the subdrain will effectively capture groundwater formerly discharged to the MSD and be as effective as extraction wells but will be less expensive because no pumping would be required (CDM, 2004a). EPA has recently approved the MSD monitoring plan (Atlantic Richfield, 2004a) that will be used to verify that appropriate groundwater capture occurs in the MSD area.

EPA Response: *The sentence referred to above in the FFS was a simplifying assumption for the estimation of costs. The changes recommended in this comment are not warranted, as the proposed plan text was accurate. Groundwater monitoring will determine the effectiveness of the groundwater capture system. Final monitoring plans will be developed during remedial design.*

13. Page 17, first partial paragraph, last sentence, LAO.

Beginning in 2005, this water will be treated at LAO. Add "before entering Silver Bow Creek" at the end of the sentence.

EPA Response: *Such a change is not warranted.*

14. Page 18, fourth bullet, Active Mine Area.

The active mine area is located east and northeast of the BPSOU; not west and northwest.

EPA Response: *Comment noted. The ROD is now accurate regarding this description.*

15. Page 21, Human Health Risk section.

As described in General Comment F, the statements in this section are very general and mischaracterize site-specific risk assessment findings potentially related

to soils in residential areas of Butte as having identified broadly unacceptable risks. For example, the statement on page 21 of the Proposed Plan, "Mean soil lead levels in nearly 26 percent of residential yards could result in blood lead levels greater than 10 micrograms per deciliter." First, many of the residential yards sampled to date are located in higher risk areas (i e. older neighborhoods and near tailings). Also, it is expected that yards in areas further from historic mining activity would have lower lead levels than those sampled to date. According to the 1992 Butte-Silver Bow Environmental Health Lead Study (BSBDH and UC, 1992), the average blood lead levels of children in Butte are quite low and are at, or below current estimates for national averages. Additionally, since over 200 residences have been remediated to date, lead risks are expected to be even lower than those indicated in previous studies.

The section also generally indicates that the carcinogenic risks from arsenic were unacceptable without any additional supporting information. To the contrary, EPA studies (Baseline Human Health Risk Assessment, EPA, 1997, Human Health Risk Assessment for Arsenic, EPA/ASTDR, 2003) have shown that potential risks related to arsenic are also normal when compared to the national average.

EPA Response: *The discussion in the proposed plan was a brief summary of human health risks associated with the BPSOU. EPA believes that the summary does not mischaracterize site specific risk assessment findings. The human health risks from lead and arsenic at the BPSOU are unacceptable. Remedial actions will continue in residential areas of the BPSOU as required by the ROD.*

16. Page 24, first bullet, Ecological Risk.

This text should be clarified. According to the risk assessment summary presented in the RI, "The perennial drainages of Missoula Gulch and Metro Storm Drain were evaluated within the context of identifying contaminant source areas that might prevent site objectives from being attained in Silver Bow Creek." Additionally, both drainages have undergone significant remediation to improve water quality since 1991 and the drafting of the Baseline Ecological Risk Assessment (CDM, 2001).

EPA Response: *The risk characterization in the BERA showed that the most hazardous ecological conditions at the BPSOU are in the tributary drainages to Silver Bow Creek (e.g., Missoula Gulch and Metro Storm Drain), which suggests that ecological conditions could still be improved with further remedial action. The text in the ROD has been clarified to include this information*

17. Page 24, fifth bullet, Risks to Waterfowl.

This bullet is too general and should specify the area or the risk that was identified. According to the summary presented in the RI, the waterfowl risks are greatest in LAO and Missoula Gulch ponds. Additionally, the RI (PRP Group, 2002) states on page 5-18, "Risk estimates to waterfowl due to exposures to contaminants in on-site ponds are probably overly conservative and are best viewed as screening level data..." These conclusions were drawn without direct data or evidence of any wildlife or waterfowl impacts. In fact, extensive biomonitoring data taken in constructed wetlands (Warm Springs Ponds) similar to the Missoula Gulch ponds

have shown that there are no impacts to waterfowl or wildlife from metals in water or sediment of the area.

EPA Response: *EPA's findings support the fact that there may be a risk to waterfowl from the consumption of water, sediment, aquatic vegetation, and aquatic invertebrates contaminated with arsenic, cadmium, copper, lead, or zinc Without an extensive biomonitoring plan for the BPSOU, conservative risk assumptions are appropriate for the site.*

18. Page 26, fourth bullet Remaining Risk.

The bullet states, "A phased storm water management program combining initial action, aggressive monitoring, source area stabilization, and engineering controls to minimize impacts from storm water runoff and return Silver Bow Creek to its beneficial uses." "[I]nitial action" should be revised to say "past actions" in order to reflect the continued operation and maintenance of existing BMPs.

EPA Response: *Comment noted. Initial action means both a continuation of past actions and possible immediate actions to address storm water.*

19. Page 34, second column, third bullet, third sentence, Collection Routing and Treatment of Groundwater.

"Alternatives 1 and 2 specify treatment with lime in lagoons in a wetland setting during treatability studies prior to being discharged to Silver Bow Creek." "[D]uring treatability studies" should be deleted from the sentence as the alternative refers to future, permanent remedy components.

EPA Response: *Comment noted.*

20. Page 40, second column, third full paragraph, Preferred Alternative for Groundwater.

The text of the Proposed Plan states, "Under the Preferred Alternative, groundwater will be treated in a conventional lime treatment plant." See General Comment E.

EPA Response: *The Agency has selected Lime Treatment as the remedy for the groundwater treatment portion of the BPSOU ROD. EPA has made a decision to continue the use of the treatment lagoons at LAO. The lagoon system will be designed and constructed to meet EPA requirements. If at any time during the demonstration period or thereafter the system regularly fails discharge standards and cannot be adjusted or modified to meet standards, or if sludge removal, management, and disposal cannot be done in compliance with ARARs and in a protective manner (all as described in the ROD), a conventional treatment system shall be designed and built at the Lower Area One area, which shall utilize lime treatment technology to treat the captured contaminated water and meet all discharge standards.*

21. Page 41, second column, second and third paragraphs, Preferred Remedy for Solid Media -- BRES.

These paragraphs discuss the Butte Reclamation Evaluation System (BRES) which has been selected by EPA as the approach that will be used to monitor the

success of reclamation after the ROD is issued. As discussed in General Comment G., AR has the following concerns related to the BRES as currently drafted:

- It incorporates observational subjectivity in the monitoring and determination of appropriate maintenance requirements
- It does not but should include provisions for termination of monitoring for those sites that are successfully reclaimed or redeveloped, similar to other statutory reclamation programs, such as the Hard Rock Mining Reclamation Act program (MCA 82-4-301 et seq.) and the Open Cut Mining Act program (MCA 82-4-401 et seq.)
- It contemplates subdividing reclaimed sites into smaller polygons for ongoing evaluations, which could lead to excessive levels of review and evaluation for larger sites and unnecessary complications with respect to monitoring and maintenance, and
- It does not include flexibility in terms of applying site-specific revegetation success criteria that take into account slope, aspect, land use, etc.

Please see General Comment G. for suggestions for finalization of the BRES.

EPA Response: *The BRES incorporates both qualitative and quantitative analysis in the monitoring of source areas in the BPSOU Because the source areas are actual caps for hazardous substances, perpetual monitoring and maintenance is currently required for the source areas. During the development of the BRES, the stakeholders determined that it was necessary to divide the sites into smaller polygons evaluation and monitoring at the site By dividing the sites into smaller areas, the site-specific success criteria can be accounted for.*

22. Page 42 "Unreclaimed Source Areas Not Exceeding Action Levels"

EPA has identified 13 sites that do not exceed (human health) action levels for lead and arsenic, but must still be reclaimed because of potential contributions to storm water contamination. As described in detail in General Comment H, none of the sites identified in this section have been identified through appropriate scientific and technical application of the BMP approach. AR's evaluation is that these sites have little if any potential to improve the quality storm water runoff to Silver Bow Creek and were identified by employees of Butte-Silver Bow primarily as 'eyesores.' Inclusion of these sites in a list of reclamation activities under the ROD is not appropriate.

EPA Response: *EPA reviewed each of these sites in the field and determined that sedimentation from these sites enters the BSB storm water system and has the potential for affecting storm water quality in the BPSOU.*

23. Page 43, fifth full paragraph, Non-Targeted Sampling of Residential Areas.

"To meet CERCLA requirements, the programmatic approach must provide for sampling of all residential properties within a reasonable time frame" Specific CERCLA requirements should be cited. Sampling of all residential properties is not a programmatic approach. See also, General Comment F.

EPA Response: *See our prior responses to similar comments from AR. CERCLA requires final remedies to be protective of human health. This means that yards and indoor living area dust must be sampled and remediated if above action levels.*

24. Page 43, sixth full paragraph, Multi-Pathway Approach.

This paragraph does not describe a multi-pathway, targeted programmatic approach consistent with the current Lead Intervention and Abatement Program currently performed by Butte-Silver Bow in the BPSOU. In accordance with the proposed Term Sheet between AR and Butte-Silver Bow, attached in Appendix E, AR would fund a targeted approach including the multi-pathway, programmatic approach that would continue to address mining sources and other sources of lead to protect the public. As described in General Comment F, the targeted, multi-pathway approach will meet EPA's stated "reasonable time frame" criterion. A non-targeted approach to sampling and remediation of residences (without regard to sensitive populations or non-mining lead sources) is not supported by the human health risk assessment and references to such approach should be removed from the ROD. *See also,* General Comment F.

EPA Response: *It is EPA's preference for an expanded multi-pathway approach to be done at BPSOU, as explained in the ROD. The multi-pathway approach portion of the program must rely on voluntary cooperation from the potentially responsible parties, the county government, and the agencies to fund and implement this comprehensive approach.*

If an agreement can be reached between the PRPs and the EPA to address lead and arsenic contamination that is not under the jurisdiction of CERCLA, such as lead-based paint, the Selected Remedy includes a Residential Metals Abatement Program to address lead, mercury, and arsenic contamination in residential settings.

If the comprehensive program cannot be achieved, the Selected Remedy requires a more rapid assessment and abatement program of all residential areas within the BPSOU Site. This program must address mercury, arsenic, and lead sampling for yards and indoor dust attributable in whole or in part to mine waste sources or yard contamination. Residential properties that have sensitive populations may be prioritized for remediation before properties that are occupied by non-sensitive populations, but all known or potential residences must be addressed within three years of the start of remedial action.

25. Page 44, first column, first bullet, Anaconda Sampling Works Site 137.

The Anaconda Sampling Works Site 137 is an active commercial site, the Pioneer Concrete yard, as has been discussed with EPA on several occasions. It is not clear where the soils samples were located that indicate metals levels above action levels, or what action is needed or can be done at the site. It appears that commercial activities at the site may have largely addressed any potential concerns.

EPA Response: *If commercial activities at this site cease, the site will be resampled to determine if there is contaminated soil requiring remediation.*

26. Page 44, second column, first bullet, Colorado Smelter Site.

As described in the information (letter to Ron Bertram, Re: Atlantic Richfield Response to the Decision to Not Grant Conditional, Limited No Further Action Status for the Colorado Smelter, December 17, 2004) recently provided by AR regarding the Colorado Smelter site, the site is in compliance with all ARARs and should not require additional action.

EPA Response: *The Colorado Smelter Site was found to potentially be out of compliance with ARM 17.50.505 regarding location specific requirements for solid waste facilities. Additionally, the rationale for granting a variance did not sufficiently demonstrate the necessary substantive conditions for the variance found at § 75-10-206 Montana Code Annotated (MCA) regarding the requirement for adequate separation between waste materials and groundwater. Subsequent to the evaluation performed in the Action Summary Document, an evaluation of the depth to groundwater beneath the repository at the Colorado Smelter Site suggests that that there may be adequate separation between the groundwater and the base of the wastes (> 10 feet) under most site conditions. However, monitoring well control at the site is limited and data from the existing wells suggest that the depth to groundwater beneath the wastes in the repository may be less than 10 feet during exceptionally wet years when the groundwater table rises more than normal. The ROD requires further data collection and evaluation regarding this issue.*

27. Page 46, second column, second paragraph, Remedial Action in Upper Silver Bow Creek.

As described in detail in General Comment H.3., identification of remedial action in upper Silver Bow Creek at this time is inappropriate. Removals should be removed only if storm water monitoring indicates that their presence is keeping Silver Bow Creek water from meeting appropriate water quality standards. Data collected over the last few years are not indicative of significant in-stream loading. Following collection and treatment of the MSD base flow, further evaluation should be completed to determine if in-stream loading is in fact significantly impacting storm flow quality. If, however, EPA determines, either now or as the result of future evaluation of information consistent with the BMP approach, that removals are necessary, AR requests that EPA identify that the scope of any reclamation activities will necessarily be limited because of the stream corridor is narrow with adjacent urban infrastructure and the potential to destabilize or damage the historical slag walls with significant excavation.

EPA Response: *The ROD requires that the contaminated sediments, stream banks, and nearby floodplain wastes be removed to minimize or eliminate impacts to surface water quality. The specifics of the remedial activities will be developed during remedial design and implemented during the remedial action phase of Superfund activities. See our prior responses addressing this same issue*

28. Page 47, second column, third full paragraph, last sentence, Recreation and Historic Amenities at LAO.

This section implies that walking trails and historical interpretive signage will be listed in the ROD and states that they will be included in final remedial designs for LAO. Walking trails and historical interpretive signage cannot be mandated as part of the CERCLA remedy. Therefore, they should not be identified as part of the remedy in the ROD. These features will be incorporated voluntarily as part of a separate agreement with Butte Silver Bow. In addition, the features have been visualized as part of the land use plan for LAO incorporating treatment lagoons where appropriate and compatible with the treatment technology. The presence of a conventional treatment plant would not provide the same sort of aesthetic setting for such features.

EPA Response: *CERCLA remedies must comply with historic preservation ARARs. Historical signage is included in the second Programmatic Agreement for the BPSOU which addresses historic preservation ARARs, and will be required under Superfund activities. Walking trails are not part of strict CERCLA requirements, but are encouraged where appropriate.*

29. Page 48, first paragraph, Conventional Treatment of Groundwater.

For the reasons detailed in General Comment E, above, AR requests that EPA identify 'lime treatment' in the ROD instead of 'conventional lime treatment technology' to allow the use of the expanded treatment lagoons for groundwater treatment, after the shakedown period.

EPA Response: *See response to specific comment 20 above.*

30. Page 48, third full paragraph, Colorado Smelter Site.

Depth to groundwater for the repository located at the Colorado Smelter site has been identified and the additional data provided to EPA. According to information (letter to Ron Bertram, Re: Atlantic Richfield Response to the Decision to Not Grant Conditional, Limited No Further Action Status for the Colorado Smelter, December 17, 2004) recently provided by AR regarding the Colorado Smelter site, the site is in compliance with all ARARs and should not require additional action.

EPA Response: *See response to specific comment 26 above*

31. Page 50, first column, last paragraph, Targeted, Multi-Pathway Approach.

AR agrees with this paragraph. However, this message is not consistently conveyed as the preferred alternative throughout the Proposed Plan. *See also,* General Comment F.

EPA Response: *See response to specific comment 24 above.*

32. Page 50, second column, third paragraph, Reclamation of Upper Silver Bow Creek.

"Contaminated stream-bed sediments have a direct impact on Silver Bow Creek water quality." According to an evaluation completed in the Focused FS

(CDM, 2004b)(Appendix E-3 of the FS) and EPA responses to NRDP comments on the Focused FS, capture of groundwater in the MSD area should achieve the reduction in COC loading necessary to meet surface water ARARs in Silver Bow Creek during normal flow (base flow) Thus, streambed sediments and bank sediment should be removed only if storm water monitoring indicates that this BMP would improve stream quality. Data collected over the last few years in accordance with the Interim Monitoring Plans indicate that concentrations in Silver Bow Creek typically decrease from approximately the confluence of Blacktail Creek and the MSD to the western end of the BPSOU and are not indicative of significant in-stream loading. Following collection and treatment of the MSD base flow, further evaluation should be completed to determine if in-stream loading is in fact significantly impacting storm flow quality.

EPA Response: *See response to specific comment 27 above.*

2.2 Response to Butte-Silver Bow Comments

BUTTE-SILVER BOW
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March 21, 2005

Mr. Ronald A. Bertram
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Mr. Richard Opper, Director
Montana Department of Environmental Quality
Metcalf Office Building, 1520 East Sixth Avenue
P.O. Box 200901
Helena, Montana 5962-0901

RE: Butte-Silver Bow Local Government Comments On the EPA's Preferred Remedy for the Butte Priority Soils Operable Unit Silver Bow Creek / Butte Area Superfund Site

Dear Messrs Bertram and Opper:

The purpose of this letter is to provide Butte-Silver Bow Local Government's (BSB's) comments on the EPA's Preferred Alternative Remedy for the Butte Priority Soils Operable Unit (BPSOU), Silver Bow Creek / Butte Area Superfund Site. We appreciate the opportunity to submit these comments to EPA.

Incorporated herein as attachments to this letter are four documents as follows:

1) The Butte-Silver Bow Position Paper Butte Priority Soils: A Proposed Solution, October 2004;
2) Butte-Silver Bow's Executive Comments on EPA's Preferred Alternative Remedy for the Butte Priority Soils Operable Unit (BPSOU), Silver Bow Creek / Butte Area Superfund Site, March 21st, 2005;
3) Verbal comments by B-SB Chief Executive Paul Babb presented to the U.S. EPA at the first BPSOU Public Hearing, Tuesday, January 25th, 2005, in Butte, Montana; and

4) Verbal comments by B-SB Chief Executive Paul Babb presented to the U.S. EPA at the second BPSOU Public Hearing, Tuesday, March 15th, 2005, in Butte, Montana.

The "BSB Position Paper" was unanimously approved by the BSB Council of Commissioners on October 20, 2004. The positions of the County have remained largely unchanged since this document was sent to the EPA in October of 2004. The BSB Position Paper is hereby submitted in its entirety as direct comment on the EPA's Preferred Remedy.

To a large extent, this comment letter restates the positions of BSB, which are contained in the October 2004 BSB Position Paper. This letter does not specifically restate each position and directs the EPA and MDEQ to the attached Position Paper and other attachments for additional comments, details, explanations and justifications.

We ask EPA and DEQ to consider these comments provided by Butte-Silver Bow Local Government as well as those comments of all concerned citizens of Butte-Silver Bow County.

Sincerely,

Paul David Babb
BSB Chief Executive

Attachments - 4
CC: Butte-Silver Bow Council of Commissioners
Butte-Silver Bow Staff
Montana DEQ
Montana NRDP
Community Technical Environmental Committee (CTEC)
Priority Soils Citizen's Working Group
Other Interested Parties

Verbal comments prepared for B-SB Chief Executive Paul Babb for presentation to the U.S. EPA during the Butte Priority Soils Operable Unit (BPSOU) Public Hearing, Tuesday, January 25th, 2005, at the Montana Tech Auditorium at 6:30 p.m.

Good Evening. My name is Paul Babb and I am the Chief Executive of Butte-Silver Bow. I wish to make a few brief statements tonight on the EPA's Proposed Plans for the Butte Priority Soils Operable Unit, or BPSOU. We are also reserving the County's right to submit written comments to the EPA at a later date.

As you know, the people of Butte and Walkerville have been anticipating the release of the EPA's Preferred Remedy for many years. In 2003, when the release of the EPAs' plans appeared imminent, the County took a positive, proactive approach and prepared it's own version of the County's Preferred Remedy. This comprehensive Position Paper laid out in great detail, precisely the remedy needed for long-term success. The County's Position Paper was distributed to the EPA, the State of Montana and the citizens of the County. After multiple drafts, extensive debate and input from the general public, the Position Paper was unanimously approved by the Butte-Silver Bow Council of Commissioners in October of 2004. The Position Paper recognizes that a comprehensive solution for the BPSOU requires more than just the CERCLA remedies set forth in the EPA's Proposed Plan.

During this same time period, the County entered into negotiations with ARCO, in order to achieve a settlement of roles and responsibilities for the work about to be performed under the final Record of Decision, or ROD, as well as other critical features of a comprehensive solution, consistent with the core principles of our Position Paper. For the last year, staff from the County Attorney's Office, the Health Department, the Planning Department and the Public Works Department, have been very busy in these negotiations. Additionally, in order to best serve and protect the interests of the County, we've also retained outside legal counsel, Mr. Gordon Hart of the law firm Paul Hastings, Janofsky & Walker, who specializes in these types of environmental settlements.

Our negotiations with ARCO have recently progressed to the point where we are very near to reaching an agreement on all major terms, subject to approval by the Council of Commissioners. We hope to present a term sheet to the Council for approval in February.

We would like to thank the EPA for extending the public comment period an additional 30 days, through March 18th. Additionally, we've noted that the EPA has scheduled only this evenings' one opportunity for a hearing of comments from the general public, and this is only scheduled for two hours. Considering the tremendous implications of the decisions now being made, and the intense public debate and public education now taking place, I would request the EPA consider providing a second public hearing toward the end of the public comment period.

Additionally, we urge each of the citizens of Butte to present their comments to the EPA. NOW is the time to speak up. NOW is the time to voice or write your opinions.

This rare opportunity for each of you to contribute directly to the Superfund process will close on March 18th and we encourage you to let the Agencies know how you feel, and what you believe, and what you want.
On specific cleanup matters, the County's Position Paper contains numerous detailed requests for consideration by the EPA and we continue to urge the Agency to consider, and re-consider, our Position Paper submitted to you last October.

Regarding the Multi-Pathway Lead Poisoning Prevention Program, we appreciate the EPA's recognition of our ongoing successful implementation of the Program. We also thank ARCO for their support of a multi-pathway approach. We strongly support the Agencies inclusion of a programmatic attic dust testing for lead, arsenic, and mercury in all homes within the Operable Unit. We strongly support the continued programmatic multi-pathway remediation of all yards, homes and attics found to exceed action levels for lead, arsenic and mercury, with testing and abatement to be phased over a thirty year period. With the inclusion of attic dusts, Butte-Silver Bow believes the program is well focused, health-based, and properly targets first, those most in need of assistance, such as homes with children or pregnant or nursing mothers The Butte-Silver Bow Health Department stands ready, willing and able to implement any multi-pathway programmatic approach ordered by the Agency to mitigate residential exposures to lead, arsenic and mercury, including all residential attics within the Operable Unit.

EPA Response: *Comment noted. EPA acknowledges the excellent job BSB has done in running the multi-pathway lead abatement program. Under the Superfund law, the Agency does not have the ability to direct the PRPs to fund the multi-pathway approach which includes lead-based paint. However, EPA hopes that an agreement can be reached between the PRPs to fund an expanded multi-pathway approach, as described in the ROD. The interior dust issue is addressed in the ROD.*

Regarding storm waters, we understand the EPA's Proposed Plan's emphasis on "Best Management Practices", or BMPs. However, we note that BMPs are only part of the solution. We are, therefore, seeking funding from ARCO for a long-term capital improvement program to repair and replace the municipal storm water systems within the Operable Unit. We do not believe it would be appropriate to require conventional lime treatment of storm waters, which we think is impractical and unnecessary.

EPA Response: *Under the BMP program, if it is determined that the municipal storm water systems are contributing contamination to storm water runoff such that ARARs are not met, appropriate corrective action, which could include storm water treatment, will be implemented.*

Regarding water treatment in Lower Area One, or LAO, the County provided 5 criteria for the EPA to meet with any water treatment methods. The County continues to believe that these 5 criteria must be met, including the establishment of a Trust Fund to operate, maintain and monitor the final facilities as long as required by the ROD We are aware that ARCO believes that its' expanded lagoon treatment system meets the 5 criteria. We believe the lagoon system may meet the criteria, and if

additional data demonstrates that it does, the lagoon system would be acceptable to Butte-Silver Bow.

EPA Response: *Comment noted.*

Regarding the removal of the Parrott Tailings and other wastes in the Metro Storm Drain corridor, the County provided 6 criteria for the EPA to meet. The County continues to believe that these 6 criteria must be met, including the establishment of a Trust Fund to operate, manage and maintain the final remedies as long as required by the ROD.

EPA Response: *EPA must base its remedial decisions on the criteria described in the CERCLA statute and the NCP. Application of these criteria by EPA to the Parrott Tailings/MSD area is described in the ROD and the Proposed Plan. EPA's enforcement actions, post-ROD, will address financial assurance requirements for PRP implementation of the ROD.*

In the Position Paper, the County emphasized that regardless of whatever final remedies are selected by the EPA, a meaningful level of Redevelopment Trust Funds must be established to restore, redevelop and enrich the Butte community. We understand that EPA's Proposed Plan does not address this issue, but we want to make clear, we support the waste-in-place remedies in the Proposed Plan for the Butte Hill because we are confident we will be able to secure a meaningful Redevelopment Trust Fund through our negotiations with ARCO.

EPA Response: *Comment noted. EPA supports the county's efforts of redevelopment of remediated sites.*

And finally, regarding any future settlements for natural resource damages, the County has clearly stated, and continues to request, that any funds from natural resource damages which occurred in Butte, be specifically earmarked for restoration projects in Butte and Butte alone. Considering that this earmarking of Natural Resource Damage funds has been implemented elsewhere in the Clark Fork Basin, the citizens of Butte deserve and demand nothing less.

Thank you very much for this opportunity to comment. As mentioned, the County intends to submit more complete and more detailed written comments at a later date.

EPA Response: *EPA does not have a decision making role in the Natural Resource Damages process.*

Verbal comments prepared for B-SB Chief Executive Paul Babb for presentation to the U.S. EPA and Montana DEQ during the Butte Priority Soils Operable Unit (BPSOU) second Public Hearing, at the Butte Elks Club, Tuesday, March 15th, 2005, at 6:30 p.m.

Good Evening. My name is Paul Babb and I am the Chief Executive of Butte-Silver Bow. I wish to make a few brief statements tonight on the EPA's Proposed Remedies for the Butte Priority Soils Operable Unit. Butte-Silver Bow is planning to submit formal written comments to the EPA on or before March 21st, 2005.

We would like to thank the EPA for extending the public comment period an additional 30 days, and for providing this second public hearing, as we requested.

As you know, the people of Butte and Walkerville have been anticipating the release of the EPA's Preferred Remedy for many years. In 2003, when the release of the EPAs' plans appeared imminent, the County took a positive, proactive approach and prepared it's own version of what the County wanted to see in the EPA's Preferred Remedy. This comprehensive Position Paper laid out in great detail, precisely the remedy needed for long-term success. The County's Position Paper was distributed to the EPA, the State of Montana and the citizens of the County. After multiple revisions, extensive debate and input from the general public, the Position Paper was unanimously approved by the Butte-Silver Bow Council of Commissioners in October of 2004.

The County recognized that a comprehensive solution for the BPSOU would require much more than just the CERCLA remedies set forth in the EPA's Proposed Plan. Accordingly, the County entered into negotiations with ARCO, in order to achieve a preliminary understanding of roles and responsibilities among the PRPs, for the work about to be performed under the Record of Decision. The County believes that critical features of a comprehensive solution, which are consistent with the core principles of the County's Position Paper must be part of the final Remedy. Additionally, in order to best serve and protect the interests of the County, we've retained outside legal counsel who specializes in these types of environmental settlements.

Our negotiations with ARCO have progressed to the point where, on February 9th, 2005,we presented a proposed Settlement Term Sheet to the Council of Commissioners for their review and approval. The Council will vote on the proposed Term Sheet at the March 23rd meeting. It is our intention that the alternative assurances from ARCO will compliment the EPA's Remedy, and provide Butte-Silver Bow with local control of long-term programs and protection from unfunded liabilities. Additionally, these negotiations will provide BSB with several critical programs, which BSB believes are absolutely necessary for success in the BPSOU Remedy. These critical programs, designed to compliment the EPA's Remedy include:

1) continuation of the Multi-Pathway Lead Poisoning Prevention Program currently operated by BSB, with an aggressive approach to indoor contamination, including dusts in residential living spaces and attics;
2) an ongoing, long-term, capital improvement program to repair and/or replace ALL of the municipal storm water systems within the BPSOU; and
3) a significant Redevelopment Trust Fund to assist the communities of B-SB in addressing the long-term impacts of leaving significant volumes of waste-in-place as part of the EPA's Remedy.

Overall, BSB believes EPA's Preferred Remedy is a positive step in many right directions, and is consistent in many ways with the BSB Position Paper released last October. On specific cleanup matters, the County's Position Paper contains numerous detailed requests for consideration by the EPA and we continue to urge the Agency to consider, and re-consider, the details in our Position Paper submitted to you last October.

Regarding the Multi-Pathway Lead Poisoning Prevention Program, Butte-Silver Bow continues to believe protection of human health is the highest priority. We are as concerned now as we were ten years ago, when elevated blood leads were discovered in our community. Indoor dusts containing elevated metals are a major concern of the Butte community and must be addressed in the Remedy. BSB believes a properly prioritized implementation of the multi-pathway program is necessary and that long-term residual concerns will need to be programmatically addressed throughout the BPSOU for as long as thirty year into the future. The staff of BSB stands ready willing and able to implement any multi-pathway programmatic approach required by the ROD to address residential exposures to metals, such as lead, arsenic and mercury. We firmly believe these contaminants need to be addressed in outside yards and inside living areas.

EPA Response: *Comment noted. EPA acknowledges the excellent job BSB has done in running the multi-pathway lead abatement program. Under the Superfund law, the Agency does not have the ability to direct the PRPs to fund the multi-pathway approach which includes lead-based paint. However, EPA hopes that an agreement can be reached between the PRPs to fund an expanded multi-pathway approach as described in the ROD. The interior dust issue is addressed in the ROD*

Regarding storm waters, we understand the EPA's Proposed Plan's emphasis on "Best Management Practices", or BMPs. However, we note that BMPs are only part of the solution. We are, therefore, seeking funding from ARCO for a long-term capital improvement program to repair and replace the municipal storm water systems within the Operable Unit. We do not believe it would be appropriate to require conventional lime treatment of storm waters, which we believe is impractical and unnecessary.

EPA Response: *Under the BMP program, if it is determined that the municipal storm water systems are contributing contamination to storm water runoff above ARAR standards, appropriate corrective action, which could include storm water treatment, will be implemented.*

Regarding water treatment in Lower Area One, or LAO, the County has provided 5 criteria for the EPA to meet with any water treatment methods. The County continues to maintain these 5 criteria must be met by the EPA's Remedy, including the assurance of available resources to operate, maintain, and monitor the final facilities as long as required by the ROD. We are aware that ARCO believes its expanded lagoon treatment system may meet BSB's 5 criteria. We believe the lagoon system may meet BSB's 5 criteria, and if additional data demonstrates that it does, and that it meets the EPA's performance criteria in the ROD the expanded lagoon system would be acceptable to Butte-Silver Bow.

EPA Response: *The ROD has selected continued use of the lagoon treatment system on a conditional basis. This decision was made in accordance with CERCLA and NCP criteria and requirements. EPA agrees that appropriate sizing is important The system will be thoroughly evaluated during remedial design. Financial assurance will be addressed in post-ROD enforcement proceedings by EPA, consistent with EPA guidance*

Regarding the removal of the Parrott Tailings and other wastes in the Metro Storm Drain corridor, the County provided 6 criteria for the EPA's Remedy to meet. The County continues to believe these 6 criteria must be. met, including the assurance of available resources to operate, manage and maintain the final Remedies as long as required by the ROD.

EPA Response: *During the remedial design phase, a detailed monitoring program will be developed and implemented. This may include installation of additional wells as deemed appropriate. If it is determined during the monitoring program that the groundwater plume is not being controlled as intended by the remedial action, additional measures will be taken as explained in the ROD Financial assurance will be addressed in post-ROD enforcement proceedings by EPA, consistent with EPA guidance.*

In our Position Paper, the County emphasized that regardless of whatever final remedies are selected by the EPA, a meaningful level of Redevelopment Trust Funds must be established to restore, redevelop and enrich the Butte community. We understand that EPA's Proposed Plan does not address this issue, but we want to make clear, we support the waste-in-place remedies in the Proposed Plan for the Butte Hill because we are confident we will be able to secure a meaningful Redevelopment Trust Fund through our negotiations with ARCO.

EPA Response: *Comment noted. EPA supports the county's efforts of redevelopment of remediated sites.*

Considering the massive amounts of wastes-left-in-place, BSB strongly requests EPA clearly establish in the ROD a high priority for grants from the EPA's Brownfields Cleanup and Redevelopment Program to the BPSOU. We are further requesting that an EPA expert in brownfields redevelopment be permanently stationed in the EPA's Butte office. Having a Butte resident expert in EPA brownfields redevelopment would provide tremendous value to the Butte banking and financial communities, as well as real estate developers, builders and homeowners. These EPA redevelopment

resources would be shared with all of the other communities along the entire length of the Clark Fork River watershed.

EPA Response: *EPA does not award Brownfield grants for Superfund sites. However, BSB or other entities in BPSOU can apply for Brownfield grants for industrial properties contaminated with wastes other than mining wastes (e.g , asbestos or lead-based paint).*

And finally, regarding any future settlements for natural resource damages, the County has clearly stated, and continues to request, that any funds from natural resource damages which occurred in Butte, be specifically earmarked for restoration projects in Butte and Butte alone. Considering that this earmarking of Natural Resource Damage funds has been implemented elsewhere in the Clark Fork Basin, the citizens of Butte deserve and demand nothing less.

EPA Response: *EPA does not have a decision making role in the Natural Resource Damages process.*

Butte-Silver Bow County again urges each of the citizens of Butte to present their comments to the EPA. This rare opportunity for each of you to contribute directly to the Superfund process will close on March 21st, and we encourage you to let the Agencies know what you the citizens, want to see in the final Remedy.

As I mentioned, the County is planning to submit formal written comments to the EPA prior to the close of the comment period. Thank you very much for this opportunity to comment.

Butte-Silver Bow's Executive Comments On EPA's Preferred Alternative Remedy For the Butte Priority Soils Operable Unit (BPSOU) Silver Bow Creek / Butte Area Superfund Site

March 21, 2005

Overall Comment
Overall, BSB believes EPA's proposed Preferred Alternative Remedy positive step in many right directions and is consistent in many ways with the BSB Position Paper.

However, in order to achieve all of the key features which BSB believes are absolutely necessary for success, such as local control of long-term programs,protection from unfunded liabilities, and mitigation of the potentially adverse impacts of the remedy on redevelopment activities, BSB has entered negotiations with the Atlantic Richfield Company (ARCO) to supplement EPA's preferred remedy with features that are critical to an overall solution to the BPSOU but which EPA has not included in its proposed remedy. These negotiations are designed to ensure, among other things:

1.) Funding to ensure continuing local government control of the Multi-Pathway Lead Poisoning Prevention Program currently operated by BSB with an aggressive approach to indoor dusts;
2.) An ongoing, long-term, capital improvement program to repair and/or replace all of the municipal storm water systems within the BPSOU; and
3.) the establishment of a significant Redevelopment Trust Fund to assist the BSB communities in addressing long-term impacts of leaving significant volumes of waste-in-place as part of the EPA's Remedy.

Public Comment Process
BSB thanks the EPA for extending the Public comment period an additional 30 days. We also thank the EPA for providing a second Public Hearing, as requested.

We ask EPA and DEQ to consider these comments provided by Butte-Silver Bow Local Government, as well as those comments of all concerned citizens of Butte-Silver Bow County.

Protection of Human Health
BSB continues to believe protection of human health is the highest priority. Indoor dusts containing elevated metals are a major concern of the Butte community and must be addressed in the Remedy.

BSB strongly believes continued implementation of BSB's Multi-Pathway Lead Poisoning Prevention Program is the approach most protective of human health. BSB believes a properly prioritized implementation of the multi-pathway program is necessary, and that long-term residual concerns will need to be programmatically addressed for as long as thirty years. BSB would implement any multi-pathway programmatic approach required by the ROD to address residential exposures to metals (e g., lead, arsenic and mercury) within the BPSOU.

BSB's recommended position on residential soils and attic dust is contingent upon two absolute assumptions that; 1) the program outlined in the attached Position Paper be administered and implemented by Butte-Silver Bow, with full control and responsibility; and 2) there be sufficient financial resources provided through the ROD and Consent Decree to implement the program. In the absence of Butte-Silver Bow's control of a fully-funded program, there is no confidence the proposed approach to address potential human health problems would be effective. The Agencies are referred to the attached BSB Position Paper for further comments.

EPA Response: *Comment noted. EPA acknowledges the excellent job BSB has done in running the multi-pathway lead abatement program. Under the Superfund law, the Agency does not have the ability to direct the PRPs to fund the multi-pathway approach which includes lead-based paint. However, EPA hopes that an agreement can be reached between the PRPs to fund an expanded multi-pathway approach as described in the ROD. The interior dust issue is addressed in the ROD*

Community Redevelopment

The EPA's Cleanup Proposal states, "EPA encourages the continued cooperation efforts among the PRPs to ensure that the extensive redevelopment efforts that have and are occurring at waste-in-place sites continues." BSB has repeatedly stated that the end result of the Priority Soils cleanup must absolutely accommodate and promote the beneficial re-use and development of the reclaimed properties. To the extent the selected Remedy relies on engineered caps to minimize exposures to mining wastes, the community will be forced to deal with those wastes in the context of long-term future development.

The concept of fostering redevelopment and historic preservation (and by extension, economic prosperity) through environmental cleanup must continue in earnest. Regardless of the future land use of the reclaimed areas, the selected Remedy must not only allow that re-use, but must provide the resources to cover any incremental redevelopment be consistent with and recognize redevelopment solution.. The community will suffer disproportionately, particularly in lower income neighborhoods, from these hidden costs if sufficient resources are not provided for redevelopment purposes.

The EPA's Cleanup Proposal further states, "The Preferred Alternative is fully compatible with redevelopment and reuse within Butte and Walkerville, and EPA and the State will continue to work cooperatively with the local County government and the PRPs to continue redevelopment efforts." However, the level and extent of EPA's cooperation is not clear. Providing permanent assistance from the EPA's Brownfields Cleanup and Redevelopment Program would substantially fortify EPA's and the State's commitment to, "working cooperatively with the local County government."

Considering the central reliance of the preferred remedy on wastes-left-in-place, BSB strongly requests EPA clearly establish in the ROD a high priority for grants from the EPA's Brownfields Cleanup and Redevelopment Program to the BPSOU.

Additionally, as the initial cleanup portions of the Butte Remedy are now approaching completion, BSB requests that an EPA expert in brownfields redevelopment be permanently stationed in the EPA's Butte office. Having a Butte-resident expert in EPA brownfields redevelopment would provide tremendous value to the Butte banking and financial communities, as well as real estate developers, builders and homeowners. These EPA resources would be shared with all of the other communities along the entire length of the Clark Fork River watershed. The Agencies are referred to in the attached BSB Position Paper for further comments.

EPA Response: *EPA does not award Brownfield grants for Superfund sites. However, BSB or other entities in BPSOU can apply for Brownfield grants for industrial properties contaminated with wastes other than mining wastes (e g., asbestos or lead-based paint).*

Enhancement of Engineered Soil Caps
The final Remedy on all non-residential source areas should be designed and constructed to comply with all Applicable or Relevant and Appropriate Requirements (ARARs),specifically standards of the State of Montana) The Agencies are referred to the attached BSB Position Paper for further comments.

EPA Response: *EPA agrees with this comment. ARARs are identified in the ROD The BRES is designed to ensure compliance with relevant reclamation ARARs in these areas.*

Mine Waste Repository
The EPA's Cleanup Proposal states that, "The existing Butte Mine Waste Repository will be closed in compliance with ARARs. A new repository will be sited next to the existing repository if that capacity is needed." The bolded language implies there may be uncertainty as to whether construction of a new repository is necessary. BSB disagrees with this uncertainty. The Remedy must clearly state the need for the new repository, along with a firm schedule for its siting and construction. The Agencies are referred to the attached BSB Position Paper for further comments.

EPA Response: *EPA disagrees. A new repository will be built only if it is necessary. Remedial design will address this issue in more detail.*

Syndicate Pit
BSB anticipates that EPA will select a final remedy in its ROD that will require reclamation of the Syndicate Pit consistent with the plan attached the March 2004 BPSOU Feasibility Study as Appendix E-2a ("Syndicate Pit Reclamation Plan"). AR would design and construct the reclamation remedy for the Syndicate Pit consistent with the Syndicate Pit Reclamation Plan. In addition, AR would provide for release of standing water from the detention basin following an appropriate period for the settling of solids.

EPA Response *Comment noted. The final design for the Syndicate Pit, including management of the storm water, will be completed during the remedial design phase and must be consistent with the ROD.*

Storm Waters
BSB understands the EPA's Proposed Plan's reliance on "Best Management Practices", or BMPs. However, we note that BMPs are only part of the solution. We are, therefore, seeking funding from ARCO for a long-term capital improvement program to repair and/or replace the municipal storm water systems within the Operable Unit. We do not believe it would be appropriate to require conventional lime treatment of storm waters, which we believe is impractical and unnecessary.

EPA Response: *Under the BMP program, if it is determined that the municipal storm water systems are contributing contamination to storm water runoff above ARAR standards, appropriate corrective action, which could include storm water treatment, will be implemented.*

Mine Wastes within Metro Storm Drain and Lower Area One
Butte-Silver Bow has established a set of criteria for the EPA's MSD and LAO Remedy to meet, fully recognizing that the EPA may yet specify any number of removal options. BSB has consistently maintained that the EPA Remedy meet all of these criteria.

Regardless of the fate of the Parrott Tailings and associated mine wastes on surface, the ROD should mandate that a series of monitoring wells be installed to accurately define and characterize the current size, shape, and locations of the contaminated groundwater plume(s) under both the MSD corridor and LAO as well as their flow rates, flow directions and level(s) of contamination. The Remedy should subsequently select and implement a Remedy, which assures, and verifies in the long-term, that the plumes are entirely contained from any further spreading. The ROD should take into account ARCO's 1993 Conceptual LAO Reclamation Plan, previously approved and adopted by the BSB Council of Commissioners, understanding that some modifications are necessary to reflect changed circumstances. The Agencies are referred to the attached BSB Position Paper for these criteria and further comments.

EPA Response: *During the remedial design phase, a detailed monitoring program will be developed and implemented. This may include installation of additional wells as deemed appropriate. If it is determined during the monitoring program that the groundwater plume is not being controlled as intended by the remedial action, additional measures will be taken as explained in the ROD.*

Treatment of Contaminated Waters
Butte-Silver Bow has established a set of criteria for the EPA's water treatment Remedy to meet, fully recognizing that the EPA may yet specify any number of water treatment options. BSB has consistently maintained that the EPA Remedy meet all of these criteria.

We note that in order to meet these criteria, whatever water treatment system(s) are selected to treat extracted groundwaters (e.g., lagoons and/or conventional), the system(s) must be appropriately sized.

EPA Response: *The ROD has selected continued use of the lagoon treatment system on a conditional basis. This decision was made in accordance with CERCLA and NCP criteria and requirements. EPA agrees that appropriate sizing is important. The system will be thoroughly evaluated during remedial design.*

BSB believes that operation of the expanded lagoon treatment system currently being implemented by Atlantic Richfield may be able to satisfy these criteria. If additional data collected by AR demonstrates that an expanded lagoon treatment system meets the BSB criteria and the performance criteria to be set forth in the ROD, then such a system would be acceptable to BSB as a permanent groundwater treatment technology for the BPSOU.

EPA Response: *Comment noted. See the above response.*

The Agencies are referred to the attached BSB Position Paper for these criteria and further comments.

Long-Term Operations and Maintenance
The Butte community must have absolute assurance in the ROD and subsequent Consent Decree that sufficient resources are available to operate, maintain, and as necessary, reconstruct and/or enhance all protective caps and water collection, water treatment and water management systems in the long-term. The Agencies are referred to the attached BSB Position Paper for further comments.

EPA Response: *Financial assurance will be addressed in post-ROD enforcement proceedings by EPA, consistent with EPA guidance*

Natural Resource Damages
The Butte-Silver Bow Local Government has clearly stated, and continues to request, that any funds from natural resource damages which occurred in Butte, be specifically earmarked for restoration projects in Butte. Considering that this earmarking of Natural Resource Damage funds has been implemented elsewhere in the Clark Fork Basin, the citizens of Butte deserve and demand nothing less. The Agencies are referred to the attached BSB Position Paper for further comments.

EPA Response: *EPA does not have a decision making role in the Natural Resource Damages process.*

2.3 Response to Railroad Group Comments

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16 March 2005

Mr. Ron Bertram
Remediation Project Manager
Region 8, Montana Office
U.S. Environmental Protection Agency
10 West 15th Street, Suite 3200
Helena, Montana 59626
Subject: Comment Regarding Superfund Program Cleanup Proposal Butte Priority Soils Operable Unit K/J 006068.00

Dear Mr. Bertram:
This letter provides comments to the United States Environmental Protection Agency (EPA) regarding the 20 December 2004 Superfund Program Cleanup Proposal (Proposed Plan) for the Butte Priority Soils Operable Unit (BPSOU) of the Silver Bow Creek/Butte Area Superfund Site. Kennedy/Jenks Consultants has prepared these comments on behalf of the BNSF Railway Company (BNSF) and the Union Pacific Railroad Company (Union Pacific).
On page 44 (Sites Not Granted "Conditional, Limited No Further Action* Status), the Proposed Plan lists three sites that were determined not to meet Applicable or Relevant and Appropriate Requirements (ARARs) and preliminary Remedial Action Goals (RAOs) in the Response Action Summary Document. Lower Railroad Yard Site 1 is one of the three sites.

The Proposed Plan calls for monitoring Lower Yard Site 1, and if the seasonal high water table is less than 10 feet below the base of the mining waste present, wastes will be removed to a designated repository. Kennedy/Jenks Consultants understands that EPA considers Lower Railroad Yard Site 1 to comprise an approximately 1,800-square-foot accumulation of mining waste (colloquially known as a "slicken") that was capped as part of the Railroad Beds Time Critical Removal Action. The slicken, which is present on the floodplain at the toe of the railroad embankment carrying the BNSF main line across the Metro Storm Drain/Silver Bow Creek floodplain, is located partly on railroad right-of-way and partly on the adjacent property to the south.

Several other slickens present on the floodplain were not specifically identified for evaluation and removal in the text discussing Lower Railroad Yard Site 1. We understand that EPA's discussion on Proposed Plan page 46, "Sediment Removal

from Blacktail and Silver Bow Creek Channels," is directed in part at removing the other slickens in the vicinity of Lower Railroad Yard Site 1.

BNSF and Union Pacific will support EPA's decision regarding remediation of slickens present in floodplain sediments located near the confluence of Metro Storm Drain, Blacktail Creek, and Silver Bow Creek, provided the remedy is consistent for all slickens, including the one at Lower Railroad Yard Site 1.

EPA Response: *EPA notes that the wastes from the railbed embankment that were placed on the slickens are not themselves slickens but other forms of waste fill. Other slickens areas near the confluence of Blacktail Creek and the MSD will be removed. Thus, if the Lower Railroad Yard Site is found to be less than 10 feet from groundwater and removed, the action will be consistent with actions at similar sites*

Our support includes removal (if selected) of the Lower Yard Site 1 slicken up to the toe of the railroad embankment. However, the remediation design will need to include careful geotechnical engineering to prevent destabilization of the railroad embankment. Installation of sheet piling or similar geotechnical support may be warranted if the slicken extends more than 1 or 2 feet below the former ground surface (before installation of the existing Site 1 soil cap).
This railroad embankment supports the BNSF main line, which carries at least four trains per day, 5 to 6 days per week. Destabilization of the embankment would severely compromise train safety. In addition, depending on the extent of slicken removal, it could also affect the stability of the eastern abutment of the Silver Bow Creek railroad bridge, which is located only 150 feet west of the Lower Yard Site 1 slicken. Destabilizing or removing any portion of the embankment could severely impair railroad services to the Butte community and endanger the safety of trains and their crews.

EPA Response: *Comment noted. These concerns will be addressed during remedial design.*

If you have any questions about our comments, please contact Dave Smith of BNSF at (406) 447-2307, Gary Honeyman of Union Pacific at (307) 745-6532, or Chuck Soule of Kennedy/Jenks Consultants at (253) 874-0555.

Very truly yours, KENNEDY/JENKS CONSULTANTS

Charles H. Soule
Railroad Group Technical Representative
cc: Sara Sparks, EPA Butte Office
Kevin Kirley, MDEQ
Dave Smith, BNSF
Gary Honeyman, Union Pacific
Leo Berry, BKBH
Chuck Stillwell, Atlantic Richfield

Section 3

Response to Agency Comments

Section 3
Responses to Agency Comments

The comments submitted to EPA from other agencies (DEQ, NRDP, and Fish and Wildlife Service) are presented in their entirety. EPA responses are presented in italic font.

3.1 EPA Response to DEQ's comments

Reference: DEQ's Public Comments on EPA's Proposed Plan, Butte Priority Soils Operable Unit (BPSOU), Silver Bow Creek/Butte Area NPL Site. Letter from Sandi Olson (DEQ) to Robert L. Fox (EPA), March 18, 2005.

Principal Threat Wastes: EPA's conclusion that there are no remaining principal threat wastes within the OU and decision not to take any action to reduce the mobility of these source materials through engineered containment is inconsistent with the NCP.

EPA Response: *EPA's guidance on principal threat wastes, "A Guide to Principal Threat and Low Level Threat Wastes" (EPA 1992) states that wastes which can be reliably contained should not be classified as principal threat wastes. The guidance also states that the determination of principal threat wastes is a site-specific one, based on site-specific circumstances At the BPSOU, where prior removal actions have addressed the most highly toxic and mobile wastes and where the actions have demonstrated that most remaining source areas can be reliably contained through capping and interception systems, as described in the ROD, EPA's determinations on this issue are appropriate and consistent with the NCP and EPA guidance.*

Additionally, EPA has taken engineering actions to reduce the mobility of the source materials at the BPSOU and requires additional actions for engineered containment in the ROD. Engineered caps are designed to contain and control the mobility of and exposure to waste source materials and have been successfully employed as a standard practice for this purpose. Interception and treatment systems reduce the mobility of mine waste constituents by preventing their uncontrolled release into Silver Bow Creek These actions are also consistent with the NCP.

The department has reviewed EPA's Proposed Plan for the Butte Priority Soils Operable Unit and has concluded that EPA's proposed remedial action does not comply with State groundwater, solid waste and floodplain ARARs. EPA proposes a waiver of all groundwater standards for the alluvial aquifer under CERCLA 42 U S.C. § 9621(d)(4)(C) [technically impracticable from an engineering perspective]. DEQ does not agree with EPA's conclusion that waiver of groundwater ARARs is necessary or appropriate for the BPSOU alluvial aquifer underlying the Metro Storm Drain (MSD) This determination is not supported by substantial evidence on the administrative record, a record that highlights uncertainty with respect to the potential of certain alternatives to clean up the aquifer.

EPA Response: *The administrative record contains extensive support for EPA's decision to waive groundwater standards in the alluvial aquifer based on CERCLA's technical impracticability waiver and EPA's Selected Remedy for groundwater. While some uncertainty exists with respect to groundwater travel times and contaminant travel times, in the end, this uncertainty does not change the fact that groundwater will need to be controlled, captured, and treated in perpetuity because it will not achieve the ARAR standards for groundwater Please see EPA's detailed responses to comments on the draft Technical Impracticability Evaluation and the final Technical Impracticability Evaluation (both EPA 2006) for further information on this issue and a detailed response to prior State comments on the TI waiver*

Further, EPA's analysis of the ARARs issue is inconsistent with the National Contingency Plan (NCP). The proposed TI waiver is not evaluated or selected in accordance with the EPA's *"Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration"* (EPA Guidance). According to EPA's Project Officer, EPA is relying on the PRP group to create a written justification for its TI decision.

EPA Response: *EPA's TI waiver decision was done in full consideration of the referenced guidance, which is, after all, guidance to be applied as appropriate to site specific circumstances. EPA's TI waiver decision is also fully consistent with the NCP A thorough explanation of EPA's decision making, which demonstrates EPA's NCP compliance and guidance consideration, is contained in EPA's detailed responses to comments on the draft Technical Impracticability Evaluation and the final Technical Impracticability Evaluation (both EPA 2006), which are incorporated herein by reference. EPA is not certain what EPA "project officer" statement the State is referring to (EPA's project personnel are known as remedial project managers and not as project officers), but EPA's decision is its own, and EPA's rationale for the decision are contained in the EPA authored documents described above and in many other EPA authored documents in the BPSOU Administrative Record*

EPA does not document a basis for waiver of the solid waste / floodplain requirements in the Proposed Plan. Therefore, the proposed remedy does not meet this threshold requirement as set forth in CERCLA 42 U.S C. § 9621(d) and 40 C.F.R. 300.430(f)(1)(i)(A) and is not eligible for selection.

EPA Response: *Some of the waste material in the Metro Storm Drain area and in the Lower Area One area (but not all) is located in a current floodplain EPA's remedial decision reflected in this ROD will leave this waste in place. Consistent with the state of Montana authored Streamside Tailings Record of Decision (EPA/DEQ 1995), when waste or contaminated soil is left in place in floodplains, the state and federal solid waste and floodplain ARARs are not triggered (see footnotes 33 and 36 of the SST ROD ARARs attachment [Appendix A to the SST ROD] unless active management of wastes occurs. EPA does not believe that active management of waste left in place, as defined as "physically disturbing accumulated wastes within a management unit" (see 57 Fed.Reg 37298 (August 18, 1992) and 54 Fed Reg 36597 (September 1, 1989), will occur under the BPSOU remedy. Therefore, the decision to leave waste in place in the floodplain does not trigger or violate the cited ARARs and a waiver is not needed*

In a measure done to address these state concerns, EPA has expanded the BPSOU Record of Decision's discussion of the technical impracticability waiver for groundwater standards to include the ARAR's cited by the State in this comment, should those ARARs be determined to have been triggered in some manner With this addition, there is no question that the ROD meets the threshold requirement of ARARs compliance of waiver justification, as required by CERCLA and the NCP. The language to address this provisional waiver was developed in close cooperation with the State and has been approved by the State

As a consequence, DEQ does not concur with the proposed remedy at the present time. DEQ has worked closely through the investigation and evaluation process and is committed to continued cooperation with EPA, and to seek changes in the proposed remedy that meet the needs of both agencies in addressing state concerns through the preparation and issuance of the Record of Decision. As you know, State acceptance is a modifying criterion to be considered in remedy selection. 40 C.F.R. 300.430(e)(9)(iii).[1]

EPA Response: *EPA will work closely with the State on the ROD and the ROD's implementation to ensure as much State concurrence and involvement as is appropriate, and appreciates the State's commitment to continued cooperation with EPA despite the disagreement over the decision to leave certain wastes in place and to capture and treat the contamination from these wastes. EPA has considered State acceptance in its decision, as a modifying criteria, as required by the NCP*

While DEQ recognizes that State concurrence on a Record of Decision is not a prerequisite to EPA's selecting a remedy,[2] EPA must, prior to the entry of any Consent Decree, provide the State an opportunity to concur or not in the remedy selection. If the State concurs, the State may become a signatory to the Consent Decree. If the State does not concur, it may, pursuant to CERCLA 42 U.S.C. § 9621(f)(2)(B), intervene in the action as a matter of right and seek to have the remedial action be made to conform to ARARs. The remedial action shall conform to ARARs if the State establishes, on the administrative record, that EPA's decision was not supported by substantial evidence. Success under this statutory procedure would postpone the remedy selection and extend Consent Decree negotiations until the Record of Decision is revised to select a remedy that complies with these standards.

EPA Response: *EPA understands that the State has certain rights under CERCLA to challenge Consent Decrees to which it is not a signatory which concern an ARAR waiver with which it does not agree EPA has carefully considered the State's views in this matter, and has tried to respond, on the record, to the substantive and legal concerns raised by the State In the*

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1 The State concerns that shall be assessed include (1) The State's position and key concerns related to the preferred alternative and other alternatives, and (2) State comments on ARARs or the proposed use of waivers 40 C F R 300 430(e)(9)(iii)(H)

2 40 C F R 300 515(e)(2)(ii)

end, EPA cannot make an important remedial decision based on a threat of delay in remedy selection and Consent Decree negotiation, but instead must make that decision based on an objective analysis of the facts and situation at hand, under the appropriate legal criteria. EPA believes it has done so with the BPSOU ROD. EPA is hopeful that the State and EPA will continue to find ways to cooperate in the implementation of the BPOSU remedy despite the State's concerns, as delay and further litigation is in no-one's interest. EPA also believes that its decision to waive the groundwater standards at issue is an appropriate one that can withstand the legal challenge described in this comment.

Summary of Preferred Alternative
Approximately 1.5 million cubic yards of mine waste materials, buried and partially saturated deposits of tailings, slag, waste rock and contaminated soil material, have come to be located on the site. The alluvial groundwater is severely contaminated with arsenic and metals that have leached and are continuing to leach from these wastes, preventing beneficial use. Shallow alluvial groundwater discharges into the Metro Storm Drain (MSD) channel and in turn into Silver Bow Creek, at levels that exceed water quality standards. Thus, these mine wastes currently impact both surface water and groundwater quality in the BPSOU. The Proposed Plan would address the impacts of the alluvial aquifer on surface water quality through capture and treatment of that portion of the contaminated groundwater that would enter the MSD channel as surface water. EPA proposes to capture and treat this water in perpetuity (for hundreds or thousands of years) because no source material will be removed. EPA proposes to take no action to address groundwater contamination. There is no action proposed to remove source material or reduce groundwater contamination. Even accessible source material is to be left in place. EPA proposes no treatment for mine waste materials, nor any engineered containment to reduce contaminant mobility and instead relies solely upon monitoring and Institutional Controls (ICs) in perpetuity to achieve the threshold requirement of protectiveness for the remedy.

EPA Response: *EPA disagrees with many aspects of this comment, much of which are a gross mischaracterization of the BPSOU remedy, and notes that it is clearly not relying solely on monitoring and Institutional Controls to achieve protectiveness, but is requiring expensive and comprehensive capture and treatment of the contaminated groundwater before that water can reach exposure pathways at the site More specific responses to these general comments are provided in the discussion below*

Problems with EPA's Remedy Selection

The Preferred Alternative does not comply with ARARs, is inconsistent with the NCP and is not evaluated or selected in accordance with the EPA's *"Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration"* (EPA Guidance). DEQ bases its objections to the selection of the Preferred Alternative upon a number of factors highlighted below. This discussion centers primarily on information referred to in the Focused Feasibility Study (FFS) and the Proposed Plan (PP).

1) Principal Threat Wastes. The NCP establishes an expectation that EPA will use treatment to address principal threats posed by a site whenever practicable. *40 CFR 300 430(a)(1)(iii)(A).* If treatment is not effective, then EPA should use engineered containment. *Id* The "principal threat" concept is applied to the characterization of source materials at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to groundwater, surface water or air, or act as a source for direct exposure. Principal threat wastes are those materials considered highly mobile that cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. Mobile source material is surface or subsurface soil containing high concentrations of chemicals of concern that are (or potentially are) mobile due to wind entrainment, surface runoff or subsurface transport.

In the BPSOU, large portions of the alluvial aquifer will remain impacted and mine waste materials will continue to leach chemicals of concern (COCs) to groundwater for thousands of years. FFS pgs. 5-14. *"Impacts are greatest beneath and downgradient of the Parrott Tailings, North Side Tailings, and the Diggings East Tailings. Contaminants in these areas exceed applicable water quality standards, in some cases by several orders of magnitude."* PP pg. 16. Consistent with EPA Guidance, DEQ endorses the remedial alternative that removes and contains these principal threat wastes to the extent practicable in an engineered repository. EPA's conclusion in the Proposed Plan that there are no remaining principal threat wastes within the operable unit (OU)[3] and decision not to take any action to reduce the mobility of these source materials through engineered containment is inconsistent with the NCP.

EPA Response: *EPA disagrees Principal threat wastes are highly mobile or toxic and cannot be reliably contained The wastes in Butte are high volume and low toxicity wastes and do not meet the definition of a principal threat waste and can be reliably contained, and are therefore not subject to the NCP's preference for treatment. See the response to the same comment above on page 1 for further explanation and answer to this comment.*

2) Preferred Alternative Does Not Comply with Threshold Criteria.[4]

To be eligible for selection as a remedy, the Preferred Alternative must meet the threshold requirement of compliance with ARARs (or provide a legitimate basis for waiving ARARs).

a) Solid Waste ARARs. The Preferred Alternative does not comply with solid waste ARARs or provide a basis for waiving these requirements. The Proposed Plan

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3 "EPA does not believe any of the remaining wastes within the OU constitute highly toxic and mobile source wastes - known in Superfund as "principal threat wastes" PP pg 17

4 42 USC § 9621(d)(2)

says *"Under the Preferred Alternative, these buried and partially saturated wastes will be managed in a waste management unit with appropriate groundwater monitoring and ICs "* PP pg. 47. The Focused Feasibility Study says: *"The MSD channel lies in a 100-year floodplain. Only a minimal amount of waste material would be disturbed in the floodplain through installation of the subdrain collection system. However, this action would trigger ARARs concerning prohibition of solid waste disposal in the floodplain, and a waiver may be needed."* FFS pg. 5-9. The Proposed Plan does not demonstrate how these ARARs are complied with or discuss a waiver of solid waste ARARs. Therefore, EPA cannot select this remedy under CERCLA or the NCP.

EPA Response: *EPA has made clear in the BPSOU ROD that the wastes are being left in place and are not being actively managed, such that these ARARs are not triggered. EPA has also worked cooperatively with the State to address a waiver for these ARARs should the BPSOU remedy be determined to constitute active management or otherwise suggest that these ARARs are triggered or apply to the remedy. See EPA's answer to a similar comment above for further explanation and response to this comment.*

b) Groundwater ARARs. The Preferred Alternative does not comply with State groundwater standards and does not properly justify a waiver of these requirements.

i) Technical Impracticability (TI) Determination Contradicted by Prior EPA Memorandum. EPA's need to waive State groundwater standards within the alluvial aquifer on the grounds of technical impracticability is directly contradicted by the August 1997, EPA Region VIII Memorandum, "Applicability of TI Evaluation for Alluvial Groundwater at Butte Priority Soils Operable Unit," by Regional Groundwater Expert, Mike Wireman and Hydrologist, Randy Breeden (Memorandum). The Memorandum explains Region VIII's conclusion *"that the BPSOU does not meet the criteria for Technical Impracticability for the alluvial ground water .. "* The primary reason given is one taken from EPA Guidance, namely, there is a remedial technology that will reliably clean up the aquifer *"It is technically possible, and indeed practical, to capture and treat the contaminated alluvial ground waters "* The Memorandum envisioned a much more expansive remedial approach than interception and treatment of only the groundwater that would enter the MSD as surface water. Like DEQ, the Memorandum recommends that the selected remedial action for the BPSOU combine *"capture, source control and flushing"* of the alluvial aquifer. Institutional controls were recommended *"to prevent public consumption and use of ground water in the alluvial aquifer, <u>until ground water quality standards are achieved</u> "* (Emphasis added.) The Memorandum concluded that after source removal, *"the longer time frame for natural flushing to occur is appropriate for this site, and therefore a technical impracticability waiver is not applicable."*

EPA Response: *The administrative record contains extensive support for EPA's decision to waive groundwater standards in the alluvial aquifer based on CERCLA's technical*

impracticability waiver and EPA's Selected Remedy for groundwater While some uncertainty exists with respect to groundwater travel times and contaminant travel times, in the end, this uncertainty does not change the fact that groundwater will need to be controlled, captured, and treated in perpetuity because it will not achieve the ARAR standards for groundwater. Please see EPA's detailed responses to comments on the draft Technical Impracticability Evaluation and the final Technical Impracticability Evaluation (both EPA 2006) for further information on this issue and a detailed response to prior State comments, many of which are similar or identical to this comment, on the Technical Impracticability waiver.

ii) ARARs / TI Determination without TI Evaluation. EPA proposes to waive state groundwater standards on the grounds of technical impracticability from an engineering perspective.[5] *"Use of the term "engineering perspective" implies that a TI determination should primarily focus on the technical capability of achieving the cleanup level ...."* EPA Guidance pg. 10. *"The first step in EPA's review process for a TI determination will be to assess the completeness and adequacy of the TI evaluation "* (i.e., in accordance with EPA Guidance.) EPA Guidance pg. 23. We cannot assess the completeness or adequacy of the TI evaluation because contrary to EPA Guidance, EPA has made a TI determination, months in advance of preparing the TI evaluation that will be placed in the administrative record.

EPA Response: *The administrative record contains extensive support for EPA's decision to waive groundwater standards in the alluvial aquifer based on CERCLA's technical impracticability waiver and EPA's Selected Remedy for groundwater. While some uncertainty exists with respect to groundwater travel times and contaminant travel times, in the end, this uncertainty does not change the fact that groundwater will need to be controlled, captured, and treated in perpetuity because it will not achieve the ARAR standards for groundwater. Please see EPA's detailed responses to comments on the draft Technical Impracticability Evaluation and the final Technical Impracticability Evaluation (both EPA 2006) for further information on this issue and a detailed response to prior State comments, many of which are similar or identical to this comment, on the Technical Impracticability waiver. Specifically, the State's concerns regarding the timing of the TI waiver evaluation are addressed on page 6, footnote 1 of the EPA Response to comments on the draft TI evaluation (EPA 2006).*

EPA's decision is based upon a debatable interpretation of site data. EPA did not remove or treat contamination sources to the extent practicable. EPA Guidance pg. 13. EPA did not use an incremental approach to selection and implementation of the remedy as a method of reducing uncertainty,[6] did not implement and monitor pilot or

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5 "EPA proposes to waive groundwater standards within the alluvial aquifer EPA believes that it is not technically feasible to meet ARAR requirements within the aquifer because of widespread contamination and the very slow overall movement of water flow within the aquifer " PP pg 37
" Analyses indicate that, even by removing wastes, low aquifer permeability and wide distribution of residual contamination will prohibit the aquifer from becoming clean for hundreds of years " PP pg 51

6 "At sites with very complex ground-water contamination problems, it may be difficult to determine whether required cleanup levels are achievable at the time a remedy selection decision must

full-scale aquifer remediation systems, EPA Guidance pg. 2, or (with the exception of capture and treatment of groundwater that enters the MSD channel as surface water and flows to Silver Bow Creek) take any steps to control or contain migration of contamination within the aquifer. EPA Guidance pg. 13. The principal focus of EPA's decision is a prediction that it is unreasonable to try to clean up the alluvial groundwater because it will take more than 100 years to achieve restoration. While 100 years is a rule of thumb described in the EPA Guidance, it says: *"... no single timeframe can be specified during which restoration must be achieved to be considered technically practicable."* EPA Guidance pg. 16. The NCP requires EPA to determine a reasonable timeframe *"given the particular circumstances of the site." 40 CFR 300.430(a)(1)(iii)(F).* What is a reasonable timeframe given the particular circumstances at the site?

EPA Response: *EPA disagrees Waste removal alternatives in the MSD were weighed carefully against the threshold, balancing, and modifying criteria for remedy selection, and EPA determined that extensive waste removal presented safety risks to the general public, would have a detrimental economic impact on nearby businesses, was not cost effective, and would not achieve ARARs regardless of the extent of removal. Rather than using an incremental approach in remedy selection, EPA referred to and relied, in part, on nationwide studies on aquifer remediation that showed the difficulty in aquifer cleanup. In any reasonable use of the metrics outlined in these studies, it was clear that the heterogeneous aquifer contaminated with metals with diminished flux would rank as particularly difficult to clean up The Agency acknowledges the technical differences between DEQ and EPA. EPA addressed these technical differences in several letter exchanges with the State, and in our TI Evaluation document (EPA 2006a) and accompanying Response to Comments document (EPA 2006b). Detailed technical responses to these state comments can be found in these documents and are incorporated herein by reference.*

It took more than 100 years of mining, milling and smelting to contaminate the groundwater in Butte. EPA is proposing a Preferred Alternative that will require a treatment system to be operated in perpetuity, for hundreds, even thousands of years. FFS pg. 5-10. We are not certain how quickly the aquifer might rebound after source removal.[7] However, if we don't remove accessible source materials, the alluvial aquifer will never be restored.

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be made This is especially true when such decisions must be based on site data collected prior to implementation and monitoring of pilot or full-scale remediation systems EPA recognizes this limitation and has recommended several approaches to reduce uncertainty during the site characterization, remedy selection and remedy implementation processes (EPA 1989a, 1992a) Determining the restoration potential of a site may be aided by employing a phased approach to site characterization and remediation " EPA Guidance pgs 2-4

[7] According to Attachment D, Focused Feasibility Study, MSD Alternative 5b, DEQ's preferred remedy, source control could be completed in three years ICs would be in place while the Agencies evaluated the effect of source control on restoration of the aquifer If effective, groundwater may be restored to its beneficial uses and capture and treatment of water at LAO would not have to continue in perpetuity The Focused Feasibility Study says just the removal of Diggings East and North Side Tailings

EPA's TI determination is based primarily on a prediction of contaminant transport times based on site characterization data only. Too much reliance is placed upon EPA's ability to predict restoration timeframes on this information and use this prediction as a basis for remedy selection Modest changes in data input for groundwater gradients, effective porosity, retardation factors and hydraulic conductivity can yield huge differences in the calculated travel time for contaminants in groundwater, changing the results from hundreds of years to decades. *See, Comments on Draft Focused Feasibility Study of the Metro Storm Drain, Montana Bureau of Mines and Geology, December 9, 2003, Madison, Metesh, MBMG.*

EPA Response: *EPA disagrees. EPA addressed these technical differences in our TI Evaluation document (EPA 2006a) and accompanying Response to Comments document (EPA 2006b), and a series of letter exchanges with the State on this matter. Detailed technical responses to these state comments can be found in these documents, which are incorporated herein by reference.*

The only other factor identified in the Proposed Plan for rejecting the removal of source materials required in Alternative 5b is that removal would cost too much.[8] Under the EPA's Guidance, cost is supposed to be subordinate to ensuring protectiveness. *"Compliance with ARARs is not subject to a cost-benefit analysis."* EPA Guidance pg. 19.

EPA Response: *EPA disagrees with this comment Cost was one consideration in the consideration of the TI waiver issue, and cost effectiveness was on of the criteria considered in the selection of the final remedy for BPSOU. Other factors included, but are not limited to, technical impracticability of aquifer remediation even with large scale removals, and the short term impact on the community during large removals in the MSD. EPA addressed similar in our TI Evaluation document (EPA 2006a) and accompanying Response to Comments document (EPA 2006b), and a series of letter exchanges with the State on this matter. Detailed technical responses to these state comments can be found in these documents, which are incorporated herein by reference.*

3) **<u>Uncertainty of Restoration Timeframes</u>.**

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areas may clean up groundwater to "a point where groundwater capture and treatment is no longer necessary in the foreseeable future " FFS pg 5-18

8 DEQ observes that the evaluation of the nine superfund criteria in the Proposed Plan does not match the discussion of these same criteria in the Focused Feasibility Study Discrepancies between the two documents lead to the conclusion that any one of four alternatives could have been scored the highest Further, the fact that construction is more difficult in the context of removal does not make it less implementable Standard excavation and dewatering techniques are available and would be applied Similarly, issues related to short-term effectiveness are manageable through standard construction practices On the basis of the discussion herein, the Preferred Remedy should be graded down on compliance with ARARs and long-term effectiveness and permanence

EPA and DEQ disagree on EPA's decision to base its TI decision on this record solely on its prediction of restoration timeframes. Part of our disagreement is based on the fact that the NCP declares its expectation that we will try to clean up groundwater contamination,[9] and further, EPA Guidance says clearly that EPA is not to base its TI decisions on restoration timeframes alone. EPA Guidance pg. 16. Yet, much of our disagreement centers on the level of uncertainty in the record on which this decision was based. There are any number of examples in the record suggesting that the Agencies don't have enough information to adequately predict the restoration potential of the alluvial aquifer. The Focused Feasibility Study says that for the lack of monitoring well data in the deeper portions of the aquifer it does not know, but cannot rule out that *"contamination at depth may be widespread."* FFS pg. 3-2 Further, " *... ground water flow paths in the deeper alluvium cannot be determined with certainty."* FFS pg. 2-6. EPA's National Remedy Review Board[10] observed:

"Based on the presentation by the Region and State representatives there appears to be some uncertainty regarding the hydrology of the alluvial aquifer and whether the MCLs or other ARARs can be achieved in a reasonable timeframe."

EPA's Groundwater Technical Support Center (Center),[11] after a site visit and examination of the record concluded:

"It is our opinion based on review of the documentation and site data provided that far too many uncertainties still remain with respect to subsurface conditions and contaminant distribution in the MSD area to conclude whether the MSD aquifer system can or cannot be remediated within a reasonable timeframe (e.g. < 100 years)."

EPA acknowledges this uncertainty in the Focused Feasibility Study:

"EPA and the State are in the planning process of conducting a joint assessment of contaminant transport in the alluvial aquifer of the MSD ... The information will be used to make refinements to the Proposed Plan and Record of Decision." FFS pg 5-5,

and the Proposed Plan·

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9 EPA expects to return usable ground waters to their beneficial uses whenever practicable 40 CFR 300 430(a)(1)(iii)(F) Restoration of contaminated ground waters is one of the primary objectives of the Superfund program " EPA Guidance, pg 1

10 National Remedy Review Board Recommendations for Silver Bow Creek / Butte Priority Soils Superfund Site, National Remedy Review Board, September 8, 2004

11 Review Comments on the Focused Feasibility Study of the Metro Storm Drain, Butte Priority Soils Operable Unit of the Silver Bow Creek / Butte Area Superfund Site, Butte, MT (04-R08-001), EPA's Ground Water Technical Support Center, November 23, 2004

"In early 2004, Montana Bureau of Mines and Geology, with funding provided by EPA and the Montana Natural Resource Damage Program, installed monitoring wells at four sites along the flow path between the Parrott Tailings area and the confluence of Blacktail and Silver Bow Creeks. The wells were drilled deeper than most others in the area; the objective was to fill important data gaps about the aquifer lithology and groundwater quality in the intermediate portions of the alluvial aquifer " PP pg. 16.

The Montana Bureau of Mines and Geology implemented this jointly planned assessment of contaminant transport in the alluvial aquifer and reached the following conclusions:

1) the site of the Parrott Complex is the most important source of ground-water contamination in the upper Silver Bow Creek drainage,
2) gaps in the water-quality and hydrogeologic data have led to underestimation of the extent of contamination by the Parrott Complex,
3) hydrogeologic conditions (aquifer properties and hydraulic gradients) are favorable for the migration of contaminated ground-water toward Silver Bow Creek. Travel times of contaminants to reach Silver Bow Creek are on the order of decades, and
4) the quality of ground-water can recover in a relatively short period of time (less than 100 years) if a proper removal of source material at the Parrott Complex is completed. If no removal occurs, recovery will be on the order of thousands of years.

Yet, this information is not used to refine its view with respect to EPA's remedy selection in the Proposed Plan. EPA continues to maintain its prediction is sufficient justification for not even attempting to clean up the aquifer.

EPA continues to insist that its expert's guess about the restoration capacity of the aquifer is sufficient justification for its TI determination. Yet, EPA acknowledges and emphasizes the Center's opinion that predicting contaminant transport is a very difficult, if not technically impossible undertaking and that resolving this uncertainty through further data collection and characterization may not be achievable."[12] EPA Guidance requires a high degree of certainty that cleanup levels cannot be achieved before a pre-implementation or front-end TI decision is made. EPA Guidance pg. 5 We do not have that level of certainty on the record before us.

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12 See, January 6, 2005, letter from EPA to Montana Department of Justice, Natural Resource Damage Program "In accordance with the Focused Feasibility Study and despite the uncertainty expressed by the Center, EPA continues to maintain that it will take an unreasonable period of time (>100 years) for the MSD alluvial aquifer to be restored to its beneficial uses, if it can be achieved at all [The Center's letter] "states that predicting contaminant transport is a very difficult, if not technically impossible, undertaking and that resolving this uncertainty through further data collection and characterization may not be achievable " Page 2 [Clarification added]

EPA Response: *EPA acknowledges the uncertainty described in this comment. EPA disagrees vehemently that it made its TI determination solely on this basis (EPA notes that the State's prior comments assert that EPA made its decision on cost considerations in addition to the consideration of the technical issues described in this comment). EPA addressed these technical differences in our TI Evaluation document (EPA 2006a) and accompanying Response to Comments document (EPA 2006b), and in a series of letter exchanges with the State. Detailed technical responses to these state comments can be found in these documents, which are incorporated herein by reference. EPA notes that every EPA expert it has asked to look at this situation – from EPA's groundwater experts to the remedy review board to the Ada, Oklahoma National Risk Management Research Laboratory Center for Ground Water and Ecosystems Restoration Division – have agreed that, despite the uncertainty regarding the transportation time and restoration capacity, the decision to leave the waste in place and to waive the groundwater ARARs is correct under CERCLA's remediation program, and that the selective quotes contained in this comment are taken out of context and are misleading.*

4) <u>Better Evaluation of the Cost of Removal Options is Needed</u>.

The State has repeatedly questioned the relative costs of the remedies evaluated for the BPSOU. Simply stated, cost-effectiveness should be re-evaluated. The Agencies can better estimate costs based on actual recent experience rather than inflated construction numbers supplied by the PRP (for purposes of discouraging selection of this alternative). Starting in west Butte, DEQ has completed reconstruction of over five miles of Silver Bow Creek. We examined the cost estimate supplied in the Focused Feasibility Study for the State's recommended remedy, Alternative 5b.[13] The detailed cost information is supplied in Attachment D to the Focused Feasibility Study. Costs for "Excavation of Source Areas" and "Excavation Backfilling" were provided to EPA by Atlantic Richfield. The PRP estimates the costs of excavation of source material around $15.00 per cubic yard and the cost of backfilling clean material around $18.00 per cubic yard. DEQ actually pays about $3.50 per cubic yard and $8.50 per cubic yard, respectively, for these same items (based on actual bid / contract prices within 10 miles of Butte) Using these inputs instead of Atlantic Richfield's, multiplied by the quantities of source material to be excavated and clean material to be backfilled,[14] we can calculate a 16 million dollar reduction in the cost of this alternative. Similar cost-saving comparisons can be made for the cost of dewatering ($1.2 million difference between FFS estimate and State's costs) and revegetation ($750,000 difference between FFS estimate and State's costs). Changes to

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13 "MSD FS - Alternative 5b - Removal of Accessible Waste Material in the MSD with Removal and Construction of the City-County Shops with Collection and Treatment of MSD Groundwater at Lower Area One"

14 One hundred percent backfill at the Upper MSD, as proposed in the FFS, is most likely not necessary, and in fact this area would serve as an excellent location for a storm water detention basin and/or wetlands

the inputs in these categories would reduce the cost of all remedial alternatives, including DEQ's recommended remedy even further. This example leads DEQ to conclude that the removal options described in Alternative 5b are a cost-effective and feasible approach to removing the primary sources of contaminants to the alluvial groundwater aquifer.[15]

EPA Response: *EPA disagrees EPA believes that these costs used in the feasibility study and the proposed plans are within the range specified in the EPA guidance documents, and that cost was appropriately considered in the selection of the BPSOU remedy and the decision to waive the ground water ARARs in the alluvial aquifer at the site. EPA notes that costs for construction have increased significantly over the last few years, due to fuel costs and other material cost increases EPA also notes that costs increase when one uses more realistic net discount rates for remedy costs (updated and more realistic costs for selected remedy components are now contained in the ROD, as requested by the State). The bottom line is that the cost of additional removal, backfilling, and revegetation as desired by the State through alternative 5b would be very substantial, and EPA appropriately considered these substantial costs as one factor among many in its ARAR waiver and remedy selection decisions.*

Conclusion

In view of a record that is at best uncertain with respect to our ability to return contaminated groundwater in the alluvial aquifer to at least some beneficial uses within a reasonable time, DEQ believes the Agencies are compelled by the NCP and by EPA Guidance to take an incremental approach to remediation of groundwater in the BPSOU and EPA's determination as to whether a TI waiver is necessary and appropriate. The best remedial option here mirrors the approach set out in EPA's TI Guidance: implement source removal to the extent practicable, collect more data to refine our understanding of the aquifer (and any contaminant plume(s) within the aquifer), then initiate a full-scale aquifer remediation system, monitor groundwater to evaluate the performance of these remedial actions and then decide if we can successfully clean up the alluvial aquifer. If, after this remedial effort is completed, we ultimately decide that it is necessary and appropriate to waive some or all State groundwater standards, EPA should then take any necessary actions *"to prevent further migration of the plume, prevent exposure to contaminated ground water, and evaluate further risk reduction." 40 CFR 300 430(a)(1)(iii)(F).* The starting point for this incremental remedial approach is removal of all accessible wastes from the Metro Storm Drain area.[16] DEQ asks that EPA select a remedy that includes the removal

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15 "Sources should be located and removed whenever feasible and where significant risk reduction will result, regardless of whether EPA has determined that ground-water restoration is technically impracticable" EPA Guidance pg 2

16 DEQ also asks that EPA assess and consider removal of accessible wastes at Lower Area One and removal / reclamation of potential sediment source areas in the Granite Mountain Memorial Area At Lower Area One wastes were removed to elevation contours, but no confirmatory sampling was done There may be significant amounts of wastes left in place after removal that will continue to degrade shallow ground water quality Other areas may also contain wastes that should be removed

options described in MSD Alternative 5b, combined with sufficient investigation and monitoring to evaluate the effects of this action upon our ability to meet groundwater standards in the future.

DEQ recognizes that it has raised many of these issues before and EPA has indicated that it disagrees. DEQ believes the Preferred Alternative is not doing enough to clean up the site. The citizens of Butte, and Montanans at large, deserve the best remedy we can fashion and the substantial investment in cleanup throughout the basin is significantly diminished if we do not do the best remedy we can at the headwaters.

DEQ looks forward to working with EPA to reach a mutually acceptable remedial alternative for the BPSOU that takes into consideration the uncertainties described above.

***EPA Response**: EPA believes its remedy decision, which will require the expenditure of between $ 109 and $ 156 million additional dollars for remediation of Butte and Walkerville according to EPA estimates (please remember that EPA has already required the expenditure of at least $ 60 million dollars for cleanup in Butte and Walkerville under prior actions), is a significant and protective remedy for the citizens of Butte and the State of Montana and is a "significant investment" under any definition of that term. EPA is confident that the remedy will capture and treat contaminated groundwater before it affects substantially any downstream cleanup efforts that are important to both EPA and the State. EPA continues to respectively disagree with the State regarding the expenditure of additional money for Metro Storm Drain and Lower Area One removals that EPA and its experts do not think will result in groundwater cleanup to standards or is otherwise appropriate under the remedial provisions of CERCLA and the NCP EPA also hopes to continue to work cooperatively with the State in the implementation of the BPSOU ROD despite this limited disagreement.*

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because of their impact to ground water, such as beneath the slag walls, Butte Reduction Works and the south rail-line DEQ asks that EPA evaluate all remaining accessible mine wastes, and to remove them if they are currently affecting ground water quality Because the storm water diversion system on the Butte Hill is designed to control the 25-year, 24-hour event, DEQ is concerned that potential sediment source areas that do not naturally drain to the Berkeley Pit may impact Silver Bow Creek in a larger storm event To address this concern, DEQ asks that EPA evaluate additional removal / reclamation in the Granite Mountain Memorial Area in the south facing slopes below the Mountain Consolidated Mine and above the Kelly Mine Yard

3.2 Response to NRDP Comments

March 21, 2005

Mr. Ron Bertram
United States Environmental Protection Office
Region 8, Montana Office
Federal Building, 10 W. 15th Street, Ste. 3200
Helena, MT 59620-1401

RE: Comments on EPA's proposed plan for the Butte Priority Soils Operable Unit.

Dear Mr. Bertram:

The Natural Resource Damage Program submits the following comments regarding the EPA's proposed plan for the Butte Priority Soils Operable Unit.

1. We agree with EPA's position in the Proposed Plan that contaminated groundwater should be captured and routed to a new lime treatment facility near Lower Area One (LAO) instead of utilizing on site lagoons. A treatment plant can easily adjust varying influent water conditions such as water quality, pH, temperature, and contaminant concentration. The treatment chemical feed rates can be changed easily to accommodate fluctuations in the influent and effluent quality. Changes in effluent quality can be accomplished in a short period of time, making it easier for the plant operators to meet discharge permit conditions. Also, sludge handling capability can be incorporated into the treatment plant. The sludge can be settled out, then dewatered or processed with special equipment and disposal can be managed on a daily or weekly basis.

EPA Response: *The Agency has selected the treatment lagoons at LAO on a provisional basis in a decision concurred on by the State DEQ. EPA, with the concurrence of the State and DEQ, believes the lagoons will treat contaminated groundwater to applicable state and federal water quality standards. EPA's rationale for this change between the Proposed Plan and the ROD is contained in the Record of Decision*

2. The final proposed plan for this operable unit should take a long-term perspective and focus on permanent solutions. With this site's location at the headwaters of the Basin, an effective, long-term solution is critical not only for the immediate area it encompasses but also for all the downgradient areas that are subject of substantial cleanup efforts. We are particularly concerned about the significantly elevated concentrations of copper and zinc which are both over 7,000 parts per million in the stream clay sediment fraction which were observed in samples collected at the

beginning of the remediated section of Silver Bow Creek in November, 2004[1]. These metals are coming from contaminated surface water from Butte Hill and LAO alluvial groundwater. This contamination is clearly moving into remediated sections of SBC as evident by concentrations found in downstream stream sediments. Preventing recontamination of SBC must be an important consideration in the BPSOU remedy.

EPA Response: *EPA agrees with this comment and believes that the extensive storm water and groundwater capture programs described in the BPSOU ROD will provide further protection for downstream cleanup actions that are important to both the State and EPA.*

3. To reduce erosion and be protective in the long-term, the vegetative caps for the waste piles that will remain in place should, at a minimum, include 18 to 22 inches of adequate topsoil, support a dense cover and diversity of native plant species, and be devoid of weeds. Many of the existing reclaimed sites that are targeted to remain in place do not meet these minimal standards and additional soil cover with organic matter will be needed. Addressing these inadequately capped sites will reduce hazardous substances from reaching Silver Bow Creek via storm water and would be far cheaper than treating storm water as a contingency contemplated in the Proposed Plan.

EPA Response: *EPA, in conjunction with DEQ, has developed the BRES to evaluate the condition and stability of the reclaimed area caps and to require corrective action if warranted to these caps. If it is determined through the BRES evaluation that the existing caps do not meet these standards developed for the BPSOU, corrective action will be required. EPA disagrees that "many" of the reclaimed sites do not meet minimal standards or that additional cover soil or organic matter will necessarily be needed, but will work with the State in the BRES evaluations to maintain and achieve quality caps at the site.*

4. The Parrott Tailings are significantly contaminating groundwater at the head of the Clark Fork Drainage. The proposed plan is based on capture and treatment of contaminated water in perpetuity. Because the long-term operation and maintenance will be required in perpetuity and because the Parrott Tailings leach elevated concentrations of metals to the aquifer, we believe that these tailings under and around the Butte City County Shop area should be removed.

- We recognize there remains scientific debate regarding the efficacy of removing these tailings. That debate is partly attributable to inadequate data and analysis of contaminant transport in Lower Area One. We support the additional data collection and analyses that the complexity and serious consequences of this decision warrants.

EPA Response: *The Agency acknowledges the technical differences between the State and EPA EPA addressed these technical differences in our TI Evaluation document (EPA 2006a)*

[1] Annual report for Post-Remediation Monitoring and Data collection SSTOU-Subareas 1-4 December 2004 by Montana Bureau of Mines and Geology

and accompanying Response to Comments document (EPA 2006b), and in a series of letter exchanges with the State, all of which are incorporated herein by reference. Detailed technical responses to these comments can be found in these documents. EPA also incorporates by reference its response to State DEQ comments of a similar nature, above.

- In its reevaluation, EPA should reconsider the scope and costs of the removal option in the proposed plan, which uses significantly higher unit costs than what the State has been incurring for the Streamside Tailings remediation and relies on a feasibility study that did not consider alternative repositories, such as the Opportunity Ponds, or alternative routes to the Butte waste repository.

EPA Response: *Please see our response to a comment of similar nature from the State DEQ, above*

- If EPA will make its remedy decision based on the insufficient database available at this time, we recommend erring on the side of long-term protectiveness by selecting alternative 5b in the Focused Feasibility Study, which involves removal of the accessible source materials and the wastes that are underlying and surrounding the City-County Shop complex. These are the waste materials that have, and unless removed, will continue to significantly contaminate area groundwater and surface water.

EPA Response: *Please see our response to a comment of similar nature from the State DEQ, above*

We appreciate the effort of EPA staff on this proposed plan and your consideration of our input.

Sincerely,

Gregory Mullen

cc: Sandi Olsen
Joe Griffin

3.3 Responses to Fish and Wildlife Service Comments

March 15, 2005

Mr. Ron Bertram
Remedial Project Manager
U.S. Environmental Protection Agency
Federal Building, 10 W. 15th Street, Suite 3200
Helena, MT 59601

Dear Mr. Bertram:

The U.S Fish and Wildlife Service (Service) has reviewed the Superfund Program Cleanup Proposal, Butte Priority Soils Operable Unit (BPSOU) of the Silver Bow Creek/Butte Area Superfund Site (Proposed Plan), and I am providing the following technical assistance comments.

As the Proposed Plan states (Page 49), net loss of wetlands is an applicable or relevant and appropriate requirement (ARAR) for remedial action at the BPSOU, as well as at all the other Superfund Sites in the Clark Fork River Basin (CFR). The EPA, with technical assistance from the Service, and the Atlantic Richfield Company developed a four-step wetlands evaluation protocol in 1992 to track pre- and post-remediation wetlands functional values. This protocol is used at all CFR Sites and is the basis for determining basin-wide compliance with the no net ARAR.

Only the Step 1 (Wetland Delineation and Functional Evaluation) was completed at the BPSOU, in 1993. Step 1 provided a general picture of delineated wetlands (110 acres) and functional assessment (average function value rating = 1.9) throughout the BPOU, but did not evaluate remedy-related impacts. In accordance with the wetlands evaluation protocol, the analysis of wetland impacts and a more refined wetland mapping effort should be conducted in a combined Step 2/3, during remedial design, prior to remedy implementation. Step 4 (Confirmation of Response Action Impacts) would be done after completion of the remedy.

EPA Response: *EPA is committed to completing the four-step process in cooperation with the Fish and Wildlife Service, to ensure that there will be no net loss of wetlands*

The Service has provided wetlands technical assistance to EPA throughout the basin, and I look forward to our continued participation at the BPSOU. If you require additional information or wish to discuss these comments, please contact Bill Olsen at 406-449-5225 extension 214.

Sincerely,

R. Mark Wilson Field Supervisor

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BPSOU Responsiveness Summary Comment Index

Document ID No.	Date	Type	Title/Opening Sentence	Last Name	First Name	Location/ Affiliation	Sector	Comment ID.	Technical/ Non-Technical/ Legal	Tier I Topic	Tier II Topic	Tier III Topic	Brief Comment Description
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.1	Non-Technical	Superfund Procedural Issues	Evaluation of NCP Criteria	Specific Comment	Preferred Alternative does not have support of public, DEQ, or NRDP
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.2	Non-Technical	Superfund Procedural Issues	Evaluation of NCP Criteria	State Acceptance	EPA is rejecting the state of Montana's position.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.3	Non-Technical	Superfund Procedural Issues	Public involvement	EPA limits public comment	EPA has been impervious to public comment.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.4	Non-Technical	Superfund Procedural Issues	Evaluation of NCP Criteria	Community Acceptance	Public Input should influence decision making process and should be considered evenly on all alternatives.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.5	Non-Technical	Superfund Procedural Issues	Redevelopment	Land Use	Proposed Plan does not consider future land use
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.6	Non-Technical	Superfund Procedural Issues	Evaluation of NCP Criteria	State Acceptance	EPA did not recognize State's opposition to preferred alternative
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.7	Non-Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation specifications	No innovative technologies considered for solid media
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.8	Non-Technical	Superfund Procedural Issues	Evaluation of NCP Criteria	Community Acceptance	EPA speculates on community acceptance of preferred alternative
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.9	Non-Technical	Site-Wide	Evaluation of NCP Criteria	Reduction of Toxicity, Mobility and Volume	Preferred Alternative does not recognize the NCP preference for treatment and removal of waste.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.10	Non-Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation specifications	No innovative technologies considered for solid media
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.11	Non-Technical	Site-Wide	Evaluation of NCP Criteria	Reduction of Toxicity, Mobility and Volume	Remedy does not reduce toxicity, mobility or volume of waste
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.12	Non-Technical	Site-Wide	Evaluation of NCP Criteria	Evaluation/Weighing of Cost	Cost for removal of Parrott tailings, a pro-active indoor dust program, and removal of contaminant source areas is not grossly excessive yet EPA eliminated these alternatives based on cost.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.13	Non-Technical	Superfund Procedural Issues	Evaluation of NCP Criteria	Community Acceptance	EPA fails to assess which components of the preferred alternative persons within the community support, have reservations about, or oppose.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.14	Non-Technical	Superfund Procedural Issues	Evaluation of NCP Criteria	State Acceptance	EPA proceeded with preferred alternative without concurrence of the State of Montana
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.15	Legal	Superfund Procedural Issues	Evaluation of NCP Criteria	Compliance with ARARs	EPA has ignored specific ARARs.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.16	Non-Technical	Superfund Procedural Issues	Evaluation of NCP Criteria	Community Acceptance	EPA has ignored public comment.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.17	Non-Technical	Site-wide	Evaluation of NCP Criteria	Reduction of Toxicity, Mobility and Volume	Justification is not provided for why the preferred alternative deviates from the NCP preference for treat or removal over waste left-in-place
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.18	Non-Technical	Site-wide	Evaluation of NCP Criteria	Reduction of Toxicity, Mobility and Volume	Remedy does not treat waste. Toxic waste will be left in place.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.19	Non-Technical	Site-Wide	Evaluation of NCP Criteria	Long-Term Effectiveness and Permanence	The EPA preferred alternative does not provide for a permanent remedy.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.20	Non-Technical	Superfund Procedural Issues	Evaluation of NCP Criteria	Long-Term Effectiveness and Permanence	EPA's preferred alternative relies on passive remedies such as caps over waste-in-place and institutional controls
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.21	Non-Technical	Parrott Tailings/MSD	Evaluation of NCP Criteria	Evaluation/Weighing of Cost	Mis-use of cost criteria with respect to preferred remedy for alluvial aquifer
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.22	Non-Technical	Superfund Procedural Issues	Evaluation of NCP Criteria	Long-Term Effectiveness and Permanence	The EPA preferred alternative relies on institutional controls and containment rather than removal and treatment of wastes.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.23	Non-Technical	Superfund Procedural Issues	Evaluation of NCP Criteria	Evaluation/Weighing of Cost	EPA mis-used the term cost effectiveness in evaluating potential remedial alternatives.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.24	Non-Technical	General Comment	Proposed Plan	Inconsistencies in the Proposed Plan	In 1986, EPA identified PSOU as site because people were living among sources of toxic mine waste but now the preferred alternative does not speak to the level of toxicity in the remaining waste.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.25	Non-Technical	Superfund Procedural Issues	Evaluation of NCP Criteria	Community Acceptance	EPA pre-supposed the waste-left-in place remedy and did not appropriately considered.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.26	Non-Technical	Site-Wide	Waste left in place	Protectiveness of human health and the environment	Leaving toxic mine wastes in-place is not protective of human health and the environment
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.27a	Non-Technical	Residential Metals	Attic and/or Interior Dust	Pathways	EPA offers no proof the absence of a complete pathway for exposure to arsenic and metals in attic dust
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.27b	Non-Technical	Residential Metals	Attic and/or Interior Dust	Pathways	EPA neglects to consider that remodeling, storage, weathering, renovation, etc., can lead to exposure to toxic attic dust.

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1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.27c	Non-Technical	Residential Metals	Attic and/or Interior Dust	Pathways	The pathways argument is at variance with the Superfund mandate that threats be cleaned up using treatment and/or removal as a primary method.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.27d	Non-Technical	Residential Metals	Attic and/or Interior Dust	Environmental Justice	Large areas of people's homes will be perpetually off-limits, particularly for lower income residents.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.27e	Non-Technical	Site-Wide	Redevelopment	Land Use	Large areas of the butte Hill will be permanently removed from reuse and redevelopment.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.28a	Non-Technical	General Comment	Proposed Plan	Inconsistencies in the Proposed Plan	In 1986, EPA identified PSOU as site because people were living among sources of toxic mine waste but now the preferred alternative does not speak to the level of toxicity in the remaining waste.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.28b	Non-Technical	Site-Wide	Human Health Risk	Risk assessment flawed	Flawed Risk Assessment does not accurately portray actual health risks. Imagine Butte Health Study is ignored by EPA. National health studies indicate that Butte has a higher incidence of illness related to heavy metal exposure.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.29	Non-Technical	General Comment	Proposed Plan	Inconsistencies in the Proposed Plan	Proposed Plan Indicates that ingestion of soils and dust is a primary exposure pathway yet, in other parts of the proposed plan (e.g., attic dust) maintain that there are no exposure pathways.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.30	Non-Technical	General Comment	Proposed Plan	Inconsistencies in the Proposed Plan	If arsenic in soils, indoor dust, and surface water have been determined to pose a human health risk, why is EPA not cleaning up contaminated soils and indoor dust?
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.31	Non-Technical	Residential Metals	Attic and/or Interior Dust	Pathways	The Walkerville Attic survey determined that few residents use attic space for living space and the argument is made then that there is no exposure pathway. EPA is using a convoluted argument to support a passive approach to indoor contamination.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.32	Non-Technical	Superfund Procedural Issue	Evaluation of NCP Criteria	Long-Term Effectiveness and Permanence	Contrary to Superfund Law, Wastes will be left in place unaddressed, untreated and unremediated. The use of caps and institutional controls have workability problems and are not permanent.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.33	Non-Technical	Site-Wide	Extent of Removal	For Removal	Remedial objectives would be best met through removal and not leaving waste-in-place.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.34	Non-Technical	Site-Wide	Institutional controls	Minimize IC's	The preferred remedy relies to heavily on institutional controls rather than removal.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.35	Non-Technical	Superfund Procedural Issues	Evaluation of NCP Criteria	Specific Comment	Specific comment: The discussion of the Criteria on page 35 of the proposed plan is not accurate and is at variance with the law.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.36a	Non-Technical	Residential Metals	Soils and/or Interior/Attic Dust	For Removal	Rather than utilize the multi-pathway approach to address residential contamination, it would be more congruent with Superfund law to simply identify areas contaminated with arsenic and remediate them
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.36b	Non-Technical	Residential Metals	Attic and/or Interior Dust	Environmental Justice	The remedy for attic dust relies on renters or owners to initiate cleanup. The approach relies on renters or owners being able to predict use of their attics, putting the responsibilities for cleanup on property owners.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.36c	Non-Technical	Residential Metals	Attic and/or Interior Dust	Pathways	Contention that attic dust contamination in Butte homes does not pose a health risk because there is no pathway is speculative. If dust gets in, it can get out. Pathway can be created or enhanced through home remodeling, attic storage, weatherization, ceiling deterioration, fire, subsidence and cracking, cleaning.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.36d	Non-Technical	Residential Metals	Attic and/or Interior Dust	Pathways	Absence of pathway rests on premise that remedy will keep people from contamination rather than removing contamination from contact with people.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.36e	Non-Technical	Residential Metals	Attic and/or Interior Dust	Pathways	Pathway argument directly contradicts the Superfund requirement for permanent solutions in human behavior patterns, residential use patterns, and general land use patterns change over time.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.36f	Non-Technical	Residential Metals	Attic and/or Interior Dust	Pathways	There exists no law, rules, or regulations prohibiting a home owner or renter from using or disturbing their attic space.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.36g	Non-Technical	Residential Metals	Attic and/or Interior Dust	Environmental Justice	Pathway argument is contrary to the principles of environmental justice in that this approach means that low-income citizens will continue to bear a disproportionate toxic burden.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.36h	Non-Technical	Residential Metals	Attic and/or Interior Dust	Economic Effects	Pathway argument is contrary to the principles of Superfund Redevelopment Initiative and the Superfund Land Revitalization Action Agenda in that it limits or precludes future productive land uses and redevelopment of sites contaminated with toxic attic dust.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.36i	Non-Technical	Residential Metals	Attic and/or Interior Dust	Pathways	Pathway argument is contrary to the Principles of Pollution Prevention and the Precautionary Principle, which are embraced by EPA policy, rules and regulations, and Montana State Law.
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.36j	Non-Technical	Residential Metals	Attic and/or Interior Dust	Libby Precedent	EPA removal actions in Libby, MT set precedent for residential removal
1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.36k	Non-Technical	Residential Metals	Attic and/or Interior Dust	Pathways	Attics are not airtight and people go in attics for many reasons. The absence of an exposure pathway is faulty.

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1	9-Jan-05	email attachment	Complaint alleging that MT EPA did not follow the proper EPA procedures and processes in developing the proposed plan	Ray	Dr. John W.	Butte, MT	Resident - Butte	1.36i	Non-Technical	Residential Metals	Attic and/or Interior Dust	Pathways	The pathways argument rests on faulty premise of controlling human behavior rather than removing toxics
2	10-Jan-05	email letter	Assessment of Sticking Points in EPA Plan	Corbett	Robert	Butte, MT	Resident - Butte	2.1	Non-Technical	Residential Metals	Attic and/or Interior Dust	Pathways	Dust that enters a building does not only enter the attic, it likely permeates the walls, floor, basement and living space as well Even if you could keep people out of their attics, they would still be exposed to contaminated dust
3a	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.1	Non-technical	Site-Wide	Waste left in place	Protectiveness of human health and the environment	It fails to protect in an adequate manner human health and the environment by leaving waste in place
3a	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.2	Legal	Superfund Procedural Issue	Evaluation of NCP Criteria	Compliance with ARARs	It fails to meet unwaived ARARs
3a	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.3	Non-technical	Site-Wide	Evaluation of NCP Criteria	Long-Term Effectiveness and Permanence	It fails to provide a permanent, long term effective cleanup... because it relies on caps and ICs, it fails the long-term effectiveness and permanence criterion
3a	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.4	Non-technical	Site-Wide	Evaluation of NCP Criteria	Reduction of Toxicity, Mobility and Volume	It fails to reduce the toxicity, mobility, and volume of contaminants, it uses no innovative technologies, it uses no treatment
3a	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.5	Non-technical	Superfund Procedural Issues	Evaluation of NCP Criteria	Evaluation/Weighing of Cost	It incorrectly applies the Superfund cost criteria... too much weight to cost and too little to protecting human health and the environment
3a	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.6	Non-technical	Site-Wide	General Comment	Commenter Opposes	It provides an unworkable solution to the contaminant problem
3a	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.7	Non-technical	Superfund Procedural Issue	Evaluation of NCP Criteria	Community Acceptance	It fails to consider... public comments... EPA's own Citizens Working Group, MT Tech meeting in Dec 2003. Process of considering public input was not conducted according to EPA polices, procedures, acts, and guidance
3a	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.8	Non-technical	Superfund Procedural Issue	Evaluation of NCP Criteria	State Acceptance	It fails to give proper consideration to the positions of the DEQ and the NRDP regarding the Parrott Tailings
3a	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.9	Non-technical	Superfund Procedural Issue	Redevelopment	Land Use	it fails to consider issues related to future land uses and revitalization per the Redevelopment initiative, Land Reuse Initiative, and Land Use Action Agenda
3a	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.10	Non-technical	Site-Wide	Human Health Risk	Environmental Justice	Fails to provide consideration so issues related to environmental justice... increase the toxics burden borne by low-income residents
3a	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.11	Non-technical	Solid Media/Waste Left in Place	Liability	Economic Effects	Fails to address the superfund liability issue because the liability associated with waste in place will preclude future economic revitalization
3a	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.12	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	Relies too heavily on a flawed health risk assessment
3a	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.13	Non-technical	Residential Metals	Attic and/or Interior Dust	Pathways	Fails to address the issue of contaminated indoor/attic dust, rest on a specious "Pathways of Exposure" Approach
3a	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.14	Non-technical	Site-Wide	Extent of Removal	For Removal	Fails to apply the Pollution Prevention and the Precautionary Principle - mandates removing contamination
3a	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.15	Legal	Superfund Procedural Issue	Evaluation of NCP Criteria	Compliance with ARARs	It is at variance with Montana State Law
3a	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.16	Non-technical	Superfund Procedural Issue	RASD	Past Response Action Sites	Fails to reevaluate previous emergency response actions against the 9 NCP Criteria (RASD was not an adequate evaluation)
3a	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.17	Non-technical	Site-Wide	Long-term Operations and Maintenance	BSB responsible for program or O&M	Relies too heavily on local government to implement the proposed plan
3a	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.18	Non-technical	Site-Wide	General Comment	Commenter Opposes	it is based on faulty, unproved assumptions
3a	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.19	Non-technical	General Comment	Proposed Plan	Inconsistencies in the Proposed Plan	Contains contradictory positions, assertions, and recommendations

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Document ID No.	Date	Type	Title/Opening Sentence	Last Name	First Name	Location/ Affiliation	Sector	Comment ID.	Technical/ Non-Technical/ Legal	Tier I Topic	Tier II Topic	Tier III Topic	Brief Comment Description
3b	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.20	Non-technical	Superfund Procedural Issue	Evaluation of NCP Criteria	State Acceptance	Specific Comment: Lack of State Concurrence - Greater weight should have been given to MDEQ's position regarding the Parrott Tailings
3b	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.21	Non-technical	Superfund Procedural Issue	RASD	Past Response Action Sites	Specific Comment: Previous Response Actions: The reevaluation of previous response actions was nothing more than a rewording and wordsmithing of the Draft RASD
3b	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.22	Non-technical	Residential Metals	Attic and/or Interior Dust	Pathways	Specific Comment: Pathways Argument - No regulatory basis for using the pathways of exposure argument as used by EPA
3b	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.23	Non-technical	General Comment	Proposed Plan	Inconsistencies in the Proposed Plan	Specific Comment: Operation and Maintenance - The document states, "...if materials are removed, there will require less O&M... there will be no need for future programs to address contaminated solid media."
3b	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.24	Non-technical	Site-Wide	Evaluation of NCP Criteria	Reduction of Toxicity, Mobility and Volume	Specific Comment: Volume of Material Removed - the PP ignores the mandate for treatment and removal by leaving waste in place and relying on caps and institutional controls
3b	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.25	Non-technical	Site-Wide	Evaluation of NCP Criteria	Specific Comment	Specific Comment: Evaluation of alternatives - the numerical ranking used in this area is totally arbitrary and capricious - the numerical ranking gives the appearance of scientific certainty in a misplaced and deceptive manner
3b	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.26	Non-technical	Superfund Procedural Issue	Evaluation of NCP Criteria	Community Acceptance	Specific Comment: Community Acceptance - The document ignores the input received from EPA Citizens group
3b	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.27	Non-technical	Residential Metals	Soils and/or Interior/Attic Dust	For Removal	Specific Comment - Solid Media Components - The ROD should call for a comprehensive sampling of all residential areas and cleanup of yards and indoor dust that exceed the action levels... should not depend on residents indicating plans to use the attic for extended time periods
3b	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.28	Non-technical	Residential Metals	Soils and/or Interior/Attic Dust	For Removal	Specific Comment: Residential Areas: The ROD should stipulate clearly and unambiguously that all residential properties should be sampled and yards and indoor dusts above action levels should be remediated - the impetus for initiation of this process should not be with the resident but with the agency
3c	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.29	Non-technical	Solid Media/Waste Left in Place	Reclamation	Reclamation specifications	Leaving large amounts of waste in place will not effectively protect human health, caps are not capable of sustaining woody vegetation, and require unrealistic IC's, covenants, and costly repairs, forever
3c	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.30	Non-technical	Site-Wide	Institutional controls	Minimize IC's	The citizen advisory group seek a reduction of toxics and a minimum use of IC's and restrictive covenants, the remedy should favor permanence over perpetual maintenance to the extent possible
3c	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.31	Non-technical	Site-Wide	Evaluation of NCP Criteria	Reduction of Toxicity, Mobility and Volume	Emphasis should be placed on the removal and treatment of waste...
3c	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.32	Non-technical	Site-Wide	Human Health Risk	Protectiveness of human health	Apply a proactive, preventative, comprehensive approach to eliminate the source of contamination identified as contributing to chronic and acute health problems
3c	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.33	Non-technical	Parrott Tailings/MSD	Extent of Removal	For Removal	Removal of the Parrott Tailings and removal of mine wastes, mill tailings, and smelter slags from the MSD channel
3c	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.34	Non-technical	Lower Area One	Extent of Removal	Removal of Accessible Wastes	A significant quantity of material was left behind at LAO and is not covered by infrastructure or the slag walls and should be removed to the maximum extent
3c	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.35	Non-technical	Solid Media/Waste Left in Place	Reclamation	Reclamation needed	Unreclaimed sites with contaminated soils should be cleaned up - remove large volumes of waste rock for development and revegetation
3c	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.36	Non-technical	Residential Metals	Soils and/or Interior/Attic Dust	Risk assessment flawed	The original HH Risk Assessment is insufficient and remedy selection cannot be based on a fatally flawed human health risk assessment
3c	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.37	Non-technical	Site-Wide	Redevelopment	Economic Effects	Calls for full implementation of the Superfund Redevelopment Initiative and Superfund Land Revitalization Agenda
3c	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.38	Non-technical	Superfund Procedural Issues	Evaluation of NCP Criteria	Evaluation/Weighing of Cost	Cost as secondary to protecting human health and the environment
3c	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.39	Non-technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	Promote environmental justice in the final remedy

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3c	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.40	Non-technical	Parrott Tailings/MSD	Extent of Removal	For Removal	Silver Bow Creek should be reconstructed along the historical Silver Bow Creek Channel into a quality creek suitable for recreation and other human uses
3c	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.41	Non-technical	Site-Wide	Extent of Removal	For Removal	Treatment and removal of contaminants rather than in place capping and fencing should be the remedy of choice
3c	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.42	Non-technical	Site-Wide	Institutional controls	Minimize IC's	Minimum use of institutional controls
3c	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.43	Non-technical	Residential Metals	Multipathway Lead Abatement Program	Supports Lead Program	All sources of contamination in Priority soils should be addressed, including attic dust, and the multipathway approach should be continued
3c	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.44	Non-technical	Superfund Procedural Issues	RASD	Past Response Action Sites	Previously conducted time critical response actions and emergency response actions should be reevaluated against the 9 superfund criteria
3c	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.45	Non-technical	Site-Wide	Redevelopment	Land Use	Remedy should emphasize productive future land use per the mandate of the superfund redevelopment initiative
3c	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.46	Non-technical	Parrott Tailings/MSD	Aquifer Restoration/Cleanup	Agency Coordination	NRDP, EPA, MDEQ, BSB should pursue joint planning for remediation and restoration of the creek
3d	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.47	Non-technical	Site-Wide	Human Health Risk	Protectiveness of human health	We should not wait for direct causal evidence of specific health harms before we engage in an aggressive cleanup of the site
3d	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.48	Non-technical	Site-Wide	Extent of Removal	For Removal	Superfund Law and the law of the state of MT mandate the precautionary principle and pollution prevention
3d	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.49	Non-technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	The Pollution Prevention Principle/Standard warrants remediating attic dust
3d	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.50	Non-technical	Solid Media/Waste Left in Place	Extent of Removal	For Removal	The Pollution Prevention Principle/Standard warrants removing waste-in-place as part of the priority soils remedy.
3d	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.51	Non-technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	Environmental Justice cannot be achieved at Priority Soils unless the Precautionary Principle is applied as part of the remedy and unless the principle of pollution prevention is applied to the remedy.
3d	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.52	Legal	Site-Wide	Evaluation of NCP Criteria	Compliance with ARARs	The pollution prevention standard and the precautionary principle are ARARs based on the MT Supreme Court decision
3d	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.53	Legal	Site-Wide	Evaluation of NCP Criteria	Compliance with ARARs	These forgotten/neglected/ignored ARARs need to be considered in the RI/FS remedy selection process
3d	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.54	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	Health risk assessment is a subjective, arbitrary, and discretionary political process, rather than an objective and scientific activity. As such it cannot guarantee that the public health will be protected
3d	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.55	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	A health risk assessment does not exclude the bias and prejudice of those doing the study
3d	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.56	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	A risk assessment does not guarantee that significant reduction of pollution will occur in the environment.
3e	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.57	Non-technical	Site-Wide	Waste left in place	Protectiveness of human health and the environment	Reliance on capping will not remove these threats and is not adequately protective of human health and the environment
3e	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.58	Non-technical	Site-Wide	Institutional controls	Implementability and Effectiveness	Reliance on institutional controls will not removed these threats and is not adequately protective of human health and the environment
3e	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.59	Non-technical	Groundwater	Capture and Treatment	Protectiveness of human health and the environment	Reliance on lime abatement will not remove these threats, is not protective of HH and the environment, and will create its own problems
3e	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.60	Non-technical	Site-Wide	Development of Alternatives	Protectiveness of human health and the environment	In-situ treatment will not remove these threats and is not protective of HH and the environment

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3e	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.61	Non-technical	Superfund Procedural Issues	Development of Alternatives	No Innovative Technology	The RI/FS is inadequate in its consideration of treatment technologies for BPSOU contaminants
3e	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.62	Non-technical	Superfund Procedural Issues	Redevelopment	Specific Comment	The RI/FS process needs to give greater attention to the provisions of the Superfund Redevelopment Initiative
3e	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.63	Non-technical	Solid Media/Waste Left in Place	Reclamation	Reduction of Toxicity, Mobility and Volume	Caps do nothing to reduce the toxicity and mobility of contaminants
3e	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.64	Non-technical	Solid Media/Waste Left in Place	Reclamation	Protectiveness of human health and the environment	Caps do nothing to clean up a site
3e	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.65	Non-technical	Solid Media/Waste Left in Place	Reclamation	Long-Term Effectiveness and Permanence	Caps would not provide a permanent remedy
3e	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.66	Non-technical	Solid Media/Waste Left in Place	Reclamation	Reduction of Toxicity, Mobility and Volume	Caps violate the superfund mandate for treatment over containment
3e	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.67	Non-technical	Site-Wide	Institutional controls	Implementability and Effectiveness	There is a tendency not to implement IC's as time passes
3e	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.68	Non-technical	Site-Wide	Institutional controls	Implementability and Effectiveness	The effectiveness of IC's usually depends on the ability, personnel and resources of the local government to implement
3e	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.69	Non-technical	Site-Wide	Institutional controls	Implementability and Effectiveness	The frequency of the 5-year review process may be insufficient to detect the failure of IC's
3e	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.70	Non-technical	Site-Wide	Institutional controls	Implementability and Effectiveness	Education and IC's - educational programs fail to materialize
3e	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.71	Non-technical	Site-Wide	Institutional controls	IC's hamper redevelopment	Substantial indirect costs associated with IC's due to limitations on how a site may be used and it does not mesh with EPA's redevelopment initiative
3e	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.72	Non-technical	Site-Wide	Institutional controls	Implementability and Effectiveness	Concern about lack of a long term IC plan (institutional memory loss)
3e	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.73	Non-technical	Site-Wide	Cost of Removal	Evaluation/Weighing of Cost	Should weigh true costs of long term IC's and O&M against cost options that would remove the contaminants completely
3e	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.74	Non-technical	Site-Wide	Institutional controls	Implementability and Effectiveness	Legal, social, and political pressures limit the effectiveness of IC's
3f	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.75	Non-technical	Parrott Tailings/MSD	Extent of Removal	For Removal	The pollution prevention principle/precautionary principle warrants total removal of the Parrott Tailings
3f	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.76	Legal	Parrott Tailings/MSD	Evaluation of NCP Criteria	Compliance with ARARs	The pollution prevention principle/precautionary principle are ARARs for the Parrott Tailings
3h	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.77	Non-technical	Residential Metals	Attic and/or Interior Dust	Environmental Justice	Low income citizens would bear a disproportionate toxic burden contrary to environmental justice
3i	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.78	Non-technical	Solid Media/Waste Left in Place	Reclamation	Protectiveness of human health and the environment	Extensive use of caps would not be protective of human health and the environment
3j	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.79	Non-technical	Solid Media/Waste Left in Place	Redevelopment	Economic Effects	Waste in place retards economic revitalization
3j	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.80	Non-technical	Superfund Procedural Issues	RASD	Past Response Action Sites	Priority Soils is getting an inferior cleanup under the RASD process
3j	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.81	Non-technical	Superfund Procedural Issues	Environmental Justice	Past Response Action Sites	By allowing the previous response action sites to get a "no further action" designation will mean the low income citizens were environmental disenfranchised

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3j	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.82	Non-technical	Superfund Procedural Issues	Environmental Justice	Public involvement	On the EPA citizens work group, low income residents of the priority soils area are grossly underrepresented
3k	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.83	Non-technical	Superfund Procedural Issues	Public Involvement	EPA limits public comment	Montana EPA officials have unilaterally declared other issues off the table for efficacious public discussion
3k	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.84	Non-technical	Superfund Procedural Issues	Public Involvement	EPA limits public comment	Metro Storm Drain project was never afforded the opportunity for meaningful public involvement - it is irrelevant whether or not the French drain is a good or bad remedy
3k	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.85	Non-technical	Superfund Procedural Issues	Public Involvement	EPA limits public comment	EPA wants to severely limit the scope of the Citizen's advisory group's input and activity
3k	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.86	Non-technical	Superfund Procedural Issues	Public Involvement	EPA limits public comment	It is clear that before the RI/FS was completed, that EPA had de facto decided on what will be the final remedy and are going through public participation in order to comply with the law, but their minds are already made up
3k	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.87	Non-technical	Superfund Procedural Issues	Public Involvement	EPA limits public comment	Agency personnel should not view the provision for meaningful public involvement as a procedural hurdle that need only be formally addressed
3l	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.88	Non-technical	Superfund Procedural Issues	Redevelopment	Land Use	So far in the RI/FS process there has been no explicit effort to incorporate productive future land use considerations into the remedy selection process.
3l	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.89	Non-technical	Superfund Procedural Issues	Redevelopment	Land Use	The EPA document, "Promoting Redevelopment at the SBC/Butte Area superfund Site" is not a reuse plan at all - it is definitely not the comprehensive plan called for by the superfund redevelopment initiative or land revitalization action agenda
3m	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.90	Non-technical	Superfund Procedural Issues	Public Involvement	EPA limits public comment	The development of the Proposed Plan failed to provide for meaningful and adequate public participation as required under superfund law
3n	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.91	Legal	Superfund Procedural Issues	Evaluation of NCP Criteria	Compliance with ARARs	If meeting ARAR's alone was sufficient, why were there eight other superfund decision making criteria developed - compliance with ARARs does not directly or indirectly address the other 8 criteria
3n	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.92	Legal	Superfund Procedural Issues	Evaluation of NCP Criteria	Compliance with ARARs	Why are not the most up to date ARARs used in the process?
3n	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.93	Non-technical	Superfund Procedural Issues	RASD	Federal Location-Specific Requirements	The location specific requirements in the RASD are no substitute for the more complete and comprehensive criteria that would be part of a full RI/FS investigation of the Past Response Action sites.
3n	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.94	Non-technical	Superfund Procedural Issues	RASD	Past Response Action Sites	Whatever terminology one wishes to use, the fact is that these previous TCRA/ERA's do get a "free pass" into the final remedy
3n	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.95	Non-technical	Superfund Procedural Issues	RASD	Past Response Action Sites	While using ARARs and PRGs and PRAOs may be well and good for a TCRA/ERA, they are insufficient to determine what should be the final remedy for a site as large and as complex as Butte Priority Soils
3n	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.96	Non-technical	Solid Media/Waste Left in Place	Reclamation	Protectiveness of human health and the environment	Caps and revegetation do not meet the 9 superfund criteria and are not protective of human health and the environment
3p	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.97	Non-technical	Solid Media/Waste Left in Place	Liability	Local Government Liability	The superfund liability scheme applies to local government as well as to private entities
3p	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.98	Non-technical	Solid Media/Waste Left in Place	Liability	Economic Effects	Waste in place will be a perpetual and permanent drag on economic development because of the liability issues relating to and adhering in a waste in place solution for priority soils
3p	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.99	Non-technical	Solid Media/Waste Left in Place	Liability	Property/Landowner Liability	Liability adheres to toxics, as long as toxics remain liability remains
3p	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.100	Non-technical	Solid Media/Waste Left in Place	Liability	Economic Effects	Toxic liability precludes economic development
3p	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.101	Non-technical	Solid Media/Waste Left in Place	Liability	Property/Landowner Liability	Toxic liability is minimized by maximum removal and treatment of wastes
3q	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.102	Non-technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	The Proposed Plan does not adequately address the threats to human health associated with trivalent arsenic in indoor and attic dusts - should be removed

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3q	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.103	Non-technical	Residential Metals	Attic and/or Interior Dust	Risk assessment flawed	The health risk assessment for arsenic did not consider the health risks posed by trivalent arsenic contaminated dust
3q	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.104	Non-technical	Residential Metals	Attic and/or Interior Dust	Libby Precedent	The Libby Cleanup precedent would warrant addressing contaminated attic dust in Butte
3q	4-Jan-05	letter	Cover Statement - Comments BPSOU... The following comments/documents/position papers are submitted as official public comment on the proposed plan...	Ray	Dr. John W.	Butte, MT	Resident - Butte	3.105	Non-technical	Residential Metals	Attic and/or Interior Dust	Environmental Justice	The citizen education approach advocated in ATSDR's health consultations documents, is inadequate - burden of avoiding exposure on residents
4	13-Jan-05	email attachment	Attached is a document which I am submitting as public comment on the Proposed Plan Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	4.1	Non-technical	Superfund Procedural Issues	RASD	Past Response Action Sites	Selecting the no further action alternative for Past Response Action sites in the BPSOU does not deliver on the EPA's promise to evaluate them using the Nine Superfund Criteria.
4	13-Jan-05	email attachment	Attached is a document which I am submitting as public comment on the Proposed Plan Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	4.2	Non-technical	Superfund Procedural Issues	RASD	Past Response Action Sites	Failing to use the Nine Superfund Criteria to evaluate the Past Response Actions gives those sites a free pass into the final remedy.
4	13-Jan-05	email attachment	Attached is a document which I am submitting as public comment on the Proposed Plan Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	4.3	Non-technical	Superfund Procedural Issues	RASD	Past Response Action Sites	EPA just reworded its 2003 RASD to incorporate terminology without using the substance of the Nine Evaluation Criteria.
4	13-Jan-05	email attachment	Attached is a document which I am submitting as public comment on the Proposed Plan Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	4.4	Non-technical	Superfund Procedural Issues	RASD	Past Response Action Sites	EPA must show that its evaluation process used in the 2003 RASD is as protective of human health and the environment as a full RI/FS using the Nine Superfund Criteria.
4	13-Jan-05	email attachment	Attached is a document which I am submitting as public comment on the Proposed Plan Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	4.5	Non-technical	Superfund Procedural Issues	RASD	Past Response Action Sites	EPA should deliver on its unfulfilled promise to do a thorough and complete reevaluation of the Past Response Action sites using the Nine Evaluation Criteria.
4	13-Jan-05	email attachment	Attached is a document which I am submitting as public comment on the Proposed Plan Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	4.6	Non-technical	Superfund Procedural Issues	RASD	Past Response Action Sites	If the BPSOU is to be properly cleaned up as mandated by CERCLA, the Past Response Action sites must be fully and permanently protective of human health and the environment.
4	13-Jan-05	email attachment	Attached is a document which I am submitting as public comment on the Proposed Plan Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	4.7	Non-technical	Superfund Procedural Issues	RASD	Past Response Action Sites	If the mission of Superfund is to be achieved, the Past Response Action sites must be reevaluated using the Nine Superfund Criteria.
4	13-Jan-05	email attachment	Attached is a document which I am submitting as public comment on the Proposed Plan Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	4.8	Non-technical	Superfund Procedural Issues	RASD	Past Response Action Sites	How do we know if past response actions are permanently protective of human health and the environment?
4	13-Jan-05	email attachment	Attached is a document which I am submitting as public comment on the Proposed Plan Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	4.9	Non-technical	Superfund Procedural Issues	RASD	Past Response Action Sites	How do we know if past actions meet the Superfund mandate to "really clean up a site?"
4	13-Jan-05	email attachment	Attached is a document which I am submitting as public comment on the Proposed Plan Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	4.10	Non-technical	Superfund Procedural Issues	RASD	Past Response Action Sites	Past emergency response actions cannot be assumed to meet the Nine Superfund Evaluation Criteria.
4	13-Jan-05	email attachment	Attached is a document which I am submitting as public comment on the Proposed Plan Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	4.11	Legal	Superfund Procedural Issues	Evaluation of NCP Criteria	Compliance with ARARs	If compliance with ARARs was considered the sole determinant of environmental and health protectiveness, why were other criteria added to the Superfund decision making process?
4	13-Jan-05	email attachment	Attached is a document which I am submitting as public comment on the Proposed Plan Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	4.12	Non-technical	Superfund Procedural Issues	Evaluation of NCP Criteria	Compliance with ARARs	Compliance with ARARs does not directly or indirectly address the other eight Superfund criteria.
4	13-Jan-05	email attachment	Attached is a document which I am submitting as public comment on the Proposed Plan Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	4.13	Legal	Superfund Procedural Issues	Evaluation of NCP Criteria	Compliance with ARARs	Why are not the most up to date ARARs used in the process?
4	13-Jan-05	email attachment	Attached is a document which I am submitting as public comment on the Proposed Plan Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	4.14	Non-technical	Superfund Procedural Issues	RASD	Federal Location-Specific Requirements	Do the Federal Location-Specific Requirements substitute as criteria for the criteria used in a full RI/FS process for these sites?
4	13-Jan-05	email attachment	Attached is a document which I am submitting as public comment on the Proposed Plan Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	4.15	Non-technical	Superfund Procedural Issues	RASD	Federal Location-Specific Requirements	The location specific requirements in the RASD are no substitute for the more complete and comprehensive criteria that would be part of a full RI/FS investigation of the Past Response Action sites.
4	13-Jan-05	email attachment	Attached is a document which I am submitting as public comment on the Proposed Plan Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	4.16	Non-technical	Superfund Procedural Issues	RASD	Past Response Action Sites	The criteria used to determine the effectiveness of the TCRA/ERA remedies is not nearly as protective as those used in a full RI/FS process.
4	13-Jan-05	email attachment	Attached is a document which I am submitting as public comment on the Proposed Plan Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	4.17	Non-technical	Superfund Procedural Issues	RASD	Past Response Action Sites	Using ARARs, PRGs, and PRAOs may be good enough for TCRA/ERAs, they are not good enough for the BPSOU.
4	13-Jan-05	email attachment	Attached is a document which I am submitting as public comment on the Proposed Plan Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	4.18	Non-technical	Superfund Procedural Issues	RASD	Past Response Action Sites	To allow the Past Response Action sites into the final remedy without having them go through the RI/FS is contrary to the intent of CERCLA.
4	13-Jan-05	email attachment	Attached is a document which I am submitting as public comment on the Proposed Plan Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	4.19	Non-technical	Superfund Procedural Issues	RASD	Past Response Action Sites	The public needs to be assured that the TCRA/ERAs are fully protective of human health and the environment in accordance with the Nine Superfund evaluation criteria.
4	13-Jan-05	email attachment	Attached is a document which I am submitting as public comment on the Proposed Plan Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	4.20	Non-technical	Superfund Procedural Issues	RASD	Past Response Action Sites	The RASD evaluation does not provide a full and complete study of the previous actions.
4	13-Jan-05	email attachment	Attached is a document which I am submitting as public comment on the Proposed Plan Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	4.21	Non-technical	Superfund Procedural Issues	RASD	Past Response Action Sites	EPA promised a thorough, extensive, and complete review of the Past Response Actions, but never delivered on that promise to Butte citizens.
5	18-Jan-05	email attachment	Attached please find a new, formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.1	Non-technical	Site-Wide	General Comment	Public Trust Doctrine Violated	EPA must adhere to the Public Trust Doctrine.

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5	18-Jan-05	email attachment	Attached please find a new, formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.2	Non-technical	Site-Wide	General Comment	Public Trust Doctrine Violated	The development of the Proposed Plan did not include the Public Trust Doctrine.
5	18-Jan-05	email attachment	Attached please find a new, formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.3	Non-technical	Site-Wide	General Comment	Public Trust Doctrine Violated	The BPSOU is at variance with the Public Trust Doctrine.
5	18-Jan-05	email attachment	Attached please find a new, formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.4	Non-technical	Site-Wide	Environmental Justice	Public Trust Doctrine Violated	Failing to follow the Public Trust Doctrine violates Environmental Justice.
5	18-Jan-05	email attachment	Attached please find a new, formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.5	Non-technical	Site-Wide	General Comment	Public Trust Doctrine Violated	The proposed plan for BPSOU should be declared null and void and redone.
5	18-Jan-05	email attachment	Attached please find a new, formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.6	Non-technical	Site-Wide	General Comment	Public Trust Doctrine Violated	Past mining activities in the BPSOU breached the public trust and Superfund has as a goal restoring that trust.
5	18-Jan-05	email attachment	Attached please find a new, formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.7	Non-technical	Superfund Procedural Issues	Evaluation of NCP Criteria	Evaluation/Weighing of Cost	The EPA's approach to developing a preferred alternative has made cost savings inordinately important.
5	18-Jan-05	email attachment	Attached please find a new, formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.8	Non-technical	Parrott Tailings/MSD	General Comment	Public Trust Doctrine Violated	The proposed plan for the Parrott Tailings and Metro Storm Drain violates the Public Trust Doctrine.
5	18-Jan-05	email attachment	Attached please find a new, formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.9	Non-technical	Parrott Tailings/MSD	Extent of Removal	For Removal	The EPA has an obligation to make every attempt to restore the water in Silver Bow Creek and the Metro Storm Drain to a beneficial public use.
5	18-Jan-05	email attachment	Attached please find a new, formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.10	Non-technical	Groundwater	General Comment	Public Trust Doctrine Violated	The plan to write off groundwater and the aquifer are contrary to the public trust doctrine because it permanently alienates a public resource from public use and enjoyment.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.11	Non-technical	Site-Wide	Extent of Removal	For Removal	The EPA has an obligation under the public trust doctrine to make every attempt to cleanup soil through treatment or remove it.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.12	Non-technical	Site-Wide	General Comment	Public Trust Doctrine Violated	The plan to leave waste in place violates the public trust doctrine.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.13	Non-technical	Parrott Tailings/MSD	General Comment	Public Trust Doctrine Violated	The EPA's uncertainty argument surrounding the Metro Storm Drain and the Parrott Tailings is contrary to the Public Trust Doctrine.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.14	Non-technical	Parrott Tailings/MSD	General Comment	Public Trust Doctrine Violated	The EPA's "uncertainty" argument violates CERCLA, SARA, Public Trust Doctrine as well as the legally mandated Precautionary Principle.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.15	Non-technical	Residential Metals	Attic and/or Interior Dust	Public Trust Doctrine Violated	The EPA's lack of pathways of exposure argument is contrary to the public trust doctrine.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.16	Non-technical	Site-Wide	Evaluation of NCP Criteria	Long-Term Effectiveness and Permanence	Nowhere in CERCLA is there a preference for leaving waste in place untreated as called for by EPA's preferred alternative for Priority Soils.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.17	Non-technical	Site-Wide	General Comment	Public Trust Doctrine Violated	The preferred alternative convolutes CERCLA and the Public Trust Doctrine in that it would leave vast amounts of waste in place untreated and unremediated, permanently threatening public health and the environment.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.18	Non-technical	Site-Wide	Environmental Justice	Public Trust Doctrine Violated	By not adhering to the Public Trust Doctrine the EPA is denying Environmental Justice to Butte
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.19	Non-technical	Site-Wide	Environmental Justice	Economic Effects	By leaving significant amounts of waste on the Butte Hill, the proposed plan makes worse the economic disparity between those on the hill and those on the flats.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.20	Non-technical	Site-Wide	Environmental Justice	Concerned about Health Effects/Risks	Because there is a causal relationship between economic disparity and poor health, the proposed plan would worsen the health problems of the poor who generally live in the boundaries of the BPSOU.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.21	Non-technical	Solid Media/Waste Left in Place	Liability	Economic Effects	Given the CERCLA and SARA liability scheme, the proposed waste in place remedy for BPSOU will preclude future economic revitalization of the area.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.22	Non-technical	Solid Media/Waste Left in Place	Liability	Economic Effects	As long as waste is left in place, liability will be left in place, which will hinder economic growth.

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5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.23	Non-technical	Site-Wide	General Comment	Public Trust Doctrine Violated	Institutional controls violate the Public Trust Doctrine.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.24	Non-technical	Site-Wide	Institutional Controls	IC's hamper redevelopment	The institutional controls being considered limit productive land uses and greatly compromise the property rights of the owners to use their land.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.25	Non-technical	Site-Wide	Institutional Controls	Minimize IC's	Institutional controls are contrary to the Superfund mandate or preference for treatment over restricted land use.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.26	Non-technical	Site-Wide	Institutional Controls	Minimize IC's	EPA has admitted that institutional controls don't work, so it is amazing they are being proposed for the BPSOU.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.27	Non-technical	Site-Wide	Human Health Risk	Public Trust Doctrine Violated	Using the health risk assessment at the priority soils site violates the public trust doctrine.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.28	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	The BPSOU risk assessment looked at only one option for the operable unit.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.29	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	The BPSOU risk assessment extensively used best judgment and estimates instead of data to minimize the health risks.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.30	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	The conclusions of the risk assessment are arbitrary and capricious.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.31	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	Peer review of the risk assessment said it was flawed, yet the EPA rejected that peer review.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.32	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	The results of a risk assessment differ depending on who is doing the assessment, making them arbitrary and capricious.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.33	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	The BPSOU risk assessment violated the federally mandated use of the Precautionary Principle for Superfund decision making.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.34	Non-technical	Site-Wide	Human Health Risk	Public Trust Doctrine Violated	Contrary to the Public Trust Doctrine, the risk assessment placed the burden of proving health harms on those affected by the contaminants at the site.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.35	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	The BPSOU substituted guesswork for real scientific knowledge.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.36	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	The risk assessment does not adequately characterize risk because it looked only at a single option, is based on inadequate data, fails to accommodate the unknowns, is based on subjective assumptions and accepts the premise that a certain amount of harm to the public trust is acceptable.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.37	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	A health risk assessment is a subjective, arbitrary and discretionary political process rather than an objective and scientific activity and does not guarantee that public health will be protected.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.38	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	A health risk assessment does not exclude the bias and prejudice of those doing the study.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.39	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	A risk assessment does not guarantee that significant reduction of pollution will occur in the environment.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.40	Non-technical	Site-Wide	Human Health Risk	Public Trust Doctrine Violated	How the risk assessment is used for priority soils violates the public trust doctrine.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.41	Non-technical	Site-Wide	General Comment	Public Trust Doctrine Violated	The Preferred alternative violates the CERCLA/Public Trust Doctrine Mandate to follow the Precautionary Principle.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.42	Non-technical	Site-Wide	Extent of Removal	For Removal	The Pollution Prevention Principle/Standard warrants remediating attic dust and removing waste-in-place as part of the priority soils remedy.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.43	Non-technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	Environmental Justice cannot be achieved at Priority Soils unless the Precautionary Principle is applied as part of the remedy and unless the principle of pollution prevention is applied to the remedy.

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5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.44	Non-technical	Site-Wide	Extent of Removal	For Removal	Given the serious nature of the waste found in the BPSOU, the pollution prevention principle warrants removing as much as possible.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.45	Non-technical	Site-Wide	Extent of Removal	For Removal	The Precautionary Principle/Standard warrants remediating contaminated attic dust now and removing waste-in-place as part of the remedy.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.46	Legal	Site-Wide	Evaluation of NCP Criteria	Compliance with ARARs	The Pollution Prevention Standard and the Precautionary Principle/Standard are ARARs for the Priority Soils
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.47	Non-technical	Site-Wide	Extent of Removal	For Removal	Leaving waste in place really is leaving an unacceptable and unwarranted threat in place.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.48	Non-technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	The Precautionary Principle and the Principle of Pollution Prevention demand that contaminated attic dust be removed and remediated as part of the priority soils remedy.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.49	Legal	Site-Wide	Evaluation of NCP Criteria	Compliance with ARARs	The Precautionary Principle and the Principle of Pollution need to be considered in the remedy selection process.
5	18-Jan-05	email attachment	Attached please find a new formal complaint regarding the Montana Office of EPA's development of a Proposed Plan for the Butte Priority Soils OU Superfund site.	Ray	Dr. John W.	Butte, MT	Resident - Butte	5.50	Non-technical	Site-Wide	General Comment	Commenter Opposes	The preferred solution should be declared null and void and should be reworked in accordance with the applicable laws.
6	21-Jan-05	email letter	Based on Wendy's comment below that emailed submitted comments on the Proposed Plan for Priority Soils "will be printed and added to the official comments," I would like for all of my submissions, whether concerned with the process or substance of the Proposed Plan for Priority Soils, be regarded as public comment requiring a response in eh responsiveness summary	Ray	Dr. John W.	Butte, MT	Resident - Butte	6.1	Non-technical	Superfund Procedural Issues	Public involvement	EPA disregards comments	Please consider the complaints submitted as complaints requiring adjudication and public comments on the BPSOU Proposed Plan and Preferred Alternative.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.1	Non-technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	Environmental justice concerns must permeate all EPA decisions involving priority soils
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.2	Non-technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	Butte Priority Soils has a higher than normal incidence of low-income citizens
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.3	Non-technical	Superfund Procedural Issues	Environmental Justice	EPA did not account for Environmental Justice	the Montana Office EPA's position on the "soils" portion of the Butte Priority Soils violates the principles of environmental justice because it places a disproportionate liability burden on the poor; it places a disproportionate land use burden on the poor; it places a disproportionate health burden on the poor; and it has not provided low-income citizens with meaningful opportunities for public participation.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.4	Non-technical	Solid Media/Waste Left in Place	Environmental Justice	Economic Effects	The proposed waste-in-place remedy will preclude future economic development in the area and place an unfair environmental regulation burden on the poor.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.5	Non-technical	Solid Media/Waste Left in Place	Redevelopment	Economic Effects	Leaving waste in place means that the associated liability remains, so the more waste that is removed, the greater the opportunity for economic revitalization.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.6	Non-technical	Solid Media/Waste Left in Place	Redevelopment	Economic Effects	The Priority Soils RI/FS and remedy development and selection process for Butte Priority Soils has so far failed to consider the mandates of the Superfund Redevelopment Initiative and the Land Revitalization Initiative Action Agenda.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.7	Non-technical	Superfund Procedural Issues	Redevelopment	Land Use	The Priority Soils remedy development and selection process has so far failed to follow the mandates OSWER Directive 9355.7-04.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.8	Non-technical	Superfund Procedural Issues	Redevelopment	Land Use	So far in the RI/FS process there has been no explicit effort to incorporate productive future land use considerations into the remedy selection process.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.9	Non-technical	Superfund Procedural Issues	Redevelopment	Land Use	Failure to consider future productive land uses is particularly acute with regard to the extensive previous response actions on the Butte Hill.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.10	Non-technical	Superfund Procedural Issues	Redevelopment	Land Use	The past response actions at the BPSOU, which have been extensive, did not take into account or consideration future productive land uses. They were emergency actions to deal with a time critical situation.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.11	Non-technical	Superfund Procedural Issues	RASD	Land Use	The RASD does not consider future productive land uses.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.12	Non-technical	Superfund Procedural Issues	Redevelopment	Land Use	Previous response action sites will never be considered for future productive land uses.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.13	Non-technical	Superfund Procedural Issues	Redevelopment	Land Use	failure to consider future productive land uses violates the provisions of the Superfund Redevelopment Initiative and the Land Revitalization Initiative/Action Agenda, which violates the provisions of OSWER Directive 9355.07-04.

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7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.14	Non-technical	Superfund Procedural Issues	Redevelopment	Land Use	A formal reuse assessment should be conducted for the BPSOU.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.15	Non-technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	Attic dust in Butte is contaminated with both trivalent arsenic and other toxic heavy metals from the Anaconda Smelter and past mining and smelting operations in Butte and under Superfund this contamination threat must be remediated.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.16	Non-technical	Residential Metals	Attic and/or Interior Dust	Risk assessment flawed	The 1997 Health Risk Assessment for arsenic and subsequent health studies for Butte Priority Soils does not specifically and directly consider trivalent arsenic found in Butte attics.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.17	Non-technical	Site-Wide	Extent of Removal	For Removal	The only real cleanup remedy for these toxics found in the BPSOU is removal of contaminants.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.18	Non-technical	Residential Metals	Attic and/or Interior Dust	Pathways	the EPA contention that contaminants found in the attics of Butte homes do not pose a health risk to Butte residents because there are no pathways of contamination is specious.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.19	Non-technical	Residential Metals	Attic and/or Interior Dust	Environmental Justice	The EPA wants to place the cleanup burden on residents and property owners in that it would be up to occupants to contact a government agency requesting remediation.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.20	Non-technical	Residential Metals	Attic and/or Interior Dust	Pathways	The pathways of exposure argument sets a dangerous precedent that as long as no one is using a site, we don't need to clean it up.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.21	Non-technical	Residential Metals	Attic and/or Interior Dust	Pathways	there are no current laws, rules or regulations that prohibit the owner of a home or the renter of a home from using or disturbing the home's attic.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.22	Non-technical	Residential Metals	Attic and/or Interior Dust	Pathways	The pathways of exposure argument is based on the false premise that, overall, there will continue to be few pathways of exposure to the contaminated attic dust.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.23	Non-technical	Residential Metals	Attic and/or Interior Dust	Action Levels	The lack of a definitive action level for contaminated dust would mandate the use of the Precautionary Principle in approaching the problem.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.24	Non-technical	Residential Metals	Attic and/or Interior Dust	Economic Effects	The pathway of exposure approach will be a permanent drag on the economic revitalization of the Butte Hill.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.25	Non-technical	Residential Metals	Attic and/or Interior Dust	Environmental Justice	Accepting the pathways argument means that low income citizens will continue to bear a disproportionate toxic burden.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.26	Non-technical	Residential Metals	Attic and/or Interior Dust	Pathways	The pathways argument limits or precludes future productive land uses and low income residents who live in the area will be unfairly affected.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.27	Non-technical	Residential Metals	Attic and/or Interior Dust	Libby Precedent	The poor in Butte would receive an inferior cleanup to those in Libby.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.28	Non-technical	Residential Metals	Attic and/or Interior Dust	Environmental Justice	The citizen education approach advocated by EPA is contrary to environmental justice because it places the burden of avoiding exposure to waste on the low-income residents of BPSOU.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.29	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	Health risk assessments are inherently uncertain and the 1997 BPSOU study has been called inadequate, so it should not be used as part of the priority soils remedy.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.30	Non-technical	Residential Metals	Attic and/or Interior Dust	Concerned about Health Effects/Risks	Attic dust needs to be specifically assessed as to its potential health risk.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.31	Technical	Residential Metals	Attic and/or Interior Dust	Characterization	A definitive determination needs to be made as to the characteristics and constituents of the attic dust.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.32	Technical	Residential Metals	Attic and/or Interior Dust	Characterization	EPA should determine if arsenic found in attic dust in BPSOU came from Anaconda.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.33	Non-technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	If contaminants in attic dust threaten human health, they should be removed as part of the BPSOU remedy.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.34	Non-technical	Superfund Procedural Issues	Environmental Justice	Public involvement	Low-income citizens have not been given meaningful opportunities for public participation and there has been a failure to follow public involvement mandates specifically applicable to low-income citizens.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.35	Non-technical	Superfund Procedural Issues	Environmental Justice	Public involvement	There have been no proactive attempts to include low-income citizens in the decision-making process.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.36	Non-technical	Superfund Procedural Issues	Environmental Justice	Public involvement	As proof that there has been no attempt to seek out low-income citizens, note that only 5 percent of the Butte Citizens Advisory Group are low-income people.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.37	Non-technical	Solid Media/Waste Left in Place	Environmental Justice	Concerned about Health Effects/Risks	There are has been no consideration of the effects of waste-in-place on low-income citizens.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.38	Non-technical	Superfund Procedural Issues	RASD	Public involvement	Using the RASD will pose an institutional barrier to meaningful public involvement in the remedy selection process for BPSOU.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.39	Non-technical	Superfund Procedural Issues	Public involvement	EPA disregards comments	The EPA has declared attic dust and using native plants on caps off the table for efficacious public discussion, which violates the public involvement mandate of the agency.

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7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.40	Non-technical	Superfund Procedural Issues	Public involvement	EPA limits public comment	The EPA wants to limit the Citizen Advisory Group's purpose to simply refining the agency's defacto proposed Priority Soils' "soils" solution.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.41	Non-technical	Superfund Procedural Issues	Public involvement	EPA limits public comment	The EPA wants the Citizens Advisory Group's discussions to be conducted on the premise that the group has already accepted the main ideas of what the EPA is proposing.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.42	Non-technical	Superfund Procedural Issues	Evaluation of NCP Criteria	Community Acceptance	The EPA decided before the BPSOU RI/FS was completed what it intended to do with the soils portion of the OU.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.43	Non-technical	Superfund Procedural Issues	RASD	Public involvement	The RASD review process of previous actions in the BPSOU violates EPA's public involvement process.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.44	Non-technical	Superfund Procedural Issues	Public involvement	EPA limits public comment	The EPA's declaration that certain topics are precluded from efficacious public comment violates the agency's public involvement process.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.45	Non-technical	Superfund Procedural Issues	Public involvement	EPA limits public comment	The EPA's attempt to limit the role and the scope of the advisory committee violates the agency's public involvement process.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.46	Non-technical	Superfund Procedural Issues	Public involvement	EPA limits public comment	Selecting a final remedy for the soils prior to the public comment period ending violates the agency's public involvement process.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.47	Non-technical	Superfund Procedural Issues	Public involvement	EPA limits public comment	By circumventing its public involvement process rules, the EPA has unfairly affected the low-income citizens of BPSOU.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.48	Non-technical	Superfund Procedural Issues	Public involvement	EPA disregards comments	EPA should not view the provision for meaningful public involvement as simply a procedural hurdle that need only be formally addressed.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.49	Non-technical	Superfund Procedural Issues	Public involvement	EPA disregards comments	The wanton corporate hubris displayed at a recent meeting on priority soils where public input was characterized as the articulation of "feelings" is a disservice and mischaracterization of the value of the public participation process.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.50	Non-technical	Superfund Procedural Issues	Public involvement	EPA disregards comments	Public participation should be considered more than histrionics.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.51	Non-technical	Site-Wide	Extent of Removal	For Removal	There must be maximum removal of toxic waste in the Butte area.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.52	Non-technical	Solid Media/Waste Left in Place	Redevelopment	Economic Effects	There must be a full and vigorous implementation of the Superfund Land Use Action Agenda and the Superfund Redevelopment Initiative.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.53	Non-technical	Superfund Procedural Issues	Environmental Justice	Public involvement	A proactive campaign must be undertaken to include and provide meaningful public participation, particularly for low-income residents.
7	21-Jan-05	email letter	Attached please find additional public comment which I am submitting to you regarding the Proposed Plan for Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	7.54	Non-technical	Superfund Procedural Issues	Environmental Justice	Public involvement	The pathways of exposure approach to attic dust must be abandoned
8	22-Jan-05	email letter	Attached is the text of a formal complaint which I am making protesting the Montana Office of EPA decision to limit comments, per person, at the January 27, 2005 Public Hearing on Priority Soils to a maximum of five minutes.	Ray	Dr. John W.	Butte, MT	Resident - Butte	8.1	Non-technical	Superfund Procedural Issues	Public Meeting	EPA limits public comment	A five minute limitation is excessively constraining to the possibility of effective public input for reasons documented in my attachment.
8	22-Jan-05	email letter	Attached is the text of a formal complaint which I am making protesting the Montana Office of EPA decision to limit comments, per person, at the January 27, 2005 Public Hearing on Priority Soils to a maximum of five minutes.	Ray	Dr. John W.	Butte, MT	Resident - Butte	8.2	Non-technical	Superfund Procedural Issues	Public Meeting	EPA limits public comment	The EPA needs to make sure that all are afforded full opportunity to present and defend their views.
8	22-Jan-05	email letter	Attached is the text of a formal complaint which I am making protesting the Montana Office of EPA decision to limit comments, per person, at the January 27, 2005 Public Hearing on Priority Soils to a maximum of five minutes.	Ray	Dr. John W.	Butte, MT	Resident - Butte	8.3	Non-technical	Superfund Procedural Issues	Public Meeting	EPA limits public comment	There is no basis in the rules, regulation, policies, procedures or guidance documents governing public input and setting a five-minute time limit.
8	22-Jan-05	email letter	Attached is the text of a formal complaint which I am making protesting the Montana Office of EPA decision to limit comments, per person, at the January 27, 2005 Public Hearing on Priority Soils to a maximum of five minutes.	Ray	Dr. John W.	Butte, MT	Resident - Butte	8.4	Non-technical	Superfund Procedural Issues	Public Meeting	EPA limits public comment	Limiting public comment to five minutes is contrary to sound decision making and efficacious public participation.
8	22-Jan-05	email letter	Attached is the text of a formal complaint which I am making protesting the Montana Office of EPA decision to limit comments, per person, at the January 27, 2005 Public Hearing on Priority Soils to a maximum of five minutes.	Ray	Dr. John W.	Butte, MT	Resident - Butte	8.5	Non-technical	Superfund Procedural Issues	Public Meeting	EPA limits public comment	Increase the time limit to at least 10 minutes per person.
8	22-Jan-05	email letter	Attached is the text of a formal complaint which I am making protesting the Montana Office of EPA decision to limit comments, per person, at the January 27, 2005 Public Hearing on Priority Soils to a maximum of five minutes.	Ray	Dr. John W.	Butte, MT	Resident - Butte	8.6	Non-technical	Superfund Procedural Issues	Public Meeting	EPA limits public comment	Keep the EPA "explanation" of the proposed plan and preferred alternative as brief as possible.
8	22-Jan-05	email letter	Attached is the text of a formal complaint which I am making protesting the Montana Office of EPA decision to limit comments, per person, at the January 27, 2005 Public Hearing on Priority Soils to a maximum of five minutes.	Ray	Dr. John W.	Butte, MT	Resident - Butte	8.7	Non-technical	Superfund Procedural Issues	Public Meeting	EPA limits public comment	The five-minute time limit only serves to reinforce the view that the agency does not value public input and is only going through the motions.
9	23-Jan-05	email letter	Attached please find a new environmental justice complaint which I am submitting regarding the Butte Priority Soils OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	9.1	Non-technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	The preferred alternative for BPSOU should be declared to be in violation of environmental justice and declared null and void as presently composed.

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Document ID No.	Date	Type	Title/Opening Sentence	Last Name	First Name	Location/ Affiliation	Sector	Comment ID.	Technical/ Non-Technical/ Legal	Tier I Topic	Tier II Topic	Tier III Topic	Brief Comment Description
10	24-Jan-05	email letter	Part of EPA's and Region 8's environmental justice program is to make sure that low-income citizens are involved in the formulation and execution of Superfund rules and regulations.	Ray	Dr. John W.	Butte, MT	Resident - Butte	10.1	Non-technical	Superfund Procedural Issues	Public Meeting	Public involvement at Public Meeting	What special efforts were made by the EPA to notify low-income residents of the priority soils area of the January 25th public meeting about cleanup in the BPSOU?
10	24-Jan-05	email letter	Part of EPA's and Region 8's environmental justice program is to make sure that low-income citizens are involved in the formulation and execution of Superfund rules and regulations.	Ray	Dr. John W.	Butte, MT	Resident - Butte	10.2	Non-technical	Superfund Procedural Issues	Public Meeting	Public involvement at Public Meeting	What special efforts did the EPA make to encourage participation by low-income residents in the Jan. 25th public meeting?
10	24-Jan-05	email letter	Part of EPA's and Region 8's environmental justice program is to make sure that low-income citizens are involved in the formulation and execution of Superfund rules and regulations.	Ray	Dr. John W.	Butte, MT	Resident - Butte	10.3	Non-technical	Superfund Procedural Issues	Environmental Justice	Public involvement	What special efforts has EPA made to involve the poor in cleanup decisions regarding BPSOU?
10	24-Jan-05	email letter	Part of EPA's and Region 8's environmental justice program is to make sure that low-income citizens are involved in the formulation and execution of Superfund rules and regulations.	Ray	Dr. John W.	Butte, MT	Resident - Butte	10.4	Non-technical	Superfund Procedural Issues	Environmental Justice	Public involvement	If no special efforts to involve the poor have been made, how does this square with the EPA mandate to make an extraordinary effort to include low-income citizens?
11	25-Jan-05	email letter	Part of EPA's and Region 8's environmental justice program to make sure that low-income citizens are involved in the formulation and execution of Superfund rules and regulations.	Ray	Dr. John W.	Butte, MT	Resident - Butte	11.1	Non-technical	Superfund Procedural Issues	Public Meeting	Public involvement at Public Meeting	Notice of the Jan. 25 meeting was in the newspaper, but many poor people can't afford the newspaper and it was very bureaucratic, so it wasn't very appealing to the poor.
11	25-Jan-05	email letter	Part of EPA's and Region 8's environmental justice program is to make sure that low-income citizens are involved in the formulation and execution of Superfund rules and regulations.	Ray	Dr. John W.	Butte, MT	Resident - Butte	11.2	Non-technical	Superfund Procedural Issues	Public Meeting	Public involvement at Public Meeting	The Jan. 25th public meeting was held at a site and time that were not convenient for the poor.
11	25-Jan-05	email letter	Part of EPA's and Region 8's environmental justice program is to make sure that low-income citizens are involved in the formulation and execution of Superfund rules and regulations.	Ray	Dr. John W.	Butte, MT	Resident - Butte	11.3	Non-technical	Superfund Procedural Issues	Public Meeting	Public involvement at Public Meeting	The Jan. 25th public meeting was in a format that may have intimidated the poor.
11	25-Jan-05	email letter	Part of EPA's and Region 8's environmental justice program is to make sure that low-income citizens are involved in the formulation and execution of Superfund rules and regulations.	Ray	Dr. John W.	Butte, MT	Resident - Butte	11.4	Non-technical	Superfund Procedural Issues	Environmental Justice	Public involvement	The Jan. 25th public meeting was at variance with the EPA's environmental justice policy.
12	26-Jan-05	email letter	After following the development of the local government's position on Priority Soils over the past months, I still have some major concerns which were not put to rest by this evening's presentation.	Ray	Dr. John W.	Butte, MT	Resident - Butte	12.1	Non-technical	General Comment	Unrelated Topic	Out of scope	This commentary is directed toward Butte-Silver Bow's position on the proposed plan and not to EPA's proposed plan.
13	26-Jan-05	email letter	After last evening's EPA public hearing, I sent the following environmental justice complaint to the national and region 8 offices of the EPA.	Ray	Dr. John W.	Butte, MT	Resident - Butte	13.1	Non-technical	Superfund Procedural Issues	Public Meeting	Public involvement at Public Meeting	This commentary was addressed in document 11.
14	26-Jan-05	email letter	The following complaint (see following emails) calls for ameliorative action now.	Ray	Dr. John W.	Butte, MT	Resident - Butte	14.1	Non-technical	Superfund Procedural Issues	Public Meeting	Public involvement at Public Meeting	This is a repeat of document 13, which was a repeat of document 11.
15	29-Jan-05	email letter	Attached please find a new environmental justice complain I am submitting regarding the Butter Priority Soils Superfund OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	15.1	Non-technical	Site-Wide	Human Health Risk	Environmental Justice	The health risk assessments actually conducted for the BPSOU violate the EPA mandate to promote environmental justice.
15	29-Jan-05	email letter	Attached please find a new environmental justice complaint I am submitting regarding the Butte Priority Soils Operable Unit.	Ray	Dr. John W.	Butte, MT	Resident - Butte	15.2	Non-technical	Site-Wide	Human Health Risk	Environmental Justice	Distorted health risk assessments preclude the possibility that low-income citizens will receive equal protection from the harms of pollution as a result of cleanup.
15	29-Jan-05	email letter	Attached please find a new environmental justice complaint I am submitting regarding the Butte Priority Soils Operable Unit.	Ray	Dr. John W.	Butte, MT	Resident - Butte	15.3	Non-technical	Site-Wide	Human Health Risk	Environmental Justice	The health risk assessments will lead to a remedy that will not rectify the disparate toxics burden that the poor living in the BPSOU endure.
15	29-Jan-05	email letter	Attached please find a new environmental justice complaint I am submitting regarding the Butte Priority Soils Operable Unit.	Ray	Dr. John W.	Butte, MT	Resident - Butte	15.4	Non-technical	Site-Wide	Human Health Risk	Environmental Justice	The health risk assessments actually increase the disparate toxic burden of low-income citizens in the BPSOU.
15	29-Jan-05	email letter	Attached please find a new environmental justice complaint I am submitting regarding the Butte Priority Soils Operable Unit.	Ray	Dr. John W.	Butte, MT	Resident - Butte	15.5	Non-technical	Site-Wide	Human Health Risk	Environmental Justice	Since environmental justice concerns must permeate all of EPA's activities and processes, this failure to promote and encompass environmental justice in the development of the proposed plan and preferred alternative warrants the discarding of the entire Proposed Plan for Priority Soils.
15	29-Jan-05	email letter	Attached please find a new environmental justice complaint I am submitting regarding the Butte Priority Soils Superfund OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	15.6	Non-technical	Site-Wide	Human Health Risk	Environmental Justice	The BPSOU Health Risk Assessments were inherently and structurally biased against the poor.
15	29-Jan-05	email letter	Attached please find a new environmental justice complaint I am submitting regarding the Butte Priority Soils Superfund OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	15.7	Non-technical	Site-Wide	Human Health Risk	Environmental Justice	The Health Risk Assessment process used specifically for BPSOU failed to account for the disproportionate health risks borne by the low-income citizens who live within the priority soils site.
15	29-Jan-05	email letter	Attached please find a new environmental justice complaint I am submitting regarding the Butte Priority Soils Superfund OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	15.8	Non-technical	Site-Wide	Human Health Risk	Environmental Justice	The risk assessments did not consider dangers associated with multiple exposures; dangers associated with mixtures of the toxics; dangers associated with above-average exposures; and dangers associated with long-term, low-dose exposures.
15	29-Jan-05	email letter	Attached please find a new environmental justice complaint I am submitting regarding the Butte Priority Soils Superfund OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	15.9	Non-technical	Site-Wide	Human Health Risk	Environmental Justice	The Health Risk Assessment failed to look at susceptibility to the harms of exposure to the substances of concern at the site in terms of income.
15	29-Jan-05	email letter	Attached please find a new environmental justice complaint I am submitting regarding the Butte Priority Soils Superfund OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	15.10	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	The Health Risk Assessment failed to evaluate low-birth weight, reduced intelligence, asthma, and numerous other environmentally caused diseases.
15	29-Jan-05	email letter	Attached please find a new environmental justice complaint I am submitting regarding the Butte Priority Soils Superfund OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	15.11	Non-technical	Site-Wide	Human Health Risk	Environmental Justice	Since the proposed plan and preferred alternative were based on a risk assessment process that discriminated against the poor, they violated environmental justice.
15	29-Jan-05	email letter	Attached please find a new environmental justice complaint I am submitting regarding the Butte Priority Soils Superfund OU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	15.12	Non-technical	Site-Wide	Human Health Risk	Environmental Justice	The proposed plan and preferred remedy should be declared null and void.

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16	31-Jan-05	email letter	The following is a complaint respectfully submitted and directed against the Montana Office of EPA Director John Wardell.	Ray	Dr. John W.	Butte, MT	Resident - Butte	16.1	Non-technical	Superfund Procedural Issues	Public Involvement	EPA limits public comment	Wardell has a limited and discriminatory view of who constitutes the public in EPA's public involvement policies and procedures. This makes achieving environmental justice for low-income citizens difficult.
16	31-Jan-05	email letter	The following is a complaint respectfully submitted and directed against the Montana Office of EPA Director John Wardell.	Ray	Dr. John W.	Butte, MT	Resident - Butte	16.2	Non-technical	Superfund Procedural Issues	Public Involvement	EPA limits public comment	Wardell said in a Jan 19 meeting that he considers input of local government to be the main indicator of public concerns and main source of public input into decision-making process. This is not supported by Superfund Law.
16	31-Jan-05	email letter	The following is a complaint respectfully submitted and directed against the Montana Office of EPA Director John Wardell.	Ray	Dr. John W.	Butte, MT	Resident - Butte	16.3	Non-technical	Superfund Procedural Issues	Public Involvement	EPA limits public comment	EPA policy calls for early, continuous, and meaningful public involvement (numerous citations given) I ask that Mr Wardell be asked to follow EPA policy and use EPA's broad definition of what constitutes the public.
17	3-Feb-05	email letter	I have been reading as assessment of the Superfund Program by the US OTA, which was conducted at the behest of the US congress, entitled: "Are we cleaning up?"	Ray	Dr. John W.	Butte, MT	Resident - Butte	17.1	Non-technical	Site-Wide	General Comment	Commenter Opposes	OTA report assesses whether we are cleaning up Superfund sites. The preferred alternative is not permanent and does not reduce toxicity, mobility, or volume of waste. It will not revitalize Butte Hill or protect human health.
17	31-Jan-05	email letter	I have been reading as assessment of the Superfund Program by the US OTA, which was conducted at the behest of the US congress, entitled: "Are we cleaning up?"	Ray	Dr. John W.	Butte, MT	Resident - Butte	17.2	Non-technical	Site-Wide	General Comment	Commenter Opposes	OTA conclusions apply to Butte: most RODS are ineffective, use of caps does not provide permanent protection, EPA consistently misapplies cost effectiveness criteria, EPA fails to use treatment technologies that reduce toxicity, mobility, or volume of wastes.
17	31-Jan-05	email letter	I have been reading as assessment of the Superfund Program by the US OTA, which was conducted at the behest of the US congress, entitled: "Are we cleaning up?"	Ray	Dr. John W.	Butte, MT	Resident - Butte	17.3	Non-technical	Site-Wide	General Comment	Commenter Opposes	The conclusions of the OTA should lead EPA to abandon it's waste left in place plan. EPA should clean up attic dust and properly apply the cost criteria.
18	7-Feb-05	email letter	The following is an addition to my environmental justice complaint against the Montana office of EPA regarding Priority Soils.	Ray	Dr. John W.	Butte, MT	Resident - Butte	18.1	Non-technical	General Comment	Environmental Justice	Public Education/Technical Communication	Engineers and technical people find it difficult communicating with the general public, let alone low-income people who tend to suffer educationally compared to the rest of the population.
18	7-Feb-05	email letter	The following is an addition to my environmental justice complaint against the Montana office of EPA regarding Priority Soils.	Ray	Dr. John W.	Butte, MT	Resident - Butte	18.2	Non-technical	General Comment	Environmental Justice	Public Education/Technical Communication	Public involvement was conducted by engineers and technically trained people. Low income citizens of Butte would have been disparately and discriminatorily treated in terms of information dispersement and in terms of credibility assigned by EPA to their comments.
18	7-Feb-05	email letter	The following is an addition to my environmental justice complaint against the Montana office of EPA regarding Priority Soils.	Ray	Dr. John W.	Butte, MT	Resident - Butte	18.3	Non-technical	General Comment	Environmental Justice	Public Education/Technical Communication	Public involvement activities (fact sheets, newspaper articles, interviews, meetings, citizen's work group) discriminated against the poor which is a violation of EPA's environmental Justice mandate.
19	13-Feb-05	email letter	Procedural justice, public participation, environmental justice and Priority Soils	Ray	Dr. John W.	Butte, MT	Resident - Butte	19.1	Non-technical	Superfund Procedural Issues	Environmental Justice	Public involvement	EPA mandates that the public is involved in the Superfund process through early, continuous, meaningful, and efficacious involvement. The public's role is far beyond just hearing and listening to public input.
19	13-Feb-05	email letter	Procedural justice, public participation, environmental justice and Priority Soils	Ray	Dr. John W.	Butte, MT	Resident - Butte	19.2	Non-technical	Superfund Procedural Issues	Environmental Justice	Public involvement	Let us consider the meaning of these words (list of words he defines first with Webster's and then with Blacks) because the words used in Superfund should mean what they say. They are used to describe and delineate the purview of public participation in Superfund decision-making.
19	13-Feb-05	email letter	Procedural justice, public participation, environmental justice and Priority Soils	Ray	Dr. John W.	Butte, MT	Resident - Butte	19.3	Non-technical	Superfund Procedural Issues	Environmental Justice	Public involvement	Neither the public nor the poor were involved or considered in the development and execution of TCRA and emergency response actions.
19	13-Feb-05	email letter	Procedural justice, public participation, environmental justice and Priority Soils	Ray	Dr. John W.	Butte, MT	Resident - Butte	19.4	Non-technical	Superfund Procedural Issues	Public Involvement	EPA disregards comments	Public input has been ignored in the development of the Proposed Plan for Priority Soils.
19	13-Feb-05	email letter	Procedural justice, public participation, environmental justice and Priority Soils	Ray	Dr. John W.	Butte, MT	Resident - Butte	19.5	Non-technical	Superfund Procedural Issues	Environmental Justice	Public involvement	Low-income citizens had no role in the RI/FS process or in the development of the Proposed Plan.
19	13-Feb-05	email letter	Procedural justice, public participation, environmental justice and Priority Soils	Ray	Dr. John W.	Butte, MT	Resident - Butte	19.6	Non-technical	Superfund Procedural Issues	Environmental Justice	Public involvement	EPA's failure to follow proper public participation procedures denies environmental justice to the poor.
19	13-Feb-05	email letter	Procedural justice, public participation, environmental justice and Priority Soils	Ray	Dr. John W.	Butte, MT	Resident - Butte	19.7	Non-technical	Superfund Procedural Issues	Environmental Justice	Public involvement	The poor have been substantively discriminated against by the actions of the Montana Office of EPA.
19	13-Feb-05	email letter	Procedural justice, public participation, environmental justice and Priority Soils	Ray	Dr. John W.	Butte, MT	Resident - Butte	19.8	Non-technical	Superfund Procedural Issues	Environmental Justice	Public involvement	The Montana Office of EPA uses an incorrect conceptualization of the meaning of the term public.
19	13-Feb-05	email letter	Procedural justice, public participation, environmental justice and Priority Soils	Ray	Dr. John W.	Butte, MT	Resident - Butte	19.9	Non-technical	Superfund Procedural Issues	Environmental Justice	EPA disregards comments	The proposed Plan and Preferred Remedy for Butte Priority Soils should be thrown out and a new Proposed Plan conducted in accordance with EPA's rules for public participation and environmental justice should be developed.
20	14-Feb-05	email letter	Not only has the development of the Proposed Plan for the Priority Soils in Butte, Montana discriminated against the low-income citizens	Ray	Dr. John W.	Butte, MT	Resident - Butte	20.1	Non-technical	Superfund Procedural Issues	Environmental Justice	Public involvement	Not only has the development of the Proposed Plan for the Priority Soils in Butte, Montana discriminated against the low-income citizens who live within the site from a procedural/process perspective, but is substantially discriminates against low-income citizens living within Priority Soils.
20	14-Feb-05	email letter	Not only has the development of the Proposed Plan for the Priority Soils in Butte, Montana discriminated against the low-income citizens who live within the site from a procedural/process perspective, but is substantially discriminates against low-income citizens living within Priority Soils.	Ray	Dr. John W.	Butte, MT	Resident - Butte	20.2	Non-technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	We can conclude that the Preferred Alternative for BPSOU violates the EPA mandate to promote environmental justice. In a substantive sense the Preferred Alternative discriminated against the low-income citizens living at the site.

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20	14-Feb-05	email letter	Not only has the development of the Proposed Plan for the Priority Soils in Butte, Montana discriminated against the low-income citizens who live within the site from a procedural/process perspective, but is substantially discriminates against low-income citizens living within Priority Soils.	Ray	Dr. John W.	Butte, MT	Resident - Butte	20.3	Non-technical	General Comment	Environmental Justice	Concerned about Health Effects/Risks	Health is directly related to income for a number of reasons (given).
20	14-Feb-05	email letter	Not only has the development of the Proposed Plan for the Priority Soils in Butte, Montana discriminated against the low-income citizens	Ray	Dr. John W.	Butte, MT	Resident - Butte	20.4	Non-technical	General Comment	Environmental Justice	Concerned about Health Effects/Risks	These income related health problems are particularly evident in children (studies cited).
20	14-Feb-05	email letter	Not only has the development of the Proposed Plan for the Priority Soils in Butte, Montana discriminated against the low-income citizens	Ray	Dr. John W.	Butte, MT	Resident - Butte	20.5	Non-technical	Site-Wide	Environmental Justice	Concerned about Health Effects/Risks	It is clear that low-income residents living within the Butte Priority Soils site experience severe health problems in comparison to the non-poor (studies cited).
20	14-Feb-05	email letter	Not only has the development of the Proposed Plan for the Priority Soils in Butte, Montana discriminated against the low-income citizens	Ray	Dr. John W.	Butte, MT	Resident - Butte	20.6	Non-technical	Site-Wide	Environmental Justice	Concerned about Health Effects/Risks	Many of the Harmful Effects of Heavy Metals occur at Low-dose Levels (studies cited).
20	14-Feb-05	email letter	Not only has the development of the Proposed Plan for the Priority Soils in Butte, Montana discriminated against the low-income citizens	Ray	Dr. John W	Butte, MT	Resident - Butte	20.7	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	The health risk assessments conducted at BPSOU failed to consider the health problems of the poor and failed to consider the causal link between these health problems and exposure to toxic metals.
21	15-Feb-05	email letter	Many of the ARARs for Priority Soils, as is the case at most Superfund Sites, are state ARARs.	Ray	Dr. John W.	Butte, MT	Resident - Butte	21.1	Legal	Site-Wide	Evaluation of NCP Criteria	Compliance with ARARs	The principles of Pollution Prevention and the Precautionary Principle/Rule (citations given) were incorrectly ignored as ARARs by the Preferred Remedy. This is a serious failure which warrants declaring the Proposed Plan null and void.
22	20-Feb-05	email attachment	Attached please find my suggested revisions to the Proposed Plan for	Ray	Dr. John W.	Butte, MT	Resident - Butte	22.1	Non-technical	Site-Wide	General Comment	Suggested Changes to PP	Wastes should not be left in place, but EPA will not agree to this, so has proposed changes to existing plan that EPA should agree to
22	20-Feb-05	email attachment	Attached please find my suggested revisions to the Proposed Plan for	Ray	Dr. John W.	Butte, MT	Resident - Butte	22.2	Non-technical	Residential Metals	General Comment	Suggested Changes to PP	1. A comprehensive, aggressive, and proactive remediation program for residential soil and indoor dust contamination: It includes: removal of major sources; programmatic and non-programmatic lead; sampling of all yards, living spaces, and attics; definition of pathway of exposure; no identification of source; public education; citizen committees; peer review; comparable action levels; and fast time frame.
22	20-Feb-05	email attachment	Attached please find my suggested revisions to the Proposed Plan for	Ray	Dr. John W.	Butte, MT	Resident - Butte	22.3	Non-technical	Solid Media/Waste Left in Place	General Comment	Suggested Changes to PP	2. Proactive and aggressive remediation program for any and all sources of contamination such as waste dumps. It includes: caps; BRES; one cap repair only; encapsulation if repair fails; innovative treatment for wastes in place; mine waste to depository, IC's supporting EPA's Return to Use policy.
22	20-Feb-05	email attachment	Attached please find my suggested revisions to the Proposed Plan for	Ray	Dr. John W.	Butte, MT	Resident - Butte	22.4	Non-technical	Parrott Tailings/MSD	General Comment	Suggested Changes to PP	Initial implementation of PA. Extensive investigation of unknowns; peer review if there is disagreement; reasonable time frame; extraction wells if standards not achieved in 18 months, followed by trenches and/or removal of wastes, if standards still not met; and automatic triggers.
22	20-Feb-05	email attachment	Attached please find my suggested revisions to the Proposed Plan for	Ray	Dr. John W.	Butte, MT	Resident - Butte	22.5	Non-technical	Surface Water - Storm Water	General Comment	Suggested Changes to PP	Reword page 45 to reflect progressive use of source controls. Removal if controls are ineffective.
22	20-Feb-05	email attachment	Attached please find my suggested revisions to the Proposed Plan for	Ray	Dr. John W.	Butte, MT	Resident - Butte	22.6	Non-technical	Site-Wide	General Comment	Suggested Changes to PP	Engage in long-range, formal planning; develop vision, goals, objectives, and activities to complete restoration/reclamation; choose removal unless there is compelling evidence to do otherwise.
22	20-Feb-05	email attachment	Attached please find my suggested revisions to the Proposed Plan for	Ray	Dr. John W.	Butte, MT	Resident - Butte	22.7	Non-technical	Site-Wide	General Comment	Suggested Changes to PP	The revisions have many advantages, including: increased protectiveness, automatic triggers, true cost-effectiveness, indoor dust addressed, environmental justice, faster implementation, preventative approach, permanence, incorporates Return to Use and Precautionary Principles. etc.
23	5-Mar-05	email letter	It seems that the Health Assessments for Butte Priority Soils based their bioavailability projections on the "Pig Study."	Ray	Dr. John W.	Butte, MT	Resident - Butte	23.1	Non-technical	Site-Wide	Human Health Risk	Bioavailability Studies	Because of the problems with the study (6 are cited in letter), it's conclusions regarding bioavailability should be discarded and the assumption made that the lead, arsenic, and mercury is bioavailable and remediation levels should reflect this bioavailability.
24	7-Mar-05	email letter	I would like to provide some additional information regarding the problems which I see regarding the HRA....	Ray	Dr. John W.	Butte, MT	Resident - Butte	24.1	Non-technical	Site-Wide	Human Health Risk	Environmental Justice	The poor are at greater risk from pollution due to both physiological and socio-economic factors.
24	7-Mar-05	email letter	I would like to provide some additional information regarding the problems which I see regarding the HRA....	Ray	Dr. John W.	Butte, MT	Resident - Butte	24.2	Non-technical	Site-Wide	Human Health Risk	Environmental Justice	The HRA failed to consider the compromised health of the poor and the effect of metals on them and the cumulative and synergistic effect of metals on the poor.
24	7-Mar-05	email letter	I would like to provide some additional information regarding the problems which I see regarding the HRA....	Ray	Dr. John W.	Butte, MT	Resident - Butte	24.3	Non-technical	Site-Wide	Human Health Risk	Environmental Justice	The HRA were not "Community Based Health Risk Assessments" as defined and mandated by EPA.
24	7-Mar-05	email letter	I would like to provide some additional information regarding the problems which I see regarding the HRA....	Ray	Dr. John W.	Butte, MT	Resident - Butte	24.4	Non-technical	Site-Wide	Human Health Risk	Environmental Justice	HRA is inherently linked to the application of the cost criterion of Superfund which disparately affects the poor.
24	7-Mar-05	email letter	I would like to provide some additional information regarding the problems which I see regarding the HRA....	Ray	Dr. John W.	Butte, MT	Resident - Butte	24.5	Non-technical	Site-Wide	Human Health Risk	Bioavailability Studies	The HRA based their bioavailability projections on the "Pig Study". The Pig Study does not adequately assess bioavailability (six reasons cited).

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25	9-Mar-05	email attachment	Attached please find a document which articulates additional arguments in favor of my proposed modifications to the Proposed plan ... which I submitted in February 2005.	Ray	Dr. John W.	Butte, MT	Resident - Butte	25.1	Non-technical	Site-Wide	General Comment	Suggested Changes to PP	See comment 22. This builds on that submittal. Lists 44 reasons why his approach is better.
26	10-Mar-05	email attachment	Attached please find additional public comment.... Additional environmental justice Arguments as well as Process Arguments/Complaints Regarding the HRAs used at BPSOU	Ray	Dr. John W.	Butte, MT	Resident - Butte	26.1	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	This conclusively proves that the HRAs conducted at BPSOU were unsound and inaccurate using an unsupportable scientific process. They cannot be used to justify or warrant action levels. Also, they violated EPA's mandate to promote Envir. justice.
26	10-Mar-05	email attachment	Attached please find additional public comment.... Additional environmental justice Arguments as well as Process Arguments/Complaints Regarding the HRAs used at BPSOU	Ray	Dr. John W.	Butte, MT	Resident - Butte	26.2	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	Lists eight sources of scientific uncertainty as they apply to BPSOU: 1. HRAs should use epidemiological data. 2. a number of factors may introduce variance up to six orders of magnitude. 3. synergistic and antagonistic effects are underestimated. 4 maximum likelihood vs upper confidence limits. 5. imprecise dose scaling. 6. mathematical modeling was imprecise. 7 multiplicative errors from assumptions, and 8. inherent uncertainty allows bias to permeate the process
26	10-Mar-05	email attachment	Attached please find additional public comment.... Additional environmental justice Arguments as well as Process Arguments/Complaints Regarding the HRAs used at BPSOU	Ray	Dr. John W.	Butte, MT	Resident - Butte	26.3	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	Uncertainty and biases would mandate EPA use of the precautionary approach and Precautionary Principle in setting exposure standards. Uncertainty has lead (sic) to a lack of standardization of assumptions in calculating health risks. HRA should be standardized.
26	10-Mar-05	email attachment	Attached please find additional public comment.... Additional environmental justice Arguments as well as Process Arguments/Complaints Regarding the HRAs used at BPSOU	Ray	Dr. John W.	Butte, MT	Resident - Butte	26.4	Non-technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	Because of these inherent problems, the most protective standards should be used, rather than the most permissive. By using permissive standards, EPA is discriminating against the low-income citizens and is violating the environmental justice mandate.
27	11-Mar-05	email attachment	Attached please find a new statutory based environmental justice complaint regarding BPSOU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	27.1	Non-technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	Compares actions taken by Montana EPA with statutory authority available to and mandated by statutes and rules/regulations governing the implementation of environmental justice into EPA programs. Lists 15 points which show how EPA failed to consider the environmental justice issues or incorporate environmental justice concerns. Many are similar and are grouped below.
27	11-Mar-05	email attachment	Attached please find a new statutory based environmental justice complaint regarding BPSOU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	27.2	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	Failed to consider the cumulative and/or synergistic impacts on low-income residents, especially since they often suffer from poor health anyway. No attempt was made to assess the health of this population. EPA rejected health info that spoke of these health effects. No consideration of bioaccumulation.
27	11-Mar-05	email attachment	Attached please find a new statutory based environmental justice complaint regarding BPSOU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	27.3	Non-technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	Uncertainty about the site should have warranted consideration of the Precautionary Principle and the Principle of Pollution Prevention.
27	11-Mar-05	email attachment	Attached please find a new statutory based environmental justice complaint regarding BPSOU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	27.4	Non-technical	Superfund Procedural Issues	Environmental Justice	Public involvement	Low-income citizens had no input into the development of the Proposed Plan. There was no pro-active engagement.
27	11-Mar-05	email attachment	Attached please find a new statutory based environmental justice complaint regarding BPSOU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	27.5	Non-technical	Site-Wide	Evaluation of NCP Criteria	Long-Term Effectiveness and Permanence	There are long-term efficacy and effectiveness problems associated with the preferred alternatives due to waste left in place.
27	11-Mar-05	email attachment	Attached please find a new statutory based environmental justice complaint regarding BPSOU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	27.6	Legal	Superfund Procedural Issues	Environmental Justice	Compliance with ARARs	Montana EPA ignored environmental justice as an ARAR.
28	16-Mar-05	email attachment	Attached please find a document wherein I compare the Proposed Remedy with the criteria for a just public decision.	Ray	Dr. John W.	Butte, MT	Resident - Butte	28.1	Non-technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	The attached document provides thirteen counts of indictment against the Preferred Alternative for Priority Soils.
28	16-Mar-05	email attachment	Attached please find a document wherein I compare the Proposed Remedy with the criteria for a just public decision.	Ray	Dr. John W.	Butte, MT	Resident - Butte	28.2	Non-technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	Justice is a complex concept with many meanings (followed by 14 "meanings", most of which have been included in other comments from this commenter, including: Black's Law Dictionary definition, Aristotle's definition, Kant's formulation, The Golden Rule, the Categorical Imperative, etc.
28	16-Mar-05	email attachment	Attached please find a document wherein I compare the Proposed Remedy with the criteria for a just public decision.	Ray	Dr. John W.	Butte, MT	Resident - Butte	28.3	Non-technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	As with all law, Superfund law was created to bring justice to society. The EPA obligation to promote Environmental Justice adds a moral and ethical dimension to agency decision-making. EPA has many positions it has to justify (13 questions cited - all included in previous submissions by this commenter), including: protectiveness of waste in place, flawed HRAs, exclusion of the poor from decision-making process, disparate and disproportionate toxics burden on poor, failure to consider Precautionary Principle and Pollution Prevention, inadequate exposure standards, and use of cost-benefit analysis.
29	17-Mar-05	email letter	Public Participation, Corporations, Corporate PRP Liability, Perpetual Treatment and O&M, Waste-in-Place and the Remedy for Butte Priority Soils.	Ray	Dr. John W.	Butte, MT	Resident - Butte	29.1	Non-technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	The only people speaking for waste in place are ARCO, ARCO's consultants, or people who work for ARCO. This testimony should be suspect, as the job of corporations is to save their shareholders money and waste in place saves money.

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29	17-Mar-05	email letter	Public Participation, Corporations, Corporate PRP Liability, Perpetual Treatment and O&M, Waste-in-Place and the Remedy for Butte Priority Soils.	Ray	Dr. John W.	Butte, MT	Resident - Butte	29.2	Non-technical	Site-Wide	General Comment	Bankruptcy Risk	12-page discussion of the nature of the common good, corporations, the role of government, causes of the problem, the power of US corporations, relationship of economic power to political power, corporate liability, bankruptcy (including Montana examples), rationale for limiting corporate ability to escape liability through bankruptcy, and environmental liability inadequacies of the current bankruptcy law.
29	17-Mar-05	email letter	Public Participation, Corporations, Corporate PRP Liability, Perpetual Treatment and O&M, Waste-in-Place and the Remedy for Butte Priority Soils.	Ray	Dr. John W.	Butte, MT	Resident - Butte	29.3	Non-technical	Site-Wide	General Comment	Bankruptcy Risk	The best clean up is to remove the wastes now and not rely on ARCO to do long-term monitoring & maintenance. IT is too risky, given the incentive for bankruptcy.
30	16-Mar-05	email letter	I have two concerns about the BPSOU Proposed Plan.	Stickney	Mike	Butte, MT	Resident - Butte	30.1	Technical	Solid Media/Waste Left in Place	Railroad Beds	Reclamation needed	Remediation plan currently in place along railroad does not adequately clean up existing contamination. Contaminated materials is visible and is being spread by wind and storm water.
30	16-Mar-05	email letter	I have two concerns about the BPSOU Proposed Plan.	Stickney	Mike	Butte, MT	Resident - Butte	30.2	Technical	Parrott Tailings/MSD	Characterization	Inadequate characterization	Hydrogeologic data from new wells appear to refute conclusions made by EPA, yet it appears that the decision to not remove the tailings has already been made.
31	18-Mar-05	email attachment	Health Risks, Uncertainty, Casualty, Toxics and Priority Soils	Ray	Dr. John W.	Butte, MT	Resident - Butte	31.1	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	Risk assessment did not consider multiple COCs and relied on animal testing
31	18-Mar-05	email attachment	Health Risks, Uncertainty, Casualty, Toxics and Priority Soils	Ray	Dr. John W.	Butte, MT	Resident - Butte	31.2	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	Risk assessment failed to consider latency from exposure to effects
31	18-Mar-05	email attachment	Health Risks, Uncertainty, Casualty, Toxics and Priority Soils	Ray	Dr. John W.	Butte, MT	Resident - Butte	31.3	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	Risk assessment failed to consider environmental factors including physiochemical, biological, and socioeconomic
31	18-Mar-05	email attachment	Health Risks, Uncertainty, Casualty, Toxics and Priority Soils	Ray	Dr. John W.	Butte, MT	Resident - Butte	31.4	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	Risk assessment failed to consider stochastic and non-stochastic effects
31	18-Mar-05	email attachment	Health Risks, Uncertainty, Casualty, Toxics and Priority Soils	Ray	Dr. John W.	Butte, MT	Resident - Butte	31.5	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	Risk assessment failed to consider the state and characteristics of arsenic
31	18-Mar-05	email attachment	Health Risks, Uncertainty, Casualty, Toxics and Priority Soils	Ray	Dr. John W.	Butte, MT	Resident - Butte	31.6	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	Risk assessment failed to consider data presented in the Imagine Butte Health study
31	18-Mar-05	email attachment	Health Risks, Uncertainty, Casualty, Toxics and Priority Soils	Ray	Dr. John W.	Butte, MT	Resident - Butte	31.7	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	Risk Assessment failed to consider metal synergism or metal antagonism
31	18-Mar-05	email attachment	Health Risks, Uncertainty, Casualty, Toxics and Priority Soils	Ray	Dr. John W.	Butte, MT	Resident - Butte	31.8	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	Risk assessment failed to consider interaction of cadmium with zinc, selenium, calcium, and vitamin D
31	18-Mar-05	email attachment	Health Risks, Uncertainty, Casualty, Toxics and Priority Soils	Ray	Dr. John W.	Butte, MT	Resident - Butte	31.9	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	Risk assessments did not consider low-income status as a variable
31	18-Mar-05	email attachment	Health Risks, Uncertainty, Casualty, Toxics and Priority Soils	Ray	Dr. John W.	Butte, MT	Resident - Butte	31.10	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	Risk assessment failed to consider sub-clinical effects of heavy metals
31	18-Mar-05	email attachment	Health Risks, Uncertainty, Casualty, Toxics and Priority Soils	Ray	Dr. John W.	Butte, MT	Resident - Butte	31.11	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	Risk assessment gave insufficient attention to effects of low doses on fetuses and infants
31	18-Mar-05	email attachment	Health Risks, Uncertainty, Casualty, Toxics and Priority Soils	Ray	Dr. John W.	Butte, MT	Resident - Butte	31.12	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	Risk assessment failed to adequately characterize the effects of low doses on human health
31	18-Mar-05	email attachment	Health Risks, Uncertainty, Casualty, Toxics and Priority Soils	Ray	Dr. John W.	Butte, MT	Resident - Butte	31.13	Non-technical	Site-Wide	Human Health Risk	Bioavailability Studies	Bioavailability values relied on animal testing
31	18-Mar-05	email attachment	Health Risks, Uncertainty, Casualty, Toxics and Priority Soils	Ray	Dr. John W.	Butte, MT	Resident - Butte	31.14	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	Risk assessment failed to consider exposure scenario of low-income citizens
31	18-Mar-05	email attachment	Health Risks, Uncertainty, Casualty, Toxics and Priority Soils	Ray	Dr. John W.	Butte, MT	Resident - Butte	31.15	Non-technical	Site-Wide	Human Health Risk	Risk assessment flawed	RA failed to consider Precautionary Principle
32	18-Mar-05	email letter	Butte Priority Soils Preferred Alternative is at variance with and contrary to NCP	Ray	Dr. John W.	Butte, MT	Resident - Butte	32.1	Non-technical	Site-Wide	Evaluation of NCP Criteria	Reduction of Toxicity, Mobility and Volume	NCP: cannot have remedy that does not reduce toxicity/mobility/volume of contaminants
32	18-Mar-05	email letter	Butte Priority Soils Preferred Alternative is at variance with and contrary to NCP	Ray	Dr. John W.	Butte, MT	Resident - Butte	32.2	Non-technical	Site-Wide	Evaluation of NCP Criteria	Evaluation/Weighing of Cost	NCP: Cost criterion was improperly applied when selecting the remedy
33	19-Mar-05	email attachment	Anaconda Montana (B-Mart pullout), Leaving Waste in Place....	Ray	Dr. John W.	Butte, MT	Resident - Butte	33.1	Non-Technical	Solid Media/Waste Left in Place	Redevelopment	Economic Effects	Waste left in place will be an impairment to economic revitalization
33	19-Mar-05	email attachment	Anaconda Montana (B-Mart pullout), Leaving Waste in Place....	Ray	Dr. John W.	Butte, MT	Resident - Butte	33.2	Non-Technical	Superfund Procedural Issues	Redevelopment	Land Use	EPA did not follow guidance on land reuse
33	19-Mar-05	email attachment	Anaconda Montana (B-Mart pullout), Leaving Waste in Place....	Ray	Dr. John W.	Butte, MT	Resident - Butte	33.3	Non-Technical	Superfund Procedural Issues	Redevelopment	Land Use	EPA did not follow guidance on land reuse
33	19-Mar-05	email attachment	Anaconda Montana (B-Mart pullout), Leaving Waste in Place....	Ray	Dr. John W.	Butte, MT	Resident - Butte	33.4	Non-Technical	Superfund Procedural Issues	RASD	Land Use	Previous actions and RASD did not follow land reuse guidance
33	19-Mar-05	email attachment	Anaconda Montana (B-Mart pullout), Leaving Waste in Place....	Ray	Dr. John W.	Butte, MT	Resident - Butte	33.5	Non-Technical	Superfund Procedural Issues	Redevelopment	Land Use	Proposed plan does not follow land reuse guidance
33	19-Mar-05	email attachment	Anaconda Montana (B-Mart pullout), Leaving Waste in Place....	Ray	Dr. John W.	Butte, MT	Resident - Butte	33.6	Non-Technical	Solid Media/Waste Left in Place	Redevelopment	Economic Effects	Waste left in place will hinder economic redevelopment
33	19-Mar-05	email attachment	Anaconda Montana (B-Mart pullout), Leaving Waste in Place....	Ray	Dr. John W.	Butte, MT	Resident - Butte	33.7	Non-Technical	Solid Media/Waste Left in Place	Redevelopment	Economic Effects	Waste left in place will negatively affect housing values
33	19-Mar-05	email attachment	Anaconda Montana (B-Mart pullout), Leaving Waste in Place....	Ray	Dr. John W.	Butte, MT	Resident - Butte	33.8	Non-Technical	Solid Media/Waste Left in Place	Environmental Justice	Economic Effects	Low-income residents live in BPSOU and are therefore economic effects discriminate against low-income
33	19-Mar-05	email attachment	Anaconda Montana (B-Mart pullout), Leaving Waste in Place....	Ray	Dr. John W.	Butte, MT	Resident - Butte	33.9	Non-Technical	Superfund Procedural Issues	Redevelopment	Economic Effects	Remedy needs to follow reuse/revitalization guidance
33	19-Mar-05	email attachment	Anaconda Montana (B-Mart pullout), Leaving Waste in Place....	Ray	Dr. John W.	Butte, MT	Resident - Butte	33.10	Non-Technical	Solid Media/Waste Left in Place	Redevelopment	Economic Effects	Waste left in place will hinder economic redevelopment
33	19-Mar-05	email attachment	Anaconda Montana (B-Mart pullout), Leaving Waste in Place....	Ray	Dr. John W.	Butte, MT	Resident - Butte	33.11	Non-Technical	Solid Media/Waste Left in Place	Redevelopment	Economic Effects	Waste left in place will hinder economic redevelopment
33	19-Mar-05	email attachment	Anaconda Montana (B-Mart pullout), Leaving Waste in Place....	Ray	Dr. John W.	Butte, MT	Resident - Butte	33.12	Legal	Surface Water - Storm Water	Liability	Local Government Liability	Local government is PRP for storm water
33	19-Mar-05	email attachment	Anaconda Montana (B-Mart pullout), Leaving Waste in Place....	Ray	Dr. John W.	Butte, MT	Resident - Butte	33.13	Non-Technical	Site-Wide	Extent of Removal	For Removal	Support maximum removal
33	19-Mar-05	email attachment	Anaconda Montana (B-Mart pullout), Leaving Waste in Place....	Ray	Dr. John W.	Butte, MT	Resident - Butte	33.14	Legal	Solid Media/Waste Left in Place	Liability	Property/Landowner Liability	Past, current, and future landowners will be liable for waste left in place
33	19-Mar-05	email attachment	Anaconda Montana (B-Mart pullout), Leaving Waste in Place....	Ray	Dr. John W.	Butte, MT	Resident - Butte	33.15	Legal	Solid Media/Waste Left in Place	Liability	Property/Landowner Liability	CERCLA is in effect a lien on property
33	19-Mar-05	email attachment	Anaconda Montana (B-Mart pullout), Leaving Waste in Place....	Ray	Dr. John W.	Butte, MT	Resident - Butte	33.16	Legal	Solid Media/Waste Left in Place	Liability	Property/Landowner Liability	CERCLA liability

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33	19-Mar-05	email attachment	Anaconda Montana (B-Mart pullout), Leaving Waste in Place....	Ray	Dr. John W.	Butte, MT	Resident - Butte	33.17	Legal	Solid Media/Waste Left in Place	Liability	Property/Landowner Liability	CERCLA liability
33	19-Mar-05	email attachment	Anaconda Montana (B-Mart pullout), Leaving Waste in Place....	Ray	Dr. John W.	Butte, MT	Resident - Butte	33.18	Legal	Solid Media/Waste Left in Place	Liability	Property/Landowner Liability	CERCLA liability
33	19-Mar-05	email attachment	Anaconda Montana (B-Mart pullout), Leaving Waste in Place....	Ray	Dr. John W.	Butte, MT	Resident - Butte	33.19	Legal	Solid Media/Waste Left in Place	Liability	Property/Landowner Liability	CERCLA liability
33	19-Mar-05	email attachment	Anaconda Montana (B-Mart pullout), Leaving Waste in Place....	Ray	Dr. John W.	Butte, MT	Resident - Butte	33.20	Legal	Solid Media/Waste Left in Place	Liability	Property/Landowner Liability	CERCLA liability
33	19-Mar-05	email attachment	Anaconda Montana (B-Mart pullout), Leaving Waste in Place....	Ray	Dr. John W.	Butte, MT	Resident - Butte	33.21	Legal	Solid Media/Waste Left in Place	Liability	Property/Landowner Liability	CERCLA liability
33	19-Mar-05	email attachment	Anaconda Montana (B-Mart pullout), Leaving Waste in Place....	Ray	Dr. John W.	Butte, MT	Resident - Butte	33.22	Legal	Solid Media/Waste Left in Place	Liability	Property/Landowner Liability	CERCLA liability
33	19-Mar-05	email attachment	Anaconda Montana (B-Mart pullout), Leaving Waste in Place....	Ray	Dr. John W.	Butte, MT	Resident - Butte	33.23	Non-technical	Site-Wide	Extent of Removal	For Removal	Advocates maximum removal of wastes
34	19-Mar-05	email letter	Superfund, Land Re-Use, Anaconda, MT and Butte MT and the Montana Office of EPA	Ray	Dr. John W.	Butte, MT	Resident - Butte	34.1	Non-Technical	General Comment	Unrelated Topic	Out of scope	Comment is about Anaconda
34	19-Mar-05	email letter	Superfund, Land Re-Use, Anaconda, MT and Butte MT and the Montana Office of EPA	Ray	Dr. John W.	Butte, MT	Resident - Butte	34.2	Non-Technical	Solid Media/Waste Left in Place	Redevelopment	Economic Effects	Implications of Anaconda/Bimart situation on Butte
34	19-Mar-05	email letter	Superfund, Land Re-Use, Anaconda, MT and Butte MT and the Montana Office of EPA	Ray	Dr. John W.	Butte, MT	Resident - Butte	34.3	Non-Technical	Superfund Procedural Issues	Redevelopment	Economic Effects	Remedy needs to follow reuse/revitalization guidance
35	20-Mar-05	email attachment	Cost Effectiveness Analysis versus Cost Benefit Analysis at BPSOU	Ray	Dr. John W.	Butte, MT	Resident - Butte	35.1	Non-Technical	Superfund Procedural Issues	Evaluation of NCP Criteria	Evaluation/Weighing of Cost	The Montana EPA office has misconstrued and misapplied the cost effectiveness criterion by confusing cost effectiveness with cost benefit analysis and by improperly applying the cost effectiveness criteria
35	20-Mar-05	email attachment	Cost Effectiveness Analysis versus Cost Benefit Analysis at BPSOU	Ray	Dr. John W.	Butte, MT	Resident - Butte	35.2	Non-Technical	Superfund Procedural Issues	Environmental Justice	EPA did not account for Environmental Justice	The cost effectiveness issue affects whether or not citizens of Butte will be afforded environmental justice
35	20-Mar-05	email attachment	Cost Effectiveness Analysis versus Cost Benefit Analysis at BPSOU	Ray	Dr. John W.	Butte, MT	Resident - Butte	35.3	Non-Technical	Superfund Procedural Issues	Evaluation of NCP Criteria	Evaluation/Weighing of Cost	The use of cost-benefit analysis (instead of cost effectiveness) gives more weight to cost because it is quantifiable, rather than benefits such as public health that is impossible to quantify in dollar amounts
35	20-Mar-05	email attachment	Cost Effectiveness Analysis versus Cost Benefit Analysis at BPSOU	Ray	Dr. John W.	Butte, MT	Resident - Butte	35.4	Non-Technical	Superfund Procedural Issues	Evaluation of NCP Criteria	Evaluation/Weighing of Cost	Cost as secondary to protecting human health and the environment
35	20-Mar-05	email attachment	Cost Effectiveness Analysis versus Cost Benefit Analysis at BPSOU	Ray	Dr. John W.	Butte, MT	Resident - Butte	35.5	Non-Technical	Superfund Procedural Issues	Evaluation of NCP Criteria	Evaluation/Weighing of Cost	Feels that the waste in place/capping remedy is a short-term, inexpensive, and impermanent remedy and that EPA selected it because it was cheaper
35	20-Mar-05	email attachment	Cost Effectiveness Analysis versus Cost Benefit Analysis at BPSOU	Ray	Dr. John W.	Butte, MT	Resident - Butte	35.6	Non-Technical	Superfund Procedural Issues	Evaluation of NCP Criteria	Evaluation/Weighing of Cost	The human health risk assessment was used as a foundation for the cost/benefit analysis - disagrees with EPA's analysis
35	20-Mar-05	email attachment	Cost Effectiveness Analysis versus Cost Benefit Analysis at BPSOU	Ray	Dr. John W.	Butte, MT	Resident - Butte	35.7	Non-Technical	Superfund Procedural Issues	Environmental Justice	EPA did not account for Environmental Justice	Montana EPA made no effort to reach out and include the poor in decision making - violates environmental justice
35	20-Mar-05	email attachment	Cost Effectiveness Analysis versus Cost Benefit Analysis at BPSOU	Ray	Dr. John W.	Butte, MT	Resident - Butte	35.8	Non-Technical	General Comment	Public involvement	Public Education/Technical Communication	Engineers/scientists are not good at talking to the general public
35	20-Mar-05	email letter	Cost Effectiveness Analysis versus Cost Benefit Analysis at BPSOU	Ray	Dr. John W.	Butte, MT	Resident - Butte	35.9	Non-technical	Site-Wide	Waste left in place	Protectiveness of human health and the environment	Definition of "health" as a state of being, sound, whole in body, mind, soul, and that EPA does not protect "health"
35	20-Mar-05	email letter	Cost Effectiveness Analysis versus Cost Benefit Analysis at BPSOU	Ray	Dr. John W.	Butte, MT	Resident - Butte	35.10	Non-technical	Site-Wide	Extent of Removal	For Removal	Maximum removal should take place to maximize the attainment of public health and environmental protection
36	21-Mar-05	email attachment	Issue paper on the bioavailability and bioaccumulation of metals	Ray	Dr. John W.	Butte, MT	Resident - Butte	36.1	Technical	Site-Wide	Human Health Risk	Bioavailability Studies	Bioavailability and bioaccumulation not accounted for in the HHRA
37	21-Mar-05	email attachment	Environmental Racism and Biased Methods of Risk Assessment	Ray	Dr. John W.	Butte, MT	Resident - Butte	37.1	Non-Technical	Site-Wide	Environmental Justice	General Comment	Attached document only. No comment to address
38	21-Mar-05	email attachment	Preventing child exposure to Environmental hazards	Ray	Dr. John W.	Butte, MT	Resident - Butte	38.1	Non-Technical	Site-Wide	Human Health Risk	Risk assessment flawed	HHRA did not adequately assess risk to children
39	21-Mar-05	email attachment	Waste Management and Risk Assessment: Environmental Discrimination through Regulation	Ray	Dr. John W.	Butte, MT	Resident - Butte	39.1	Non-Technical	Site-Wide	Environmental Justice	General Comment	Attached document only. No comment to address
40	21-Mar-05	email attachment	Civic Environmentalism, continued	Ray	Dr. John W.	Butte, MT	Resident - Butte	40.1	Non-Technical	Site-Wide	Environmental Justice	General Comment	Attached document only. No comment to address
41	21-Mar-05	email attachment	Children in Harm's Way	Ray	Dr. John W.	Butte, MT	Resident - Butte	41.1	Non-Technical	Site-Wide	Human Health Risk	Risk assessment flawed	HHRA did not adequately assess risk to children
42	21-Mar-05	email attachment	Chapter 8: risk Reduction and Environmental Justice	Ray	Dr. John W.	Butte, MT	Resident - Butte	42.1	Non-Technical	Site-Wide	Environmental Justice	General Comment	Attached document only. No comment to address
43	21-Mar-05	email attachment	Environmental Health Criteria 18 - Arsenic	Ray	Dr. John W.	Butte, MT	Resident - Butte	41.1	Non-Technical	Site-Wide	Human Health Risk	Risk assessment flawed	Attached document only. No comment to address
44	21-Mar-05	email attachment	Attached is a document which clearly shows the uncertainties of risk assessment	Ray	Dr. John W.	Butte, MT	Resident - Butte	44.1	Technical	Site-Wide	Human Health Risk	Risk assessment flawed	Risk assessments are not certain.
45	21-Mar-05	email attachment	Please consider as public comment the attached document regarding the serious health effects of mercury exposure at BPSOU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	45.1	Technical	Site-Wide	Human Health Risk	mercury	There are serious health effects associated with mercury exposure in the BPSOU.
46	21-Mar-05	email attachment	Please consider the attached document detailing the toxic effects of arsenic such as that found at Butte Priority Soils.	Ray	Dr. John W.	Butte, MT	Resident - Butte	46.1	Technical	Site-Wide	Human Health Risk	Arsenic	Being exposed to arsenic such as that found at Butte Priority Soils can have a toxic effect.
47	21-Mar-05	email attachment	Please consider the attached document as public comment regarding the health effects of cadmium present at Butte Priority Soils.	Ray	Dr. John W.	Butte, MT	Resident - Butte	47.1	Technical	Site-Wide	Human Health Risk	cadmium	Cadmium at the Butte Priority Soils has health effects.
48	21-Mar-05	email attachment	Please consider the attached as public comment regarding the arsenic present at BPSOU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	48.1	Technical	Site-Wide	Human Health Risk	Arsenic	General description of arsenic trioxide.
49	21-Mar-05	email attachment	Please consider the attached as public comment regarding the lead found at BPSOU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	49.1	Technical	Site-Wide	Human Health Risk	lead	General description of lead found at BPSOU.
50	21-Mar-05	email attachment	Please consider the attached as public comment regarding the lead found in soils within the BPSOU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	50.1	Technical	Site-Wide	Human Health Risk	lead	Analysis paper: Impact of Lead-Contaminated Soil on Public Health.
51	21-Mar-05	email attachment	Attached document is submitted as public comment on health effects of toxics at BPSOU.)	Ray	Dr. John W.	Butte, MT	Resident - Butte	51.1	Technical	Site-Wide	Human Health Risk	Concerned about Health Effects/Risks	Health Effects of the 20 Most Dangerous Substances Found at Superfund Sites.
52	21-Mar-05	email attachment	Attached please find documents attesting to the serious health effects of the contaminants at BPSOU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	52.1	Technical	Site-Wide	Human Health Risk	Arsenic	ATSDR - Public Health Statement Arsenic.

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52	21-Mar-05	email attachment	Attached please find documents attesting to the serious health effects of the contaminants at BPSOU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	52.2	Technical	Site-Wide	Human Health Risk	cadmium	ATSDR - Public Health Statement Cadmium.
52	21-Mar-05	email attachment	Attached please find documents attesting to the serious health effects of the contaminants at BPSOU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	52.3	Technical	Site-Wide	Human Health Risk	lead	ATSDR - Public Health Statement Lead.
52	21-Mar-05	email attachment	Attached please find documents attesting to the serious health effects of the contaminants at BPSOU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	52.4	Technical	Site-Wide	Human Health Risk	mercury	ATSDR - Public Health Statement Mercury.
53	21-Mar-05	email attachment	Attached please find a document I would like to submit under public comment to the EPA regarding environmental justice and Butte Priority Soils.	Ray	Dr. John W.	Butte, MT	Resident - Butte	53.1	Non-technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	Environmental justice laws were not used to develop the Proposed Plan, violating the EPA mandate to foster and promote environmental justice.
53	21-Mar-05	email attachment	Attached please find a document I would like to submit under public comment to the EPA regarding environmental justice and Butte Priority Soils.	Ray	Dr. John W.	Butte, MT	Resident - Butte	53.2	Non-technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	Asks that the responsiveness summary address why federal laws about environmental justice were not used to ensure environmental justice at BPSOU.
53	21-Mar-05	email attachment	Attached please find a document I would like to submit under public comment to the EPA regarding environmental justice and Butte Priority Soils.	Ray	Dr. John W.	Butte, MT	Resident - Butte	53.3	Non-technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	Environmental Law Institute Research Report: Opportunities for Advancing Environmental Justice: An Analysis of U.S. EPA Statutory Authorities.
54	21-Mar-05	email attachment	The attached document is being submitted as part of the public comment period for BPSOU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	54.1	Non-technical	Site-Wide	Institutional controls	Implementability and Effectiveness	Asks that the recommendations in "Protecting Public Health at Superfund Sites: Can Institutional Controls Meet the Challenge?" be adopted.
54	21-Mar-05	email attachment	The attached document is being submitted as part of the public comment period for BPSOU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	54.2	Non-technical	Site-Wide	Institutional controls	Implementability and Effectiveness	"Protecting Public Health at Superfund Sites: Can Institutional Controls Meet the Challenge?"
55	21-Mar-05	email attachment	Attached please find a report which I am submitting under the public comment provisions for BPSOU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	55.1	Non-technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	Suggests that provisions of the federal laws cited in the attached article be used to promote environmental justice as part of the ROD for BPSOU.
55	21-Mar-05	email attachment	Attached please find a report which I am submitting under the public comment provisions for BPSOU.	Ray	Dr. John W.	Butte, MT	Resident - Butte	55.2	Non-technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	"A Citizen's Guide to Using Federal Environmental Laws to Secure Environmental Justice."
56	19-Mar-05	email attachment	I am writing to inform you of my comments regarding the Butte Priority Soils cleanup, or the cleanup of our town and neighborhoods as I see it.	Link	Carol	Butte, MT	Resident - Butte	56.1	Non-technical	Residential Metals	Soils and/or Interior/Attic Dust	Concerned about Health Effects/Risks	When they bought their house 10 years ago they weren't aware they would be exposed to heavy metals.
56	19-Mar-05	email attachment	I am writing to inform you of my comments regarding the Butte Priority Soils cleanup, or the cleanup of our town and neighborhoods as I see it.	Link	Carol	Butte, MT	Resident - Butte	56.2	Non-technical	Site-Wide	Human Health Risk	Concerned about Health Effects/Risks	Disturbed to learn incidences of cancer in Butte are higher than the state and national average and is growing rather than slowing.
56	19-Mar-05	email attachment	I am writing to inform you of my comments regarding the Butte Priority Soils cleanup, or the cleanup of our town and neighborhoods as I see it.	Link	Carol	Butte, MT	Resident - Butte	56.3	Non-technical	Site-Wide	General Comment	Public Education/Technical Communication	Information and science involved are confusing, which causes worry.
56	19-Mar-05	email attachment	I am writing to inform you of my comments regarding the Butte Priority Soils cleanup, or the cleanup of our town and neighborhoods as I see it.	Link	Carol	Butte, MT	Resident - Butte	56.4	Non-technical	Site-Wide	Human Health Risk	Arsenic	What does EPA know about arsenic and other heavy metals and how they affect people who have heavy, long term exposure?
56	19-Mar-05	email attachment	I am writing to inform you of my comments regarding the Butte Priority Soils cleanup, or the cleanup of our town and neighborhoods as I see it.	Link	Carol	Butte, MT	Resident - Butte	56.5	Non-technical	Site-Wide	Human Health Risk	Action Levels	Why is action level for arsenic higher in Montana than in the rest of the country?
56	19-Mar-05	email attachment	I am writing to inform you of my comments regarding the Butte Priority Soils cleanup, or the cleanup of our town and neighborhoods as I see it.	Link	Carol	Butte, MT	Resident - Butte	56.6	Non-technical	Site-Wide	Human Health Risk	Arsenic	Does EPA really know what level of exposure to arsenic is safe?
56	19-Mar-05	email attachment	I am writing to inform you of my comments regarding the Butte Priority Soils cleanup, or the cleanup of our town and neighborhoods as I see it.	Link	Carol	Butte, MT	Resident - Butte	56.7	Non-technical	Site-Wide	Human Health Risk	Arsenic	Does anyone know what normal background levels of arsenic in the area are?
56	19-Mar-05	email attachment	I am writing to inform you of my comments regarding the Butte Priority Soils cleanup, or the cleanup of our town and neighborhoods as I see it.	Link	Carol	Butte, MT	Resident - Butte	56.8	Non-technical	Site-Wide	Human Health Risk	Arsenic	Has information about normal levels of arsenic been published?
56	19-Mar-05	email attachment	I am writing to inform you of my comments regarding the Butte Priority Soils cleanup, or the cleanup of our town and neighborhoods as I see it.	Link	Carol	Butte, MT	Resident - Butte	56.9	Non-technical	Site-Wide	General Comment	General Comment	Butte deserves best possible cleanup.
56	19-Mar-05	email attachment	I am writing to inform you of my comments regarding the Butte Priority Soils cleanup, or the cleanup of our town and neighborhoods as I see it.	Link	Carol	Butte, MT	Resident - Butte	56.10	Non-technical	Site-Wide	General Comment	General Comment	Cleanup should be done now.
56	19-Mar-05	email attachment	I am writing to inform you of my comments regarding the Butte Priority Soils cleanup, or the cleanup of our town and neighborhoods as I see it.	Link	Carol	Butte, MT	Resident - Butte	56.11	Non-technical	Site-Wide	Public involvement	Public Education/Technical Communication	EPA needs to start a comprehensive education program about lead abatement and how to reduce exposure to mine waste. The program should include a air quality program and cleanup of homes.
56	19-Mar-05	email attachment	I am writing to inform you of my comments regarding the Butte Priority Soils cleanup, or the cleanup of our town and neighborhoods as I see it.	Link	Carol	Butte, MT	Resident - Butte	56.12	Technical	Parrott Tailings/MSD	Extent of Removal	For Removal	The Parrott tailings and tailings around railroad beds that are still exposed should be completely removed.
56	19-Mar-05	email attachment	I am writing to inform you of my comments regarding the Butte Priority Soils cleanup, or the cleanup of our town and neighborhoods as I see it.	Link	Carol	Butte, MT	Resident - Butte	56.13	Technical	Lower Area One	Treatment Lagoons	Performance - general	There is a pond at Lower Area One that doesn't seem to be functioning properly, so it should be fixed.

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56	19-Mar-05	email attachment	I am writing to inform you of my comments regarding the Butte Priority Soils cleanup, or the cleanup of our town and neighborhoods as I see it.	Link	Carol	Butte, MT	Resident - Butte	56.14	Non-technical	Solid Media/Waste Left In Place	Reclamation	Reclamation specifications	All mine waste - capped or otherwise - on the hill should be removed to a point that trees can grow on the dumps.
56	19-Mar-05	email attachment	I am writing to inform you of my comments regarding the Butte Priority Soils cleanup, or the cleanup of our town and neighborhoods as I see it.	Link	Carol	Butte, MT	Resident - Butte	56.15	Non-technical	Granite Mountain Memorial Area	Reclamation	Reclamation needed	The road to the memorial should be paved and the area should be cleaned up so that it doesn't resemble a moonscape.
56	19-Mar-05	email attachment	I am writing to inform you of my comments regarding the Butte Priority Soils cleanup, or the cleanup of our town and neighborhoods as I see it.	Link	Carol	Butte, MT	Resident - Butte	56.16	Non-technical	Site-Wide	Long-term Operations and Maintenance	Funding	There should be enough funding and controls to make sure cleanup lasts forever.
56	19-Mar-05	email attachment	I am writing to inform you of my comments regarding the Butte Priority Soils cleanup, or the cleanup of our town and neighborhoods as I see it.	Link	Carol	Butte, MT	Resident - Butte	56.17	Non-technical	Site-Wide	Redevelopment	Economic Effects	EPA should take advantage of opportunity to create jobs and educational programs through the cleanup.
57	15-Mar-05	letter	Why waste the time of the people of Butte on your cleanup plans?	Myers	Serge	Anaconda, MT	Non-Resident	57.1	Non-technical	Superfund Procedural Issues	Public involvement	EPA disregards comments	The cleanup plan was crafted in secret and is a done deal, making public input meaningless
57	15-Mar-05	letter	Why waste the time of the people of Butte on your cleanup plans?	Myers	Serge	Anaconda, MT	Non-Resident	57.2	Non-technical	Site-Wide	General Comment	Commenter Opposes	Don't let outside interests determine reclamation
57	15-Mar-05	letter	Why waste the time of the people of Butte on your cleanup plans?	Myers	Serge	Anaconda, MT	Non-Resident	57.3	Non-technical	Site-Wide	Evaluation of NCP Criteria	Community Acceptance	Plan will affect residents forever, so EPA must take into account what citizens' want. In Opportunity residents' input about mine waste was meaningless
57	15-Mar-05	letter	Why waste the time of the people of Butte on your cleanup plans?	Myers	Serge	Anaconda, MT	Non-Resident	57.4	Non-technical	Site-Wide	General Comment	Timeframe	Do not take 100 years to do this cleanup.
58	2-Dec-04	letter	The current plan to build a water treatment facility and only address water contamination is woefully inadequate.	Murtagh	Charles	Bozeman, MT	Non-Resident	58.1	Non-technical	Lower Area One	Capture and Treatment	General Comment	The plan to build a water treatment facility and only address water contamination is not adequate.
58	2-Dec-04	letter	The current plan to build a water treatment facility and only address water contamination is woefully inadequate.	Murtagh	Charles	Bozeman, MT	Non-Resident	58.2	Non-technical	Site-Wide	Extent of Removal	For Removal	Tailings and other sources of pollution should not be left in place.
58	2-Dec-04	letter	The current plan to build a water treatment facility and only address water contamination is woefully inadequate.	Murtagh	Charles	Bozeman, MT	Non-Resident	58.3	Non-technical	Site-Wide	General Comment	Commenter Opposes	Citizens' health and economic well-being adversely affected by failure to completely cleanup the toxins.
58	2-Dec-04	letter	The current plan to build a water treatment facility and only address water contamination is woefully inadequate.	Murtagh	Charles	Bozeman, MT	Non-Resident	58.4	Non-technical	Site-Wide	Environmental Justice	Concerned about Health Effects/Risks	Low-income residents are especially negatively affected.
58	2-Dec-04	letter	The current plan to build a water treatment facility and only address water contamination is woefully inadequate.	Murtagh	Charles	Bozeman, MT	Non-Resident	58.5	Technical	Surface Water - General	Extent of Removal	Meeting WQB-7 standards in Silver Bow Creek	Water quality in area river systems also at risk if tailings are not completely removed.
58	2-Dec-04	letter	The current plan to build a water treatment facility and only address water contamination is woefully inadequate.	Murtagh	Charles	Bozeman, MT	Non-Resident	58.6	Non-technical	Site-Wide	Environmental Justice	Economic Effects	Low-income residents cannot relocate and are forced to suffer the consequences of poor health and an afflicted economy.
58	2-Dec-04	letter	The current plan to build a water treatment facility and only address water contamination is woefully inadequate.	Murtagh	Charles	Bozeman, MT	Non-Resident	58.7	Non-technical	Site-Wide	Waste left in place	Economic Effects	Community suffers stigma that lasts forever if pollutants are not completely removed.
58	2-Dec-04	letter	The current plan to build a water treatment facility and only address water contamination is woefully inadequate.	Murtagh	Charles	Bozeman, MT	Non-Resident	58.8	Non-technical	Residential Metals	Soils and/or Interior/Attic Dust	For Removal	Inside dust should be removed and lawns should be replaced
58	2-Dec-04	letter	The current plan to build a water treatment facility and only address water contamination is woefully inadequate.	Murtagh	Charles	Bozeman, MT	Non-Resident	58.9	Non-technical	Site-Wide	Extent of Removal	For Removal	Current plan needs to call for complete cleanup and not allow any waste to be left in place.
59	20-Mar-05	email letter	I keep hearing the same rhetoric that their (sic) is a limited amount of money for Butte Priority Soils and that we must make do with what we have.	Stierle	Andrea	Butte, MT	Resident - Butte	59.1	Non-technical	Site-Wide	Extent of Removal	For Removal	Failing to completely remove Parrott Tailings and completely treat attic dust ensures there will be problems in Butte forever
59	20-Mar-05	email letter	I keep hearing the same rhetoric that their (sic) is a limited amount of money for Butte Priority Soils and that we must make do with what we have.	Stierle	Andrea	Butte, MT	Resident - Butte	59.2	Non-technical	Site-Wide	Evaluation of NCP Criteria	Evaluation/Weighing of Cost	The law says EPA must find a remedy that protects human health and the environment and then consider cost.
59	20-Mar-05	email letter	I keep hearing the same rhetoric that their (sic) is a limited amount of money for Butte Priority Soils and that we must make do with what we have.	Stierle	Andrea	Butte, MT	Resident - Butte	59.3	Non-technical	Site-Wide	Human Health Risk	Protectiveness of human health	EPA should make sure that it protects the health of the residents of Butte and ensure the community has a bright economic future.
60	20-Mar-05	email letter	I have attended countless meetings on the Butte Priority Soils Operable Unit over the years and always looked forward to the day when a ROD would be developed and the cleanup moved forward.	Curran	Larry	Butte, MT	Resident - Butte	60.1	Non-technical	Site-Wide	General Comment	Commenter Opposes	Butte citizens are being coerced to accept a compromised cleanup.
60	20-Mar-05	email letter	I have attended countless meetings on the Butte Priority Soils Operable Unit over the years and always looked forward to the day when a ROD would be developed and the cleanup moved forward.	Curran	Larry	Butte, MT	Resident - Butte	60.2	Non-technical	Site-Wide	General Comment	Commenter needs more information	The experts are divided on key issues and the plan is so convoluted that no one can determine if it is an appropriate cleanup.
60	20-Mar-05	email letter	I have attended countless meetings on the Butte Priority Soils Operable Unit over the years and always looked forward to the day when a ROD would be developed and the cleanup moved forward.	Curran	Larry	Butte, MT	Resident - Butte	60.3	Non-technical	Solid Media/Waste Left in Place	Reclamation	Reclamation specifications	Some caps should be made deeper and recontoured so they will look nicer and support trees.
60	20-Mar-05	email letter	I have attended countless meetings on the Butte Priority Soils Operable Unit over the years and always looked forward to the day when a ROD would be developed and the cleanup moved forward.	Curran	Larry	Butte, MT	Resident - Butte	60.4	Non-technical	Site-Wide	General Comment	Commenter needs more information	There needs to be greater consensus among the experts about whether the plan provides permanent solutions
61	20-Mar-05	email letter	I have attended several meetings with your group and other groups concerning the cleanup of the Butte Hill.	Worley	Bob	Butte, MT	Resident - Butte	61.1	Non-technical	Solid Media/Waste Left in Place	Reclamation	Reclamation specifications	Caps put on some of the areas are probably going to fail.

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61	20-Mar-05	email letter	I have attended several meetings with your group and other groups concerning the cleanup of the Butte Hill.	Worley	Bob	Butte, MT	Resident - Butte	61.2	Non-technical	Site-Wide	Redevelopment	Economic Effects	Doesn't want to see businesses leave Butte because a contaminated site is found after the clean up is final.
61	20-Mar-05	email letter	I have attended several meetings with your group and other groups concerning the cleanup of the Butte Hill.	Worley	Bob	Butte, MT	Resident - Butte	61.3	Non-technical	Site-Wide	General Comment	Economic Effects	Ensuring a complete cleanup in Butte could ease concerns for those wanting to build or expand a business.
61	20-Mar-05	email letter	I have attended several meetings with your group and other groups concerning the cleanup of the Butte Hill.	Worley	Bob	Butte, MT	Resident - Butte	61.4	Non-technical	Site-Wide	General Comment	General Comment	Please consider all options since there will only be one chance to cleanup the Hill.
62	21-Mar-05	email letter	I have hesitated in commenting on the Butte Priority Soils Proposal out of utter disbelief and frustration.	Carstarphen	Camela	Butte, MT	Resident - Butte	62.1	Technical	Parrott Tailings/MSD	Characterization	Inadequate characterization	Characterization of the Parrott Tailings was not sound science or thorough and is appalling and unconscionable.
62	21-Mar-05	email letter	I have hesitated in commenting on the Butte Priority Soils Proposal out of utter disbelief and frustration.	Carstarphen	Camela	Butte, MT	Resident - Butte	62.2	Non-technical	Parrott Tailings/MSD	Characterization	Inadequate characterization	The EPA and DEQ response to new Parrott characterization by the Bureau of Mines is criminal.
62	21-Mar-05	email letter	I have hesitated in commenting on the Butte Priority Soils Proposal out of utter disbelief and frustration.	Carstarphen	Camela	Butte, MT	Resident - Butte	62.3	Technical	Residential Metals	Attic and/or Interior Dust	Characterization	Fundamental work to document the extent of attic dust needs to be completed to understand its distribution and variability before any health risk study is completed.
63	15-Mar-05	letter	A motion was passed by the Butte-Silver Bow Chamber of Commerce Board of Directors that reads as follows:	Sando	John	Butte, MT	Business Group	63.1	Non-technical	Site-Wide	ARCO/BSB Agreement	General Comment	The chamber strong supports the Settlement Agreement between ARCO and the Butte-Silver Bow government. Comment is not directed specifically at EPA's proposed plan
64	17-Feb-05	letter	RE: ARCO transporting tailings across Anaconda/Opportunity state lands	L	Mae	Opportunity, MT	Non-Resident	64.1	Non-technical	General Comment	Unrelated Topic	Out of scope	Comments not relevant to Butte Priority Soils Operable Unit.
65	3-Feb-05	letter	EPA Proposed Remedy for Butte Priority Soils	George Grant Chapter of Trout Unlimited		Trout Unlimited	Citizen Group	65.1	Non-Technical	Surface Water - General	Water Quality	Clark Fork River Headwaters/Downstream Recontamination	Believes Silver Bow Creek will remain contaminated
65	3-Feb-05	letter	EPA Proposed Remedy for Butte Priority Soils	George Grant Chapter of Trout Unlimited		Trout Unlimited	Citizen Group	65.2	Non-Technical	Site-Wide	Waste left in place	Protectiveness of human health and the environment	Notes that waste will be left in place throughout town
65	3-Feb-05	letter	EPA Proposed Remedy for Butte Priority Soils	George Grant Chapter of Trout Unlimited		Trout Unlimited	Citizen Group	65.3	Non-Technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	Notes that attic dust will be left in place
65	3-Feb-05	letter	EPA Proposed Remedy for Butte Priority Soils	George Grant Chapter of Trout Unlimited		Trout Unlimited	Citizen Group	65.4	Non-Technical	Parrott Tailings/MSD	Extent of Removal	For Removal	Notes that waste will be left in place in downtown (i.e. MSD) - infer they are for removal
65	3-Feb-05	letter	EPA Proposed Remedy for Butte Priority Soils	George Grant Chapter of Trout Unlimited		Trout Unlimited	Citizen Group	65.5	Non-Technical	Surface Water - Storm Water	BMPs	Design Criteria	Waste left in place will contaminate Silver Bow Creek - refers to snowmelt and rainfall - i.e. runoff - if not protected
65	3-Feb-05	letter	EPA Proposed Remedy for Butte Priority Soils	George Grant Chapter of Trout Unlimited		Trout Unlimited	Citizen Group	65.6	Technical	Lower Area One	Treatment Lagoons	Performance - general	*Concerned about the use of treatment lagoons and conventional* lime treatment that they won't be able to meet water quality standards based on comparison to the Warm Springs Ponds
65	3-Feb-05	letter	EPA Proposed Remedy for Butte Priority Soils	George Grant Chapter of Trout Unlimited		Trout Unlimited	Citizen Group	65.7	Non-Technical	Groundwater	Capture and Treatment	Capture Effectiveness	Questions efficacy of ground water capture systems
65	3-Feb-05	letter	EPA Proposed Remedy for Butte Priority Soils	George Grant Chapter of Trout Unlimited		Trout Unlimited	Citizen Group	65.8	Non-Technical	Groundwater	Extent of Removal	For Removal	Opposes the use of treatment in perpetuity at a facility that will continue to pollute the headwaters of the Clark Fork in lieu of waste removal
65	3-Feb-05	letter	EPA Proposed Remedy for Butte Priority Soils	George Grant Chapter of Trout Unlimited		Trout Unlimited	Citizen Group	65.9	Technical	Surface Water - Storm Water	Characterization	Perceived Data Gap	Suggests that no baseline data were collected on storm water runoff
65	3-Feb-05	letter	EPA Proposed Remedy for Butte Priority Soils	George Grant Chapter of Trout Unlimited		Trout Unlimited	Citizen Group	65.10	Technical	Lower Area One	Treatment Lagoons	Perceived Data Gap	Suggests that no baseline data were collected from existing lagoon effluent
65	3-Feb-05	letter	EPA Proposed Remedy for Butte Priority Soils	George Grant Chapter of Trout Unlimited		Trout Unlimited	Citizen Group	65.11	Non-Technical	Parrott Tailings/MSD	Evaluation of NCP Criteria	State Acceptance	EPA ignored MBMG and MDEQ
65	3-Feb-05	letter	EPA Proposed Remedy for Butte Priority Soils	George Grant Chapter of Trout Unlimited		Trout Unlimited	Citizen Group	65.12	Technical	Parrott Tailings/MSD	General Comment	EPA disregards comments	EPA ignored MBMG study on Parrott tailings; relied on CDM study; ignored EPA review.
65	3-Feb-05	letter	EPA Proposed Remedy for Butte Priority Soils	George Grant Chapter of Trout Unlimited		Trout Unlimited	Citizen Group	65.13	Technical	Parrott Tailings/MSD	Cost of Removal	Cost Overestimated	Disagrees with EPA costs estimate for removal of Parrott tailings.
65	3-Feb-05	letter	EPA Proposed Remedy for Butte Priority Soils	George Grant Chapter of Trout Unlimited		Trout Unlimited	Citizen Group	65.14	Non-Technical	Surface Water - General	Water Quality	Clark Fork River Headwaters/Downstream Recontamination	Believes Silver Bow Creek will remain permanently impaired
65	3-Feb-05	letter	EPA Proposed Remedy for Butte Priority Soils	George Grant Chapter of Trout Unlimited		Trout Unlimited	Citizen Group	65.15	Non-Technical	Site-Wide	Ecological Risk	For Removal	Plan should include removal of environmental hazards that impair ecological functions
65	3-Feb-05	letter	EPA Proposed Remedy for Butte Priority Soils	George Grant Chapter of Trout Unlimited		Trout Unlimited	Citizen Group	65.16	Technical	Surface Water - General	Water Quality	Restoration of Fishery	Copper levels in Silver Bow Creek will be too high for Westslope Cutthroat trout.
65	3-Feb-05	letter	EPA Proposed Remedy for Butte Priority Soils	George Grant Chapter of Trout Unlimited		Trout Unlimited	Citizen Group	65.17	Technical	Groundwater	Capture and Treatment	Meeting WQB-7 standards in Silver Bow Creek	Questions the ability of lime treatment to meet surface water ARARs
65	3-Feb-05	letter	EPA Proposed Remedy for Butte Priority Soils	George Grant Chapter of Trout Unlimited		Trout Unlimited	Citizen Group	65.18	Non-Technical	Surface Water - General	Water Quality	For Removal	Extensive removal of wastes is necessary for long-term control of COCs
65	3-Feb-05	letter	EPA Proposed Remedy for Butte Priority Soils	George Grant Chapter of Trout Unlimited		Trout Unlimited	Citizen Group	65.19	Technical	Site-Wide	Extent of Removal	Waste in contact with Groundwater	Caps over waste left in place are unacceptable in the flood plain and aquifer
65	3-Feb-05	letter	EPA Proposed Remedy for Butte Priority Soils	George Grant Chapter of Trout Unlimited		Trout Unlimited	Citizen Group	65.20	Technical	Parrott Tailings/MSD	Characterization	Inadequate characterization	Need more characterization of the Parrott tailings to confirm/refute MBMG findings

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Document ID No.	Date	Type	Title/Opening Sentence	Last Name	First Name	Location/ Affiliation	Sector	Comment ID.	Technical/ Non-Technical/ Legal	Tier I Topic	Tier II Topic	Tier III Topic	Brief Comment Description
65	3-Feb-05	letter	EPA Proposed Remedy for Butte Priority Soils	George Grant Chapter of Trout Unlimited		Trout Unlimited	Citizen Group	65.21	Technical	Groundwater	Characterization	Need Monitoring	Need more characterization of the Copper Mountain Ball Fields to determine if ground water is contaminated
65	3-Feb-05	letter	EPA Proposed Remedy for Butte Priority Soils	George Grant Chapter of Trout Unlimited		Trout Unlimited	Citizen Group	65.22	Technical	Parrott Tailings/MSD	Capture and Treatment	Capture Effectiveness	Ground water collection and treatment should be based on a thorough understanding of the aquifer and state-of-the-art technologies
65	3-Feb-05	letter	EPA Proposed Remedy for Butte Priority Soils	George Grant Chapter of Trout Unlimited		Trout Unlimited	Citizen Group	65.23	Non-Technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	Advocates testing and, if appropriate, removal of dust from attics and walls
66	16-Mar-05	letter	This letter provides comments to [EPA] regarding the 20 December 2004 Superfund [Proposed Plan] for the [BPSOU] of the [SBC/BA]	Soule	Charles H.	Railroad Group	PRP	66.1	Technical	Solid Media/Waste Left in Place	Railroad Beds	Lower Railroad Yard Site 1	Railroad Group considers Lower Railroad Yard Site 1 to be the "slicken" at the base of the grade in the MSD/SBC floodplain
66	16-Mar-05	letter	This letter provides comments to [EPA] regarding the 20 December 2004 Superfund [Proposed Plan] for the [BPSOU] of the [SBC/BA]	Soule	Charles H.	Railroad Group	PRP	66.2	Technical	Solid Media/Waste Left in Place	Railroad Beds	Lower Railroad Yard Site 1	Railroad Group supports remediation of floodplain sediments near the MSD/SBC confluence
66	16-Mar-05	letter	This letter provides comments to [EPA] regarding the 20 December 2004 Superfund [Proposed Plan] for the [BPSOU] of the [SBC/BA]	Soule	Charles H.	Railroad Group	PRP	66.3	Technical	Solid Media/Waste Left in Place	Railroad Beds	Lower Railroad Yard Site 1	Remediation design in this area needs to consider railroad embankment stability
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.1	Technical	Lower Area One	Treatment Lagoons	Performance - general	In general, CTTL can meet water quality standards consistently
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.2	Technical	Groundwater	Capture and Treatment	Performance - general	MSD water should be similar enough to LAO water that they should be easy to treat together
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.3	Technical	Groundwater	Capture and Treatment	Performance - general	Minor treatment upsets after addition of MSD water to LAO water should be expected initially, but are expected to be manageable in time
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.4	Technical	Lower Area One	Treatment Lagoons	Sludge Volume/Removal/Handling	With high residence time, lime usage should be efficient which results in less sludge produced
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.5	Technical	Lower Area One	Treatment Lagoons	Performance - general	Long residence time allows pH to drop to acceptable levels with no dedicated pH reduction system prior to discharge
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.6	Technical	Lower Area One	Treatment Lagoons	Cost Overestimated	Both long term and O&M costs of the treatment lagoons are expected to be lower than for conventional treatment
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.7	Technical	Lower Area One	Treatment Lagoons	Cost Underestimated	FS did not include effluent monitoring and monitoring report preparation in O&M costs for the treatment lagoons, but did include them for the conventional lime treatment plant
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.8	Technical	Lower Area One	Treatment Lagoons	Performance - general	Treatment lagoons are capable of dealing with treatment upsets (lime addition, feed composition)
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.9	Technical	Lower Area One	Treatment Lagoons	Performance - general	Increases in lime dosage may be required when "retreating" water to compensate for decreased residence time
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.10	Technical	Lower Area One	Treatment Lagoons	Performance - general	Commenter notes concerns over the reliability of the current lime dosage system which is based on manual pH checking and lime slurry strength
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.11	Technical	Lower Area One	Treatment Lagoons	Performance - general	Commenter notes that there is a delicate balance/little margin for error between achieving metals removal and allowing enough residence time for the pH to drop to less than 9.5 (notes recent exceedances of 9.5 in effluent pH)
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.12	Technical	Lower Area One	Treatment Lagoons	Performance - cold weather	Untested during extended cold weather - a truly cold winter has not occurred since the system began operation - shorten retention time, damage silt curtains, etc.
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.13	Technical	Lower Area One	Treatment Lagoons	Performance - arsenic	A potential long term problem could be leaching of arsenic from the sediment as currently happens at the Warm Springs Ponds, except the sludge will be periodically removed
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.14	Technical	Lower Area One	Treatment Lagoons	Performance - general	Treatment lagoons will interact with local groundwater - both good (infiltration of clean water) and bad (exfiltration of contaminated water into treated water cells)
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.15	Technical	Lower Area One	Treatment Lagoons	Sludge Volume/Removal/Handling	Details of sludge removal and handling have not been well-defined
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.16	Technical	Lower Area One	Treatment Lagoons	Performance - during maintenance	Taking one of the lagoon systems offline for maintenance will require careful operation to ensure adequate treatment in the shortened retention time
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.17	Technical	Lower Area One	Treatment Lagoons	Sludge Volume/Removal/Handling	Sludge will not simply dewater over a few days, meaning more dewatering time will be required or wetter sludge will need to be handled
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.18	Technical	Lower Area One	Treatment Lagoons	Sludge Volume/Removal/Handling	A total of 2500-7000 cubic yards of sludge will need to be transported every 2-5 years, assuming 10 cubic yards per truck, this is 250-200 loads to be transported which is a significant effort
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.19	Technical	Lower Area One	Treatment Lagoons	Performance - during maintenance	Removing sludge from the lagoon may result in an inadvertent exposure of tailings beneath the lagoon, potentially interfering with water treatment (temporarily)
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.20	Technical	Lower Area One	Conventional Lime Treatment	Sludge Volume/Removal/Handling	Conventional treatment is not affected by sludge removal

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67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.21	Technical	Lower Area One	Conventional Lime Treatment	Sludge Volume/Removal/Handling	Dewatering of sludge is controllable and predictable using conventional treatment
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.22	Technical	Lower Area One	Conventional Lime Treatment	Sludge Volume/Removal/Handling	High density solids conventional treatment plant would produce considerably less volume than the treatment lagoons
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.23	Technical	Lower Area One	Capture and Treatment	Sludge Volume/Removal/Handling	The feasibility study did not compare sludge dewatering and handling processes for the treatment lagoons and the conventional treatment plant, indicating no cost advantage either way
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.24	Technical	Lower Area One	Treatment Lagoons	Operations and Maintenance	The treatment lagoons are portrayed as a low cost, low maintenance system, but anecdotal evidence indicates the system is not maintenance free
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.25	Non-technical	Lower Area One	Capture and Treatment	Aesthetics	Neither treatment lagoons or conventional treatment would be aesthetically pleasing - the industrial nature of the area may not justify aesthetic enhancements
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.26	Non-technical	Lower Area One	Treatment Lagoons	Operations and Maintenance	Butte-Silver Bow operators do not want to operate and maintain the system because of unknowns
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.27	Non-technical	Lower Area One	Treatment Lagoons	Operations and Maintenance	BSB personnel do not have personnel and equipment to perform regular unscheduled maintenance
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.28	Technical	Lower Area One	Treatment Lagoons	Design Criteria	BSB has not seen any design for the system and are not comfortable with trusting Atlantic Richfield that the design is adequate
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.29	Technical	Lower Area One	Treatment Lagoons	Operations and Maintenance	BSB has not seen any O&M plans for the system
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.30	Technical	Lower Area One	Treatment Lagoons	Performance - arsenic	BSB is concerned that the lagoons will have arsenic exceedances similar to Warm Springs Ponds and that they will be held liable for the discharge violations
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.31	Technical	Groundwater	Capture and Treatment	Performance - general	BSB is concerned that MSD water will have a sufficiently different composition than the current waters and there is no guarantee that the treatment lagoons can handle it
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.32	Technical	Lower Area One	Treatment Lagoons	Sludge Volume/Removal/Handling	Details of sludge removal and handling have not been well-defined
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.33	Technical	Lower Area One	Treatment Lagoons	Performance - general	Insufficient surge capacity for water from a significant storm event
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.34	Non-technical	Lower Area One	Treatment Lagoons	Operations and Maintenance	BSB is concerned that the lagoons will require some sort of unforeseen maintenance over and above the amount paid to them by Atlantic Richfield to operate the system
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.35	Technical	Lower Area One	Treatment Lagoons	Sludge Volume/Removal/Handling	Estimated sludge production rates may be underestimated by about 1/2 based on a calcium mass balance
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.36	Technical	Lower Area One	Treatment Lagoons	Sludge Volume/Removal/Handling	Sludge volume highly dependent on water content, making estimation extremely difficult
67	18-Mar-05	email letter	The purpose of this email is to provide public comment on the Proposed Plan for the Butte Priority Soils Operable Unit - MSE	Park	Brian	MSE	Consultant	67.37	Technical	Lower Area One	Treatment Lagoons	Operations and Maintenance	Suggest developing a dynamic model of the lagoon system to be an integral tool for actually operating the system
68	21-Mar-05	letter	The Natural Resource Damage Program submits the following comments regarding the EPA's proposed plan for the Butte Priority Soils Operable Unit	Mullen	Gregory	NRDP	Agency	68.1	Technical	Lower Area One	Conventional Lime Treatment	Commenter Supports	NRDP supports EPA's selection of conventional lime treatment over treatment lagoons in the proposed plan
68	21-Mar-05	letter	The Natural Resource Damage Program submits the following comments regarding the EPA's proposed plan for the Butte Priority Soils Operable Unit	Mullen	Gregory	NRDP	Agency	68.2	Technical	Lower Area One	Conventional Lime Treatment	Performance - general	Conventional treatment can adjust to variations in influent water conditions
68	21-Mar-05	letter	The Natural Resource Damage Program submits the following comments regarding the EPA's proposed plan for the Butte Priority Soils Operable Unit	Mullen	Gregory	NRDP	Agency	68.3	Technical	Lower Area One	Conventional Lime Treatment	Performance - general	Conventional treatment can accomplish changes in effluent quality in a short period of time
68	21-Mar-05	letter	The Natural Resource Damage Program submits the following comments regarding the EPA's proposed plan for the Butte Priority Soils Operable Unit	Mullen	Gregory	NRDP	Agency	68.4	Technical	Lower Area One	Conventional Lime Treatment	Sludge Volume/Removal/Handling	Sludge handling can be incorporated into the treatment plant
68	21-Mar-05	letter	The Natural Resource Damage Program submits the following comments regarding the EPA's proposed plan for the Butte Priority Soils Operable Unit	Mullen	Gregory	NRDP	Agency	68.5	Non-technical	Site-Wide	General Comment	Long-Term Effectiveness and Permanence	EPA should focus on permanent solutions
68	21-Mar-05	letter	The Natural Resource Damage Program submits the following comments regarding the EPA's proposed plan for the Butte Priority Soils Operable Unit	Mullen	Gregory	NRDP	Agency	68.6	Non-technical	Site-Wide	General Comment	Clark Fork River Headwaters/Downstream Recontamination	Butte is at the headwaters of the Clark Fork River and need to clean up Butte to not recontaminate downgradient areas
68	21-Mar-05	letter	The Natural Resource Damage Program submits the following comments regarding the EPA's proposed plan for the Butte Priority Soils Operable Unit	Mullen	Gregory	NRDP	Agency	68.7	Technical	Surface Water - General	Water Quality	Clark Fork River Headwaters/Downstream Recontamination	Reconstructed SBC channel downstream of Butte has shown recontamination of sediments - 7000 ppm copper
68	21-Mar-05	letter	The Natural Resource Damage Program submits the following comments regarding the EPA's proposed plan for the Butte Priority Soils Operable Unit	Mullen	Gregory	NRDP	Agency	68.8	Technical	Surface Water - General	Water Quality	Clark Fork River Headwaters/Downstream Recontamination	Prevent recontamination of SBC downstream of Butte

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68	21-Mar-05	letter	The Natural Resource Damage Program submits the following comments regarding the EPA's proposed plan for the Butte Priority Soils Operable Unit	Mullen	Gregory	NRDP	Agency	68.9	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation specifications	Vegetative caps should have an 18-22 inch cover to support a dense cover of native plants and no weeds
68	21-Mar-05	letter	The Natural Resource Damage Program submits the following comments regarding the EPA's proposed plan for the Butte Priority Soils Operable Unit	Mullen	Gregory	NRDP	Agency	68.10	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation specifications	Many reclaimed caps do not meet minimal standards
68	21-Mar-05	letter	The Natural Resource Damage Program submits the following comments regarding the EPA's proposed plan for the Butte Priority Soils Operable Unit	Mullen	Gregory	NRDP	Agency	68.11	Technical	Surface Water - Storm Water	Reclamation	Storm Water Treatment	Making sure that reclamation is adequate will ensure storm water treatment is not needed and should be less expensive than treatment of storm water
68	21-Mar-05	letter	The Natural Resource Damage Program submits the following comments regarding the EPA's proposed plan for the Butte Priority Soils Operable Unit	Mullen	Gregory	NRDP	Agency	68.12	Non-technical	Parrott Tailings/MSD	Extent of Removal	Removal of Accessible Wastes	Supports Alternative 5b
68	21-Mar-05	letter	The Natural Resource Damage Program submits the following comments regarding the EPA's proposed plan for the Butte Priority Soils Operable Unit	Mullen	Gregory	NRDP	Agency	68.13	Technical	Parrott Tailings/MSD	Characterization	Inadequate characterization	Additional data collection needed due to debate over contaminant transport
68	21-Mar-05	letter	The Natural Resource Damage Program submits the following comments regarding the EPA's proposed plan for the Butte Priority Soils Operable Unit	Mullen	Gregory	NRDP	Agency	68.14	Technical	Parrott Tailings/MSD	Cost of Removal	Cost Overestimated	Removal of Parrott Tailings cost overestimated due to higher unit costs used in the FFS compared to the state's unit costs for streamside tailings
68	21-Mar-05	letter	The Natural Resource Damage Program submits the following comments regarding the EPA's proposed plan for the Butte Priority Soils Operable Unit	Mullen	Gregory	NRDP	Agency	68.15	Technical	Parrott Tailings/MSD	Cost of Removal	Cost Overestimated	MSD FFS did not consider alternative repositories such as the Opportunity Ponds
68	21-Mar-05	letter	The Natural Resource Damage Program submits the following comments regarding the EPA's proposed plan for the Butte Priority Soils Operable Unit	Mullen	Gregory	NRDP	Agency	68.16	Technical	Parrott Tailings/MSD	Cost of Removal	Cost Overestimated	MSD FFS did not consider alternative routes to the Butte waste repository
69	18-Mar-05	letter	DEQ's public comments on EPA's proposed plan	Olsen	Sandi	DEQ	Agency	69.1	Legal	Parrott Tailings/MSD	Aquifer Restoration/Cleanup	Compliance with ARARs	The Proposed remedial action does not comply with state groundwater ARARs
69	18-Mar-05	letter	DEQ's public comments on EPA's proposed plan	Olsen	Sandi	DEQ	Agency	69.2	Technical	Parrott Tailings/MSD	Aquifer Restoration/Cleanup	Feasibility or Technical Impracticability	DEQ does not agree with EPA's conclusion that waiver of groundwater ARARs is necessary or appropriate for the BPSOU alluvial aquifer underlying the MSD
69	18-Mar-05	letter	DEQ's public comments on EPA's proposed plan	Olsen	Sandi	DEQ	Agency	69.3	Legal	Parrott Tailings/MSD	Evaluation of NCP Criteria	Compliance with ARARs	EPA's analysis of the ARARs issue is inconsistent with the NCP
69	18-Mar-05	letter	DEQ's public comments on EPA's proposed plan	Olsen	Sandi	DEQ	Agency	69.4	Technical	Groundwater	Consistency with Guidance	Feasibility or Technical Impracticability	The proposed TI waiver is not evaluated or selected in accordance with EPA's guidance for evaluating the TI of groundwater restoration
69	18-Mar-05	letter	DEQ's public comments on EPA's proposed plan	Olsen	Sandi	DEQ	Agency	69.5	Technical	Parrott Tailings/MSD	General Comment	State Acceptance	DEQ does not concur with the proposed remedy at the present time
69	18-Mar-05	letter	DEQ's public comments on EPA's proposed plan	Olsen	Sandi	DEQ	Agency	69.6	Technical	Site-Wide	Evaluation of NCP Criteria	Principal threat wastes	EPA's conclusion that there are no remaining principal threat wastes within the OU and decision not to take any action to reduce the mobility of these source materials through engineered containment is inconsistent with the NCP
69	18-Mar-05	letter	DEQ's public comments on EPA's proposed plan	Olsen	Sandi	DEQ	Agency	69.7	Legal	Site-Wide	Waste left in place	Compliance with ARARs	*The preferred alternative does not comply with solid waste* ARARs or provide a basis for waiving these requirements
69	18-Mar-05	letter	DEQ's public comments on EPA's proposed plan	Olsen	Sandi	DEQ	Agency	69.8	Legal	Groundwater	Consistency with Guidance	Feasibility or Technical Impracticability	EPA's need to waive groundwater standards is directly contradicted by the August 1997 EPA Region VIII memorandum that a TI waiver is not needed
69	18-Mar-05	letter	DEQ's public comments on EPA's proposed plan	Olsen	Sandi	DEQ	Agency	69.9	Technical	Parrott Tailings/MSD	Characterization	Inadequate characterization	EPA's decision is based on a debatable interpretation of site data
69	18-Mar-05	letter	DEQ's public comments on EPA's proposed plan	Olsen	Sandi	DEQ	Agency	69.10	Technical	Parrott Tailings/MSD	Extent of Removal	Removal of Accessible Wastes	EPA did not remove or treat contamination sources to the extent practicable
69	18-Mar-05	letter	DEQ's public comments on EPA's proposed plan	Olsen	Sandi	DEQ	Agency	69.11	Technical	Parrott Tailings/MSD	Characterization	Inadequate characterization	EPA did not use an incremental approach to selection and implementation of the remedy as a method of reducing uncertainty
69	18-Mar-05	letter	DEQ's public comments on EPA's proposed plan	Olsen	Sandi	DEQ	Agency	69.12	Technical	Parrott Tailings/MSD	Aquifer Restoration/Cleanup	Performance - general	EPA did not implement and monitor pilot or full scale aquifer remediation systems
69	18-Mar-05	letter	DEQ's public comments on EPA's proposed plan	Olsen	Sandi	DEQ	Agency	69.13	Technical	Parrott Tailings/MSD	Capture and Treatment	Contaminant Transport	EPA did not take any steps to control or contain migration of contamination in the aquifer
69	18-Mar-05	letter	DEQ's public comments on EPA's proposed plan	Olsen	Sandi	DEQ	Agency	69.14	Technical	Parrott Tailings/MSD	Characterization	Contaminant Transport	EPA's TI determination is based primarily on a prediction of contaminant transport times based on site characterization data and modest changes in data input for gradients, porosity, etc. can yield huge differences in travel times
69	18-Mar-05	letter	DEQ's public comments on EPA's proposed plan	Olsen	Sandi	DEQ	Agency	69.15	Technical	Parrott Tailings/MSD	Cost of Removal	Cost Overestimated	Cost is to be subordinate to ensuring protectiveness
69	18-Mar-05	letter	DEQ's public comments on EPA's proposed plan	Olsen	Sandi	DEQ	Agency	69.16	Technical	Parrott Tailings/MSD	Characterization	Contaminant Transport	The agencies don't have enough information to adequately predict the restoration potential of the alluvial aquifer
69	18-Mar-05	letter	DEQ's public comments on EPA's proposed plan	Olsen	Sandi	DEQ	Agency	69.17	Technical	Parrott Tailings/MSD	Cost of Removal	Cost Overestimated	Removal costs were overestimated and cost effectiveness should be reevaluated
69	18-Mar-05	letter	DEQ's public comments on EPA's proposed plan	Olsen	Sandi	DEQ	Agency	69.18	Technical	Parrott Tailings/MSD	Cost of Removal	Cost Overestimated	One hundred percent backfill in the upper MSD is most likely not necessary (would reduce costs)
69	18-Mar-05	letter	DEQ's public comments on EPA's proposed plan	Olsen	Sandi	DEQ	Agency	69.19	Technical	Lower Area One	Extent of Removal	Removal of Accessible Wastes	EPA should assess removal of additional accessible wastes at Lower Area One
69	18-Mar-05	letter	DEQ's public comments on EPA's proposed plan	Olsen	Sandi	DEQ	Agency	69.20	Technical	Granite Mountain Memorial Area	Reclamation	Reclamation needed	EPA should consider reclamation of potential sediment source areas in the Granite Mountain Memorial Area (south slopes of the Mountain Con and Kelley)
69	18-Mar-05	letter	DEQ's public comments on EPA's proposed plan	Olsen	Sandi	DEQ	Agency	69.21	Technical	Parrott Tailings/MSD	Extent of Removal	Removal of Accessible Wastes	DEQ asks that EPA select a remedy that includes the removal options described in MSD alternative 5b

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70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Babb	Paul	Chief Executive, BSB	PRP	70.1	Non-technical	Superfund Procedural Issues	Public Meeting	Public involvement at Public Meeting	EPA should schedule a second meeting and the citizen's of Butte should speak up.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Babb	Paul	Chief Executive, BSB	PRP	70.2	Technical	Site-Wide	ARCO/BSB Agreement	General Comment	We urge EPA to reconsider our position paper, submitted last October on the cleanup of BPSOU.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Babb	Paul	Chief Executive, BSB	PRP	70.3	Technical	Residential Metals	Multipathway Lead Abatement Program	Supports Lead Program	We thank ARCO for their support and strongly urge continued support of the programmatic, multi-pathway and remediation of all yards, homes, and attics found to exceed arsenic, lead, and mercury levels over a 30-year period. BSB Health Department is ready to help with implementation.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Babb	Paul	Chief Executive, BSB	PRP	70.4	Technical	Surface Water - Storm Water	BMPs	Commenter Opposes	BMPs are only part of the solution. Seeking funding from ARCO for a long-term capital improvement system to repair and replace the municipal storm water systems in the OU.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Babb	Paul	Chief Executive, BSB	PRP	70.5	Technical	Lower Area One	Treatment Lagoons	Community Acceptance	Five criteria provided earlier to EPA must be met, including establishment of a trust fund to operate, maintain, and monitor the facilities as long as required. Lagoon system may meet the five criteria, but ARCO needs to prove it to the county.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Babb	Paul	Chief Executive, BSB	PRP	70.6	Technical	Parrott Tailings/MSD	Extent of Removal	Community Acceptance	Six criteria for EPA to meet were provided earlier by the county. This includes a trust fund for operation, maintenance, and management of remedies.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Babb	Paul	Chief Executive, BSB	PRP	70.7	Technical	Site-Wide	Waste left in place	Commenter Supports	The county supports the waste-in-place remedy because we are confident that we can secure a meaningful redevelopment trust fund through our negotiations with ARCO
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Babb	Paul	Chief Executive, BSB	PRP	70.8	Non-technical	Site-Wide	NRDP	Funding	The county requests that any resource damages which occurred in Butte be specifically earmarked for restoration projects in Butte and Butte alone.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Harrington	Jerry	Butte, MT	Resident - Butte	70.9	Non-technical	Site-Wide	NRDP	Funding	Elected leaders should embrace his recommendations and keep in mind distinction between Remedy (Superfund Cleanup) and Restoration (above and beyond Superfund). NRD funds will not last if Superfund does not cleanup adequately.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Harrington	Jerry	Butte, MT	Resident - Butte	70.10	Non-technical	Parrott Tailings/MSD	Extent of Removal	For Removal	EPA view is flawed from cost perspective. Tailings are worst source of contamination and most can and should be removed. MBMG projects beneficial use standards would be attained within several decades, instead of never under current plan.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Harrington	Jerry	Butte, MT	Resident - Butte	70.11	Technical	Surface Water - Storm Water	Storm Water Conveyances	Design Criteria	Ditch is very ugly and impediment to economic development. It is also too small to handle flows and threatens downstream reaches. Upstream sites should be cleaned to a level that will allow elimination of the ditch.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Harrington	Jerry	Butte, MT	Resident - Butte	70.12	Technical	Surface Water - Storm Water	Storm Water Conveyances	Design Criteria	Re: Missoula Gulch - Storm events above 10-yr threshold will undermine and destroy ditch integrity. Remedy should include planting bottom with aspens, alder, cottonwood, and willow and constructing channel as a more natural streambed (rocks, deadfall, etc.)
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Harrington	Jerry	Butte, MT	Resident - Butte	70.13	Non-technical	Site-Wide	Redevelopment	Economic Effects	Butte Hill is especially in need of cleanup because it is in the midst of urban population and a substantial infrastructure connected to the region. Economic future depends on eliminating the stigma and lingering myths about Superfund and Butte.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Ray	Dr. John W.	Butte, MT	Resident - Butte	70.14	Non-technical	Site-Wide	General Comment	Commenter Opposes	A bad process produces a bad outcome and this has been a bad process. The outcome is harmful to the interest of Butte and the surrounding areas.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Ray	Dr. John W.	Butte, MT	Resident - Butte	70.15	Non-technical	Superfund Procedural Issues	Public Involvement	EPA limits public comment	EPA failed to meaningfully involve the public and ignored recommendations from the Citizen's Working Group and from an ad hoc committee that met at Tech.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Ray	Dr. John W.	Butte, MT	Resident - Butte	70.16	Non-technical	Superfund Procedural Issues	RASD	Past Response Action Sites	EPA was supposed to do a complete, thorough, and comprehensive review of past actions. They did not do a review or evaluation.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Ray	Dr. John W.	Butte, MT	Resident - Butte	70.17	Non-technical	Superfund Procedural Issues	Redevelopment	Land Use	EPA was supposed to consider productive land uses and economic revitalization in developing the proposed remedy. They did not do this.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Ray	Dr. John W.	Butte, MT	Resident - Butte	70.18	Non-technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	There is no consideration of environmental justice in this plan.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup - MSE	Ruffner	Jeff	MSE	Consultant	70.19	Technical	Parrott Tailings/MSD	Characterization	Groundwater flow rates	MSE reviewed the plan and finds that there is not sufficient data to support the claims made relative to the flows and natural flushing as claimed by ARCO.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup - MSE	Ruffner	Jeff	MSE	Consultant	70.20	Technical	Lower Area One	Treatment Lagoons	Operations and Maintenance	Lagoon treatment was a valid treatment option if specific operational and maintenance issues could be addressed.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup - MSE	Ruffner	Jeff	MSE	Consultant	70.21	Non-technical	Site-Wide	General Comment	Commenter needs more information	We are commenting on proposed actions with only half the information needed to solve the problems. Even the experts can't identify all the long-term issues in the time frame.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup - MSE	Ruffner	Jeff	MSE	Consultant	70.22	Technical	Site-Wide	Waste left in place	Commenter Supports	I am willing to accept waste-in-place as a solution, provided there is fair compensation to BSB for accepting the damaged resource. Fair compensation to: enhance the appearance of damaged areas, enhance business opportunity, support O&M, and build infrastructure. More effort needs to go into determining the value of the lost resource.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Kimball	Dianne	Butte, MT	Resident - Butte	70.23	Technical	Site-Wide	Institutional Controls	Implementability and Effectiveness	What are the number and kind of institutional controls proposed to keep the caps from being broken and recontamination from occurring?

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70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Kimball	Dianne	Butte, MT	Resident - Butte	70.24	Technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	All homes should be sampled for attic dust and those above average should be cleaned up, regardless of whether there appears to be an exposure pathway. Pathways can develop later.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Jordan	Joe	Butte, MT	Resident - Butte	70.25	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation specifications	He built the caps, starting with Dept of State Lands. When EPA and ARCO got involved, the caps were much better (18 inches of good growth media) and control of runoff. They are a permanent fix.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Jordan	Joe	Butte, MT	Resident - Butte	70.26	Technical	Parrott Tailings/MSD	Capture and Treatment	General Comment	The groundwater from the storm drain is being captured and pumped to the LAO for treatment.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Jordan	Joe	Butte, MT	Resident - Butte	70.27	Non-technical	Site-Wide	General Comment	Much Work Already Done	We should be thankful for the money spent and work done to date. It has been done properly, under engineering oversight, and is a permanent fix.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	MacDonald, sister	Mary Jo	Butte, MT	Resident - Butte	70.28	Technical	Site-Wide	General Comment	Commenter Opposes	EPA should protect the environment today and in the distant future. Soil slumping and earthquakes can destroy the caps put on the wastes.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	MacDonald, sister	Mary Jo	Butte, MT	Resident - Butte	70.29	Non-technical	Site-Wide	Environmental Justice	Concerned about Health Effects/Risks	Illnesses have resulted from this contamination. When they happen to the poor, who are not insured, they overload the hospital system. Charity volume is astronomical in Butte.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	MacDonald, sister	Mary Jo	Butte, MT	Resident - Butte	70.30	Non-technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	I challenge everyone to organize and go door to door to help people start a "remodeling" process so that their attics will qualify for cleanup.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	MacDonald, sister	Mary Jo	Butte, MT	Resident - Butte	70.31	Non-technical	Site-Wide	General Comment	General Comment	We must do the very best cleanup we can, not the minimum. Look up the Earth Charter Document on the internet. We need to guarantee the future of this community.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Hafer	Carl	Butte, MT	Resident - Butte	70.32	Non-technical	Site-Wide	General Comment	Commenter Supports	EPA's plans will best serve the community of Butte. ARCO has shown their commitment verbally and in writing and has spent in excess of $300 M. EPA has also given their written commitment
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Hafer	Carl	Butte, MT	Resident - Butte	70.33	Non-technical	Site-Wide	General Comment	Commenter Supports	EPA, as a government agency regulated by law, is the best one to do this. The plan has substance. I think a good job has been done and that work will continue to be done in a good manner. My feelings are based on past experience.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Deeney	Craig	TREC	Consultant	70.34	Technical	Lower Area One	Treatment Lagoons	Performance - general	Lime treatment plant that is proposed will not reduce cadmium levels to acceptable standards. The lagoon treatment system does achieve the standard.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Deeney	Craig	TREC	Consultant	70.35	Technical	Lower Area One	Treatment Lagoons	Performance - general	Lagoons are bigger and allow more retention time and more time for metals to settle out. This gives the system robustness or sturdiness. They can still function, even when lime delivery problems occur - something conventional lime treatment can not say.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Deeney	Craig	TREC	Consultant	70.36	Technical	Lower Area One	Treatment Lagoons	Sludge Volume/Removal/Handling	Lagoons may use two or three times less lime than the conventional system, mainly because of extended mixing time.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Deeney	Craig	TREC	Consultant	70.37	Technical	Lower Area One	Treatment Lagoons	Sludge Volume/Removal/Handling	Lagoons will also have much less sludge to deal with. TREC looks forward to comparing the two technologies in the future and demonstrating the effectiveness and O&M benefits.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Deeney	Craig	TREC	Consultant	70.38	Non-technical	Lower Area One	Treatment Lagoons	Aesthetics	The lagoons are much more aesthetically pleasing than the conventional system of tanks and metal buildings would be. This is important, given their location. They are visible from the interstate, trails, and from Centennial Ave.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Deeney	Craig	TREC	Consultant	70.39	Technical	Lower Area One	Treatment Lagoons	Commenter Supports	The lagoons are already in place and using them would save millions of dollars over installing and operating a conventional lime treatment system. EPA should identify lime treatment via a lagoon system in the ROD
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Sheehan	Marci	Walkerville, MT	Resident - Walkerville	70.4	Non-technical	Site-Wide	General Comment	Much Work Already Done	Experienced first-hand the lead testing and abatement. Yard and basement have been remediated. She encourages EPA to support ARCO's multi-pathway approach.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Jones	Gary	Butte, MT	Resident - Butte	70.41	Technical	Solid Media/Waste Left in Place	Extent of Removal	Against Removal	Short-term risks from waste removal outweigh the long-term risks of leaving waste in place. Leaving wastes in place will also help with future use and redevelopment of Butte.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Jones	Gary	Butte, MT	Resident - Butte	70.42	Non-technical	Site-Wide	Redevelopment	Commenter Supports	MERDI has worked with EPA and ARCO on redevelopment projects like East Mercury Street, Belmont head frame, and the new central activities facility. If we all continue to work together, we can redevelop these areas. The equitable tradeoff for resources lost needs to be used to plan for the future.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Scally	Gavin	ARCO	PRP	70.43	Non-technical	Site-Wide	General Comment	Much Work Already Done	ARCO is appreciative of EPA's tremendous collaborative effort over the past 20 years in Butte. ARCO has spent over $300M in BSB county, including over $75M in BPSOU alone. ARCO has spent more money in Butte than in any other community in the CFR Basin.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Scally	Gavin	ARCO	PRP	70.44	Non-technical	Site-Wide	Human Health Risk	Much Work Already Done	There has been a tremendous amount of scientific study and remediation to address the human health issues on an expedited basis. ARCO looks forward to continuing that work.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Scally	Gavin	ARCO	PRP	70.45	Technical	Parrott Tailings/MSD	Aquifer Restoration/Cleanup	Commenter Supports	ARCO agrees that the aquifer beneath the MSD cannot be restored within a reasonable time frame even with a total removal.

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70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Scally	Gavin	ARCO	PRP	70.46	Technical	Site-Wide	NRDP	Remediation vs. restoration	ARCO believes that it is important to keep remediation and restoration distinct. Remediation is intended to address human health and the environment. The NRD program is a litigation-based program that seeks monetary damages for supposed injury to natural resources.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Scally	Gavin	ARCO	PRP	70.47	Technical	Site-Wide	Waste left in place	Consistency with other Clark Fork River Sites or similar NPL sites	EPA's plan to leave waste-in-place is consistent with their remedies across the rest of the CFR Basin. ARCO has gone above and beyond this my removing wastes material within the MSD channel during construction.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Scally	Gavin	ARCO	PRP	70.48	Technical	Groundwater	Capture and Treatment	General Comment	ARCO acknowledges that groundwater treatment will be needed for a long time, and they have built a treatment system at the Berkeley Pit. This system would be needed, even if wastes were removed. ARCO wants to spend money in Butte on revitalization and economic development, rather than on moving wastes from one location in the community to another.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Scally	Gavin	ARCO	PRP	70.49	Technical	Lower Area One	Treatment Lagoons	Commenter Supports	ARCO believes the lagoon system does and can meet the cleanup levels of Superfund.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Scally	Gavin	ARCO	PRP	70.50	Technical	Residential Metals	Multipathway Lead Abatement Program	Supports Lead Program	ARCO is supportive of the multi-pathway approach for cleanup of resident property. The program is nationally recognized and is a model for other cleanups.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Scally	Gavin	ARCO	PRP	70.51	Non-technical	Site-Wide	General Comment	Commenter Supports	It's been proven that we can perform a successful cleanup to protect the human health and the environment while also providing for economic revitalization, historic preservation, and redevelopment of Butte.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Scally	Gavin	Butte, MT	Resident - Butte	70.52	Technical	Site-Wide	General Comment	Commenter Supports	Plan is protective of human health and the environment and is more comprehensive than any remedial plan I have seen or heard of in my previous experience in this area. Leaving wastes in place in common place through many areas of the world and is sensible.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Scally	Gavin	ARCO	PRP	70.53	Non-technical	Site-Wide	General Comment	Commenter Supports	History demonstrates that the community can work together to clean up and revitalize areas that were impacted at one point in time. I am sure we will complete the cleanup we've started.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Appleman	Rick	Butte, MT	Resident - Butte	70.54	Non-technical	Site-Wide	General Comment	Commenter needs more information	Would vote for Site-wide Alternative 3 and Metro Storm Drain Alternative 5B.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Appleman	Rick	Butte, MT	Resident - Butte	70.55	Technical	Site-Wide	General Comment	Commenter needs more information	Would like a Summary for the Protection of Human Health and the Environment - Past, Present, and Future. Show the progress that has been made and give an estimate for the future (SBC was dead and now has muskrat and suckers).
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Appleman	Rick	Butte, MT	Resident - Butte	70.56	Non-technical	Site-Wide	Human Health Risk	Much Work Already Done	Has concerns about COCs, but many have improved. The Lead Abatement Program has made wonderful progress.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Appleman	Rick	Butte, MT	Resident - Butte	70.57	Technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	Attic dust needs to be addressed. Something simple like a roof repair can send clouds of dust into the community.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Appleman	Rick	Butte, MT	Resident - Butte	70.58	Technical	Site-Wide	Human Health Risk	Action Levels	The standards (for arsenic) have dropped and will probably continue to do so. How will EPA handle that in the future? It needs to be addressed.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Appleman	Rick	Butte, MT	Resident - Butte	70.59	Non-technical	Solid Media/Waste Left in Place	Reclamation	Much Work Already Done	Rode on tailings as a kid. They were fun but toxic. Glad they are gone. No more clouds of dust from tailings in community. People need to see these improvements.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Appleman	Rick	Butte, MT	Resident - Butte	70.60	Technical	Site-Wide	Human Health Risk	Out of scope	What are the risks from active mining? Everyday inversions and big wind storms move contaminants into the community.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Appleman	Rick	Butte, MT	Resident - Butte	70.61	Technical	Site-Wide	Human Health Risk	cadmium and mercury	Would like to see data on level of cadmium in local food and bioaccumulation of mercury in the local food chain.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Appleman	Rick	Butte, MT	Resident - Butte	70.62	Technical	Surface Water - General	Water Quality	Water quality improvements	Progress in Silver Bow Creek has been wonderful. Document it for us in the Summary report.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Appleman	Rick	Butte, MT	Resident - Butte	70.63	Technical	Solid Media/Waste Left in Place	BRES	Supports BRES program	BRES is a wonderful plan for make sure the caps and their integrity hold.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Appleman	Rick	Butte, MT	Resident - Butte	70.64	Technical	Air Quality	Air Monitoring	Characterization	Need more inside and outside monitoring of contaminants of concern, both daily and big wind events.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Appleman	Rick	Butte, MT	Resident - Butte	70.65	Technical	Surface Water - Storm Water	Characterization	Need Monitoring	Continue the monitoring and add another station, a point of compliance station upstream near Montana Street.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Munday	Pat	Trout Unlimited	Citizen Group	70.66	Non-technical	Groundwater	General Comment	Restoration	Thanks to NRD people for supporting clean water and working for us on a better remedy that what's been proposed by the EPA.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Munday	Pat	Trout Unlimited	Citizen Group	70.67	Technical	Parrott Tailings/MSD	Extent of Removal	Meeting WQB-7 standards in Silver Bow Creek	Parrot Tailings must be removed in order to see trout restored throughout Silver Bow Creek.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Munday	Pat	Walkerville, MT	Resident - Walkerville	70.68	Non-technical	Lower Area One	Development of Alternatives	No Innovative Technology	Conventional lime treatment and lagoons are nineteenth century technologies that don't work. We need to find something better.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Munday	Pat	Walkerville, MT	Resident - Walkerville	70.69	Technical	Residential Metals	Attic and/or Interior Dust	Property Resale - Disclosure of Contamination/Remediation	Owns house next door and has been remodeling and released lots of dust. Test the attics. Results should go in deed, otherwise potential buyers will never know if it is safe. Has taken local dogs to have their hair tested by Dr. Peterson for exposure.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Munday	Pat	Walkerville, MT	Resident - Walkerville	70.70	Technical	Surface Water - Storm Water	BMPs	Commenter Opposes	BMPs should be "Bad Management Practices". Let's just dig the stuff up, not monitor it for the rest of our children's lives and on to our grandchildren's lives, as well.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Munday	Pat	Walkerville, MT	Resident - Walkerville	70.71	Non-technical	Parrott Tailings/MSD	General Comment	Clark Fork River Headwaters/Downstream Recontamination	Call it the headwaters of Silver Bow Creek - that's what it is. It's not an open sewer or a storm drain. Calling it that implies that it is okay to leave it polluted.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Munday	Pat	Walkerville, MT	Resident - Walkerville	70.72	Non-technical	Solid Media/Waste Left in Place	Extent of Removal	For Removal	ICs mean fences. An 18-inch cap will not stand up to a tree. The roots go too deep. Clean it up, don't cover it up.

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70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Harrington	Bernie	Walkerville, MT	Resident - Walkerville	70.73	Non-technical	Site-Wide	General Comment	Commenter Opposes	The plan stinks, especially when the main PRP agrees with it. EPA is protecting the economic health and environment, ARCO, themselves, and their contractors.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Harrington	Bernie	Walkerville, MT	Resident - Walkerville	70.74	Non-technical	Solid Media/Waste Left in Place	Institutional Controls	General Comment	ICs are a farce and are nothing but a cover up for EPA failing to do their job. EPA made two "temporary repositories" upgradient of houses in Walkerville permanent.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Harrington	Bernie	Walkerville, MT	Resident - Walkerville	70.75	Non-technical	Superfund Procedural Issues	Public Involvement	EPA disregards comments	EPA says it listens to the public, but I have been involved with this since 1987 and you never listen to anyone.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Archibald	Brad	Butte, MT	Resident - Butte	70.76	Technical	Parrott Tailings/MSD	Extent of Removal	Against Removal	There is doubt as to whether removing the wastes would equal achieving groundwater standards. Even if groundwater standards were achieved, the surface water would still have to be treated.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Archibald	Brad	Butte, MT	Resident - Butte	70.77	Technical	Parrott Tailings/MSD	Extent of Removal	Against Removal	Removal of tailings would end up being much more extensive that estimated before digging begins. That is always what happens. It would be a major problem for people in Butte.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Archibald	Brad	Butte, MT	Resident - Butte	70.78	Technical	Parrott Tailings/MSD	Extent of Removal	Against Removal	There is no exposure pathway for the wastes in the MSD, so there is no risk. If there is no risk, there should be no removal. Short-term risks from a removal action far outweigh any potential benefits.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Deal	Ed	Butte, MT	Resident - Butte	70.79	Non-technical	Parrott Tailings/MSD	Characterization	Inadequate characterization	I find it disappointing that in 17 years, adequate data to determine what is happening in that aquifer downstream from the Parrott Tailings has not been collected. I think it is a failed investigation.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Yovich	Matt	TREC	Consultant	70.80	Non-technical	Solid Media/Waste Left in Place	Reclamation	Much Work Already Done	Over 180 acres and 400 sites have been cleaned up. I am confident of the long-term protection of the reclaimed areas.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Yovich	Matt	TREC	Consultant	70.81	Non-technical	Site-Wide	Redevelopment	Commenter Supports	There has been much redevelopment work done. Such as Copper Mt Sports complex, Belmont Area, uptown Rails to Trails. The projects are good for the community and are examples of what can be done in the future.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Yovich	Matt	TREC	Consultant	70.82	Non-technical	Granite Mountain Memorial Area	Redevelopment	Commenter Supports	Commends EPA for their recognition in the Proposed Plan of ARCO and BSB's cleanup plan for the Granite Mountain Memorial Interpretive Area.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Yovich	Matt	TREC	Consultant	70.83	Technical	Residential Metals	Multipathway Lead Abatement Program	Against Non-Targeted Sampling	Programmatic approach to lead abatement in Butte has been recognized nationally. EPA's changes to that program in the Proposed Plan are not consistent nor appropriate.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Greb	Lee	Butte, MT	Resident - Butte	70.84	Non-technical	Site-Wide	General Comment	Concerned about Health Effects/Risks	attic dust is related to yard contamination is related to Berkeley Pit, Lower Area One, etc. I don't see where you look at all of this as combined and what's going to happen. That concerns me.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Greb	Lee	Butte, MT	Resident - Butte	70.85	Technical	Residential Metals	Attic and/or Interior Dust	Characterization	Why are you not going to go in and make a survey of all Butte's attics and whatever would collect dust? We live in the dust day after day.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Greb	Lee	Butte, MT	Resident - Butte	70.86	Non-technical	Site-Wide	General Comment	Cost Underestimated	I know it is going to cost more than $66M - I know the government. What really worries me is that you do not prove your point. You are supposed to be scientists, but you just say "this is what we think should be done."
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Storey	Darrel	Butte, MT	Resident - Butte	70.87	Technical	Parrott Tailings/MSD	Extent of Removal	Against Removal	I am the safety consultant for Jordan Construction. I am concerned about the exposure and accident risks to the public if the decision is made to remove the tailings. It will take a long time and there is a potential for accidents and other problems.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Smithham	Jim	Butte, MT	Resident - Butte	70.88	Non-technical	Site-Wide	Redevelopment	Aesthetics	Redevelopment is hampered by the ugliness of the mining legacy. We have a huge opportunity to dramatically improve the aesthetics of our community. We have a tough time selling the community to prospective businesses because of the aesthetics. Keep aesthetics in mind.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Miller	Barbara	Habitat for Humanity	Citizen Group	70.89	Technical	Residential Metals	Attic and/or Interior Dust	Concerned about Health Effects/Risks	We have been working, since 1994, to improve the housing conditions in Butte and SW Montana. Since we have learned about the dangers of attic dust, we have been struggling to identify a response that protects volunteers, Owner/builders, and contractors from the hazards of working around and living with the smelter dust.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Miller	Barbara	Habitat for Humanity	Citizen Group	70.90	Non-technical	Site-Wide	Redevelopment	Funding	We support the BSB notion of a redevelopment trust fund to cover unknown companion costs.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Miller	Barbara	Habitat for Humanity	Citizen Group	70.91	Technical	Residential Metals	Attic and/or Interior Dust	Funding	EPA has underestimated the costs of attic dust cleanups. It would cost $12K to $30K per property. Under EPA's plan there would not be enough money and homeowners would be doomed to paying themselves or going without cleanup.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Miller	Barbara	Habitat for Humanity	Citizen Group	70.92	Technical	Residential Metals	Soils and/or Interior/Attic Dust	For Removal	We support the push to get action levels reduced to a safe level while urging the development of a comprehensive indoor air quality component of the multi-pathway program when the cleanup remedy is fully fleshed out. We also urge EPA to clean up highly contaminated lots where children may be exposed.

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70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Miller	Barbara	Habitat for Humanity	Citizen Group	70.93	Non-technical	Site-Wide	General Comment	Much Work Already Done	We should thank ARCO, BSB, and EPA for their many years of work on this cleanup and we agree much progress has been made, but we urge EPA to continue to work with local government to respond to the needs for a much more aggressive cleanup along the lines BSB officials recommended.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Miller	Barbara	Butte, MT	Resident - Butte	70.94	Technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	I have had to learn for myself about dust remediation during my own remodeling (presents bag of dust from wall). Dust is not just in attics, it is in walls. The dust was tested and the one from the attic had arsenic of 313 ppm and lead of 5,490 ppm.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Miller	Barbara	Butte, MT	Resident - Butte	70.95	Technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	Based on the results, the city came and vacuumed out the dust from the attic and put in the cost of replacing the insulation. We decided to have the walls vacuumed, too. We are two thirds done and it has cost $21K.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Miller	Barbara	Butte, MT	Resident - Butte	70.96	Technical	Residential Metals	Attic and/or Interior Dust	Funding	This type of investment might be worth it if the cost of the home is $60K+, or if health or depression problems plague the household. If done right, there should be some energy savings, too.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Miller	Barbara	Butte, MT	Resident - Butte	70.97	Technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	The current plan only covers attics, but there is fine dust in every joint, crack, seam, hole, vent. The partial plan is not safe. Arsenic in smelter dust is much more toxic than naturally occurring arsenic.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Miller	Barbara	Butte, MT	Resident - Butte	70.98	Non-technical	Site-Wide	Redevelopment	Funding	Redevelopment trust fund is critical element to help with loan guarantees and matching funds for homeowners. We are frustrated saying that we cannot support the plan as it is now.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Parwana	Noorjahan	Butte, MT	Resident - Butte	70.99	Non-technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	EPA's plan seems to be a compromise between citizen health and ARCO's pocketbook. I think that is just a sell out.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Parwana	Noorjahan	Butte, MT	Resident - Butte	70.100	Technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	I unknowingly pulled down my ceiling and was covered with attic dust. For a recent remodeling project, EPA told me to go to the health department. Their solution was to lend me a vacuum cleaner that didn't have any attachments.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Parwana	Noorjahan	Butte, MT	Resident - Butte	70.101	Technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	I had my house resided this summer. There was black everywhere. I had a window replaced and black dust came filtering out.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Parwana	Noorjahan	Butte, MT	Resident - Butte	70.102	Technical	Residential Metals	Soils and/or Interior/Attic Dust	Reclamation needed	I don't have children, so I can't get my yard cleaned up, but there is high lead. There is also lead on the hill behind me where children sled and in the alley, where they play in the dirt (because there is no grassy place to play). This should be taken care of.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Parwana	Noorjahan	Butte, MT	Resident - Butte	70.103	Technical	Surface Water - Storm Water	BMPs	Commenter Opposes	BMP and SMC laws come about through a compromise between people who are concerned for the environment and corporations who want to make sure their bottom dollar is protected. They are not adequate.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Craig	Mary Kay	Butte, MT	Resident - Butte	70.104	Non-technical	Superfund Procedural Issues	Public Involvement	EPA limits public comment	EPA's past behavior gives no confidence that the input of citizens is really wanted. In previous RODs (Warm Springs, Berkeley Pit) EPA did not listen to public comment. EPA ignored thousands of public comments in the responsiveness summaries for those sites. EPA would not allow any public comment on the TCRAs for the BPSOU. Promised review and relevant public involvement are not allowed in the BPSOU proposed plan.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Craig	Mary Kay	Butte, MT	Resident - Butte	70.105	Non-technical	Superfund Procedural Issues	Public Involvement	EPA limits public comment	Technical assistance groups, like TAGs, are a requirement. EPA has made CTEC toothless by threatening to pull their grant if they get out of hand.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Craig	Mary Kay	Butte, MT	Resident - Butte	70.106	Technical	Air Quality	Air Monitoring	Characterization	We have previously requested air quality studies and have been ignored.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Craig	Mary Kay	Butte, MT	Resident - Butte	70.107	Non-technical	Superfund Procedural Issues	Public Involvement	EPA limits public comment	We hear a different opinion from those who work on the cleanup than from ordinary citizens. Citizens who are unpaid to deal with these issues are most important. EPA's responsiveness summary needs to separate these people out. Pea continues to reverence the corporate PRP, ARCO, over the dignity of the human persons who live here and who you work for.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Corbett	Bob	Butte, MT	Resident - Butte	70.108	Technical	Site-Wide	Human Health Risk	Concerned about Health Effects/Risks	Of utmost concern to me are the human health issues that have been uncovered by the Imagine Butte Community Needs Survey. The data show that something is going on with respect to indoor air quality in Butte.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Corbett	Bob	Butte, MT	Resident - Butte	70.109	Technical	Residential Metals	Attic and/or Interior Dust	Pathways	EPA clearly does not understand the infiltration characteristics of old buildings. Dust is everywhere in these buildings and there IS an exposure pathway for indoor air. It is bad science to say otherwise.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Corbett	Bob	Butte, MT	Resident - Butte	70.110	Technical	Residential Metals	Attic and/or Interior Dust	Pathways	Buildings are influenced by a number of factors, some natural and some occupant controlled, which affect the way and the rate that indoor air is replaced by outdoor air.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Corbett	Bob	Butte, MT	Resident - Butte	70.111	Technical	Residential Metals	Attic and/or Interior Dust	Pathways	To assume that deposited dust does not move is folly. The heating system creates a stack effect that can move dust around within a residence. If it is toxic dust, there is a problem.

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70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Corbett	Bob	Butte, MT	Resident - Butte	70.112	Non-technical	Residential Metals	Attic and/or Interior Dust	Pathways	Human nature will thwart any ICs that are planned. People will accidentally themselves out of ignorance or purposely expose themselves doing repairs because they are afraid telling someone will cost them money. Also, poor people are much more likely to use attics or basements for sleeping space. People will not apply for building permits.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Corbett	Bob	Butte, MT	Resident - Butte	70.113	Non-technical	Residential Metals	Attic and/or Interior Dust	Pathways	Even if you could keep people out of their attics, they would still be exposed to contaminants coming from the building envelope. Your plan would essentially abandon these people to their own resources. Butte deserves better.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Bullock	Bill	Pioneer Technical Services	Consultant	70.114	Non-technical	Site-Wide	General Comment	Commenter Supports	I support EPA's preferred plan. It is a good, solid plan. It may not be perfect, but I am very confident that whatever problems may crop up, or will crop up as we finish cleanup, will be solved.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Bullock	Bill	Pioneer Technical Services	Consultant	70.115	Technical	Parrott Tailings/MSD	Extent of Removal	Against Removal	I know from experience that the extent of tailings in the Parrott Tailings area is much greater than assessed in studies. If you want to remove the tailings to clean groundwater, you will have to remove the Civic Center, too.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Bullock	Bill	Pioneer Technical Services	Consultant	70.116	Technical	Parrott Tailings/MSD	Extent of Removal	Against Removal	There has to be a cost/benefit ratio. We can tear up all of the upper Harrison Avenue business district and maybe not get all of the source material. What is the benefit? It is likely that there will be enough waste left in place that ARCO will STILL have to do groundwater treatment in perpetuity.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Zaluski	Marek	MSE	Consultant	70.117	Technical	Parrott Tailings/MSD	Extent of Removal	Commenter needs more information	I do not know whether it is better to remove the tailings or leave them in place because we do not have enough information to make such a multimillion dollar decision.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Zaluski	Marek	MSE	Consultant	70.118	Technical	Parrott Tailings/MSD	Characterization	Inadequate characterization	The site characterization in the FS is inadequate to understand how the groundwater regime behaves, how the contaminant transport happens, and how large how deep is the extent of contamination. More information is needed.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Zaluski	Marek	MSE	Consultant	70.119	Technical	Parrott Tailings/MSD	Characterization	Inadequate characterization	Methods used for characterization of the groundwater are 50 years old. Modern tools exist, like groundwater modeling, transport modeling, geochemical modeling, etc. EPA's GW tech center focused on the lack of data in their review. They did not criticize the technical tools used because they did not want to embarrass the HQ office or others that sent the CDM report as a sufficient source to make the multi-million-dollar decision.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Peoples	Don	MERDI	Business Group	70.120	Non-technical	Site-Wide	Redevelopment	Brownfields	MSE and MERDI have been involved in redevelopment of mining properties for a number of years. We are the prime mover for redevelopment of over 30 acres of Brownfield areas east of As street. The redeveloped property will benefit the entire community - particularly the uptown area.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Peoples	Don	MERDI	Business Group	70.121	Non-technical	Site-Wide	Redevelopment	Brownfields	Taking on the abandoned property was a wise decision. It is only the beginning of a larger development that will improve the entire area east of AZ street to Continental Drive. This will be attractive and will be an economically viable interest to Butte's uptown area.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Peoples	Don	MERDI	Business Group	70.122	Non-technical	Site-Wide	General Comment	Commenter Supports	MSE and MERDI initially supported the proposed plan with three conditions: protection of public health and safety, ARCO would establish O&M fund, and redevelopment fund would be established by ARCO to serve as fair compensation.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Peoples	Don	MERDI	Business Group	70.123	Non-technical	Site-Wide	Redevelopment	Economic Effects	MSE and MERDI now has reservations about supporting the plan because EPA is restricted by its own regulations to consider restoration and redevelopment and the plan does not contain elements of funding and integration for the future of restoration and redevelopment. We still believe the parties involved can get together and work out a win/win result for Butte.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Stillwell	Chuck	ARCO	PRP	70.124	Technical	Site-Wide	Waste left in place	Commenter Supports	We definitely support most of what the proposed plan says for the solid media elements. We will work with EPA and the county to finish up the reclaimed areas and to address the unreclaimed mine sites.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Stillwell	Chuck	ARCO	PRP	70.125	Technical	Surface Water - Storm Water	BMPs	Supports BMP program	The BMP process has been done and is a tried and true process of cleaning up where you don't have an "end of pipe" discharge. It's hard to understand the system dynamics when you have waste coming in from all over town - so it takes time. Monitoring data show that our approach is working and EPA is simply saying that the process will continue.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Stillwell	Chuck	ARCO	PRP	70.126	Technical	Surface Water - Storm Water	Storm Water Treatment	Commenter Opposes	What we don't agree with is that, when it is all said and done, if the BMP process doesn't work, we build a treatment plant to do the final work. The BMP process is going to work.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Corbett	Bob	Butte, MT	Resident - Butte	70.127	Technical	Lower Area One	Conventional Lime Treatment	Commenter Opposes	We believe a lagoon system of treatment is what is needed - not a conventional lime treatment system. Give us a few years to prove that the newly expanded system will work.

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70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Brick	Chris	Clark Fork Coalition	Citizen Group	70.129	Technical	Parrott Tailings/MSD	Extent of Removal	Removal of Accessible Wastes	Data are inadequate, but a decision must be made. CFC supports removal of accessible wastes from channel. Treatment of GW will still be needed, but will be lessened.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Brick	Chris	Clark Fork Coalition	Citizen Group	70.130	Technical	Residential Metals	Multipathway Lead Abatement Program	Supports Lead Program	Glad to hear about multi-pathway approach for lead, arsenic, and mercury vapors. This is excellent way to build current abatement program. When you are testing for the multi-pathway approach, you could also reevaluate for potential migration pathways of dust from wall spaces and from attics.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Brick	Chris	Clark Fork Coalition	Citizen Group	70.131	Non-technical	Site-Wide	Redevelopment	Funding	It is clear that money is needed for redevelopment. I hope it is not held hostage as a tradeoff between having a really comprehensive cleanup and having this redevelopment money. Butte needs both.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Magruder	Ian	CTEC	Citizen Group	70.132	Non-technical	Site-Wide	Public Involvement	Public Education/Technical Communication	This is a complex site and it is hard for the average citizen to understand. People should call CTEC for and impartial and objective idea of what's going on.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Magruder	Ian	CTEC	Citizen Group	70.133	Non-technical	Site-Wide	General Comment	Much Work Already Done	A lot of good things have happened with the cleanup. People's exposure from waste piles and storm water runoff has been lessened. We are here to keep things moving in a positive direction and bring about the best end to this process.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Magruder	Ian	CTEC	Citizen Group	70.134	Technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	CTEC believes that there is a proven exposure pathway and that the dust should be cleaned up in all areas of people's houses.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Magruder	Ian	CTEC	Citizen Group	70.135	Technical	Site-Wide	Human Health Risk	Action Levels	Action levels are too high. 1 in 20 Butte kids is too high to have elevated lead levels. 1 in 10,000 is too high for the cancer rate.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Magruder	Ian	CTEC	Citizen Group	70.136	Technical	Site-Wide	General Comment	Cost Underestimated	The funding was only been costed out for 100 years. It needs to be forever.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Magruder	Ian	CTEC	Citizen Group	70.137	Technical	Parrott Tailings/MSD	Extent of Removal	For Removal	CTEC believes that the Parrot tailings should be removed, because there is not enough data to prove that they should be left in place.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Magruder	Ian	CTEC	Citizen Group	70.138	Non-technical	Site-Wide	General Comment	Commenter Opposes	We think the plan is too rigid. There are good and bad aspects of the plan and the public should be allowed to vote on individual components and create a better overall plan.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Magruder	Ian	CTEC	Citizen Group	70.139	Non-technical	Site-Wide	Redevelopment	Land Use	We hope the final decision pursues a cleanup remedy which fosters redevelopment beyond an 18-inch cap with fences around it.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Magruder	Ian	CTEC	Citizen Group	70.140	Non-technical	Superfund Procedural Issues	Public Involvement	EPA limits public comment	The public believes that EPA will not listen to them. This is EPA's chance to prove otherwise. Have more public meetings. One meeting doesn't do justice to 20 years of bringing about a Proposed Plan.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	McCarthy	Dave	ARCO	PRP	70.141	Technical	Lower Area One	Conventional Lime Treatment	Commenter Opposes	No rationale for EPA's selection of conventional lime treatment. The lagoons are better for many reasons, and we have long-term O&M data to prove it. We can share the data with anyone
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	McCarthy	Dave	ARCO	PRP	70.142	Technical	Lower Area One	Conventional Lime Treatment	Commenter Opposes	The lagoon system will have less sludge to deal with than the conventional lime treatment system.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	McCarthy	Dave	ARCO	PRP	70.143	Non-technical	Lower Area One	Treatment Lagoons	Aesthetics	The lagoon system will be much more aesthetically pleasing than a conventional lime treatment system.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	McCarthy	Dave	ARCO	PRP	70.144	Technical	Lower Area One	Conventional Lime Treatment	Commenter Opposes	The lagoon system will meet the most stringent standards for arsenic, cadmium, copper, lead, and zinc. Conventional treatment may not
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	McCarthy	Dave	ARCO	PRP	70.145	Technical	Lower Area One	Conventional Lime Treatment	Commenter Opposes	The lagoon system uses less lime and will not need flocculants or other chemicals needed by the conventional system.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	McCarthy	Dave	ARCO	PRP	70.146	Technical	Lower Area One	Conventional Lime Treatment	Commenter Opposes	The lagoon system is better able to deal with upsets than conventional treatment, given the large size and retention time.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	McCarthy	Dave	ARCO	PRP	70.147	Technical	Lower Area One	Conventional Lime Treatment	Commenter Opposes	The lagoon system is less expensive than conventional treatment.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Bruner	Lee	Butte, MT	Resident - Butte	70.148	Non-technical	Parrott Tailings/MSD	Extent of Removal	Against Removal	I run a 90-year old business on Harrison Ave, next to the Storm Drain. There are tailings under the building, under the parking lot, and under the streets around us. They do not bother us. We are separated by asphalt or concrete.
70	25-Jan-05	public mtg transcript	Before the EPA Public Meeting on the Proposed Plan for the BPSOU Cleanup	Bruner	Lee	Butte, MT	Resident - Butte	70.149	Non-technical	Parrott Tailings/MSD	Extent of Removal	Against Removal	Removal of the tailings would be a major disruption to our business. All for some hypothetical ideas that things might get better. We don't want our business torn up and disrupted just on the chance that things might get better way out in the future.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Babb	Paul	Chief Executive, BSB	PRP	71.1	Non-technical	Site-Wide	ARCO/BSB Agreement	General Comment	BSB took a positive, proactive approach and prepared its own version of what we wanted to see in EPA's preferred remedy. It was laid out in great detail and approved by the council of commissioners in October 2004.

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71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Babb	Paul	Chief Executive, BSB	PRP	71.2	Non-technical	Site-Wide	ARCO/BSB Agreement	General Comment	BSB entered into preliminary negotiations with ARCO to achieve a preliminary understanding of our roles under the ROD. We presented a proposed settlement sheet to the council of commissioners (they will vote on March 23). It is our intention that the alternative assurances from ARCO will complement EPA's remedy.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Babb	Paul	Chief Executive, BSB	PRP	71.3	Technical	Site-Wide	ARCO/BSB Agreement	General Comment	Three critical programs were obtained in these negotiations: continuation of the lead poisoning prevention program (including attic dust), long-term capitol improvement program to repair/replace all municipal storm water systems in the BPSOU, and a significant redevelopment trust fund to assist with the impacts of leaving waste in place.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Babb	Paul	Chief Executive, BSB	PRP	71.4	Technical	Site-Wide	ARCO/BSB Agreement	General Comment	Overall BSB believes EPA's preferred remedy is a positive step in many right directions and is consistent in many ways with the BSB position. We urge EPA to consider, and reconsider, the details of our proposal.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Babb	Paul	Chief Executive, BSB	PRP	71.5	Technical	Residential Metals	Multipathway Lead Abatement Program	BSB responsible for program or O&M	BSB believes continuation of the multi-pathway lead program is critical and is ready, willing, and able to implement any multi-pathway programmatic approach required by the ROD to address lead, arsenic, and mercury. These contaminants need to be addressed in outside yards and indoor living areas.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Babb	Paul	Chief Executive, BSB	PRP	71.6	Technical	Surface Water - Storm Water	BMPs	Commenter Opposes	BMPs are only part of the solution. Seeking funding from ARCO for a long-term capital improvement system to repair and replace the municipal storm water systems in the OU.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Babb	Paul	Chief Executive, BSB	PRP	71.7	Technical	Lower Area One	Treatment Lagoons	Community Acceptance	Five criteria provided earlier to EPA must be met, including establishment of a trust fund to operate, maintain, and monitor the facilities as long as required. Lagoon system may meet the five criteria, but ARCO needs to prove it to the county
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Babb	Paul	Chief Executive, BSB	PRP	71.8	Technical	Parrott Tailings/MSD	Extent of Removal	Community Acceptance	Six criteria for EPA to meet were provided earlier by the county. This includes a trust fund for operation, maintenance, and management of remedies.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Babb	Paul	Chief Executive, BSB	PRP	71.9	Technical	Site-Wide	Waste left in place	Commenter Supports	The county supports the waste-in-place remedy because we are confident that we can secure a meaningful redevelopment trust fund through our negotiations with ARCO
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Babb	Paul	Chief Executive, BSB	PRP	71.10	Technical	Site-Wide	Redevelopment	Brownfields	The county requests that EPA establish in the ROD a high priority form Brownfields grants and permanently station a Brownfields expert in the Butte EPA office.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Babb	Paul	Chief Executive, BSB	PRP	71.11	Non-technical	Site-Wide	NRDP	Funding	The county requests that any resource damages which occurred in Butte be specifically earmarked for restoration projects in Butte and Butte alone.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Ray	Dr. John W.	Butte, MT	Resident - Butte	71.12	Non-technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	EPA has nine criteria for evaluating a remedy, but there is a higher criterion that assumes these nine. Because the purpose of government is to achieve justice in society, justice, then, is the overriding criterion. Government exists to take care of the poor and injured. The rich and strong can better take care of themselves.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Ray	Dr. John W.	Butte, MT	Resident - Butte	71.13	Non-technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	Various definitions of the word "justice" provided.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Ray	Dr. John W.	Butte, MT	Resident - Butte	71.14	Non-technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	People have a right to a clean and healthy environment because it is part of human dignity. One cannot have dignity in a degraded, polluted environment.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Ray	Dr. John W.	Butte, MT	Resident - Butte	71.15	Non-technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	A clean and healthy natural environment is guaranteed in the Montana Constitution. It is not in the National Constitution, but is assumed by many acts. Without it, we do not have justice.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Ray	Dr. John W.	Butte, MT	Resident - Butte	71.16	Non-technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	The poorest citizens live in the BPSOU. As long as they bear a disproportionate toxic burden, no remedy can be accepted.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Ray	Dr. John W.	Butte, MT	Resident - Butte	71.17	Non-technical	Site-wide	Environmental Justice	EPA did not account for Environmental Justice	Because there are toxics present and illnesses that could have been caused by the toxics, EPA should use the precautionary principle to address them. EPA has done this in the past - when lead was banned from gasoline. The poor are the least able to tolerate these toxics and justice demands that they are protected.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Ray	Dr. John W.	Butte, MT	Resident - Butte	71.18	Non-technical	Site-wide	Environmental Justice	EPA did not account for Environmental Justice	The whole notion of attic dust is a misnomer. It should be indoor dust. It is everywhere inside the homes. It is very bioavailable and affects the poor greatly.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Bullock	Robin	ARCO	PRP	71.19	Non-technical	Site-Wide	General Comment	Commenter Supports	Atlantic Richfield is pleased to support the proposed plan. It's time to move forward and complete our obligations that we've had established here and set forth for so long. We do have two exceptions to our support of the plan.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Bullock	Robin	ARCO	PRP	71.20	Technical	Lower Area One	Treatment Lagoons	Commenter Supports	The first exception is the wetlands lagoon system, which we believe is a better system than the conventional lime treatment specified in the plan. It is better from a management and aesthetics standpoint.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Bullock	Robin	ARCO	PRP	71.21	Technical	Residential Metals	Multipathway Lead Abatement Program	Supports Lead Program	The second exception is that we support the multi-pathway approach over a reasonable period of time. A long-term approach is a mutual benefit which is realized to the citizens of Butte.

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71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Bullock	Robin	ARCO	PRP	71.22	Technical	Parrott Tailings/MSD	NRDP	Technical record	The basic premise of the outstanding NRD claim is very consistent with what the Proposed Plan lays out. It is stated that they hoped that the PP would keep the Parrott Tailings in place, and that's what caused the residual claim to be what it was as far as restoration activities.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Bullock	Robin	ARCO	PRP	71.23	Non-technical	Site-Wide	General Comment	Commenter Supports	We believe the PP is consistent with other remedies in the Basin, and with the BSB/Atlantic Richfield term sheet.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Magruder	Ian	CTEC	Citizen Group	71.24	Technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	CTEC has prepared a paper that details an approach to abatement. It includes some elements in BSB's plan as well as some new ones. CTEC believes it is imperative to remove attic dust, both from a health perspective and because of the stigma that will be associated with uncleaned houses.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Magruder	Ian	CTEC	Citizen Group	71.25	Technical	Parrott Tailings/MSD	Extent of Removal	Commenter needs more information	Not enough information. In the absence of further information, CTEC would like the tailings to be removed.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Magruder	Ian	CTEC	Citizen Group	71.26	Technical	Site-Wide	Human Health Risk	Action Levels	Lead remedial goals need to be evaluated to incorporate the local presence of lead-based paint, higher levels than the national average in drinking water, and the presence of attic dust and other indoor contaminated dust.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Magruder	Ian	CTEC	Citizen Group	71.27	Technical	Site-Wide	Human Health Risk	Action Levels	CTEC believes that the arsenic action levels need to be reevaluated. The current remedial goal is too high.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Daley	Fritz	Butte, MT	Resident - Butte	71.28	Non-technical	Site-Wide	General Comment	Commenter Opposes	EPA, DEQ, and NRD have failed the citizens of Butte (as well as the entire Pacific Northwest Region). Their cleanup approach is a band aid and aspirin approach when what we need is a major reconstructive surgery approach.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Daley	Fritz	Butte, MT	Resident - Butte	71.29	Technical	Parrott Tailings/MSD	Extent of Removal	For Removal	My main focus has always been the cleanup of Butte's portion of Silver Bow Creek. EPA's decision will eventually lead to recontamination of the creek and will results in fish kills in the Clark Fork and millions of dollars of cleanup in the future.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Daley	Fritz	Butte, MT	Resident - Butte	71.30	Technical	Lower Area One	Conventional Lime Treatment	Commenter Supports	A conventional lime treatment plant is preferable to the current treatment lagoons.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Daley	Fritz	Butte, MT	Resident - Butte	71.31	Non-technical	Parrott Tailings/MSD	Extent of Removal	For Removal	I find it unbelievable that EPA would propose cleaning our creek to a lower standard than the rest of the creek. That's wrong. You find it essential to remove the tailings from Milltown Dam, yet you are not going to remove them from Butte. They are the same tailings. If they are toxic in Missoula, they are toxic in Butte.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Daley	Fritz	Butte, MT	Resident - Butte	71.32	Technical	Parrott Tailings/MSD	General Comment	Clark Fork River Headwaters/Downstream Recontamination	*I'd like to see the water that used to be in Silver Bow Creek, and* that's in Dixie Creek and that's in Yankee Doodle Creek, diverted in a pipeline and placed into Silver Bow Creek. It's not the Metro Storm Drain - call it what you want, but it's the Silver Bow Creek and it should be reestablished as it should be.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Corbett	Bob	Butte, MT	Resident - Butte	71.33	Technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	How is environmental justice embodied in the plan?
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Corbett	Bob	Butte, MT	Resident - Butte	71.34	Technical	Superfund Procedural Issues	Public Involvement	EPA limits public comment	Why did EPA not do more to involve the citizens of Butte when it became clear they were not participating in the comment and review process?
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Corbett	Bob	Butte, MT	Resident - Butte	71.35	Non-technical	Residential Metals	Attic and/or Interior Dust	Funding	Who should bear the cost of cleanup in the homeowner decides to remodel or sell his home to someone who wished to remodel?
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Corbett	Bob	Butte, MT	Resident - Butte	71.36	Non-technical	Residential Metals	Institutional controls	General Comment	What are the institutional controls you would impose on homeowners?
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Corbett	Bob	Butte, MT	Resident - Butte	71.37	Technical	Site-Wide	Human Health Risk	Action Levels	Why is an action level of 250 mg/kg clean enough when it is higher at other sites?
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Corbett	Bob	Butte, MT	Resident - Butte	71.38	Technical	Site-Wide	General Comment	Out of scope	Why did the original Anaconda Stack Plume OU not extend further to include at least the BPSOU?
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Corbett	Bob	Butte, MT	Resident - Butte	71.39	Technical	Site-Wide	Human Health Risk	Action Levels	Why is Region 8's historical record of arsenic action levels so much higher than in other parts of the country?
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	McDonald	Mary Jo	Butte, MT	Resident - Butte	71.40	Non-technical	Superfund Procedural Issues	Public Meeting	Public involvement at Public Meeting	I am sorry there are not more people here tonight. I know that EPA did a lot of advertising and I appreciate that. I think it is wonderful on your part that you did that.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	McDonald	Mary Jo	Butte, MT	Resident - Butte	71.41	Non-technical	Site-Wide	Human Health Risk	Concerned about Health Effects/Risks	It is sad that after 25 years of investigation, EPA admits that we don't know if toxics left my mining and smelting in this community are making people ill. Why hasn't the community health department done the studies already? I am tired of hearing that we didn't have the money.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	McDonald	Mary Jo	Butte, MT	Resident - Butte	71.42	Non-technical	Residential Metals	Attic and/or Interior Dust	Timeframe	We have done less than what the EPA mission states. How many people here think that 30 years is a reasonable time frame for cleaning up indoor dust and yards? That's not an aggressive remedy to protect people in this community.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	McDonald	Mary Jo	Butte, MT	Resident - Butte	71.43	Non-technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	Companies have reaped great rewards on the backs of the people of Butte and it's time that these same companies and the government of our city step up to the plate and say "We will do better for the community". It should happen in much less time than 30 years.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	McDonald	Mary Jo	Butte, MT	Resident - Butte	71.44	Non-technical	Site-Wide	General Comment	Commenter Opposes	If one person contracts a disease because of toxics left in place and dies from that, isn't that one too many? Think about your own family...
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	McDonald	Mary Jo	Butte, MT	Resident - Butte	71.45	Non-technical	Parrott Tailings/MSD	Extent of Removal	For Removal	It is the Butte-Silver Bow Creek, not the Metro Storm Drain, and the citizens of Butte need to reclaim it as our Silver Bow Creek (implies for removal)

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71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Casick	Matt	Butte, MT	Resident - Butte	71.46	Non-technical	Superfund Procedural Issues	Public Meeting	Public involvement at Public Meeting	Are any members of the Butte-Silver Bow /ARCO committee here tonight? And if so, I'd like to have them make a comment and be subject to some questioning.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Maxwell	Lawrence	Butte, MT	Resident - Butte	71.47	Non-technical	Site-Wide	General Comment	Commenter Opposes	The proposed plan does not give me confidence that it is both proactive and thorough and that people would feel comfortable raising their children. The results of the cleanup will affect the technical, economic, medical, and social life of this area for a long time.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Lindh	Janet	Butte, MT	Resident - Butte	71.48	Technical	Site-Wide	Human Health Risk	Concerned about Health Effects/Risks	The majority of our schools are in this cleanup area, and I have yet to hear anybody talk about the environmental concerns affecting these children.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Lindh	Janet	Butte, MT	Resident - Butte	71.49	Technical	Site-Wide	General Comment	Commenter Opposes	Butte deserves the same attention and effort given to cleanups in other parts of the state. We are counting on EPA to treat us fairly, to work with the other industries, and to restore positive things for us so that we can attract more business so that our future will be better.
71	15-Mar-05	public mtg transcript	Before the EPA - Second Public Meeting for the Proposed Plan for the BPSOU Cleanup	Maxwell	Bill	Butte, MT	Resident - Butte	71.50	Technical	Residential Metals	Attic and/or Interior Dust	Concerned about Health Effects/Risks	I recently had my old home rewired and insulated. Neither I nor my contractor had any idea that the dust was hazardous. This is inexcusable. It would have been easy to fix.
73	15-Feb-05	Blue, 2-comment postcard	Extra comment on Blue, 2-comment postcard	Corbett	David	Fayetteville, NY	Non-Resident	73.8	Non-technical	Residential Metals	Attic and/or Interior Dust	Concerned about Health Effects/Risks	Worked for Anaconda Environmental Eng Dept for 11 years and environmental consultant for 15 years (some with EPA). Very familiar with issues facing Butte. Human health issues arising from attic dust have not been addressed. Consider it carefully.
73	1-Feb-05	Blue, 2-comment postcard	Extra comment on Blue, 2-comment postcard	Breen	Lucy	Butte, MT	Resident - Butte	73.10	Non-technical	Residential Metals	Attic and/or Interior Dust	Concerned about Health Effects/Risks	Just relocated to Butte with 10-year old son. Live in very old house with floor furnace that is very dusty. Worried about health effects from dust.
74	21-Mar-05	email letter	When my (birth) family moved to Butte approximately 50 years ago...	Dockter	Anna	Butte, MT	Resident - Butte	74.1	non-technical	Site-wide	Human Health Risk	Concerned about Health Effects/Risks	Born and raised in Butte. Believe that large amounts of toxic waste are a direct threat to human health. Mother died of cancer and husband has cancer. Other illnesses are very prevalent.
74	21-Mar-05	email letter	When my (birth) family moved to Butte approximately 50 years ago...	Dockter	Anna	Butte, MT	Resident - Butte	74.2	Technical	Solid Media/Waste Left in Place	Reclamation	Protectiveness of human health and the environment	Caps are only a band aid solution. Butte needs a permanent remedy. Human health is overriding concern but businesses suffer from people not wanting to relocate.
74	21-Mar-05	email letter	When my (birth) family moved to Butte approximately 50 years ago...	Dockter	Anna	Butte, MT	Resident - Butte	74.3	Non-technical	Site-wide	General Comment	Concerned about Health Effects/Risks	Also concerned about mercury seeping into streets, arsenic in attics, and the Berkeley Pit.
75	22-Mar-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Angel	Ellen	Walkerville, MT	Resident - Walkerville	75.97	Non-technical	Residential Metals	Attic and/or Interior Dust	Concerned about Health Effects/Risks	"Concerned about attic dust!"
75	22-Mar-05	Blue, 4-conment large postcard	Extra comment on Blue, 4-comment postcard	Arnold	Carol	Deer Lodge, MT	Non-Resident	75.102	Non-technical	Solid Media/Waste Left in Place	Reclamation	Operations and Maintenance	"Have a provision established for ongoing weed control."
75	21-Mar-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Guidi	Mary	Butte, MT	Resident - Butte	75.118	Non-technical	Residential Metals	Attic and/or Interior Dust	Out of scope	"We had zonolite in attic whose responsible"
75	21-Mar-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Guidi	Albert	Butte, MT	Resident - Butte	75.120	Non-technical	Residential Metals	Attic and/or Interior Dust	Out of scope	"Zone-lite in our attic! Is the company that makes it responsible."
75	15-Mar-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Lindh	Janet	Butte, MT	Resident - Butte	75.139	Non-technical	Site-wide	Extent of Removal	For Removal	"I live in Butte. People making these decisions don't. Please listen and give more attention to removing the Parrott Tailings and attic dust. Make Butte cleaner and safer for the future. Thanx"
75	28-Jan-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Ballenger?	Glenn	Butte, MT	Resident - Butte	75.120	Non-technical	Solid Media/Waste Left in Place	Reclamation	Operations and Maintenance	"To immediately fence contaminated areas to keep vehicles from stirring up dust"
75	31-Jan-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Maxwell	Lawrence?	Butte, MT	Resident - Butte	75.121	Non-technical	Site-wide	Public Involvement	EPA limits public comment	"Listen to the technical review committee. They are a public voice on this issue that has the residential know how needed to offer alternatives. I feel I attended meetings only to have the EPA marginalize our public Input. This must change."
75	10-Feb-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Rawlings?	Orval	Butte, MT	Resident - Butte	75.138	Non-technical	Air Quality	General Comment	Out of scope	"The dust pollution from the crusher and concentrator in Butte"
75	10-Feb-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Waring	George	Butte, MT	Resident - Butte	75.142	Non-technical	Solid Media/Waste Left in Place	Reclamation	Long-Term Effectiveness and Permanence	"Revisit the so-called "caps" these are insufficient"
75	17-Feb-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Minich?	I?	Butte, MT	Resident - Butte	75.166	Non-technical	Residential Metals	Soils and/or Interior/Attic Dust	For Removal	"Clean up all the houses - not just the ones that have children living there."
75	17-Feb-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Costello	Angeline	Butte, MT	Resident - Butte	75.168	Non-technical	Site-wide	Extent of Removal	For Removal	"Butte needs a coon Clean up especially with all that waste that was dumped at one time in the Butte Silverbow Creek from mine/mills of smelters.
75	28-Feb-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Barth	Michael	Butte, MT	Resident - Butte	75.178	Non-technical	Site-wide	Extent of Removal	For Removal	"Remove Parrot Tailings and attic dust"
75	28-Feb-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Stillings?	Nadine	Butte, MT	Resident - Butte	75.179	Non-technical	Solid Media/Waste Left in Place	Reclamation	Reclamation specifications	"Reclamation caps more natural, not hay fields, trees, and rocks"
75	2-Mar-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Mazurek	Byron	Butte, MT	Resident - Butte	75.183	Non-technical	Site-wide	General Comment	Timeframe	"Butte should get a 10 year clean up like Missoula is getting at Milltown Dam"
75	3-Mar-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Phinkll?	Kare?	Butte, MT	Resident - Butte	75.186	Non-technical	Site-wide	General Comment	Timeframe	"within 10 years for cleanup"
75	3-Mar-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Scown	Johanna	Butte, MT	Resident - Butte	75.187	Non-technical	Site-wide	General Comment	Timeframe	"within 10 years for cleanup"
75	3-Mar-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Jensen	Marian	Butte, MT	Resident - Butte	75.189	Non-technical	Parrott Tailings/MSD	Extent of Removal	For Removal	"removal of the Parrot tailings"
75	3-Mar-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Scown	James	Butte, MT	Resident - Butte	75.191	Non-technical	Site-wide	General Comment	Timeframe	"within 10 years for cleanup"
75	3-Mar-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Scown	Patricia	Butte, MT	Resident - Butte	75.192	Non-technical	Site-wide	General Comment	Timeframe	"10 years, not 30 for clean up"
75	4-Mar-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Mazurek	Susan	Butte, MT	Resident - Butte	75.197	Non-technical	Site-wide	General Comment	General Comment	"Butte should not suffer the consequences of negligent environmental protection."
75	4-Mar-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Reamer	Ruth	Butte, MT	Resident - Butte	75.198	Non-technical	Site-wide	General Comment	Timeframe	"30 years in toooo long"

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75	4-Mar-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Reamer	Thomas	Butte, MT	Resident - Butte	75.199	Non-technical	Site-wide	General Comment	Timeframe	"30 years in toooo long"
75	4-Mar-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	McDonough	R.M.	Butte, MT	Resident - Butte	75.200	Non-technical	Site-wide	Unrelated Topic	Out of scope	"Remove hot mix plant (BSB) clean area on So. Mont. St."
75	7-Mar-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Royes	Lisa	Butte, MT	Resident - Butte	75.204	Non-technical	Site-wide	General Comment	Timeframe	"within 10 years for cleanup"
75	7-Mar-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Beavis	Al	Butte, MT	Resident - Butte	75.206	Non-technical	Site-wide	General Comment	Out of scope	"Dust particles, diesel fumes S.G. Berkeley & vapor from pit water"
75	7-Mar-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Wolf	Theodore	Butte, MT	Resident - Butte	75.211	Non-technical	Site-wide	General Comment	Timeframe	"I will be dead in 30 years - please make it quicker"
75	7-Mar-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Johnson	Clara	Butte, MT	Resident - Butte	75.215	Non-technical	Site-wide	General Comment	Timeframe	"30 years is too long a period to spread the cleanup over"
75	9-Mar-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Rawens?	Connie	Butte, MT	Resident - Butte	75.218	Non-technical	Residential Metals	Soils and/or Interior/Attic Dust	Concerned about Health Effects/Risks	"I do not feel the houses in my area have been taken care of properly."
75	9-Mar-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Opie?	Beverly	Butte, MT	Resident - Butte	75.220	Non-technical	Residential Metals	Attic and/or Interior Dust	Libby Precedent	"Do we have another Libby in Butte"
75	9-Mar-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	McDonald	Jim	Butte, MT	Resident - Butte	75.221	Non-technical	Parrott Tailings/MSD	Extent of Removal	For Removal	"Remove the Parrott Tailings"
75	10-Mar-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Dennehey	Laure	Butte, MT	Resident - Butte	75.222	Non-technical	Site-wide	General Comment	Timeframe	"30 years is too long"
75	10-Mar-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Johnston	Carol	Butte, MT	Resident - Butte	75.224	Non-technical	Site-wide	General Comment	Timeframe	"30 years is way too long"
75	14-Apr-05	Blue, 4-comment large postcard	Extra comment on Blue, 4-comment postcard	Malausky	A	Butte, MT	Resident - Butte	75.233	Non-technical	Site-wide	Extent of Removal	For Removal	"the soil pollution in the area, and the acid lake clean-up that is needed"
75	12-Feb-05	White, 4-comment postcard, postage paid	Extra comment on white, 4-comment postcard, postage paid	Stevenson	Kalman	Anaconda, MT	Non-Resident	75.15	Non-technical	Site-wide	General Comment	Out of scope	"We have arsenic-laden dust in attics in houses here in Anaconda. These also should be decontaminated
75	19-Feb-05	White, 4-comment postcard, postage paid	Extra comment on white, 4-comment postcard, postage paid	Viceri	D.L.	Butte, MT	Resident - Butte	75.62	Non-technical	Residential Metals	Attic and/or Interior Dust	Concerned about Health Effects/Risks	"Contaminated dust in areas houses - not just Walkerville"
76	20-Mar-05	email letter	Habitat Letter Comment on Priority Soils	Habitat for Humanity of Southwest Montana		Habitat for Humanity	Citizen Group	76.1	Non-Technical	Site-Wide	Characterization	Funding	Wants funding for testing equipment to be able to identify contamination.
76	20-Mar-05	email letter	Habitat Letter Comment on Priority Soils	Habitat for Humanity of Southwest Montana		Habitat for Humanity	Citizen Group	76.2	Non-Technical	Residential Metals	Attic and/or Interior Dust	Concerned about Health Effects/Risks	Concerned about protection of workers and residents from dust.
77	4-Feb-05	letter	I am writing regarding Butte Priority Soils area.	Parwana	Noorjahan	Butte, MT	Resident - Butte	77.1	Non-Technical	Residential Metals	Attic and/or Interior Dust	Action Levels	The dust cleanup levels are too high
77	4-Feb-05	letter	I am writing regarding Butte Priority Soils area.	Parwana	Noorjahan	Butte, MT	Resident - Butte	77.2	Non-Technical	Parrott Tailings/MSD	Extent of Removal	For Removal	Supports removal of tailings at the highest level possible.
77	4-Feb-05	letter	I am writing regarding Butte Priority Soils area.	Parwana	Noorjahan	Butte, MT	Resident - Butte	77.3	Non-Technical	Site-Wide	Evaluation of NCP Criteria	State Acceptance	EPA ignored MBMG and MDEQ
77	4-Feb-05	letter	I am writing regarding Butte Priority Soils area.	Parwana	Noorjahan	Butte, MT	Resident - Butte	77.4	Non-Technical	Site-Wide	General Comment	Commenter Opposes	EPA chose options to please ARCO
78	18-Jan-05	email letter	It is my understanding that I could write to you with my comments...	McCormick	Jack	Butte, MT	Resident - Butte	78.1	Non-Technical	Site-Wide	General Comment	Commenter Opposes	The plan is poor
78	18-Jan-05	email letter	It is my understanding that I could write to you with my comments...	McCormick	Jack	Butte, MT	Resident - Butte	78.2	Non-Technical	Site-Wide	Extent of Removal	For Removal	All waste should be removed from the hill
78	18-Jan-05	email letter	It is my understanding that I could write to you with my comments...	McCormick	Jack	Butte, MT	Resident - Butte	78.3	Non-Technical	Site-Wide	General Comment	Commenter Opposes	Has right to have the pollution cleaned up
79	4-Jan-05	letter	I am writing this letter to request that the Butte Superfund site...	Bagen	Maggie	Butte, MT	Resident - Butte	79.1	Non-Technical	Site-Wide	Environmental Justice	Economic Effects	Plan hurts low income families; should provide funding for the cleanup
80	23-Jan-05	letter	1. With reference to the Parrot Tailings, et al:	Kujawa, Ph.D., P.E.	Stephan	Butte, MT	Resident - Butte	80.1	Technical	Parrott Tailings/MSD	General Comment	General Comment	Area of concern should be actively leached. Leaching can be accelerated by in-situ oxidation and acid leaching. Pilot testing could prove viability of techniques.
80	23-Jan-05	letter	1. With reference to the Parrot Tailings, et al:	Kujawa, Ph.D., P.E.	Stephan	Butte, MT	Resident - Butte	80.2	Technical	General Comment	Unrelated Topic	Out of scope	Double size of Horseshoe Bend plant and dewater to at least 3900 foot level of the Kelley, and preferably, to bottom of Mt Con. Pit is better dry. Mining could begin again. Sludge could be stockpiled and sold as ferrite source or for wrought iron manufacture.
81	25-Jan-05	letter	I appreciate the opportunity to comment on EPA's Proposed Plan for remediation of the BPSOU - the Butte Hill.	Harrington	Jerry	Butte, MT	Resident - Butte	81.1	Non-technical	Site-Wide	NRDP	Funding	Elected leaders should embrace his recommendations and keep in mind distinction between Remedy (Superfund Cleanup) and Restoration (above and beyond Superfund). NRD funds will not last if Superfund does not cleanup adequately.
81	25-Jan-05	letter	I appreciate the opportunity to comment on EPA's Proposed Plan for remediation of the BPSOU - the Butte Hill.	Harrington	Jerry	Butte, MT	Resident - Butte	81.2	Non-technical	Parrott Tailings/MSD	Extent of Removal	For Removal	EPA view is flawed from cost perspective. Tailings are worst source of contamination and most can and should be removed. MBMG projects beneficial use standards would be attained within several decades, instead of never under current plan.
81	25-Jan-05	letter	I appreciate the opportunity to comment on EPA's Proposed Plan for remediation of the BPSOU - the Butte Hill.	Harrington	Jerry	Butte, MT	Resident - Butte	81.3	Technical	Surface Water - Storm Water	Storm Water Conveyances	Design Criteria	Ditch is very ugly and impediment to economic development. It is also too small to handle flows and threatens downstream reaches. Upstream sites should be cleaned to a level that will allow elimination of the ditch.
81	25-Jan-05	letter	I appreciate the opportunity to comment on EPA's Proposed Plan for remediation of the BPSOU - the Butte Hill.	Harrington	Jerry	Butte, MT	Resident - Butte	81.4	Technical	Surface Water - Storm Water	Storm Water Conveyances	Design Criteria	Re: Missoula Gulch - Storm events above 10-yr threshold will undermine and destroy ditch integrity. Remedy should include planting bottom with aspens, alder, cottonwood, and willow and constructing channel as a more natural streambed (rocks, deadfall, etc.)

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81	25-Jan-05	letter	I appreciate the opportunity to comment on EPA's Proposed Plan for remediation of the BPSOU - the Butte Hill.	Harrington	Jerry	Butte, MT	Resident - Butte	81.5	Non-technical	Site-Wide	General Comment	Economic Effects	Butte Hill is especially in need of cleanup because it is in the midst of urban population and a substantial infrastructure connected to the region. Economic future depends on eliminating the stigma and lingering myths about Superfund and Butte.
82	25-Jan-05	letter	This letter is to comment on your Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit of the Silver Bow Creek/Butte Area Superfund Site.	Corbett	Bob	Butte, MT	Resident - Butte	82.1	Technical	Residential Metals	Attic and/or Interior Dust	Pathways	Very concerned about human health issues in homes. EPA is wrong in saying that there is not a complete exposure pathway for contaminants in Butte homes. The stack effect (see diagram) moves contaminants into and throughout the home.
82	25-Jan-05	letter	This letter is to comment on your Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit of the Silver Bow Creek/Butte Area Superfund Site.	Corbett	Bob	Butte, MT	Resident - Butte	82.2	Technical	Residential Metals	Attic and/or Interior Dust	Environmental Justice	EPA cannot keep people out of their basements or attics for a variety of reasons, including disbelief, mistrust, and poverty. Even if you could, they would still be exposed to toxics in and coming from the building envelope itself. This plan abandons the poorest people who are exposed to the worst contamination.
83	15-Mar-05	email letter	Having moved to Butte some nine years ago, I have followed the Butte Superfund cleanup very closely and watched the intrigue, deal making, work and accomplishments first hand.	Tonc	Vincent	Butte, MT	Resident - Butte	83.1	Non-technical	Site-Wide	General Comment	Long-Term Effectiveness and Permanence	ARCO's only goal is to spend the minimum possible to avoid fines and penalties an to get as much relief from future liabilities as possible. The only supporters of the proposed approach are those who will benefit monetarily. Everyone else is hoping EPA will take the lead to protect them. It is time for EPA to take a leadership role and develop and implement a long lasting and acceptable approach.
83	15-Mar-05	email letter	Having moved to Butte some nine years ago, I have followed the Butte Superfund cleanup very closely and watched the intrigue, deal making, work and accomplishments first hand.	Tonc	Vincent	Butte, MT	Resident - Butte	83.2	Technical	Site-Wide	General Comment	Design Criteria	Program has been flawed for the beginning with the lack of specific defined requirements and standards, established design criteria, or engineering and construction implemented to provide a reasonable assurance of cleanup.
83	15-Mar-05	email letter	Having moved to Butte some nine years ago, I have followed the Butte Superfund cleanup very closely and watched the intrigue, deal making, work and accomplishments first hand.	Tonc	Vincent	Butte, MT	Resident - Butte	83.3	Technical	Surface Water - Storm Water	BMPs	Design Criteria	"The engineering design needs to be based on a PMP and PMF criteria, or other specific event but no less than the 100 yr design event in regard to the basis of engineering approach"
83	15-Mar-05	email letter	Having moved to Butte some nine years ago, I have followed the Butte Superfund cleanup very closely and watched the intrigue, deal making, work and accomplishments first hand.	Tonc	Vincent	Butte, MT	Resident - Butte	83.4	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation specifications	"In the absence of and/or in addition to specific engineering design standards, performance based standards need to be identified and implemented."
83	15-Mar-05	email letter	Having moved to Butte some nine years ago, I have followed the Butte Superfund cleanup very closely and watched the intrigue, deal making, work and accomplishments first hand.	Tonc	Vincent	Butte, MT	Resident - Butte	83.5	Non-technical	Groundwater	General Comment	Restoration	"All contaminated groundwater needs to be actively restored to the best technical level possible."
83	15-Mar-05	email letter	Having moved to Butte some nine years ago, I have followed the Butte Superfund cleanup very closely and watched the intrigue, deal making, work and accomplishments first hand.	Tonc	Vincent	Butte, MT	Resident - Butte	83.6	Technical	Parrott Tailings/MSD	Characterization	Inadequate characterization	"The evaluation, investigation and alternative analysis needs to be completed to a professional high standard on all contaminated groundwater."
83	15-Mar-05	email letter	Having moved to Butte some nine years ago, I have followed the Butte Superfund cleanup very closely and watched the intrigue, deal making, work and accomplishments first hand.	Tonc	Vincent	Butte, MT	Resident - Butte	83.7	Technical	Site-Wide	Extent of Removal	For Removal	"All mill tailings (as defined separately from mine waste) need to be placed in an engineered containment, whose design is based on good engineering standards and for whose performance in monitored."
83	15-Mar-05	email letter	Having moved to Butte some nine years ago, I have followed the Butte Superfund cleanup very closely and watched the intrigue, deal making, work and accomplishments first hand.	Tonc	Vincent	Butte, MT	Resident - Butte	83.8	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation specifications	"All mine tailings need to be covered with an engineered cap specific and unique to the site utilizing a minimum 100 year design life."
83	15-Mar-05	email letter	Having moved to Butte some nine years ago, I have followed the Butte Superfund cleanup very closely and watched the intrigue, deal making, work and accomplishments first hand.	Tonc	Vincent	Butte, MT	Resident - Butte	83.9	Technical	Site-Wide	Extent of Removal	Waste in contact with Groundwater	"All mill tailings and mine waste need to be removed from contact with surface and ground water."
83	15-Mar-05	email letter	Having moved to Butte some nine years ago, I have followed the Butte Superfund cleanup very closely and watched the intrigue, deal making, work and accomplishments first hand.	Tonc	Vincent	Butte, MT	Resident - Butte	83.10	Technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	"All known contaminated houses need to be cleaned up immediately. All expected contaminated houses need to be evaluated immediately."
83	15-Mar-05	email letter	Having moved to Butte some nine years ago, I have followed the Butte Superfund cleanup very closely and watched the intrigue, deal making, work and accomplishments first hand.	Tonc	Vincent	Butte, MT	Resident - Butte	83.11	Non-technical	Site-Wide	Institutional Controls	Implementability and Effectiveness	"Butte/Silver Bow needs to develop and implement institutional controls through their construction permitting process in regard to homes, structures, and property on all permits."
83	15-Mar-05	email letter	Having moved to Butte some nine years ago, I have followed the Butte Superfund cleanup very closely and watched the intrigue, deal making, work and accomplishments first hand.	Tonc	Vincent	Butte, MT	Resident - Butte	83.12	Non-technical	Site-Wide	Redevelopment	Land Use	Butte/Silver Bow needs to develop and implement local government reclamation standards and regulations that include and pertain to historic, current, and future mining, milling, and ancillary property."
83	15-Mar-05	email letter	Having moved to Butte some nine years ago, I have followed the Butte Superfund cleanup very closely and watched the intrigue, deal making, work and accomplishments first hand.	Tonc	Vincent	Butte, MT	Resident - Butte	83.13	Technical	Site-Wide	ARCO/BSB Agreement	General Comment	"The Butte/Silver Bow/ARCO agreement needs to be modified to exclude the first five years after future reclamation and cleanup of a site, or date of agreement, with ARCO being liable and fully responsible for immediate and near term fixes, i.e. they can't buy their way out of poor design and past work.
84	27-Jan-05	letter	The purpose of this letter is to convey to you what I had originally intended to state in my oral testimony on January 25	Kambich	James	MERDI	Business Group	84.1	Non-technical	Site-Wide	General Comment	Commenter Supports	I support the EPA plan along with Butte Silver Bow's position paper.
84	27-Jan-05	letter	The purpose of this letter is to convey to you what I had originally intended to state in my oral testimony on January 25	Kambich	James	MERDI	Business Group	84.2	Technical	Parrott Tailings/MSD	Extent of Removal	Against Removal	Waste in place is not new. So long as the Parrot tailings are in place and not a public health risk, it makes sense to leave them in place. Risks of moving the wastes to a new spot are extremely high.
84	27-Jan-05	letter	The purpose of this letter is to convey to you what I had originally intended to state in my oral testimony on January 25	Kambich	James	MERDI	Business Group	84.3	Technical	Lower Area One	Treatment Lagoons	Commenter Supports	As far as the lagoons and treatment position at LAO; if lagoons prove out and as long as we can make it as lush as possible and be maintained properly, let's move forward.

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84	27-Jan-05	letter	The purpose of this letter is to convey to you what I had originally intended to state in my oral testimony on January 25	Kambich	James	MERDI	Business Group	84.4	Non-technical	Site-Wide	Redevelopment	Funding	I support a redevelopment trust fund to be administered by the citizens of Butte-Silver Bow for storm draining improvements and the lead and attic programs.
84	27-Jan-05	letter	The purpose of this letter is to convey to you what I had originally intended to state in my oral testimony on January 25	Kambich	James	MERDI	Business Group	84.5	Non-technical	Site-Wide	Redevelopment	Specific Comment	With EPA (especially Sara Sparks), MERDI has made real progress on redevelopment in Butte using private dollars - no help from NRD.
85	14-Mar-05	letter	The Clark Fork Coalition, representing over a thousand members within the Clark Fork watershed, presents these comments	Brick	Christine	Clark Fork Coalition	Citizen Group	85.1	Technical	Lower Area One	Conventional Lime Treatment	Commenter Supports	A conventional lime treatment plant is preferable to the current treatment lagoons. Long-term performance of lagoons is unproven, and there is a potential for failure during extended cold weather and major runoff events.
85	14-Mar-05	letter	The Clark Fork Coalition, representing over a thousand members within the Clark Fork watershed, presents these comments	Brick	Christine	Clark Fork Coalition	Citizen Group	85.2	Technical	Solid Media/Waste Left in Place	BRES	Supports BRES program	We support the use of BRES, but think vegetation should be upgraded to be more diverse. Focus should be on non-invasive species with binding root mass. Provision for localized areas with more fill depth. In areas where caps erode, option should exist for waste removal.
85	14-Mar-05	letter	The Clark Fork Coalition, representing over a thousand members within the Clark Fork watershed, presents these comments	Brick	Christine	Clark Fork Coalition	Citizen Group	85.3	Technical	Surface Water - Storm Water	Storm Water Conveyances	Design Criteria	BMPs and source control should be implemented ASAP, but emphasis should be on removal. Any structures for routing must be built to 100-yr specs.
85	14-Mar-05	letter	The Clark Fork Coalition, representing over a thousand members within the Clark Fork watershed, presents these comments	Brick	Christine	Clark Fork Coalition	Citizen Group	85.4	Technical	Surface Water - General	In-Stream Flow Augmentation	Commenter Opposes	Clean water from Silver Lake should not be used to dilute contaminated surface water. This does nothing to reduce the TMDL.
85	14-Mar-05	letter	The Clark Fork Coalition, representing over a thousand members within the Clark Fork watershed, presents these comments	Brick	Christine	Clark Fork Coalition	Citizen Group	85.5	Technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	Plan is not protective. Extent of problem has not been fully investigated and risks are unknown. Trigger level is too low, given that site is in urban area. Exposure pathway may be seriously underestimated, due to older, leaky homes. Cleanup should happen in 5-10 years - not 30 as proposed.
85	14-Mar-05	letter	The Clark Fork Coalition, representing over a thousand members within the Clark Fork watershed, presents these comments	Brick	Christine	Clark Fork Coalition	Citizen Group	85.6	Technical	Groundwater	General Comment	Commenter Opposes	Plan is inadequate for long-term protectiveness, permanence, and reduction of toxicity, mobility, or volume of waste. Too many uncertainties to conclude that the aquifer cannot be remediated in a reasonable time frame. Delineation of the flow regime and transport of contaminants is inadequate for selecting a permanent remedy. Based on assumptions. Estimate of travel times is simplistic. Obtaining adequate additional data would not be overly challenging or costly. Without that data, we recommend removing as much waste as possible.
86	25-Mar-05	letter	As a member of Butte's business community I am writing you to provide my view of the EPA Proposed Plan for	Thames (?)	none	Butte, MT	Resident - Butte	86.1	Non-technical	Site-Wide	General Comment	Commenter Supports	I support the Proposed Plan because I understand it requires the final cleanup actions that leave our community safe for people. I approve of the past cleanups, especially those that have involved redevelopment. I appreciate EPA encouraging redevelopment and historic preservation where they can.
86	25-Mar-05	letter	As a member of Butte's business community I am writing you to provide my view of the EPA Proposed Plan for	Thames (?)	none	Butte, MT	Resident - Butte	86.2	Non-technical	Site-Wide	ARCO/BSB Agreement	General Comment	I know the agreement is not perfect, but the time is now to complete a settlement that compliments the EPA remedy in a manner that provides funding and benefits. Those include redevelopment, historic preservation, and a multi-pathway lead and arsenic program for homes in uptown Butte.
87	21-Mar-05	letter	I am writing to express my support for EPA's cleanup proposal for the Butte Priority Soils Operable Unit, please include this letter with EPA's public comment record.	Harrington	Gary	Butte, MT	Resident - Butte	87.1	Non-technical	Site-Wide	General Comment	Commenter Supports	I feel this proposal is reasonable to resolve this problem that has overshadowed Butte for too long. Additional study or delay seems inappropriate after the years that have already been devoted by all parties involved. It is time to move forward with actions and allow the community to devote its time and energy to the future.
88	15-Mar-05	letter	The U.S. Fish and Wildlife Service has reviewed the Superfund Program Cleanup Proposal, Butte Priority Soils Operable Unit of the Silver Bow Creek/Butte Area Superfund site and I am providing the following technical assistance comments.	Wilson	Mark	U.S. Fish and Wildlife Service	Agency	88.1	Technical	Site-Wide	Characterization	Wetlands	Only the Step 1 (Wetland Delineation and Functional Evaluation) of the 4-step plan has been completed. ARCO needs to evaluate remedy-related impacts. The analysis of wetland impacts and a more refined wetland mapping effort should be conducted in a combined Step 2/3, during remedial design, prior to remedy implementation. Confirmation of impacts would be done after completion.
89	21-Mar-05	email letter	For as long as I have been involved in Silber Bow County, nearly 13 years, "waste in place" has been the EPA/ARCO mantra with respect to the Superfund cleanup on the Butte Hill.	Keck	Tom	Northern Rockies Soil and Water	Consultant	89.1	Non-technical	Site-Wide	Waste left in place	Protectiveness of human health and the environment	Policy has never made sense in a urban area, but has been entrenched so opposing it seems futile.
89	21-Mar-05	email letter	For as long as I have been involved in Silber Bow County, nearly 13 years, "waste in place" has been the EPA/ARCO mantra with respect to the Superfund cleanup on the Butte Hill.	Keck	Tom	Northern Rockies Soil and Water	Consultant	89.2	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation specifications	Past practice of using coarse granitic sand on unstable slopes is like sugar sitting on the hill. It will fail. Current practice of using Tertiary fill as cover soil appears to be a big improvement.
89	21-Mar-05	email letter	For as long as I have been involved in Silber Bow County, nearly 13 years, "waste in place" has been the EPA/ARCO mantra with respect to the Superfund cleanup on the Butte Hill.	Keck	Tom	Northern Rockies Soil and Water	Consultant	89.3	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation specifications	Reclamation goal should be stable-diverse-native based reclamation, not the unstable monoculture of non-native plant species seen on the Hill.
89	21-Mar-05	email letter	For as long as I have been involved in Silber Bow County, nearly 13 years, "waste in place" has been the EPA/ARCO mantra with respect to the Superfund cleanup on the Butte Hill.	Keck	Tom	Northern Rockies Soil and Water	Consultant	89.4	Non-technical	Solid Media/Waste Left in Place	Long-term Operations and Maintenance	Funding	Final solution must provide substantial funding for Butte to cover the tremendous future liability costs of maintaining and ultimately replacing failed reclamation caps.
89	21-Mar-05	email letter	For as long as I have been involved in Silber Bow County, nearly 13 years, "waste in place" has been the EPA/ARCO mantra with respect to the Superfund cleanup on the Butte Hill.	Keck	Tom	Northern Rockies Soil and Water	Consultant	89.5	Non-technical	Solid Media/Waste Left in Place	Long-term Operations and Maintenance	BSB responsible for program or O&M	Final solution must ensure local control

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Document ID No.	Date	Type	Title/Opening Sentence	Last Name	First Name	Location/ Affiliation	Sector	Comment ID.	Technical/ Non-Technical/ Legal	Tier I Topic	Tier II Topic	Tier III Topic	Brief Comment Description
89	21-Mar-05	email letter	For as long as I have been involved in Silber Bow County, nearly 13 years, "waste in place" has been the EPA/ARCO mantra with respect to the Superfund cleanup on the Butte Hill.	Keck	Tom	Northern Rockies Soil and Water	Consultant	89.6	Technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	Follow recommendations set forth by Imagine Butte: lower action levels, faster cleanup time frame, indoor air quality program, fully-funded role for local government.
90	20-Mar-05	email letter	The Butte-Silver Bow County Council of Commissioners appears poised to approve the Settlement Term Sheet negotiated by county staff with Atlantic Richfield	Craig	Mary Kay	Butte, MT	Resident - Butte	90.1	Non-technical	Site-Wide	Environmental Justice	Evaluation/Weighing of Cost	EPA must not massage its cleanup decision to reflect a deal negotiated between the county and ARCO, but must stay with the integrity of making a cleanup occur that will be in the best interests of the poor who live within the Superfund site.
90	20-Mar-05	email letter	The Butte-Silver Bow County Council of Commissioners appears poised to approve the Settlement Term Sheet negotiated by county staff with Atlantic Richfield	Craig	Mary Kay	Butte, MT	Resident - Butte	90.2	Non-technical	Site-Wide	Environmental Justice	Attic Dust should be removed	Environmental justice issues cannot be met by a stretched out cleanup of the attics of affected homes. Redevelopment monies come to the site in lieu of a prompt cleanup of poisons that threaten health, especially that of youngsters from low income families.
90	20-Mar-05	email letter	The Butte-Silver Bow County Council of Commissioners appears poised to approve the Settlement Term Sheet negotiated by county staff with Atlantic Richfield	Craig	Mary Kay	Butte, MT	Resident - Butte	90.3	Non-technical	Superfund Procedural Issues	RASD	Public involvement	Many areas were dealt with in a closed process as TCRAs. The public was told there would be a review and they would have an opportunity to comment prior to the ROD being issued. Now the review is not going to happen. New residents will never know the extent of the TCRA decisions. Give people the chance to say whether or not they agree.
90	20-Mar-05	email letter	The Butte-Silver Bow County Council of Commissioners appears poised to approve the Settlement Term Sheet negotiated by county staff with Atlantic Richfield	Craig	Mary Kay	Butte, MT	Resident - Butte	90.4	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation needed	The SE end of the Ansemlo Mine yard is where timbers were treated with a very deadly type of arsenic and the area has not been adequately cleaned up.
90	20-Mar-05	email letter	The Butte-Silver Bow County Council of Commissioners appears poised to approve the Settlement Term Sheet negotiated by county staff with Atlantic Richfield	Craig	Mary Kay	Butte, MT	Resident - Butte	90.5	Technical	Site-Wide	Human Health Risk	Concerned about Health Effects/Risks	1976 Time magazine article said that Butte was a cancer hot spot. Research I did also shows that MS and Lou Gherig's disease are four times the national average.
90	20-Mar-05	email letter	The Butte-Silver Bow County Council of Commissioners appears poised to approve the Settlement Term Sheet negotiated by county staff with Atlantic Richfield	Craig	Mary Kay	Butte, MT	Resident - Butte	90.6	Technical	Site-Wide	Human Health Risk	Concerned about Health Effects/Risks	The four COCs have not been adequately researched for adverse synergism, even though an EPA epidemiologist said they had been.
90	20-Mar-05	email letter	The Butte-Silver Bow County Council of Commissioners appears poised to approve the Settlement Term Sheet negotiated by county staff with Atlantic Richfield	Craig	Mary Kay	Butte, MT	Resident - Butte	90.7	Technical	Site-Wide	Human Health Risk	Out of scope	EPA should have listed crystalline silica as the fifth COC at the OU. The IARC says it is a 1A carcinogen. Butte's levels in ambient air are seven times those seen in Vermont.
90	20-Mar-05	email letter	The Butte-Silver Bow County Council of Commissioners appears poised to approve the Settlement Term Sheet negotiated by county staff with Atlantic Richfield	Craig	Mary Kay	Butte, MT	Resident - Butte	90.8	Non-technical	Site-Wide	Evaluation of NCP Criteria	Long-Term Effectiveness and Permanence	EPA used to talk about permanence of cleanup, but now waters it down to "long-term effectiveness". EPA should honor the intent of Congress or explain why in the Responsiveness Summary.
90	20-Mar-05	email letter	The Butte-Silver Bow County Council of Commissioners appears poised to approve the Settlement Term Sheet negotiated by county staff with Atlantic Richfield	Craig	Mary Kay	Butte, MT	Resident - Butte	90.9	Non-technical	Site-Wide	Human Health Risk	Concerned about Health Effects/Risks	EPA has done a poor job on investigating human health issues at the OU. Citizen volunteers have had their questions batted away. EPA should address those issues now and protect human health and the environment.
91	21-Mar-05	letter	My comments concern the attic contamination on the Butte Hill.	Lynch	Joan	Walkerville, MT	Resident - Walkerville	91.1	Non-technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	EPA sent a team of professional to my two homes to test the attics and living area. One attic was contaminated and the living areas were clean. EPA told me they would not remediate because living area was clean.
91	21-Mar-05	letter	My comments concern the attic contamination on the Butte Hill.	Lynch	Joan	Walkerville, MT	Resident - Walkerville	91.2	Non-technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	Why was the testing done, if cleanup was not going to happen? If living areas were the trigger, why test attics? I am suspicious of the cost benefit of this testing.
91	21-Mar-05	letter	My comments concern the attic contamination on the Butte Hill.	Lynch	Joan	Walkerville, MT	Resident - Walkerville	91.3	Non-technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	My attic is accessible to the LR and to children. It cannot be sealed off. What about electrical work, etc.?
91	21-Mar-05	letter	My comments concern the attic contamination on the Butte Hill.	Lynch	Joan	Walkerville, MT	Resident - Walkerville	91.4	Non-technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	I am a senior and will need to sell in the foreseeable future. Since I know the results, I will have to disclose. Also, it would be immoral to sell to a family with young children (the likely buyer).
91	21-Mar-05	letter	My comments concern the attic contamination on the Butte Hill.	Lynch	Joan	Walkerville, MT	Resident - Walkerville	91.5	Non-technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	Clean up my attic and those of other Walkerville residents that are contaminated. Do it in a timely manner so we can sell and not jeopardize children.
91	21-Mar-05	letter	My comments concern the attic contamination on the Butte Hill.	Lynch	Joan	Walkerville, MT	Resident - Walkerville	91.6	Non-technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	Put a statement in the deed that reads "All areas of this property that were found contaminated by testing have been cleaned. This property is hazardous material safe to sell to families with children."
91	21-Mar-05	letter	My comments concern the attic contamination on the Butte Hill.	Lynch	Joan	Walkerville, MT	Resident - Walkerville	91.7	Non-technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	I don't underestimate the difficulty of your job. I do appreciate the work that has been done. Remember, you work for a government that has the "moral values" label. Apply those values to the homes you tested for unhealthy attics. Best wishes and thanks for the good work you do.
92	21-Mar-05	email letter	Submission concerning BPSOU during the open comment period	Coleman	David	County Commissioner	BSB County	92.1	Non-Technical	Site-Wide	ARCO/BSB Agreement	General Comment	Supports agreement between ARCO and Butte-Silver Bow
92	21-Mar-05	email letter	Submission concerning BPSOU during the open comment period	Coleman	David	County Commissioner	BSB County	92.2	Non-Technical	Parrott Tailings/MSD	Extent of Removal	Removal of Accessible Wastes	Supports removal of accessible wastes; opposes total removal.
92	21-Mar-05	email letter	Submission concerning BPSOU during the open comment period	Coleman	David	County Commissioner	BSB County	92.3	Non-Technical	Site-Wide	Human Health Risk	Action Levels	Disagrees with cleanup standards
92	21-Mar-05	email letter	Submission concerning BPSOU during the open comment period	Coleman	David	County Commissioner	BSB County	92.4	Non-Technical	Site-Wide	Human Health Risk	Concerned about Health Effects/Risks	Describes specific waste and observed health effects
92	21-Mar-05	email letter	Submission concerning BPSOU during the open comment period	Coleman	David	County Commissioner	BSB County	92.5	Non-Technical	Site-Wide	Human Health Risk	Action Levels	Disagrees with cleanup standards
92	21-Mar-05	email letter	Submission concerning BPSOU during the open comment period	Coleman	David	County Commissioner	BSB County	92.6	Non-Technical	Site-Wide	ARCO/BSB Agreement	General Comment	Supports agreement between ARCO and Butte-Silver Bow
92	21-Mar-05	email letter	Submission concerning BPSOU during the open comment period	Coleman	David	County Commissioner	BSB County	92.7	Non-Technical	Site-Wide	ARCO/BSB Agreement	General Comment	Encourages agencies to "get this one right."

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93	21-Mar-05	email letter	EPS's Proposed Plan & BSB/ARCO Settlement Agreement	North Abbott	Mary	Butte, MT	Resident - Butte	93.1	Non-Technical	Site-Wide	General Comment	Commenter Supports	Supports proposed plan
93	21-Mar-05	email letter	EPS's Proposed Plan & BSB/ARCO Settlement Agreement	North Abbott	Mary	Butte, MT	Resident - Butte	93.2	Non-Technical	Site-Wide	ARCO/BSB Agreement	General Comment	Supports agreement between ARCO and Butte-Silver Bow
94	21-Mar-05	email letter	Butte Priority Soils	Brock	Rose	Butte, MT	Resident - Butte	94.1	Non-Technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	Children living in houses with attic dust are at risk
95	21-Mar-05	email attachment	Butte Priority Soils	buttemarypat@aol.com		Butte, MT	Resident - Butte	95.1	Non-Technical	Site-Wide	General Comment	General Comment	Encourages agencies to "Do what is right."
96	21-Mar-05	email letter	Please consider my comments that follow:	Paull	Lori	Butte, MT	Resident - Butte	96.1	Legal	Site-Wide	General Comment	General Comment	Concerned that Butte's cleanup will result in a number of lawsuits
96	21-Mar-05	email letter	Please consider my comments that follow:	Paull	Lori	Butte, MT	Resident - Butte	96.2	Non-technical	Site-Wide	General Comment	Concerned about Health Effects/Risks	Illnesses could be prevented with a thorough cleanup
96	21-Mar-05	email letter	Please consider my comments that follow:	Paull	Lori	Butte, MT	Resident - Butte	96.3	Non-technical	Site-Wide	General Comment	Economic Effects	Proper cleanup promotes health, morale, and economic development
96	21-Mar-05	email letter	Please consider my comments that follow:	Paull	Lori	Butte, MT	Resident - Butte	96.4	Non-technical	Site-Wide	Redevelopment	Economic Effects	Butte's economic development efforts could be hampered by cleanup needs
97	21-Mar-05	email letter	In my opinion, the RGs proposed by the EPA for soil contamination from mercury, lead, arsenic, etc. will not provide a high enough level of safety for our community.	Stamp	James	Butte, MT	Resident - Butte	97.1	Technical	Site-Wide	Human Health Risk	Action Levels	Cancer risk level of 1 in 10,000 is much too high. Level should be 1 in 100,000 to 1 in 1,000,000.
97	21-Mar-05	email letter	In my opinion, the RGs proposed by the EPA for soil contamination from mercury, lead, arsenic, etc. will not provide a high enough level of safety for our community.	Stamp	James	Butte, MT	Resident - Butte	97.2	Technical	Residential Metals	Attic and/or Interior Dust	Action Levels	EPA should include lead paint and airborne dust in reclamation goals.
97	21-Mar-05	email letter	In my opinion, the RGs proposed by the EPA for soil contamination from mercury, lead, arsenic, etc. will not provide a high enough level of safety for our community.	Stamp	James	Butte, MT	Resident - Butte	97.3	Non-technical	Site-Wide	Human Health Risk	Action Levels	Risk levels should be as low as possible because Butte residents live and work among the toxic waste.
97	21-Mar-05	email letter	In my opinion, the RGs proposed by the EPA for soil contamination from mercury, lead, arsenic, etc. will not provide a high enough level of safety for our community.	Stamp	James	Butte, MT	Resident - Butte	97.4	Non-technical	Site-Wide	General Comment	Concerned about Health Effects/Risks	Cleanup needs to be done right for current and future residents
98	21-Mar-05	email letter	The capped solid media repositories on upland sites are still a risk to human health in our uncertain future.	Douglass	Kriss	Butte, MT	Resident - Butte	98.1	Non-technical	Solid Media/Waste Left in Place	Institutional Controls	Funding	Following institutional controls will help maintain caps, but if those caps fail, we may not have resources to handle the contamination
98	21-Mar-05	email letter	The capped solid media repositories on upland sites are still a risk to human health in our uncertain future.	Douglass	Kriss	Butte, MT	Resident - Butte	98.2	Non-technical	Parrott Tailings/MSD	Extent of Removal	Commenter needs more information	Parrott Tailings have not been adequately defined and there is too much disagreement over the amount of tailings to be removed to make a decision now
98	21-Mar-05	email letter	The capped solid media repositories on upland sites are still a risk to human health in our uncertain future.	Douglass	Kriss	Butte, MT	Resident - Butte	98.3	Non-technical	Parrott Tailings/MSD	Extent of Removal	Removal of Accessible Wastes	Remove as much of the tailings as possible and leave the Albertson's complex in place.
98	21-Mar-05	email letter	The capped solid media repositories on upland sites are still a risk to human health in our uncertain future.	Douglass	Kriss	Butte, MT	Resident - Butte	98.4	Non-technical	Residential Metals	Attic and/or Interior Dust	Concerned about Health Effects/Risks	Is EPA going to look into the study results from Imagine Butte?
98	21-Mar-05	email letter	The capped solid media repositories on upland sites are still a risk to human health in our uncertain future.	Douglass	Kriss	Butte, MT	Resident - Butte	98.5	Non-technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	Happy the health department has designed a schedule to clean up inside dust.
98	21-Mar-05	email letter	The capped solid media repositories on upland sites are still a risk to human health in our uncertain future.	Douglass	Kriss	Butte, MT	Resident - Butte	98.6	Non-technical	Lower Area One	Treatment Lagoons	General Comment	Water treatment should use both the lime treatment plant and limed lagoons.
98	21-Mar-05	email letter	The capped solid media repositories on upland sites are still a risk to human health in our uncertain future.	Douglass	Kriss	Butte, MT	Resident - Butte	98.7	Non-technical	Site-Wide	General Comment	Aesthetics	EPA and the PRPs have made Butte cleaner and more aesthetically pleasing.
99	21-Mar-05	email attachment	All opinions expressed below are my own...	Smith	Larry	Butte, MT	Resident - Butte	99.1	Technical	Parrott Tailings/MSD	Characterization	Aquifer Hydrogeology	Disagrees with aquifer hydrostratigraphy
99	21-Mar-05	email attachment	All opinions expressed below are my own...	Smith	Larry	Butte, MT	Resident - Butte	99.2	Technical	Parrott Tailings/MSD	Characterization	Contaminant Transport	Disagrees with ground water contaminant plume maps
99	21-Mar-05	email attachment	All opinions expressed below are my own...	Smith	Larry	Butte, MT	Resident - Butte	99.3	Technical	Parrott Tailings/MSD	Characterization	Aquifer Hydrogeology	Aquifer tests were insufficient
99	21-Mar-05	email attachment	All opinions expressed below are my own...	Smith	Larry	Butte, MT	Resident - Butte	99.4	Technical	Parrott Tailings/MSD	Characterization	Contaminant Sources	Disagrees with North Side and Diggings East as contaminant sources; did not evaluate Parrott tailings as source
99	21-Mar-05	email attachment	All opinions expressed below are my own...	Smith	Larry	Butte, MT	Resident - Butte	99.5	Technical	Parrott Tailings/MSD	Characterization	Aquifer Hydrogeology	Water level fluctuations show that ground water is moving from the Parrott tailings
99	21-Mar-05	email attachment	All opinions expressed below are my own...	Smith	Larry	Butte, MT	Resident - Butte	99.6	Technical	Parrott Tailings/MSD	Characterization	Inadequate characterization	Purports that there are insufficient data to draw the conclusion that the aquifer will not clean up in a reasonable time
99	21-Mar-05	email attachment	All opinions expressed below are my own...	Smith	Larry	Butte, MT	Resident - Butte	99.7	Technical	Parrott Tailings/MSD	Characterization	Contaminant Transport	Column leach test should be conducted
99	21-Mar-05	email attachment	All opinions expressed below are my own...	Smith	Larry	Butte, MT	Resident - Butte	99.8	Technical	Parrott Tailings/MSD	Characterization	Contaminant Transport	Didn't consider data collected during dewatering at LAO
99	21-Mar-05	email attachment	All opinions expressed below are my own...	Smith	Larry	Butte, MT	Resident - Butte	99.9	Technical	Parrott Tailings/MSD	Characterization	Contaminant Transport	FFS did not fully consider the importance of acid-generating material; supports removal of vast majority of waste
99	21-Mar-05	email attachment	All opinions expressed below are my own...	Smith	Larry	Butte, MT	Resident - Butte	99.10	Technical	Site-Wide	Extent of Removal	Separation between waste and ground water	Suggests that the criterion of 10 feet separation between waste and ground water should be used site wide
99	21-Mar-05	email attachment	All opinions expressed below are my own...	Smith	Larry	Butte, MT	Resident - Butte	99.11	Technical	Parrott Tailings/MSD	Extent of Removal	Removal of Accessible Wastes	Supports option 5b - removal of accessible wastes
99	21-Mar-05	email attachment	All opinions expressed below are my own...	Smith	Larry	Butte, MT	Resident - Butte	99.12	Technical	Parrott Tailings/MSD	Capture and Treatment	Capture Effectiveness	Should improve WLIP caps, extend subdrain, and install more monitoring wells
99	21-Mar-05	email attachment	All opinions expressed below are my own...	Smith	Larry	Butte, MT	Resident - Butte	99.13	Technical	Lower Area One	Extent of Removal	Removal of Accessible Wastes	Supports removal of all accessible wastes in LAO
99	21-Mar-05	email attachment	All opinions expressed below are my own...	Smith	Larry	Butte, MT	Resident - Butte	99.14	Technical	Residential Metals	Attic and/or Interior Dust	Pathways	Attic dust definition should be expanded to include all mining-related dust
99	21-Mar-05	email attachment	All opinions expressed below are my own...	Smith	Larry	Butte, MT	Resident - Butte	99.15	Non-Technical	Residential Metals	Attic and/or Interior Dust	Property/Landowner Liability	Liability and cost of removal of dust should not be borne by the owner

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99	21-Mar-05	email attachment	All opinions expressed below are my own...	Smith	Larry	Butte, MT	Resident - Butte	99.16	Technical	Residential Metals	Attic and/or Interior Dust	Action Levels	Health risk standard should be 1 in 100,000
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.1	Technical	Parrott Tailings/MSD	Characterization	Aquifer Hydrogeology	Wells and borings used only represent the shallow portion of the aquifer and do not represent the rest of the aquifer
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.2	Technical	Parrott Tailings/MSD	Characterization	Aquifer Hydrogeology	The predominance of fine-grained units in the shallow wells has been inappropriately confused with the deeper wells, which show a more coarse-grained nature
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.3	Technical	Parrott Tailings/MSD	Characterization	Aquifer Hydrogeology	The aquifer is more homolithic than heterolithic
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.4	Technical	Parrott Tailings/MSD	Characterization	Aquifer Hydrogeology	The "past flow system" affects current hydrogeochemistry of the aquifer is unsubstantiated and hypothetical
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.5	Technical	Parrott Tailings/MSD	Characterization	Groundwater flow rates	New wells installed in 2004 indicate groundwater movement was underestimated. pump test used in FFS was biased low
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.6	Technical	Parrott Tailings/MSD	Characterization	Contaminant Sources	FFS concluded without analysis that the contamination discharging to the lower MSD came from the North Side and Diggings East Tailings and the Parrott Tailings were not evaluated as a source for the contamination
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.7	Technical	Parrott Tailings/MSD	Characterization	Contaminant Transport	FFS analysis of groundwater flow and contaminant transport is inadequate for the purpose of remedial alternative selection
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.8	Technical	Parrott Tailings/MSD	Characterization	Contaminant Transport	The technical approach used in the FFS does not comply with advanced technologies and methods of using groundwater modeling - should have used 3-D groundwater flow modeling incorporating geochemical modeling
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.9	Technical	Parrott Tailings/MSD	Characterization	Groundwater flow rates	Single hydraulic conductivity value resulted in an inappropriate travel time calculation with too low a linear velocity
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.10	Technical	Parrott Tailings/MSD	Characterization	Out of scope	Review of WET report on hydraulic conductivity- not a comment on the PP
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.11	Technical	Parrott Tailings/MSD	Characterization	Out of scope	Review of WET report on retardation factor - not a comment on the PP
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.12	Technical	Parrott Tailings/MSD	Characterization	Groundwater flow rates	Hydraulic conductivity increasing in downstream direction is unnecessary as data from previous investigations exist
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.13	Technical	Parrott Tailings/MSD	Characterization	Groundwater flow rates	Disagree with strong vertical component of flow in upper MSD suggested in FFS and to reconcile this disagreement, a groundwater flow model is essential
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.14	Technical	Parrott Tailings/MSD	Aquifer Restoration/Cleanup	Feasibility or Technical Impracticability	Conclusion that aquifer restoration is not possible was based on no data collected from this operable unit
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.15	Technical	Parrott Tailings/MSD	Characterization	Contaminant Transport	Vertical and horizontal delineation of contaminant plume and characterization of aquifer materials was not carried out
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.16	Technical	Parrott Tailings/MSD	Aquifer Restoration/Cleanup	Timeframe	No data have been collected to test the hypothesis of the importance of adsorption/desorption in contamination of aquifer materials
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.17	Technical	Parrott Tailings/MSD	Characterization	Contaminant Transport	Need to conduct column leach tests, rapid desorption from MBMG test contrary to FFS lack of plume mobility
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.18	Technical	Parrott Tailings/MSD	Characterization	Contaminant Sources	New MBMG wells suggest overlooked contamination at the intermediate depth of the aquifer, should be confirmed with more wells as directed by groundwater modeling
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.19	Technical	Parrott Tailings/MSD	Capture and Treatment	Design Criteria	Flow rate in the MSD subdrain is higher than was predicted, what happens in wetter years ?
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.20	Technical	Parrott Tailings/MSD	Capture and Treatment	Capture Effectiveness	A model is required to determine whether or not all of the flow is being captured
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.21	Technical	Parrott Tailings/MSD	Extent of Removal	For Removal	Tailings removed and placed in a secure location will still generate acid mine drainage - but mine waste repositories have reduced contamination, which is better than leaving waste in contact with groundwater
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.22	Technical	Parrott Tailings/MSD	Extent of Removal	Waste in contact with Groundwater	Leaving waste in place within the area of a fluctuating groundwater table is unacceptable
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.23	Technical	Parrott Tailings/MSD	Aquifer Restoration/Cleanup	Comparison to benefits of other removal actions	Post-removal data from LAO should be used to predict aquifer cleanup in the MSD
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.24	Technical	Parrott Tailings/MSD	Extent of Removal	Removal of Accessible Wastes	Alternative 5b is a reasonable solution that is likely to permanently solve the groundwater contamination problems
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.25	Technical	Parrott Tailings/MSD	Waste left in place	Reducing infiltration	If MSD tailings are left in place, impermeable caps and drains under ball fields should be installed to reduce infiltration
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.26	Technical	Parrott Tailings/MSD	Capture and Treatment	Capture Effectiveness	Extend subdrain to Texas avenue and install another drain parallel to Blacktail creek to capture water that does not flow toward the current drain
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.27	Technical	Parrott Tailings/MSD	Capture and Treatment	Capture Effectiveness	Install more monitoring wells to track contaminants and groundwater flow paths

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100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.28	Technical	Parrott Tailings/MSD	Aquifer Restoration/Cleanup	Timeframe	No removal ensures the aquifer will only clean up over geologic time
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.29	Technical	Parrott Tailings/MSD	Extent of Removal	For Removal	Due to uncertainties, removal or isolation is the only way to protect human health and the environment
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.30	Non-technical	Parrott Tailings/MSD	General Comment	General Comment	The lack of defendable scientific work on the MSD area speaks to the lack of scientific oversight
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.31	Non-technical	Parrott Tailings/MSD	General Comment	General Comment	EPA should appoint an independent group of scientists to rectify competing opinions on site characterization and remedial options
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.32	Technical	Surface Water - Storm Water	BMPs	Supports BMP program	BMP program for controlling surface water quality has promise
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.33	Technical	Surface Water - General	In-Stream Flow Augmentation	Commenter Opposes	Dilution is the solution to pollution is unacceptable
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.34	Technical	Surface Water - Storm Water	Storm Water Treatment	Commenter Opposes	Treatment plant for storm water is a white elephant and will not likely be effective, whereas source control and monitoring is more acceptable
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.35	Technical	Surface Water - Storm Water	BMPs	Detention/Retention Basins	Suggest dry basins that are cleaned out every year
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.36	Technical	Surface Water - Storm Water	BMPs	Design Criteria	If channels/basins are sized for 25 year events, waste left in place should be protected from channel failures from larger events
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.37	Technical	Parrott Tailings/MSD	Capture and Treatment	Capture Effectiveness	Not sure why was constructed parallel to the valley gradient, no data to demonstrate how effective it will be, concern that minor inefficiencies may result in release to SBC
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.38	Non-Technical	Parrott Tailings/MSD	Unrelated Topic	Out of scope	Costs for reconditioning the treatment lagoons along the MSD - there are no lagoons planned for the MSD???
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.39	Technical	Solid Media/Waste Left in Place	Long-term Operations and Maintenance	Funding	Costs for maintaining reclamation covers over the long term
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.40	Non-Technical	Parrott Tailings/MSD	Unrelated Topic	Out of scope	Are costs for the ongoing work at the LAO ponds potentially applicable to the MSD ponds? (again, which MSD ponds??)
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.41	Technical	Lower Area One	Extent of Removal	Removal of Accessible Wastes	Additional wastes at LAO should be removed if not under structures or slag walls
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.42	Technical	Lower Area One	Extent of Removal	Removal of Accessible Wastes	Any wastes <10 feet should be removed
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.43	Technical	Lower Area One	Treatment Lagoons	Performance - cold weather	Untested during extended cold weather
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.44	Technical	Lower Area One	Treatment Lagoons	Performance - arsenic	Arsenic may leach to groundwater - similar to Warm Springs ponds
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.45	Technical	Lower Area One	Treatment Lagoons	Sludge Volume/Removal/Handling	Little information on sludge removal and handling
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.46	Technical	Lower Area One	Treatment Lagoons	Performance - during maintenance	Demonstrate performance if subset of lagoons are offline
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.47	Technical	Lower Area One	Treatment Lagoons	Sludge Volume/Removal/Handling	Believe volume of sludge significantly underestimated
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.48	Technical	Lower Area One	Treatment Lagoons	Performance - general	Concern that cannot meet metals standards and pH standards at the same time
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.49	Non-technical	Solid Media/Waste Left in Place	Environmental Justice	Economic Effects	Leaving waste in place ignores environmental justice
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.50	Non-technical	Solid Media/Waste Left in Place	Redevelopment	Economic Effects	Economic well being hampered by superfund stigma - reference to BiMart in Anaconda
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.51	Non-technical	Site-Wide	Characterization	Inadequate characterization	BPSOU has not been adequately characterized using the best available technology and decisions are being made without enough information
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.52	Non-technical	Solid Media/Waste Left in Place	Redevelopment	Economic Effects	To save money by leaving waste in place at the expense of public health and economic development - stigma of potential toxicity
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.53	Technical	Parrott Tailings/MSD	Characterization	Contaminant Transport	Acid generation by waste materials not addressed in FFS and PP
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.54	Technical	Parrott Tailings/MSD	Characterization	Contaminant Transport	Removal of acid generating wastes under alt 5b would raise pH and make contaminants less mobile
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.55	Technical	Parrott Tailings/MSD	Characterization	Contaminant Transport	Implies EPA does not understand acid mine drainage and that modeling should be done to understand the processes

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100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.56	Non-technical	Site-Wide	General Comment	Clark Fork River Headwaters/Downstream Recontamination	Waste left in place at the headwaters of the Clark Fork River jeopardizes downstream reclamation
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.57	Technical	Groundwater	Extent of Removal	Waste in contact with Groundwater	Waste left in place in contact with groundwater is not protective
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.58	Non-technical	Solid Media/Waste Left in Place	Reclamation	Reclamation specifications	Inadequate caps on source areas on the Butte Hill is not protective
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.59	Non-technical	Site-Wide	General Comment	Concerned about Health Effects/Risks	Waste left in place at jeopardizes human health
100	21-Mar-05	letter	This letter represents the comments agreed upon by several scientists who work, live and recreate in the Butte Area.	Multiple authors		Butte, MT	Resident - Butte	100.60	Non-technical	Site-Wide	Waste left in place	Economic Effects	Waste left in place hampers economic redevelopment in Butte
101	18-Mar-05	letter	My comments concern the attic contamination on the Butte Hill	Lynch	Joan	Walkerville, MT	Resident - Walkerville	101.1	Non-technical	Residential Metals	Attic and/or Interior Dust	Characterization	Why was sampling performed and cleanup not done when the attic dust was found to be contaminated?
101	18-Mar-05	letter	My comments concern the attic contamination on the Butte Hill	Lynch	Joan	Walkerville, MT	Resident - Walkerville	101.2	Non-technical	Residential Metals	Attic and/or Interior Dust	Characterization	Why was sampling done if EPA did not intend to clean it up if contamination was found?
101	18-Mar-05	letter	My comments concern the attic contamination on the Butte Hill	Lynch	Joan	Walkerville, MT	Resident - Walkerville	101.3	Technical	Residential Metals	Attic and/or Interior Dust	Characterization	If living areas were the only concern, why were these areas not tested to the exclusion of the attics
101	18-Mar-05	letter	My comments concern the attic contamination on the Butte Hill	Lynch	Joan	Walkerville, MT	Resident - Walkerville	101.4	Technical	Residential Metals	Attic and/or Interior Dust	Characterization	Why were attics tested?
101	18-Mar-05	letter	My comments concern the attic contamination on the Butte Hill	Lynch	Joan	Walkerville, MT	Resident - Walkerville	101.5	Non-technical	Residential Metals	Attic and/or Interior Dust	Pathways	Attic is easily accessible from living area, accessible by child, cannot seal it off, cannot guarantee entry to attic would not be required in the future
101	18-Mar-05	letter	My comments concern the attic contamination on the Butte Hill	Lynch	Joan	Walkerville, MT	Resident - Walkerville	101.6	Non-technical	Residential Metals	Attic and/or Interior Dust	Concerned about Health Effects/Risks	Concerned that a family with young children will buy the house, putting them at risk (as a senior she is not a high risk group), and notes that families with children have moved in on either side of her property
101	18-Mar-05	letter	My comments concern the attic contamination on the Butte Hill	Lynch	Joan	Walkerville, MT	Resident - Walkerville	101.7	Non-technical	Residential Metals	Attic and/or Interior Dust	Concerned about Health Effects/Risks	Immoral to knowingly allow children to live in a house with a contaminated attic
101	18-Mar-05	letter	My comments concern the attic contamination on the Butte Hill	Lynch	Joan	Walkerville, MT	Resident - Walkerville	101.8	Non-technical	Residential Metals	Attic and/or Interior Dust	Property Resale - Disclosure of Contamination/Remediation	Since she allowed her attic to be tested, she now must disclose the results to potential buyers, decreasing property value
101	18-Mar-05	letter	My comments concern the attic contamination on the Butte Hill	Lynch	Joan	Walkerville, MT	Resident - Walkerville	101.9	Non-technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	Requesting EPA to cleanup her attic and other contaminated attics
101	18-Mar-05	letter	My comments concern the attic contamination on the Butte Hill	Lynch	Joan	Walkerville, MT	Resident - Walkerville	101.10	Non-technical	Residential Metals	Attic and/or Interior Dust	Property Resale - Disclosure of Contamination/Remediation	Simple statement declaring property has been cleaned up should be attached to their deeds
102	18-Mar-05	letter	After actually reading the EPA Superfund Program Cleanup Proposal, I decided that is has much to recommend it	Swiger	Pam	Butte, MT	Resident - Butte	102.1	Non-technical	Residential Metals	Attic and/or Interior Dust	Pathways	Unacceptable risks found, but propose to leave them alone unless a pathway is opened
102	18-Mar-05	letter	After actually reading the EPA Superfund Program Cleanup Proposal, I decided that is has much to recommend it	Swiger	Pam	Butte, MT	Resident - Butte	102.2	Non-technical	Residential Metals	Attic and/or Interior Dust	Timeframe	Cleanup timeframe is 30 years - most of us will be dead by then
102	18-Mar-05	letter	After actually reading the EPA Superfund Program Cleanup Proposal, I decided that is has much to recommend it	Swiger	Pam	Butte, MT	Resident - Butte	102.3	Technical	Residential Metals	Attic and/or Interior Dust	Pathways	Does not understand why fugitive dust is a secondary pathway
102	18-Mar-05	letter	After actually reading the EPA Superfund Program Cleanup Proposal, I decided that is has much to recommend it	Swiger	Pam	Butte, MT	Resident - Butte	102.4	Technical	Residential Metals	Attic and/or Interior Dust	Action Levels	Risk level of 1 in 10,000 is unacceptable
102	18-Mar-05	letter	After actually reading the EPA Superfund Program Cleanup Proposal, I decided that is has much to recommend it	Swiger	Pam	Butte, MT	Resident - Butte	102.5	Non-technical	General Comment	General Comment	Commenter Opposes	Wonders if EPA would feel differently if they lived in the area
102	18-Mar-05	letter	After actually reading the EPA Superfund Program Cleanup Proposal, I decided that is has much to recommend it	Swiger	Pam	Butte, MT	Resident - Butte	102.6	Technical	Site-Wide	Human Health Risk	Bioavailability Studies	Swine and monkeys do not live in Butte, human health surveys, health department monitoring should be used instead
102	18-Mar-05	letter	After actually reading the EPA Superfund Program Cleanup Proposal, I decided that is has much to recommend it	Swiger	Pam	Butte, MT	Resident - Butte	102.7	Technical	Residential Metals	Attic and/or Interior Dust	Action Levels	Butte action levels are higher than those at Tacoma Smelter
102	18-Mar-05	letter	After actually reading the EPA Superfund Program Cleanup Proposal, I decided that is has much to recommend it	Swiger	Pam	Butte, MT	Resident - Butte	102.8	Non-technical	Parrott Tailings/MSD	Extent of Removal	For Removal	Does not make sense to spend money downstream but not at the source
102	18-Mar-05	letter	After actually reading the EPA Superfund Program Cleanup Proposal, I decided that is has much to recommend it	Swiger	Pam	Butte, MT	Resident - Butte	102.9	Non-technical	Parrott Tailings/MSD	Extent of Removal	Removal of Accessible Wastes	Does not make sense to scrap areas like the civic center, but anything accessible should be removed, why does Missoula get to have its tailings removed but Butte doesn't?
103	21-Mar-05	letter	As a member of Butte's business community I am writing you to provide my view of the EPA Proposed Plan...	Stein?		Butte, MT	Resident - Butte	103.1	Non-technical	Site-Wide	General Comment	Commenter Supports	Supports EPA PP and also BSB/ARCO settlement agreement
104	21-Mar-05	letter	Personal comments on the so call plan	Harrington	Bernard	Walkerville, MT	Resident - Walkerville	104.1	Non-technical	Site-Wide	General Comment	Commenter Opposes	Assumes PP is not good since PRP's agree with plan
104	21-Mar-05	letter	Personal comments on the so call plan	Harrington	Bernard	Walkerville, MT	Resident - Walkerville	104.2	Non-technical	Superfund Procedural Issues	Public involvement	EPA disregards comments	Feels EPA ignores public input
104	21-Mar-05	letter	Personal comments on the so call plan	Harrington	Bernard	Walkerville, MT	Resident - Walkerville	104.3	Non-technical	Site-Wide	Institutional Controls	Minimize IC's	IC's not needed if waste was removed
104	21-Mar-05	letter	Personal comments on the so call plan	Harrington	Bernard	Walkerville, MT	Resident - Walkerville	104.4	Technical	Solid Media/Waste Left in Place	Railroad Beds	Reclamation needed	Ryan Road was a part of the North Pacific RR but has not been reclaimed
104	21-Mar-05	letter	Personal comments on the so call plan	Harrington	Bernard	Walkerville, MT	Resident - Walkerville	104.5	Technical	Site-Wide	Human Health Risk	Action Levels	Carcinogenic risks and non-carcinogenic risks for arsenic, acceptable risk ranges
104	21-Mar-05	letter	Personal comments on the so call plan	Harrington	Bernard	Walkerville, MT	Resident - Walkerville	104.6	Technical	Solid Media/Waste Left in Place	Ecological Risk	Terrestrial Risk Assessment	Disagrees that EPA did not do a terrestrial risk assessment
104	21-Mar-05	letter	Personal comments on the so call plan	Harrington	Bernard	Walkerville, MT	Resident - Walkerville	104.7	Non-Technical	Solid Media/Waste Left in Place	General Comment	Long-Term Effectiveness and Permanence	Mine waste was moved to "temporary" disposal areas in residential settings and then EPA made these sites permanent
105	21-Mar-05	letter	Town of Walkerville Comments on the Superfund Program Cleanup Proposal	Harrington	Bernard	Mayor of Walkerville	Town of Walkerville	105.1	Non-technical	Site-Wide	General Comment	Commenter Opposes	Assumes PP is not good since PRP's agree with plan

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105	21-Mar-05	letter	Town of Walkerville Comments on the Superfund Program Cleanup Proposal	Harrington	Bernard	Mayor of Walkerville	Town of Walkerville	105.2	Non-technical	Superfund Procedural Issues	Public involvement	EPA disregards comments	Feels EPA ignores public input
105	21-Mar-05	letter	Town of Walkerville Comments on the Superfund Program Cleanup Proposal	Harrington	Bernard	Mayor of Walkerville	Town of Walkerville	105.3	Technical	Granite Mountain Memorial Area	Air Monitoring	Concerned about Health Effects/Risks	Where are the air monitors and where are they installed?
105	21-Mar-05	letter	Town of Walkerville Comments on the Superfund Program Cleanup Proposal	Harrington	Bernard	Mayor of Walkerville	Town of Walkerville	105.4	Technical	Solid Media/Waste Left in Place	Railroad Beds	Reclamation needed	Ryan Road was a part of the North Pacific RR but has not been reclaimed
105	21-Mar-05	letter	Town of Walkerville Comments on the Superfund Program Cleanup Proposal	Harrington	Bernard	Mayor of Walkerville	Town of Walkerville	105.5	Technical	Site-Wide	Human Health Risk	Action Levels	Carcinogenic risks and non-carcinogenic risks for arsenic, acceptable risk ranges
105	21-Mar-05	letter	Town of Walkerville Comments on the Superfund Program Cleanup Proposal	Harrington	Bernard	Mayor of Walkerville	Town of Walkerville	105.6	Technical	Solid Media/Waste Left in Place	Ecological Risk	Terrestrial Risk Assessment	Disagrees that EPA did not do a terrestrial risk assessment
105	21-Mar-05	letter	Town of Walkerville Comments on the Superfund Program Cleanup Proposal	Harrington	Bernard	Mayor of Walkerville	Town of Walkerville	105.7	Non-technical	Solid Media/Waste Left in Place	General Comment	Long-Term Effectiveness and Permanence	Mine waste was moved to "temporary" disposal areas in residential settings and then EPA made these sites permanent
105	21-Mar-05	letter	Town of Walkerville Comments on the Superfund Program Cleanup Proposal	Harrington	Bernard	Mayor of Walkerville	Town of Walkerville	105.8	Non-technical	Superfund Procedural Issues	Development of Alternatives	No difference among alternatives	Same action for soil in alternatives 2-5
105	21-Mar-05	letter	Town of Walkerville Comments on the Superfund Program Cleanup Proposal	Harrington	Bernard	Mayor of Walkerville	Town of Walkerville	105.9	Legal	Granite Mountain Memorial Area	Institutional Controls	Walkerville Zoning/Roads	Walkerville roads that are in the GMMA are planned to be closed but Walkerville does not want them closed
105	21-Mar-05	letter	Town of Walkerville Comments on the Superfund Program Cleanup Proposal	Harrington	Bernard	Mayor of Walkerville	Town of Walkerville	105.10	Non-technical	Solid Media/Waste Left in Place	Institutional Controls	IC's hamper redevelopment	IC's could be used to block redevelopment on reclaimed sites, need to review the IC's before they are accepted
105	21-Mar-05	letter	Town of Walkerville Comments on the Superfund Program Cleanup Proposal	Harrington	Bernard	Mayor of Walkerville	Town of Walkerville	105.11	Legal	Site-Wide	Institutional Controls	Walkerville Zoning/Roads	BSB ordinances do not apply in Walkerville
105	21-Mar-05	letter	Town of Walkerville Comments on the Superfund Program Cleanup Proposal	Harrington	Bernard	Mayor of Walkerville	Town of Walkerville	105.12	Technical	Residential Metals	Attic and/or Interior Dust	Characterization	EPA should do a comprehensive study of attic dust before the ROD is issued
105	21-Mar-05	letter	Town of Walkerville Comments on the Superfund Program Cleanup Proposal	Harrington	Bernard	Mayor of Walkerville	Town of Walkerville	105.13	Non-technical	Site-Wide	General Comment	Timeframe	What is a "reasonable time frame"?
106	1-Mar-05	letter	I would like to comment about the remediation and cleanup of the Butte Hill and the Butte Priority Soils Area	McDonough	Brendan R.	Butte, MT	Resident - Butte	106.1	Non-technical	Site-Wide	General Comment	Concerned about Health Effects/Risks	Extensive cleanup needed to protect the health of current and future citizens of Butte
106	1-Mar-05	letter	I would like to comment about the remediation and cleanup of the Butte Hill and the Butte Priority Soils Area	McDonough	Brendan R.	Butte, MT	Resident - Butte	106.2	Non-technical	Site-Wide	General Comment	Clark Fork River Headwaters/Downstream Recontamination	Extensive cleanup needed for environmental restoration of CFR headwaters and to beautify Butte
106	1-Mar-05	letter	I would like to comment about the remediation and cleanup of the Butte Hill and the Butte Priority Soils Area	McDonough	Brendan R.	Butte, MT	Resident - Butte	106.3	Non-technical	Site-Wide	General Comment	Economic Effects	Cleanup will affect economic well-being over the long term
107	26-Feb-05	email letter	I would like to submit the following questions/comments on the proposal for managing the priority soils related issues and other environmental problems in Butte	Bowler	Tom	Butte, MT	Resident - Butte	107.1	Non-technical	Site-Wide	General Comment	Perceived Data Gap	No technical data produced for carrying out the plan as proposed
107	26-Feb-05	email letter	I would like to submit the following questions/comments on the proposal for managing the priority soils related issues and other environmental problems in Butte	Bowler	Tom	Butte, MT	Resident - Butte	107.2	Non-technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	If attic dust is hazardous, it should be removed
107	26-Feb-05	email letter	I would like to submit the following questions/comments on the proposal for managing the priority soils related issues and other environmental problems in Butte	Bowler	Tom	Butte, MT	Resident - Butte	107.3	Technical	Residential Metals	Attic and/or Interior Dust	Risk assessment flawed	Technical conclusions in attic dust risk assessment are flawed
107	26-Feb-05	email letter	I would like to submit the following questions/comments on the proposal for managing the priority soils related issues and other environmental problems in Butte	Bowler	Tom	Butte, MT	Resident - Butte	107.4	Non-technical	Residential Metals	Attic and/or Interior Dust	Pathways	Cites three examples of when emergency access to attic was required to fix roof, fix electrical, and due to foundation collapse - no time to wait to get the attic cleaned up first
107	26-Feb-05	email letter	I would like to submit the following questions/comments on the proposal for managing the priority soils related issues and other environmental problems in Butte	Bowler	Tom	Butte, MT	Resident - Butte	107.5	Non-technical	Residential Metals	Attic and/or Interior Dust	Concerned about Health Effects/Risks	What was the risk when exposed to these dusts?
107	26-Feb-05	email letter	I would like to submit the following questions/comments on the proposal for managing the priority soils related issues and other environmental problems in Butte	Bowler	Tom	Butte, MT	Resident - Butte	107.6	Legal	Residential Metals	Attic and/or Interior Dust	Property/Landowner Liability	Is the property owner liable if they have not cleaned up the attic dust and then expose a contractor to it? Was hazardous waste improperly disposed of in the landfill?
107	26-Feb-05	email letter	I would like to submit the following questions/comments on the proposal for managing the priority soils related issues and other environmental problems in Butte	Bowler	Tom	Butte, MT	Resident - Butte	107.7	Technical	Residential Metals	Attic and/or Interior Dust	Characterization	Has the attic dust been characterized?
107	26-Feb-05	email letter	I would like to submit the following questions/comments on the proposal for managing the priority soils related issues and other environmental problems in Butte	Bowler	Tom	Butte, MT	Resident - Butte	107.8	Non-technical	Residential Metals	Attic and/or Interior Dust	Out of scope	Question if attic materials have been tested for zonolite
107	26-Feb-05	email letter	I would like to submit the following questions/comments on the proposal for managing the priority soils related issues and other environmental problems in Butte	Bowler	Tom	Butte, MT	Resident - Butte	107.9	Non-technical	Residential Metals	Multipathway Lead Abatement Program	Funding	If attic dust is removed, then ARCO will withdraw funding from the lead program
107	26-Feb-05	email letter	I would like to submit the following questions/comments on the proposal for managing the priority soils related issues and other environmental problems in Butte	Bowler	Tom	Butte, MT	Resident - Butte	107.10	Non-technical	Site-Wide	Extent of Removal	For Removal	Mine wastes should be removed
107	26-Feb-05	email letter	I would like to submit the following questions/comments on the proposal for managing the priority soils related issues and other environmental problems in Butte	Bowler	Tom	Butte, MT	Resident - Butte	107.11	Non-technical	Surface Water - Storm Water	Storm Water Conveyances	Diversion to Berkeley Pit	Why were storm water conveyances built to convey storm water and mine waste to the Berkeley Pit instead of removing the wastes
107	26-Feb-05	email letter	I would like to submit the following questions/comments on the proposal for managing the priority soils related issues and other environmental problems in Butte	Bowler	Tom	Butte, MT	Resident - Butte	107.12	Non-technical	Solid Media/Waste Left in Place	Redevelopment	Economic Effects	Waste in place will be a perpetual anchor on economic survival
107	26-Feb-05	email letter	I would like to submit the following questions/comments on the proposal for managing the priority soils related issues and other environmental problems in Butte	Bowler	Tom	Butte, MT	Resident - Butte	107.13	Technical	Site-Wide	Extent of Removal	For Removal	Excavation and transport of wastes is straightforward, technically undemanding, and cost effective

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107	26-Feb-05	email letter	I would like to submit the following questions/comments on the proposal for managing the priority soils related issues and other environmental problems in Butte	Bowler	Tom	Butte, MT	Resident - Butte	107.14	Non-technical	Site-Wide	Cost of Removal	Evaluation/Weighing of Cost	ARCO is avoiding normal costs of doing business - the wastes should be cleaned up
107	26-Feb-05	email letter	I would like to submit the following questions/comments on the proposal for managing the priority soils related issues and other environmental problems in Butte	Bowler	Tom	Butte, MT	Resident - Butte	107.15	Legal	Surface Water - Storm Water	Liability	Local Government Liability	Why is Butte responsible for the mine waste as it pertains to storm water?
107	26-Feb-05	email letter	I would like to submit the following questions/comments on the proposal for managing the priority soils related issues and other environmental problems in Butte	Bowler	Tom	Butte, MT	Resident - Butte	107.16	Non-technical	Parrott Tailings/MSD	Extent of Removal	Removal of Accessible Wastes	Remove tailings in alluvial groundwater to the extent possible
107	26-Feb-05	email letter	I would like to submit the following questions/comments on the proposal for managing the priority soils related issues and other environmental problems in Butte	Bowler	Tom	Butte, MT	Resident - Butte	107.17	Non-technical	Parrott Tailings/MSD	Extent of Removal	For Removal	EPA does not provide rationale for leaving waste in place
107	26-Feb-05	email letter	I would like to submit the following questions/comments on the proposal for managing the priority soils related issues and other environmental problems in Butte	Bowler	Tom	Butte, MT	Resident - Butte	107.18	Non-technical	Parrott Tailings/MSD	Aquifer Restoration/Cleanup	Monetary Compensation	Should be compensated on a gallon for gallon basis for the lost resource
107	26-Feb-05	email letter	I would like to submit the following questions/comments on the proposal for managing the priority soils related issues and other environmental problems in Butte	Bowler	Tom	Butte, MT	Resident - Butte	107.19	Non-technical	Parrott Tailings/MSD	Aquifer Restoration/Cleanup	Comparison to benefits of other removal actions	Data shows benefit from removals along SBC so why won't waste removal benefit in the case of the Parrott Tailings area?
107	26-Feb-05	email letter	I would like to submit the following questions/comments on the proposal for managing the priority soils related issues and other environmental problems in Butte	Bowler	Tom	Butte, MT	Resident - Butte	107.20	Technical	Lower Area One	Treatment Lagoons	Performance - cold weather	Scientific literature casts serious doubt on such engineered systems in our climate
107	26-Feb-05	email letter	I would like to submit the following questions/comments on the proposal for managing the priority soils related issues and other environmental problems in Butte	Bowler	Tom	Butte, MT	Resident - Butte	107.21	Technical	Lower Area One	Treatment Lagoons	Performance - general	PRP has not provided data to back up claims that demonstrate effluent meets discharge standards under all variations in climate, weather, operational difficulties, etc. as compared to a conventional treatment plant
107	26-Feb-05	email letter	I would like to submit the following questions/comments on the proposal for managing the priority soils related issues and other environmental problems in Butte	Bowler	Tom	Butte, MT	Resident - Butte	107.22	Technical	Lower Area One	Treatment Lagoons	Sludge Volume/Removal/Handling	No data on loading rates, frequency of sludge removal, where sludge will be disposed
107	26-Feb-05	email letter	I would like to submit the following questions/comments on the proposal for managing the priority soils related issues and other environmental problems in Butte	Bowler	Tom	Butte, MT	Resident - Butte	107.23	Technical	Lower Area One	Treatment Lagoons	Sludge Volume/Removal/Handling	Why is sludge transport through town acceptable when waste transport through town is unacceptable and a "deal breaker" for the waste removal alternative?
107	26-Feb-05	email letter	I would like to submit the following questions/comments on the proposal for managing the priority soils related issues and other environmental problems in Butte	Bowler	Tom	Butte, MT	Resident - Butte	107.24	Non-technical	Site-Wide	Waste left in place	Economic Effects	Perpetual management of hazardous waste gives a select few good jobs while economic development is hampered in the rest of the community
107	26-Feb-05	email letter	I would like to submit the following questions/comments on the proposal for managing the priority soils related issues and other environmental problems in Butte	Bowler	Tom	Butte, MT	Resident - Butte	107.25	Non-technical	Site-Wide	General Comment	Concerned about Health Effects/Risks	Perpetual management also may impact health
107	26-Feb-05	email letter	I would like to submit the following questions/comments on the proposal for managing the priority soils related issues and other environmental problems in Butte	Bowler	Tom	Butte, MT	Resident - Butte	107.26	Non-technical	General Comment	General Comment	Commenter Opposes	Independent audit of EPA and PRP work should be done
107	26-Feb-05	email letter	I would like to submit the following questions/comments on the proposal for managing the priority soils related issues and other environmental problems in Butte	Bowler	Tom	Butte, MT	Resident - Butte	107.27	Non-technical	General Comment	General Comment	Commenter Opposes	Finds little credibility on what they are told can and cannot be done because things that can't be done have been done
108	10-Mar-05	letter	The following are my comments on the Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit	Appleman	Richard	Butte, MT	Resident - Butte	108.1	Non-technical	Site-Wide	General Comment	Commenter needs more information	Cannot make an informed decision without concise information derived from the thousands of pages of reports already produced
108	10-Mar-05	letter	The following are my comments on the Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit	Appleman	Richard	Butte, MT	Resident - Butte	108.2	Technical	Site-Wide	General Comment	Commenter needs more information	Would like to see report on human health and the environment, past, present, and future to summarize and project data
108	10-Mar-05	letter	The following are my comments on the Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit	Appleman	Richard	Butte, MT	Resident - Butte	108.3	Technical	Residential Metals	Multipathway Lead Abatement Program	Supports Lead Program	Lead abatement program is wonderful and should be continued
108	10-Mar-05	letter	The following are my comments on the Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit	Appleman	Richard	Butte, MT	Resident - Butte	108.4	Technical	Residential Metals	Attic and/or Interior Dust	Characterization	Attic dust is probably more bioavailable than the contaminated yard soils
108	10-Mar-05	letter	The following are my comments on the Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit	Appleman	Richard	Butte, MT	Resident - Butte	108.5	Non-technical	Site-Wide	Human Health Risk	Action Levels	Larger health problem than currently understood - lower drinking water standard, may be inferring soil standard
108	10-Mar-05	letter	The following are my comments on the Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit	Appleman	Richard	Butte, MT	Resident - Butte	108.6	Non-Technical	Lower Area One	General Comment	Much Work Already Done	Large source area (Colorado Tailings) was reduced, water quality and air quality were improved
108	10-Mar-05	letter	The following are my comments on the Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit	Appleman	Richard	Butte, MT	Resident - Butte	108.7	Non-Technical	Air Quality	Unrelated Topic	Out of scope	Consider impacts from windy events from active mining OU, west Butte area, and Opportunity ponds
108	10-Mar-05	letter	The following are my comments on the Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit	Appleman	Richard	Butte, MT	Resident - Butte	108.8	Technical	Solid Media/Waste Left in Place	BRES	Supports BRES program	Believes BRES is a great monitoring program
108	10-Mar-05	letter	The following are my comments on the Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit	Appleman	Richard	Butte, MT	Resident - Butte	108.9	Technical	Surface Water - General	Water Quality	Water quality improvements	Commenter notes improvements in copper and zinc levels
108	10-Mar-05	letter	The following are my comments on the Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit	Appleman	Richard	Butte, MT	Resident - Butte	108.10	Technical	Parrott Tailings/MSD	Water Quality	WQB-7 standards in Silver Bow Creek	If the Parrott Tailings are not removed, can WQB-7 standards be met?

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108	10-Mar-05	letter	The following are my comments on the Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit	Appleman	Richard	Butte, MT	Resident - Butte	108.11	Technical	Surface Water - Storm Water	Characterization	Perceived Data Gap	Data not readily available, concentrations probably still high
108	10-Mar-05	letter	The following are my comments on the Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit	Appleman	Richard	Butte, MT	Resident - Butte	108.12	Technical	Air Quality	Air Monitoring	Characterization	No plan to monitor indoor air quality or outside areas
108	10-Mar-05	letter	The following are my comments on the Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit	Appleman	Richard	Butte, MT	Resident - Butte	108.13	Technical	Surface Water - General	Water Quality	Monitoring Stations	Suggests monitoring stations
108	10-Mar-05	letter	The following are my comments on the Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit	Appleman	Richard	Butte, MT	Resident - Butte	108.14	Technical	Site-Wide	General Comment	Perceived Data Gap	EPA needs to demonstrate through monitoring and modeling that air, land, water, and food are safe, then all wastes should be removed
108	10-Mar-05	letter	The following are my comments on the Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit	Appleman	Richard	Butte, MT	Resident - Butte	108.15	Technical	Surface Water - Storm Water	BMPs	Supports BMP program	BMP program for controlling surface water quality has promise
108	10-Mar-05	letter	The following are my comments on the Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit	Appleman	Richard	Butte, MT	Resident - Butte	108.16	Technical	Surface Water - General	In-Stream Flow Augmentation	Commenter Opposes	Dilution is the solution to pollution is unacceptable
108	10-Mar-05	letter	The following are my comments on the Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit	Appleman	Richard	Butte, MT	Resident - Butte	108.17	Technical	Surface Water - Storm Water	Storm Water Treatment	Commenter Opposes	Treatment plant for storm water is a white elephant and will not likely be effective, whereas source control and monitoring is more acceptable
108	10-Mar-05	letter	The following are my comments on the Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit	Appleman	Richard	Butte, MT	Resident - Butte	108.18	Technical	Surface Water - Storm Water	BMPs	Detention/Retention Basins	Suggest dry basins that are cleaned out every year
108	10-Mar-05	letter	The following are my comments on the Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit	Appleman	Richard	Butte, MT	Resident - Butte	108.19	Technical	Surface Water - Storm Water	BMPs	Detention/Retention Basins	Wet basins may be a concern with West Nile Virus
108	10-Mar-05	letter	The following are my comments on the Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit	Appleman	Richard	Butte, MT	Resident - Butte	108.20	Technical	Surface Water - Storm Water	BMPs	Detention/Retention Basins	Will basins be removed once the hill is cleaned
108	10-Mar-05	letter	The following are my comments on the Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit	Appleman	Richard	Butte, MT	Resident - Butte	108.21	Technical	Surface Water - Storm Water	BMPs	Design Criteria	If channels/basins are sized for 25 year events, waste left in place should be protected from channel failures from larger events
108	10-Mar-05	letter	The following are my comments on the Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit	Appleman	Richard	Butte, MT	Resident - Butte	108.22	Technical	Surface Water - Storm Water	BMPs	Design Criteria	Establish Butte-specific design storms, precipitation gage on the hill
108	10-Mar-05	letter	The following are my comments on the Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit	Appleman	Richard	Butte, MT	Resident - Butte	108.23	Technical	Surface Water - Storm Water	BMPs	Design Criteria	Convey 25 year event should not be 2.2 inches in 24 hours but 1.6 inches in 30 minutes
108	10-Mar-05	letter	The following are my comments on the Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit	Appleman	Richard	Butte, MT	Resident - Butte	108.24	Technical	Surface Water - Storm Water	Characterization	Need Monitoring	Additional monitoring stations at Syndicate Pit and Missoula Gulch
108	10-Mar-05	letter	The following are my comments on the Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit	Appleman	Richard	Butte, MT	Resident - Butte	108.25	Non-technical	Parrott Tailings/MSD	Extent of Removal	Removal of Accessible Wastes	Support alternative 5b without replacing fill and redevelop wetlands before mining
108	10-Mar-05	letter	The following are my comments on the Superfund Program Cleanup Proposal for the Butte Priority Soils Operable Unit	Appleman	Richard	Butte, MT	Resident - Butte	108.26	Technical	Parrott Tailings/MSD	Waste left in place	Reducing infiltration	If MSD tailings are left in place, impermeable caps and drains under ball fields should be installed to reduce infiltration
109	1-Mar-05	letter	I have been attending the recent round of meetings regarding the Butte Priority Soils Cleanup	Waring	George H.	Butte, MT	Resident - Butte	109.1	Non-technical	Site-Wide	Public involvement	Disappointed that meeting was dominated by ARCO and its contractors	Public meeting was dominated by ARCO and its contractors
109	1-Mar-05	letter	I have been attending the recent round of meetings regarding the Butte Priority Soils Cleanup	Waring	George H.	Butte, MT	Resident - Butte	109.2	Non-technical	Solid Media/Waste Left in Place	Extent of Removal	For Removal	Opposed to any remedy that calls for the use of caps... surrounded by wire fencing ... that leave waste in place
109	1-Mar-05	letter	I have been attending the recent round of meetings regarding the Butte Priority Soils Cleanup	Waring	George H.	Butte, MT	Resident - Butte	109.3	Non-technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	Attic dust should be removed - well funded program to get rid of the smelter dust quickly
109	1-Mar-05	letter	I have been attending the recent round of meetings regarding the Butte Priority Soils Cleanup	Waring	George H.	Butte, MT	Resident - Butte	109.4	Non-technical	Parrott Tailings/MSD	Extent of Removal	For Removal	Do a total removal of the Parrott Tailings so that we can have a restored Silver Bow Creek with spawning trout
110	18-Feb-05	letter	The following are my official comments on the proposed cleanup plan for Butte Priority Soils	Watson	Dr. Vicki	Missoula, MT	Non-Resident	110.1	Non-technical	Parrott Tailings/MSD	Extent of Removal	Removal of Accessible Wastes	Alternative 5b is the best solution for long term remediation of water quality in the creek
110	18-Feb-05	letter	The following are my official comments on the proposed cleanup plan for Butte Priority Soils	Watson	Dr. Vicki	Missoula, MT	Non-Resident	110.2	Legal	Parrott Tailings/MSD	Aquifer Restoration/Cleanup	Compliance with ARARs	At a minimum, water bodies should be fishable and swimable if feasible - SBC can be reclaimed... hence ARARs dictate that this must be done
110	18-Feb-05	letter	The following are my official comments on the proposed cleanup plan for Butte Priority Soils	Watson	Dr. Vicki	Missoula, MT	Non-Resident	110.3	Non-technical	Parrott Tailings/MSD	Aquifer Restoration/Cleanup	Agency Coordination	NRDP, EPA, MDEQ, BSB should pursue joint planning for remediation and restoration of the creek
110	18-Feb-05	letter	The following are my official comments on the proposed cleanup plan for Butte Priority Soils	Watson	Dr. Vicki	Missoula, MT	Non-Resident	110.4	Non-technical	Site-Wide	Waste left in place	Protectiveness of human health and the environment	Waste left in place remains a human health and environmental threat
110	18-Feb-05	letter	The following are my official comments on the proposed cleanup plan for Butte Priority Soils	Watson	Dr. Vicki	Missoula, MT	Non-Resident	110.5	Non-technical	Solid Media/Waste Left in Place	Redevelopment	Economic Effects	waste left in place inhibits economic recovery
110	18-Feb-05	letter	The following are my official comments on the proposed cleanup plan for Butte Priority Soils	Watson	Dr. Vicki	Missoula, MT	Non-Resident	110.6	Non-technical	Site-Wide	Institutional Controls	Minimize IC's	IC's place a great burden on local government to enforce
110	18-Feb-05	letter	The following are my official comments on the proposed cleanup plan for Butte Priority Soils	Watson	Dr. Vicki	Missoula, MT	Non-Resident	110.7	Technical	Superfund Procedural Issues	RASD	Past Response Action Sites	Need to reevaluate response actions that were done as a short-term/time critical action for long term effectiveness
110	18-Feb-05	letter	The following are my official comments on the proposed cleanup plan for Butte Priority Soils	Watson	Dr. Vicki	Missoula, MT	Non-Resident	110.8	Technical	Residential Metals	Multipathway Lead Abatement Program	Supports Lead Program	The BSB multi-pathway approach... should be continued
110	18-Feb-05	letter	The following are my official comments on the proposed cleanup plan for Butte Priority Soils	Watson	Dr. Vicki	Missoula, MT	Non-Resident	110.9	Non-technical	Residential Metals	Attic and/or Interior Dust	Environmental Justice	Burden to homeowner to take the initiative to have their attic dust cleaned up
110	18-Feb-05	letter	The following are my official comments on the proposed cleanup plan for Butte Priority Soils	Watson	Dr. Vicki	Missoula, MT	Non-Resident	110.10	Non-technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	All homeowners in contaminated areas should be able to take advantage of a free or subsidized attic dust removal now
110	18-Feb-05	letter	The following are my official comments on the proposed cleanup plan for Butte Priority Soils	Watson	Dr. Vicki	Missoula, MT	Non-Resident	110.11	Non-technical	Site-Wide	Institutional Controls	Minimize IC's	IC's burden local government and do no promote productive land uses
110	18-Feb-05	letter	The following are my official comments on the proposed cleanup plan for Butte Priority Soils	Watson	Dr. Vicki	Missoula, MT	Non-Resident	110.12	Non-technical	Solid Media/Waste Left in Place	Institutional Controls	IC's hamper redevelopment	IC's should only be used when it is not technically possible to reclaim the land to productive use

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110	18-Feb-05	letter	The following are my official comments on the proposed cleanup plan for Butte Priority Soils	Watson	Dr. Vicki	Missoula, MT	Non-Resident	110.13	Non-technical	Surface Water - General	Extent of Removal	Removal of streamside wastes	Remove soil contamination near streams
110	18-Feb-05	letter	The following are my official comments on the proposed cleanup plan for Butte Priority Soils	Watson	Dr. Vicki	Missoula, MT	Non-Resident	110.14	Technical	Surface Water - General	Unrelated Topic	Out of scope	Suggests diversion of clean water above Yankee Doodle Tailings so that water does not become contaminated
111	21-Jan-05	letter	I have read the EPA's proposed plan for the Butte Priority soils superfund site.	Curtis	Kevin	Butte, MT	Resident - Butte	111.1	Non-technical	Site-Wide	General Comment	Commenter Opposes	I would like to go on record as saying that I think it is crap
111	21-Jan-05	letter	I have read the EPA's proposed plan for the Butte Priority soils superfund site.	Curtis	Kevin	Butte, MT	Resident - Butte	111.2	Non-technical	Site-Wide	General Comment	Concerned about Health Effects/Risks	EPA is leaving the families of Butte with heavy metals in their homes, yards, and throughout town
111	21-Jan-05	letter	I have read the EPA's proposed plan for the Butte Priority soils superfund site.	Curtis	Kevin	Butte, MT	Resident - Butte	111.3	Non-technical	General Comment	General Comment	Commenter Opposes	EPA corrupt sellouts to ARCO, EPA won't stand up and do what is right, only care about money
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.1	Non-technical	Site-Wide	General Comment	Commenter Opposes	strongly oppose various aspects of EPA's proposed remedy for BPSOU
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.2	Non-technical	Site-Wide	General Comment	Commenter Opposes	Fact that ARCO is happy with PP is reason enough for suspicion
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.3	Technical	Lower Area One	Treatment Lagoons	Performance - general	Compares to Warm Spring Ponds, claim that effluent exceeds WQ standards much of the time
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.4	Non-technical	Lower Area One	Treatment Lagoons	Performance - general	No detailed plan on treatment of water from Butte hill (presume in LAO lagoons)
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.5	Technical	Lower Area One	Treatment Lagoons	Sludge Volume/Removal/Handling	not yet knowledge available on the operation and maintenance of them
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.6	Technical	Lower Area One	Conventional Lime Treatment	Performance - general	No evidence that conventional lime treatment ... will remove enough metals to meet WQ standards
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.7	Technical	Lower Area One	Treatment Lagoons	Performance - arsenic	There is plenty of evidence that such a treatment facility will not remove arsenic and that in fact it might actually increase arsenic levels
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.8	Technical	Parrott Tailings/MSD	Capture and Treatment	Capture Effectiveness	constructed parallel to valley gradient - horrible design
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.9	Technical	Parrott Tailings/MSD	Aquifer Restoration/Cleanup	Timeframe	No removal ensures treatment in perpetuity
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.10	Technical	Surface Water - Storm Water	Characterization	Perceived Data Gap	No baseline data presented and made public from runoff from the various waste sites
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.11	Technical	Lower Area One	Treatment Lagoons	Perceived Data Gap	No baseline data collected and made public from effluent from water treatment lagoons
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.12	Technical	Residential Metals	Attic and/or Interior Dust	Concerned about Health Effects/Risks	No data collected on the actual exposure of residents to attic and wall dust
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.13	Technical	Residential Metals	Attic and/or Interior Dust	Pathways	No data presented on exposure for people whose work routinely creates an exposure pathway - roofers, electricians, and home remodelers
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.14	Technical	Parrott Tailings/MSD	Characterization	Groundwater flow rates	Migration from Parrott Tailings toward SBC is more rapid than EPA believes
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.15	Technical	Parrott Tailings/MSD	Aquifer Restoration/Cleanup	Timeframe	Removal of the Parrott Tailings would lead to a relatively short term recovery of groundwater resources
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.16	Technical	Parrott Tailings/MSD	Characterization	Aquifer Hydrogeology	EPA's knowledge of the SBC aquifer is inadequate when it comes to choosing a remediation alternative, does not know enough to refute MBMG's studies
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.17	Technical	Parrott Tailings/MSD	Cost of Removal	Cost Overestimated	EPA's cost estimate for removal appears to be a gross overestimate - NRDP says $18M instead of $37M
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.18	Technical	Parrott Tailings/MSD	Water Quality	WQB-7 standards in Silver Bow Creek	EPA's proposed remedy ensures SBC will be a permanently impaired stream
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.19	Non-technical	Site-Wide	Ecological Risk	For Removal	Proposed remedy should include removal of environmental hazards that impair ecological function (Missoula, Helena, have abundant wildlife in their communities)
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.20	Non-technical	Site-Wide	General Comment	General Comment	Big Butte and mine dumps over the Butte hill should serve as an urban wildlife corridor to bring nature into Butte
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.21	Non-Technical	Surface Water - General	Water Quality	Restoration of Fishery	Proposed remedy will ensure fragmented habitat
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.22	Technical	Surface Water - General	Water Quality	WQB-7 standards in Silver Bow Creek	Copper standards are exceeded below LAO
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.23	Technical	Groundwater	Capture and Treatment	Meeting WQB-7 standards in Silver Bow Creek	Concerned that lime treatment will not reduce copper levels below water quality standards, don't want an ARAR waiver
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.24	Technical	Surface Water - General	Extent of Removal	Meeting WQB-7 standards in Silver Bow Creek	Extensive removal required to meet WQ standards in SBC
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.25	Technical	Groundwater	Extent of Removal	For Removal	Removal is required so that treatment has a chance of succeeding

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112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.26	Non-technical	Site-Wide	Evaluation of NCP Criteria	For Removal	Only removal meets EPA's threshold and balancing criteria
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.27	Non-technical	Site-Wide	General Comment	Concerned about Health Effects/Risks	Environmental health will suffer with waste left in place
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.28	Non-technical	Site-Wide	General Comment	Long-Term Effectiveness and Permanence	Remedy is temporary
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.29	Technical	Solid Media/Waste Left in Place	Reclamation	Commenter Supports	Caps over waste effective for dumps outside of floodplain
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.30	Technical	Site-Wide	Extent of Removal	Waste in contact with Groundwater	Wastes in floodplain or in contact with aquifer are unacceptable
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.31	Technical	Parrott Tailings/MSD	Characterization	Aquifer Hydrogeology	Hydrology of the Parrott Tailings needs to be better characterized
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.32	Technical	Surface Water - General	Water Quality	For Removal	If water quality (runoff and groundwater) from capped waste does not meet standards, then mine waste should be removed
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.33	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation specifications	Thin and failing caps
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.34	Technical	Surface Water - Storm Water	Characterization	Perceived Data Gap	Where are the data showing reclamation in Missoula Gulch should become part of the remedy
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.35	Technical	Groundwater	Capture and Treatment	Design Criteria	Groundwater collection system needs to be well thought out based on good understanding of groundwater movement
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.36	Technical	Groundwater	Capture and Treatment	Design Criteria	Groundwater treatment system needs to be designed using state of the art technologies that remove As and heavy metals
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.37	Technical	Residential Metals	Attic and/or Interior Dust	Characterization	All homes should be tested for smelter dust
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.38	Technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	Attic dust should be removed
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.39	Technical	Residential Metals	Attic and/or Interior Dust	Pathways	Remodeling, roof repair, rewiring create future pathways
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.40	Technical	Residential Metals	Attic and/or Interior Dust	Property Resale - Disclosure of Contamination/Remediation	Metals and arsenic levels should be recorded as part of the deed for that property
112	6-Feb-05	letter	As residents of the affected area, we strongly oppose various aspects of EPA's proposed remedy for the Butte Priority Soils OU.	Munday	Pat, Jan, and Emily	Walkerville, MT	Resident - Walkerville	112.41	Non-technical	Site-Wide	General Comment	General Comment	Let us know when EPA will propose a remedy to make our homes safe
113	4-Jan-05	letter	I am writing this letter to request that the Butte Superfund Site with its contamination and danger to the citizens of Butte be addressed	Bagon	Maggie	North Bend, OR	Non-Resident	113.1	Non-technical	Site-Wide	Environmental Justice	EPA did not account for Environmental Justice	People who are being hurt the worst are those the least able to help themselves
113	4-Jan-05	letter	I am writing this letter to request that the Butte Superfund Site with its contamination and danger to the citizens of Butte be addressed	Bagon	Maggie	North Bend, OR	Non-Resident	113.2	Non-technical	Site-Wide	General Comment	General Comment	Left Butte due to physical problems from the pollution on the hill
114	20-Mar-05	email letter	The EPA, in its wholly inadequate proposed action regarding Butte Priority Soils....	Edwards	Paul	Helena, MT	Non-Resident	114.1	Non-technical	General Comment	General Comment	Commenter Opposes	EPA putting the well being of corporations ahead of well being of individual citizens etc.
115	15-Mar-05	verbal comment	Verbal comments prepared for BSB Chief Executive Paul Babb for presentation...second public hearing Tues March 15, 2005	Babb	Paul	Chief Executive, BSB	PRP	115.1	Non-technical	Site-Wide	ARCO/BSB Agreement	BSB responsible for program or O&M	BSB wants control of long-term programs and protection from unfunded liabilities
115	15-Mar-05	verbal comment	Verbal comments prepared for BSB Chief Executive Paul Babb for presentation...second public hearing Tues March 15, 2005	Babb	Paul	Chief Executive, BSB	PRP	115.2	Technical	Residential Metals	Multipathway Lead Abatement Program	Supports Lead Program	BSB strongly believes that the continued implementation of the multipathway lead program is necessary, with an aggressive approach to indoor contamination
115	15-Mar-05	verbal comment	Verbal comments prepared for BSB Chief Executive Paul Babb for presentation...second public hearing Tues March 15, 2005	Babb	Paul	Chief Executive, BSB	PRP	115.3	Non-technical	Surface Water - Storm Water	Storm Water Conveyances	Funding	Long term capital improvement program to repair and replace the storm water system infrastructure
115	15-Mar-05	verbal comment	Verbal comments prepared for BSB Chief Executive Paul Babb for presentation...second public hearing Tues March 15, 2005	Babb	Paul	Chief Executive, BSB	PRP	115.4	Non-technical	Solid Media/Waste Left in Place	Redevelopment	Funding	Establish a redevelopment trust fund to assist w/ long term impacts of waste left in place
115	15-Mar-05	verbal comment	Verbal comments prepared for BSB Chief Executive Paul Babb for presentation...second public hearing Tues March 15, 2005	Babb	Paul	Chief Executive, BSB	PRP	115.5	Non-technical	Residential Metals	Soils and/or Interior/Attic Dust	General Comment	BSB believes protection of human health is the highest priority
115	15-Mar-05	verbal comment	Verbal comments prepared for BSB Chief Executive Paul Babb for presentation...second public hearing Tues March 15, 2005	Babb	Paul	Chief Executive, BSB	PRP	115.6	Non-technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	Indoor dusts containing elevated metals are a major concern and must be addressed in the remedy
115	15-Mar-05	verbal comment	Verbal comments prepared for BSB Chief Executive Paul Babb for presentation...second public hearing Tues March 15, 2005	Babb	Paul	Chief Executive, BSB	PRP	115.7	Technical	Residential Metals	Multipathway Lead Abatement Program	Protectiveness of human health	BSB believes a properly prioritized implementation of the multipathway program is necessary
115	15-Mar-05	verbal comment	Verbal comments prepared for BSB Chief Executive Paul Babb for presentation...second public hearing Tues March 15, 2005	Babb	Paul	Chief Executive, BSB	PRP	115.8	Technical	Residential Metals	Multipathway Lead Abatement Program	Timeframe	Long term concerns will need to be programmatically addressed throughout the BPSOU for as long as 30 years into the future
115	15-Mar-05	verbal comment	Verbal comments prepared for BSB Chief Executive Paul Babb for presentation...second public hearing Tues March 15, 2005	Babb	Paul	Chief Executive, BSB	PRP	115.9	Non-technical	Surface Water - Storm Water	Storm Water Conveyances	Funding	Seeking funding for long term capital improvement of storm water systems
115	15-Mar-05	verbal comment	Verbal comments prepared for BSB Chief Executive Paul Babb for presentation...second public hearing Tues March 15, 2005	Babb	Paul	Chief Executive, BSB	PRP	115.10	Technical	Surface Water - Storm Water	Storm Water Treatment	Commenter Opposes	BSB believes conventional lime treatment of storm waters would be impractical and unnecessary

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115	15-Mar-05	verbal comment	Verbal comments prepared for BSB Chief Executive Paul Babb for presentation...second public hearing Tues March 15, 2005	Babb	Paul	Chief Executive, BSB	PRP	115.11	Technical	Groundwater	Capture and Treatment	General Comment	BSB provided 5 criteria for EPA to meet for the treatment method to be acceptable (position paper)
115	15-Mar-05	verbal comment	Verbal comments prepared for BSB Chief Executive Paul Babb for presentation...second public hearing Tues March 15, 2005	Babb	Paul	Chief Executive, BSB	PRP	115.12	Technical	Lower Area One	Treatment Lagoons	Commenter Supports	BSB believes that the expanded lagoon system may meet performance and BSB criteria, if so, such a system would be acceptable to BSB
115	15-Mar-05	verbal comment	Verbal comments prepared for BSB Chief Executive Paul Babb for presentation...second public hearing Tues March 15, 2005	Babb	Paul	Chief Executive, BSB	PRP	115.13	Non-technical	Parrott Tailings/MSD	Long-term Operations and Maintenance	Funding	Regardless of the fate of the Parrott tailings, BSB wants 6 criteria met, plus long term funding for O&M
115	15-Mar-05	verbal comment	Verbal comments prepared for BSB Chief Executive Paul Babb for presentation...second public hearing Tues March 15, 2005	Babb	Paul	Chief Executive, BSB	PRP	115.14	Non-technical	Site-Wide	Redevelopment	Brownfields	BSB requests EPA establish in the ROD a high priority for grants from the EPA Brownfields cleanup and redevelopment program to the BPSOU
115	15-Mar-05	verbal comment	Verbal comments prepared for BSB Chief Executive Paul Babb for presentation...second public hearing Tues March 15, 2005	Babb	Paul	Chief Executive, BSB	PRP	115.15	Non-technical	Site-Wide	Redevelopment	Brownfields	BSB requests EPA expert in brownfields redevelopment be stationed permanently in Butte
115	15-Mar-05	verbal comment	Verbal comments prepared for BSB Chief Executive Paul Babb for presentation...second public hearing Tues March 15, 2005	Babb	Paul	Chief Executive, BSB	PRP	115.16	Non-technical	Site-Wide	NRDP	Funding	Any funds from the NRD which occurred in Butte be specifically earmarked for restoration projects in Butte
116	18-Mar-05	letter	Regarding final soil and dust action levels	Sheron	Barbara and Glen	Butte, MT	Resident - Butte	116.1	Technical	Site-Wide	Human Health Risk	Action Levels	The 1 in 10,000 cancer risk is unacceptable, cleanup level should protect to a 1 in 100,000 or 1 in 1,000,000 risk
117	17-Mar-05	letter	We believe the proposed remediation goals for Superfund cleanup in Butte are inadequate	Thomas	William and Valerie	Butte, MT	Resident - Butte	117.1	Technical	Site-Wide	General Comment	Concerned about Health Effects/Risks	Proposed remediation goals are inadequate
117	17-Mar-05	letter	We believe the proposed remediation goals for Superfund cleanup in Butte are inadequate	Thomas	William and Valerie	Butte, MT	Resident - Butte	117.2	Non-technical	Residential Metals	Soils and/or Interior/Attic Dust	For Removal	Toxins in soils and houses must be removed
117	17-Mar-05	letter	We believe the proposed remediation goals for Superfund cleanup in Butte are inadequate	Thomas	William and Valerie	Butte, MT	Resident - Butte	117.3	Technical	Site-Wide	Human Health Risk	Action Levels	The 1 in 10,000 cancer risk is unacceptable, cleanup level should protect to 1 in 1,000,000 risk or greater
117	17-Mar-05	letter	We believe the proposed remediation goals for Superfund cleanup in Butte are inadequate	Thomas	William and Valerie	Butte, MT	Resident - Butte	117.4	Technical	Residential Metals	Multipathway Lead Abatement Program	Lead paint	Lead paint should be part of the lead abatement program
118	30-Jan-05	email letter	Because the Butte Priority Soils Superfund site encompasses the towns of Butte and Walkerville and sits at the headwaters of the Clark Fork Watershed...	Weber	John	Butte, MT	Resident - Butte	118.1	Technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	Remove smelter dust in buildings and residential homes
118	30-Jan-05	email letter	Because the Butte Priority Soils Superfund site encompasses the towns of Butte and Walkerville and sits at the headwaters of the Clark Fork Watershed...	Weber	John	Butte, MT	Resident - Butte	118.2	Technical	Parrott Tailings/MSD	Extent of Removal	Removal of Accessible Wastes	Supports Alternative 5b
118	30-Jan-05	email letter	Because the Butte Priority Soils Superfund site encompasses the towns of Butte and Walkerville and sits at the headwaters of the Clark Fork Watershed...	Weber	John	Butte, MT	Resident - Butte	118.3	Non-technical	Parrott Tailings/MSD	Extent of Removal	For Removal	Consider long term ramifications of leaving waste in place
119	15-Mar-05	letter	Regarding the proposed plan I would like to submit the following comments;	Peck	Josh M.	Butte, MT	Resident - Butte	119.1	Non-technical	Site-Wide	General Comment	Commenter Supports	Plan is well thought out and keeps the best interests of Butte in mind
119	15-Mar-05	letter	Regarding the proposed plan I would like to submit the following comments;	Peck	Josh M.	Butte, MT	Resident - Butte	119.2	Non-technical	Site-Wide	Extent of Removal	Against Removal	Previous comments regarding full removal are unrealistic
119	15-Mar-05	letter	Regarding the proposed plan I would like to submit the following comments;	Peck	Josh M.	Butte, MT	Resident - Butte	119.3	Non-technical	Solid Media/Waste Left in Place	Extent of Removal	Against Removal	The community has not taken the true effects of total removal into consideration - cites personal accident with heavy equipment
119	15-Mar-05	letter	Regarding the proposed plan I would like to submit the following comments;	Peck	Josh M.	Butte, MT	Resident - Butte	119.4	Non-technical	Solid Media/Waste Left in Place	Extent of Removal	Against Removal	Material has to be capped wherever it is moved
119	15-Mar-05	letter	Regarding the proposed plan I would like to submit the following comments;	Peck	Josh M.	Butte, MT	Resident - Butte	119.5	Non-technical	Solid Media/Waste Left in Place	Redevelopment	Land Use	Might as well cap the waste here and reuse the property
119	15-Mar-05	letter	Regarding the proposed plan I would like to submit the following comments;	Peck	Josh M.	Butte, MT	Resident - Butte	119.6	Non-technical	Site-Wide	Redevelopment	Commenter Supports	Reclamation areas are a wonderful addition to the community
119	15-Mar-05	letter	Regarding the proposed plan I would like to submit the following comments;	Peck	Josh M.	Butte, MT	Resident - Butte	119.7	Non-technical	Site-Wide	General Comment	Aesthetics	Reclamation has changed the appearance of the town and Butte looks like and exciting place to have a business and raise a family
120	15-Mar-05	letter	I am a property owner in Butte-Silver Bow that is affected by storm water run-off from the Butte Hill.	McDonough	R.M.	Butte, MT	Resident - Butte	120.1	Technical	Surface Water - Storm Water	Storm Water Conveyances	Specific Comment	Believes storm water ditch is improperly located on his property
120	15-Mar-05	letter	I am a property owner in Butte-Silver Bow that is affected by storm water run-off from the Butte Hill.	McDonough	R.M.	Butte, MT	Resident - Butte	120.2	Technical	Surface Water - Storm Water	Storm Water Conveyances	Specific Comment	Believes storm water runoff is improperly routed on to his property and drainage ditch is improperly located on his property
120	15-Mar-05	letter	I am a property owner in Butte-Silver Bow that is affected by storm water run-off from the Butte Hill.	McDonough	R.M.	Butte, MT	Resident - Butte	120.3	Non-Technical	General Comment	Unrelated Topic	Out of scope	Suggests that Butte hot-mix plant on Montana St. near I-15/90 exit be moved away from its current location
121	21-Mar-05	email letter	...the Butte-Silver Bow County Commissioners are being asked to vote on what is referred to as the "Term Paper" concerning the Butte Priority Soils clean-up.	Dunlap	Laura Lee	County Commissioner	BSB County	121.1	Non-Technical	Site-Wide	General Comment	Concerned about Health Effects/Risks	Believes Butte is in desperate need of a massive clean-up.
121	21-Mar-05	email letter	...the Butte-Silver Bow County Commissioners are being asked to vote on what is referred to as the "Term Paper" concerning the Butte Priority Soils clean-up.	Dunlap	Laura Lee	County Commissioner	BSB County	121.2	Non-Technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	All homes that were here prior to the Anaconda Smelter shutting down in 1980 must be tested for dust contamination and removal instituted.
122	18-Mar-05	email letter	The article below, "Toxic Lead and Violence" from Rachel's Environment & Health News, August 2004, discusses in lay terms scientific data that proves the lead cleanup levels ARCO negotiated for Butte are far too lenient.	Craig	Mary Kay	Butte, MT	Resident - Butte	122.1	Non-technical	Site-Wide	Human Health Risk	lead	EPA apparently is unaware of information contained in an article from Rachel's Environment & Health News. This information should be used to help make decisions regarding the BPSOU.
122	18-Mar-05	email letter	The article below, "Toxic Lead and Violence" from Rachel's Environment & Health News, August 2004, discusses in lay terms scientific data that proves the lead cleanup levels ARCO negotiated for Butte are far too lenient.	Craig	Mary Kay	Butte, MT	Resident - Butte	122.2	Non-technical	Site-Wide	Human Health Risk	lead	In light of the data in the attached article, the cleanup level for lead in Butte's soils should be dramatically lowered.

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Document ID No.	Date	Type	Title/Opening Sentence	Last Name	First Name	Location/ Affiliation	Sector	Comment ID.	Technical/ Non-Technical/ Legal	Tier I Topic	Tier II Topic	Tier III Topic	Brief Comment Description
122	18-Mar-05	email letter	The article below, "Toxic Lead and Violence" from Rachel's Environment & Health News, August 2004, discusses in lay terms scientific data that proves the lead cleanup levels ARCO negotiated for Butte are far too lenient.	Craig	Mary Kay	Butte, MT	Resident - Butte	122.3	Non-technical	Site-Wide	Human Health Risk	Concerned about Health Effects/Risks	Could EPA survey Butte doctors to learn the number of cases of ADHD in Butte's children?
122	18-Mar-05	email letter	The article below, "Toxic Lead and Violence" from Rachel's Environment & Health News, August 2004, discusses in lay terms scientific data that proves the lead cleanup levels ARCO negotiated for Butte are far too lenient.	Craig	Mary Kay	Butte, MT	Resident - Butte	122.4	Non-technical	Site-Wide	Human Health Risk	Concerned about Health Effects/Risks	Given the data in the attached article, shouldn't EPA test children living in rental housing on the Butte Hill to determine their average blood lead level and provide remedial care for those with levels 1 to 3 mcg/deciliter or higher?
122	18-Mar-05	email letter	The article below, "Toxic Lead and Violence" from Rachel's Environment & Health News, August 2004, discusses in lay terms scientific data that proves the lead cleanup levels ARCO negotiated for Butte are far too lenient.	Craig	Mary Kay	Butte, MT	Resident - Butte	122.5	Non-technical	Site-Wide	Human Health Risk	lead	EPA should review the information in "Toxic Lead and Violence" from Rachel's Environment & Health News #797.
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.1	Technical	Site-Wide	Human Health Risk	Risk assessment flawed	Risk assessment did not consider trivalent or organic arsenic
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.2	Technical	Site-Wide	Human Health Risk	Risk assessment flawed	Wants a new baseline health risk assessment
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.3	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation specifications	Concerned about cap stability and seed mixture
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.4	Technical	Site-Wide	Human Health Risk	Action Levels	Action levels are unprotective of human health
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.5	Technical	Site-Wide	Human Health Risk	Action Levels	Action levels not comparable to other sites
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.6	Technical	Site-Wide	Human Health Risk	Action Levels	Action levels based on incomplete science
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.7	Technical	Site-Wide	Human Health Risk	Risk assessment flawed	Risk assessment did not consider all sources of exposure
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.8	Technical	Site-Wide	Human Health Risk	Action Levels	Risk level should nor be 10-4; should be 10-5
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.9	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation needed	Lexington waste/baseball field needs more work
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.10	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation needed	Wants waste removed at Timber Butte mill site
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.11	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation needed	Prefers more waste removal at Mountain Con, Bell Diamond, and Grayrock area
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.12	Technical	Surface Water - Storm Wat	General Comment	Action Levels	Soil cleanup in source areas should have/meet RGs for copper and zinc
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.13	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation needed	All mine yards should be cleaned up
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.14	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation needed	Wants cleanup at Atlantic, Josephine, and Sister sites
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.15	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation needed	Wants Alexander street paved to the GMMIA
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.16	Technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	Attic dust should include all dust in buildings
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.17	Technical	Residential Metals	Attic and/or Interior Dust	Timeframe	Dust cleanup program should be expedited to be completed in 5-10 years
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.18	Technical	Solid Media/Waste Left in Place	Railroad Beds	Reclamation specifications	Supports removal of wastes from steep slopes
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.19	Technical	Solid Media/Waste Left in Place	Railroad Beds	Reclamation specifications	Cellular confinement should be removed and slopes laid back and reclaimed
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.20	Technical	Surface Water - Storm Wat	Storm Water Conveyances	Aesthetics	Design of Missoula and Buffalo gulches should have considered aesthetics
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.21	Technical	Parrott Tailings/MSD	Extent of Removal	Removal of Accessible Wastes	Supports removal of accessible wastes at Parrott and Diggings
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.22	Technical	Parrott Tailings/MSD	Characterization	Inadequate characterization	Aquifer is poorly characterized
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.23	Technical	Parrott Tailings/MSD	Characterization	Contaminant Transport	Disagrees with contaminant maps and aquifer tests in FFS
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.24	Technical	Parrott Tailings/MSD	Characterization	Contaminant Sources	FFS did not consider Parrott Tailings as contminant sourse, but concluded that the Diggings east was the source without analysis.
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.25	Technical	Parrott Tailings/MSD	Characterization	Aquifer Hydrogeology	Water table fluctuations show significant quatities of water move through Parrott Tailings
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.26	Technical	Parrott Tailings/MSD	Aquifer Restoration/Cleanup	Feasibility or Technical Impracticability	EPA did not collected any data to show that the aquifer cannot be restored
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.27	Technical	Parrott Tailings/MSD	Characterization	Contaminant Transport	Low pH of the ground water in the Parrott tailings and its effect on metals mobility was not considered in the FFS and PP
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.28	Technical	Site-Wide	Extent of Removal	Separation between waste and ground water	The distance to ground water of <10 ft. as a criterion for waste removal should be used site-wide
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.29	Technical	Parrott Tailings/MSD	Capture and Treatment	Capture Effectiveness	The subdrain has lowered the water table and this needs to be accounted; a ground water model is needed
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.30	Technical	Parrott Tailings/MSD	Capture and Treatment	Capture Effectiveness	Drought has lowered the water table and this needs to be accounted; a ground water model is needed
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.31	Technical	Parrott Tailings/MSD	Characterization	Contaminant Transport	Column leach tests are needed
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.32	Technical	Site-Wide	Extent of Removal	Separation between waste and ground water	separation between wastes and ground water should be considered for all decisions
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.33	Technical	Groundwater	Capture and Treatment	Capture Effectiveness	The flux of ground water exiting the OU is poorly quanitifed and should be revisited
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.34	Technical	Parrott Tailings/MSD	Extent of Removal	For Removal	acid-generating materials should be removed

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123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.35	Technical	Parrott Tailings/MSD	Extent of Removal	Removal of Accessible Wastes	Supports alternative 5b
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.36	Technical	Parrott Tailings/MSD	Characterization	Inadequate characterization	More characterization is necessary to assure the selected remedies are appropriate
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.37	Technical	Parrott Tailings/MSD	Capture and Treatment	Capture Effectiveness	If parrot, diggings, north side are not removed, these are needed: impermeable caps, another subdrain parallel to Blacktail, more monitoring wells, better understanding of the system
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.38	Technical	Lower Area One	Extent of Removal	Removal of Accessible Wastes	Much waste remains in LAO; supports removal of all accessible waste
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.39	Technical	Lower Area One	Treatment Lagoons	Performance - general	Ponds at LAO will remain an eyesore; no guarantee of long-term protection of downstream receptors
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.40	Technical	Lower Area One	Conventional Lime Treatment	Commenter Supports	Supports removal of LAO ponds and construction of lime treatment plant
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.41	Technical	Solid Media/Waste Left in Place	Reclamation	Fire Hazard	O&M of reclamation: grassy slopes can be a fire hazard; need plans for fire prevention and suppression - suggests irrigation
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.42	Technical	Solid Media/Waste Left in Place	Reclamation	Operations and Maintenance	caps will need significant maintentnce and removals may be necessary
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.43	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation specifications	caps need deep-rooted and/or woody vegetation
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.44	Technical	Solid Media/Waste Left in Place	Long-term Operations and Maintenance	BSB responsible for program or O&M	BSB should have a role in remediation/reclamation/O&M and be funded
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.45	Technical	Solid Media/Waste Left in Place	BRES	Supports BRES program	Supports BRES
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.46	Technical	Site-Wide	Human Health Risk	Risk assessment flawed	Wants a new human health risk assessment that includes Imagine Butte information, state cancer profiles, and adresses trivalent arsenic
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.47	Technical	Surface Water - Storm Water	Storm Water Conveyances	Design Criteria	Missoula and Buffalo gulch remedies should be disigned to handle greater then the 10-year storm and should look more natural
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.48	Technical	Solid Media/Waste Left in Place	Railroad Beds	Reclamation specifications	Does not like railroad cellular confinement; supports 3:1 slopes, coversoil, and revegetation
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.49	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation needed	Lexington Mine/Walkerville ballfields need additional reclamation
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.50	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation needed	Concerned about the waste left at the Timber Butte mill site; suggests waste removal
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.51	Technical	Solid Media/Waste Left in Place	Reclamation	Fire Hazard	O&M of reclamation: grassy slopes can be a fire hazard; consider different species or irrigation
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.52	Technical	Residential Metals	Human Health Risk	Concerned about Health Effects/Risks	Vacant lots are unreclaimed and are unfenced; should be included in Superfund process
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.53	Technical	Granite Mountain Memorial Area	Extent of Removal	For Removal	Supports more removals and less "interpretive features" at Mountain Con, Bell Diamond and Grayrock
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.54	Technical	Solid Media/Waste Left in Place	Railroad Beds	Reclamation needed	Suggests more work is needed along the railroad walking trail to reduce contact with waste; either more removals or better caps
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.55	Technical	Parrott Tailings/MSD	Extent of Removal	Removal of Accessible Wastes	Strongly recommends removal of accessible wastes in the Parrott/MSD area
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.56	Technical	Parrott Tailings/MSD	Extent of Removal	Removal of Accessible Wastes	Ground water in the MSD area might become clean if the waste materials are removed
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.57	Technical	Lower Area One	Extent of Removal	Removal of Accessible Wastes	Wants additional waste removal at LAO
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.58	Technical	Lower Area One	Conventional Lime Treatment	Commenter Supports	Wants to eliminate the treatment ponds at LAO and replace them with a lime treatment plant
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.59	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation needed	Wants cleanup of Atlantic, Josephine and Sister sites
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.60	Technical	Granite Mountain Memorial Area	Air Monitoring	Concerned about Health Effects/Risks	If air monitoring shows a risk, then dumps within Granite Mountain Memorial should be cleaned up
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.61	Technical	Granite Mountain Memorial Area	Reclamation	Reclamation needed	Wants Alexander street to the Granite Mountain Memorial paved
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.62	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation needed	Wants all mine dumps in the BPSOU reclaimed
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.63	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation specifications	Current caps are grasses only and the commenter prefers mixed grass/shrubforest
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.64	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation needed	Unreclaimed sites with elevated metals should be cleaned up
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.65	Technical	Solid Media/Waste Left in Place	Long-term Operations and Maintenance	Funding	A system for maintenance of caps should be implemented and funded in perpetuity
123	21-Mar-05	email attachment	Butte Priority Soils Superfund Site Citizen's Working Group's Comments	Tribe	Virginia	Citizen's Working Group	Citizen Group	123.66	Technical	Residential Metals	Attic and/or Interior Dust	Characterization	More investigation of dust is necessary before a remedy can be selected
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.1	Technical	Lower Area One	Capture and Treatment	Capture Effectiveness	SBC is subject to recontamination due to waste left in place; a contingency plan is needed
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.2	Technical	Surface Water - Storm Water	Storm Water Conveyances	Design Criteria	Storm water approach should account for large events
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.3	Technical	Lower Area One	Capture and Treatment	Capture Effectiveness	More monitoring wells are needed to make sure LAO groundwater is not reaching SBC
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.4	Technical	Lower Area One	Capture and Treatment	Capture Effectiveness	Ground water capture and extraction should be a contingency
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.5	Technical	Surface Water - Storm Water	Reclamation	Storm Water Treatment	More aggressive treatment of sources areas should be considered before lime treatment of runoff
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.6	Non-technical	Parrott Tailings/MSD	Development of Alternatives	No difference among alternatives	Alternatives should be considered as individual elements rather than site wide
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.7	Technical	Site-Wide	Evaluation of NCP Criteria	Short-Term Effectiveness	Risk to workers during removal action should not reduce score for protection of human health
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.8	Technical	Parrott Tailings/MSD	Extent of Removal	Removal of Accessible Wastes	Supports Alternative 5b
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.9	Technical	Parrott Tailings/MSD	Characterization	Inadequate characterization	Conceptual site model is flawed

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124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.10	Technical	Parrott Tailings/MSD	Characterization	Inadequate characterization	More modeling is needed to evaluate ground water under Parrott tailings
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.11	Technical	Site-Wide	General Comment	Perceived Data Gap	Documents were not available for review
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.12	Technical	Parrott Tailings/MSD	Cost of Removal	Cost Overestimated	Unit costs of waste removal are too high.
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.13	Technical	Parrott Tailings/MSD	Extent of Removal	For Removal	Limited backfill of excavations should be considered
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.14	Technical	Site-Wide	Human Health Risk	Action Levels	PRG for lead should be reconsidered
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.15	Technical	Site-Wide	Human Health Risk	Action Levels	PRG for lead should be reconsidered to account for lead-based paint
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.16	Technical	Site-Wide	Human Health Risk	Action Levels	PRG for lead should be reconsidered to account for lead in drinking water
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.17	Technical	Site-Wide	Human Health Risk	Action Levels	PRG for lead should be reconsidered to account for lead in ambient air
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.18	Technical	Site-Wide	Human Health Risk	Action Levels	PRG for lead should be reconsidered to account for funding of lead abatement program
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.19	Technical	Site-Wide	Human Health Risk	Bioavailability Studies	Needs more data to support bioavailability values
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.20	Technical	Site-Wide	Human Health Risk	Bioavailability Studies	Needs more data on dust to support bioavailability values
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.21	Technical	Site-Wide	Human Health Risk	Action Levels	PRGs should be different for indoor and outdoor scenarios
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.22	Technical	Site-Wide	Human Health Risk	Action Levels	PRG for arsenic should be based on a risk of 1 in 100,000
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.23	Technical	Lower Area One	Treatment Lagoons	Performance - general	Needs data on performance of treatment lagoons and ability to meet ARARs
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.24	Technical	Solid Media/Waste Left in Place	Long-term Operations and Maintenance	Funding	More information is needed on funding of long-term O&M
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.25	Non-technical	Residential Metals	Multipathway Lead Abatement Program	Funding	Must fund Lead Abatement Program longer than 30 years
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.26	Technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	All forms of dust should be removed, not just attic dust
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.27	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation specifications	Should use BRES as part of cap designs to ensure permanence
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.28	Non-Technical	Site-Wide	General Comment	Perceived Data Gap	The list of documents for "Previous Investigations" is not consistent with the searchable list at the library
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.29	Technical	Air Quality	Air Monitoring	Characterization	Air monitoring at Granite Mountain Memorial should specifically at the visitor's center and at breathing height
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.30	Technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	Attic dust could enter the living space, so the plan should use a complete exposure pathway rather than attics only
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.31	Technical	Parrott Tailings/MSD	Aquifer Restoration/Cleanup	Timeframe	Disagrees with FFS travel times
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.32	Technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	Attic dust should be identified as a principal threat waste
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.33	Technical	Surface Water - General	Water Quality	WQB-7 standards in Silver Bow Creek	Plan should clarify that success of surface water cleanup affects the need for future operation of the Warm Springs Ponds
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.34	Technical	Residential Metals	Attic and/or Interior Dust	Characterization	EPA has not fully characterized all contaminated dust nor fully characterized the risk
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.35	Technical	Air Quality	Air Monitoring	Characterization	Wind erosion of source areas need to be clarified
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.36	Technical	Residential Metals	Attic and/or Interior Dust	Pathways	Dermal exposure to dust pathway should be evaluated
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.37	Technical	Residential Metals	Human Health Risk	Action Levels	Lead PRGs need to be more conservative
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.38	Technical	Site-Wide	Human Health Risk	Action Levels	Arsenic PRGs need to be more conservative
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.39	Technical	Site-Wide	Human Health Risk	Action Levels	Cancer risk was not clearly identified
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.40	Non-Technical	Site-Wide	Redevelopment	Land Use	Reasonable anticipated future land uses needs to be clarified
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.41	Technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	Exposure to contaminated dust should be considered an unacceptable risk
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.42	Technical	Site-Wide	Human Health Risk	Action Levels	Basis for exposure levels for lead and arsenic in dust needs to be clarified
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.43	Technical	Surface Water - General	Water Quality	Monitoring Stations	More explanation is needed concerning monitoring of point source discharges
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.44	Technical	Site-Wide	Institutional Controls	Minimize IC's	IC's need to be fully explained so that public can better compare alternatives
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.45	Technical	Site-Wide	Extent of Removal	Long-Term Effectiveness and Permanence	Disagrees with scoring of waste removal alternatives
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.46	Technical	Surface Water - General	In-Stream Flow Augmentation	Commenter Opposes	Flow augmentation should be better explained to clarify that is does not reduce loading
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.47	Technical	Surface Water - Storm Water	BMPs	Timeframe	Storm water actions should meet ARARs sooner - not decades
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.48	Technical	Surface Water - Storm Water	Extent of Removal	Removal of streamside wastes	Waste in contact with surface water should be removed
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.49	Technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	Supports removal of attic dust
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.50	Technical	Residential Metals	Attic and/or Interior Dust	General Comment	House dust should be clarified to mean contaminated dust
124	18-Mar-05	letter	CTEC Position paper	Larson	Jill	CTEC	Citizen Group	124.51	Non-Technical	Groundwater	Capture and Treatment	Monetary Compensation	Cost of water source replacement should be paid
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.1	Non-technical	Solid Media/Waste Left in Place	Long-term Operations and Maintenance	Funding	There must be a premium on the long term maintenance of these caps and water management facilities
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.2	Non-technical	Solid Media/Waste Left in Place	Redevelopment	Land Use	Cleanup project must accommodate and promote beneficial reuse and development of reclaimed properties
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.3	Technical	Residential Metals	Multipathway Lead Abatement Program	Supports Lead Program	Lead program must be included with emphasis in three areas...
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.4	Non-technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	Expanded abatement services for a more aggressive approach to the presence of lead/arsenic in attic dusts
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.5	Non-technical	Residential Metals	Soils and/or Interior/Attic Dust	Concerned about Health Effects/Risks	Need to add a long-term health monitoring program
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.6	Technical	Residential Metals	Multipathway Lead Abatement Program	Supports Lead Program	Program needs maximum flexibility to deal with site-specific conditions
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.7	Non-technical	Residential Metals	Multipathway Lead Abatement Program	BSB responsible for program or O&M	The lead abatement/attic dust program will be administered and implemented by BSB
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.8	Non-technical	Residential Metals	Multipathway Lead Abatement Program	Funding	ROD and Consent Decree must ensure sufficient financial resources for lead program
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.9	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation specifications	EPA should require in the ROD a Berm and Curb program to prevent storm water runon/runoff onto/from source areas

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Document ID No.	Date	Type	Title/Opening Sentence	Last Name	First Name	Location/ Affiliation	Sector	Comment ID.	Technical/ Non-Technical/ Legal	Tier I Topic	Tier II Topic	Tier III Topic	Brief Comment Description
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.10	Non-technical	Solid Media/Waste Left in Place	Long-term Operations and Maintenance	Fences	EPA should require in the ROD a reevaluation of all superfund fences in the OU
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.11	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation specifications	BSB believes in some cases original reclamation work was not done effectively and should be upgraded as necessary
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.12	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation needed	Specific Comment: BSB expects all or portions of the following list of reclaimed sites to be reevaluated...gives list of sites
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.13	Legal	Solid Media/Waste Left in Place	Reclamation	Reclamation specifications	Final remedy on non-residential source areas should be designed and constructed to comply with ARARs of the state of Montana (refers to diverse vegetation, trees, etc)
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.14	Technical	Granite Mountain Memorial Area	Reclamation	Reclamation needed	Areas west of the memorial should be reclaimed
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.15	Technical	Granite Mountain Memorial Area	Reclamation	Reclamation needed	Areas east of the memorial should be left "as is"
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.16	Technical	Solid Media/Waste Left in Place	Reclamation	Aesthetics	Syndicate Pit - provide an aesthetic buffer to residential areas nearby
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.17	Technical	Surface Water - Storm Water	BMPs	Detention/Retention Basins	Syndicate Pit - drainage measures should be taken to route surface water from a widened and improved Clark Street into the pit
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.18	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation needed	Lists specific sites where reclamation is needed
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.19	Technical	Solid Media/Waste Left in Place	Characterization	Flexibility	ROD should allow flexibility in remedy for discovery of unknown unreclaimed source areas
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.20	Technical	Site-Wide	Mine Waste Repository	Reclamation needed	ROD must include final closure of existing repository
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.21	Technical	Site-Wide	Mine Waste Repository	Need new repository	ROD must include siting and construction of a new repository and reclamation to handle volumes of material from the OU for years to come
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.22	Technical	Surface Water - Storm Water	Storm Water Conveyances	Green Mountain Shaft	A properly designed storm water inlet should be built on top of the shaft
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.23	Technical	Surface Water - Storm Water	Storm Water Conveyances	Green Mountain Shaft	An adjacent sedimentation basin should be constructed to allow removal of sediments
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.24	Technical	Surface Water - Storm Water	Storm Water Conveyances	Green Mountain Shaft	Backup system should be prepared as a backup conveyance anticipating the eventual failure of the Green Mountain shaft as a water conveyance
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.25	Non-technical	Solid Media/Waste Left in Place	Long-term Operations and Maintenance	Funding	Fully funded O&M program needed
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.26	Non-technical	Solid Media/Waste Left in Place	Long-term Operations and Maintenance	Funding	Need fully funded Land Management Program to track and control all activities (maintenance, ownership, redevelopment) - GIS
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.27	Non-technical	Solid Media/Waste Left in Place	Redevelopment	Funding	Need a substantial redevelopment trust fund
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.28	Non-technical	Solid Media/Waste Left in Place	General Comment	Funding	Need insurance products to protect BSB from unexpected costs
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.29	Technical	Surface Water - Storm Water	Storm Water Conveyances	Design Criteria	Critical that all storm water conveyance channels be properly designed, constructed, and maintained - want to get more precipitation data to better design for the intense "gullywasher" which have destroyed structures
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.30	Non-technical	Surface Water - Storm Water	Long-term Operations and Maintenance	Funding	Fully funded O&M program needed for storm water system
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.31	Technical	Surface Water - Storm Water	BMPs	Reclamation needed	Reclaim the upfront "storm water sites" in the ROD instead of waiting for the BMP program
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.32	Technical	Surface Water - Storm Water	Storm Water Conveyances	Specific Comment	Replace Missoula Gulch storm sewer section (Empire to Iron street)
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.33	Non-technical	Surface Water - Storm Water	Storm Water Conveyances	Funding	Long term capital improvement program to repair and replace the storm water system infrastructure
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.34	Technical	Groundwater	Extent of Removal	General Comment	If removal occurs, use cost-effective community acceptable measures - less intrusive haul routes, siting an appropriate repository, reduced backfill requirements
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.35	Non-technical	Groundwater	Capture and Treatment	Use of treated water	All treated groundwater shall be made available to BSB for beneficial reuse
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.36	Technical	Groundwater	Characterization	Need Monitoring	Need to add monitoring wells to define groundwater plumes, size shape and flow directions
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.37	Non-technical	Groundwater	General Comment	Monetary Compensation	If no removal occurs, compensate for loss of aquifer to BSB
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.38	Non-technical	Groundwater	Long-term Operations and Maintenance	Funding	Funding available to manage the resource and remedy in perpetuity
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.39	Non-technical	Groundwater	Capture and Treatment	Aesthetics	Final remedy must be aesthetically pleasing
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.40	Non-technical	Groundwater	Capture and Treatment	General Comment	All sources of water should be treated at the same facility
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.41	Technical	Lower Area One	Treatment Lagoons	Performance - general	There does not appear to be sufficient evidence that the lagoons will be effective in the short or long term
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.42	Technical	Groundwater	Capture and Treatment	Performance - general	Treatment system must meet WQB-7 standards
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.43	Non-technical	Groundwater	Capture and Treatment	Aesthetics	Treatment system must provide aesthetics
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.44	Non-technical	Lower Area One	Redevelopment	Land Use	Treatment system must allow for the maximum reuse of LAO
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.45	Technical	Groundwater	Capture and Treatment	Operations and Maintenance	Treatment system must be easy to operate and maintain
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.46	Non-technical	Groundwater	Long-term Operations and Maintenance	Funding	Trust fund needed to operate the system in perpetuity

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125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.47	Technical	Lower Area One	Treatment Lagoons	General Comment	The treatment lagoons "treatability study" cannot go on in perpetuity - no further classification of the lagoons as a treatability study
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.48	Legal	Surface Water - Storm Water	Institutional Controls	Local Ordinance Needed	BSB needs a storm water ordinance to manage storm water effectively
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.49	Technical	Parrott Tailings/MSD	Capture and Treatment	Capture Effectiveness	BSB believes that the near-surface subdrain may not adequately contain contaminated groundwater from deeper portions of the aquifer
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.50					Number accidentally skipped
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.51	Technical	Groundwater	Characterization	Need Monitoring	If groundwater plume is spreading, the ROD must mandate additional remedial actions
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.52	Technical	Groundwater	Capture and Treatment	Capture Effectiveness	Groundwater interception and extraction wells should be used to capture groundwater below MSD and LAO
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.53	Technical	Groundwater	Capture and Treatment	Design Criteria	Treatment system must be sized to handle extra flow from deep extraction wells
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.54	Non-technical	Groundwater	General Comment	Monetary Compensation	Trust fund for groundwater would pay for alternative groundwater resources and replacement of municipal water lines
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.55	Non-technical	Site-Wide	General Comment	Agency Coordination	BSB wants to enforce IC's and perform maintenance tasks, encouraging that the State/EPA/ARCO/NRD enter into an integrated settlement
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.56	Non-technical	Site-Wide	General Comment	Operations and Maintenance	Suggest establishing an independent agency to manage superfund related programs
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.57	Technical	Solid Media/Waste Left in Place	BRES	Supports BRES program	Reach agreement on standards for reclamation vegetation/caps specifications and the BRES
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.58	Non-technical	Groundwater	Institutional Controls	Funding	Long term costs to administer a groundwater control area need to be defined
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.59	Non-technical	Solid Media/Waste Left in Place	Long-term Operations and Maintenance	Funding	Funds should be provided for reclamation O&M work and is distinct from standard property ownership responsibilities - burden shouldn't be on property owner
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.60	Non-technical	Solid Media/Waste Left in Place	Redevelopment	Funding	Need trust fund to help ensure redevelopment of the reclaimed properties
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.61	Non-technical	Site-Wide	General Comment	Funding	Need money in trust fund to cover 5-year reviews and any resulting corrective action stemming from the review findings
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.62	Non-technical	Site-Wide	General Comment	Funding	BSB and ARCO should pay an insurance policy to cover future unforeseen costs
125	21-Mar-05	letter	Butte-Silver Bow Position Paper - Butte Priority Soils: A Proposed Solution	Babb	Paul	Chief Executive, BSB	PRP	125.63	Technical	Groundwater	Capture and Treatment	General Comment	Want treatment plant to integrate metals contamination and nutrient contamination (from wastewater)
126	21-Mar-05	letter	Butte-Silver Bow's Executive Comments on EPA's Preferred Alternative Remedy	Babb	Paul	Chief Executive, BSB	PRP	126.1	Non-technical	Site-Wide	General Comment	Commenter Supports	Overall the PP is a positive step and is consistent in many ways with the BSB position paper
126	21-Mar-05	letter	Butte-Silver Bow's Executive Comments on EPA's Preferred Alternative Remedy	Babb	Paul	Chief Executive, BSB	PRP	126.2	Non-technical	Residential Metals	Multipathway Lead Abatement Program	BSB responsible for program or O&M	Funding to ensure continuing local government control over the multipathway lead program
126	21-Mar-05	letter	Butte-Silver Bow's Executive Comments on EPA's Preferred Alternative Remedy	Babb	Paul	Chief Executive, BSB	PRP	126.3	Non-technical	Surface Water - Storm Water	Storm Water Conveyances	Funding	Long term capital improvement program to repair and replace the storm water system infrastructure
126	21-Mar-05	letter	Butte-Silver Bow's Executive Comments on EPA's Preferred Alternative Remedy	Babb	Paul	Chief Executive, BSB	PRP	126.4	Non-technical	Solid Media/Waste Left in Place	Redevelopment	Funding	Establish a redevelopment trust fund to assist w/ long term impacts of waste left in place
126	21-Mar-05	letter	Butte-Silver Bow's Executive Comments on EPA's Preferred Alternative Remedy	Babb	Paul	Chief Executive, BSB	PRP	126.5	Technical	Residential Metals	Multipathway Lead Abatement Program	BSB responsible for program or O&M	BSB strongly believes that the continued implementation of the multipathway lead program is necessary and BSB should have full control and responsibility
126	21-Mar-05	letter	Butte-Silver Bow's Executive Comments on EPA's Preferred Alternative Remedy	Babb	Paul	Chief Executive, BSB	PRP	126.6	Non-technical	Residential Metals	Multipathway Lead Abatement Program	Funding	Sufficient resources should be provided for a fully funded program
126	21-Mar-05	letter	Butte-Silver Bow's Executive Comments on EPA's Preferred Alternative Remedy	Babb	Paul	Chief Executive, BSB	PRP	126.7	Non-technical	Site-Wide	Redevelopment	Brownfields	Level and extent of EPA's cooperation with continuing redevelopment efforts is unclear, want permanent assistance from EPA (e.g., Brownfields)
126	21-Mar-05	letter	Butte-Silver Bow's Executive Comments on EPA's Preferred Alternative Remedy	Babb	Paul	Chief Executive, BSB	PRP	126.8	Non-technical	Site-Wide	Redevelopment	Brownfields	BSB requests EPA establish in the ROD a high priority for grants from the EPA Brownfields cleanup and redevelopment program to the BPSOU
126	21-Mar-05	letter	Butte-Silver Bow's Executive Comments on EPA's Preferred Alternative Remedy	Babb	Paul	Chief Executive, BSB	PRP	126.9	Non-technical	Site-Wide	Redevelopment	Brownfields	BSB requests EPA expert in brownfields redevelopment be stationed permanently in Butte
126	21-Mar-05	letter	Butte-Silver Bow's Executive Comments on EPA's Preferred Alternative Remedy	Babb	Paul	Chief Executive, BSB	PRP	126.10	Legal	Solid Media/Waste Left in Place	Reclamation	Reclamation specifications	Final remedy on non-residential source areas should be designed and constructed to comply with ARARs of the state of Montana (refers to diverse vegetation, trees, etc)
126	21-Mar-05	letter	Butte-Silver Bow's Executive Comments on EPA's Preferred Alternative Remedy	Babb	Paul	Chief Executive, BSB	PRP	126.11	Technical	Site-Wide	Mine Waste Repository	Need new repository	ROD must include siting and construction of a new repository along with a firm schedule for its siting and construction
126	21-Mar-05	letter	Butte-Silver Bow's Executive Comments on EPA's Preferred Alternative Remedy	Babb	Paul	Chief Executive, BSB	PRP	126.12	Technical	Surface Water - Storm Water	Storm Water Treatment	Commenter Opposes	BSB believes conventional lime treatment of storm waters would be impractical and unnecessary
126	21-Mar-05	letter	Butte-Silver Bow's Executive Comments on EPA's Preferred Alternative Remedy	Babb	Paul	Chief Executive, BSB	PRP	126.13	Technical	Groundwater	Characterization	Need Monitoring	ROD should mandate monitoring wells to accurately define and characterize size, shape, of plume(s) under MSD and LAO
126	21-Mar-05	letter	Butte-Silver Bow's Executive Comments on EPA's Preferred Alternative Remedy	Babb	Paul	Chief Executive, BSB	PRP	126.14	Non-technical	Lower Area One	Redevelopment	Land Use	ROD should take into account ARCO's 1993 LAO conceptual reclamation plan, previously approved and adopted by the BSB council of commissioners
126	21-Mar-05	letter	Butte-Silver Bow's Executive Comments on EPA's Preferred Alternative Remedy	Babb	Paul	Chief Executive, BSB	PRP	126.15	Technical	Groundwater	Capture and Treatment	Design Criteria	The treatment system must be appropriately sized
126	21-Mar-05	letter	Butte-Silver Bow's Executive Comments on EPA's Preferred Alternative Remedy	Babb	Paul	Chief Executive, BSB	PRP	126.16	Technical	Lower Area One	Treatment Lagoons	Commenter Supports	BSB believes that the expanded lagoon system may meet performance and BSB criteria, if so, such a system would be acceptable to BSB
126	21-Mar-05	letter	Butte-Silver Bow's Executive Comments on EPA's Preferred Alternative Remedy	Babb	Paul	Chief Executive, BSB	PRP	126.17	Non-technical	Site-Wide	Long-term Operations and Maintenance	Funding	Butte must have absolute assurance that sufficient resources are available to operate, maintain, and if necessary, reconstruct or enhance caps, water collection, water treatment in the long term
126	21-Mar-05	letter	Butte-Silver Bow's Executive Comments on EPA's Preferred Alternative Remedy	Babb	Paul	Chief Executive, BSB	PRP	126.18	Non-technical	Site-Wide	NRDP	Funding	Any funds from the NRD which occurred in Butte be specifically earmarked for restoration projects in Butte

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127	25-Jan-05	verbal comment	Verbal comments prepared for BSB Chief Executive Paul Babb for presentation ...during the public hearing Tues January 25, 2005	Babb	Paul	Chief Executive, BSB	PRP	127.1	Non-technical	Site-Wide	ARCO/BSB Agreement	General Comment	BSB position paper recognizes that a comprehensive solution for the BPSOU requires more than just the CERCLA remedies outlined in the proposed plan
127	25-Jan-05	verbal comment	Verbal comments prepared for BSB Chief Executive Paul Babb for presentation...during the public hearing Tues January 25, 2005	Babb	Paul	Chief Executive, BSB	PRP	127.2	Non-technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	Indoor dusts containing elevated metals are a major concern and must be addressed in the remedy
127	25-Jan-05	verbal comment	Verbal comments prepared for BSB Chief Executive Paul Babb for presentation...during the public hearing Tues January 25, 2005	Babb	Paul	Chief Executive, BSB	PRP	127.3	Technical	Residential Metals	Multipathway Lead Abatement Program	Supports Lead Program	BSB strongly believes that the continued implementation of the multipathway lead program is necessary
127	25-Jan-05	verbal comment	Verbal comments prepared for BSB Chief Executive Paul Babb for presentation...during the public hearing Tues January 25, 2005	Babb	Paul	Chief Executive, BSB	PRP	127.4	Non-technical	Surface Water - Storm Water	Storm Water Conveyances	Funding	Seeking funding for long term capital improvement of storm water systems
127	25-Jan-05	verbal comment	Verbal comments prepared for BSB Chief Executive Paul Babb for presentation...during the public hearing Tues January 25, 2005	Babb	Paul	Chief Executive, BSB	PRP	127.5	Technical	Surface Water - Storm Water	Storm Water Treatment	Commenter Opposes	BSB believes conventional lime treatment of storm waters would be impractical and unnecessary
127	25-Jan-05	verbal comment	Verbal comments prepared for BSB Chief Executive Paul Babb for presentation...during the public hearing Tues January 25, 2005	Babb	Paul	Chief Executive, BSB	PRP	127.6	Technical	Lower Area One	Treatment Lagoons	Commenter Supports	BSB believes that the expanded lagoon system may meet performance and BSB criteria, if so, such a system would be acceptable to BSB
127	25-Jan-05	verbal comment	Verbal comments prepared for BSB Chief Executive Paul Babb for presentation...during the public hearing Tues January 25, 2005	Babb	Paul	Chief Executive, BSB	PRP	127.7	Non-technical	Parrott Tailings/MSD	Long-term Operations and Maintenance	Funding	Regardless of the fate of the Parrott tailings, BSB wants 6 criteria met, plus long term funding for O&M
127	25-Jan-05	verbal comment	Verbal comments prepared for BSB Chief Executive Paul Babb for presentation...during the public hearing Tues January 25, 2005	Babb	Paul	Chief Executive, BSB	PRP	127.8	Non-technical	Site-Wide	Redevelopment	Brownfields	BSB requests EPA establish in the ROD a high priority for grants from the EPA Brownfields cleanup and redevelopment program to the BPSOU
127	25-Jan-05	verbal comment	Verbal comments prepared for BSB Chief Executive Paul Babb for presentation ...during the public hearing Tues January 25, 2005	Babb	Paul	Chief Executive, BSB	PRP	127.9	Non-technical	Site-Wide	NRDP	Funding	Any funds from the NRD which occurred in Butte be specifically earmarked for restoration projects in Butte
128	18-Mar-05	email letter	I do not think the proposed cleanup of the Butte site is sufficient.	Curtis	Amanda	Butte, MT	Resident - Butte	128.1	Non-technical	Site-Wide	Human Health Risk	Protectiveness of human health	The proposed plan does not adequately protect the Butte residents' health
128	18-Mar-05	email letter	I do not think the proposed cleanup of the Butte site is sufficient.	Curtis	Amanda	Butte, MT	Resident - Butte	128.2	Non-technical	Site-Wide	Extent of Removal	For Removal	All of the contaminated soil should be removed
129a	21-Mar-05	email attachment	Ninety days ago I didn't know anything specific about Superfund and certainly did not know a single thing about Butte Priority Soils OU.	Wilmoth	Dorea	Butte, MT	Resident - Butte	129a.1	Non-technical	Site-Wide	Human Health Risk	Action Levels	EPA should reconsider the action levels for remediation.
129a	21-Mar-05	email attachment	Ninety days ago I didn't know anything specific about Superfund and certainly did not know a single thing about Butte Priority Soils OU.	Wilmoth	Dorea	Butte, MT	Resident - Butte	129a.2	Non-technical	Site-Wide	Human Health Risk	Concerned about Health Effects/Risks	More study needs to be done to determine if there is a link between health problems and mine waste.
129a	21-Mar-05	email attachment	Ninety days ago I didn't know anything specific about Superfund and certainly did not know a single thing about Butte Priority Soils OU.	Wilmoth	Dorea	Butte, MT	Resident - Butte	129a.3	Non-technical	Site-Wide	Institutional Controls	IC's hamper redevelopment	Solid proof exists that the redevelopment of the Butte Hill will be almost impossible if institutional controls like caps are used.
129a	21-Mar-05	email attachment	Ninety days ago I didn't know anything specific about Superfund and certainly did not know a single thing about Butte Priority Soils OU.	Wilmoth	Dorea	Butte, MT	Resident - Butte	129a.4	Non-technical	Solid Media/Waste Left in Place	Extent of Removal	For Removal	Disagrees with Butte-Silver Bow government that a waste-in-place remedy is acceptable contingent upon "extras;" money should be spent on removal.
129a	21-Mar-05	email attachment	Ninety days ago I didn't know anything specific about Superfund and certainly did not know a single thing about Butte Priority Soils OU.	Wilmoth	Dorea	Butte, MT	Resident - Butte	129a.5	Non-technical	Residential Metals	Soils and/or Interior/Attic Dust	Timeframe	Disagrees that a 30-year timeline is acceptable for remediating residential areas on the Butte Hill. Twenty years is more acceptable.
129a	21-Mar-05	email attachment	Ninety days ago I didn't know anything specific about Superfund and certainly did not know a single thing about Butte Priority Soils OU.	Wilmoth	Dorea	Butte, MT	Resident - Butte	129a.6	Non-technical	Site-Wide	Extent of Removal	For Removal	Complete remediation of every bit of mine waste including smelter dust, tailings and other wastes is the only way Butte has a chance of surviving.
129b	23-Mar-05	letter	I must herby (sic) say that I am very disappointed in the work that has been done to this point on the proposed remedy for the U.S. Environmental Protection Agency's Butte Priority Soils Superfund Operable Unit.	Greb	Leland	Butte, MT	Resident - Butte	129b.1	Non-technical	Site-Wide	General Comment	Commenter Opposes	Disappointed in the work EPA did on the proposed remedy for the operable unit.
129b	23-Mar-05	letter	I must herby (sic) say that I am very disappointed in the work that has been done to this point on the proposed remedy for the U.S. Environmental Protection Agency's Butte Priority Soils Superfund Operable Unit.	Greb	Leland	Butte, MT	Resident - Butte	129b.2	Non-technical	Site-Wide	Public Involvement	Disappointed that meeting was dominated by ARCO and its contractors	At the Jan. 25th public meeting mostly ARCO supporters talked and they did not discuss health issues, showing they were more interested in saving ARCO money than promoting a good cleanup.
129b	23-Mar-05	letter	I must herby (sic) say that I am very disappointed in the work that has been done to this point on the proposed remedy for the U.S. Environmental Protection Agency's Butte Priority Soils Superfund Operable Unit.	Greb	Leland	Butte, MT	Resident - Butte	129b.3	Non-technical	Site-Wide	General Comment	General Comment	The EPA needs to decide if it is an advocate for the people of Butte or ARCO and the other PRPs.
129b	23-Mar-05	letter	I must herby (sic) say that I am very disappointed in the work that has been done to this point on the proposed remedy for the U.S. Environmental Protection Agency's Butte Priority Soils Superfund Operable Unit.	Greb	Leland	Butte, MT	Resident - Butte	129b.4	Non-technical	Residential Metals	Attic and/or Interior Dust	Concerned about Health Effects/Risks	Very anxious about the smelter dust present in most of the pre-1980 houses in Butte.
129b	23-Mar-05	letter	I must herby (sic) say that I am very disappointed in the work that has been done to this point on the proposed remedy for the U.S. Environmental Protection Agency's Butte Priority Soils Superfund Operable Unit.	Greb	Leland	Butte, MT	Resident - Butte	129b.5	Non-technical	Residential Metals	Soils and/or Interior/Attic Dust	Timeframe	An uncompromising, swift public-health oriented cleanup offers the people of Butte an excellent chance of for future growth.
129b	23-Mar-05	letter	I must herby (sic) say that I am very disappointed in the work that has been done to this point on the proposed remedy for the U.S. Environmental Protection Agency's Butte Priority Soils Superfund Operable Unit.	Greb	Leland	Butte, MT	Resident - Butte	129b.6	Non-technical	Residential Metals	Soils and/or Interior/Attic Dust	Economic Effects	A public-health oriented cleanup could help create jobs and could help make area homes more energy efficient.
129b	23-Mar-05	letter	I must herby (sic) say that I am very disappointed in the work that has been done to this point on the proposed remedy for the U.S. Environmental Protection Agency's Butte Priority Soils Superfund Operable Unit.	Greb	Leland	Butte, MT	Resident - Butte	129b.7	Non-technical	Site-Wide	Human Health Risk	Concerned about Health Effects/Risks	Disappointed that the proposed financial plan sets the relative importance of human health versus other parts of the cleanup at $12.9 million to $56.9 million over 30 years.

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129b	23-Mar-05	letter	I must herby (sic) say that I am very disappointed in the work that has been done to this point on the proposed remedy for the U.S. Environmental Protection Agency's Butte Priority Soils Superfund Operable Unit.	Greb	Leland	Butte, MT	Resident - Butte	129b.8	Non-technical	Site-Wide	Human Health Risk	Concerned about Health Effects/Risks	No thought has been given to the current state of the public health, which makes it impossible to measure the effects of cleanup on public health in the future.
129b	23-Mar-05	letter	I must herby (sic) say that I am very disappointed in the work that has been done to this point on the proposed remedy for the U.S. Environmental Protection Agency's Butte Priority Soils Superfund Operable Unit.	Greb	Leland	Butte, MT	Resident - Butte	129b.9	Non-technical	Site-Wide	General Comment	General Comment	No one is paying attention to how the BPSOU cleanup fits in with other plans for the region, nation and the world.
129b	23-Mar-05	letter	I must herby (sic) say that I am very disappointed in the work that has been done to this point on the proposed remedy for the U.S. Environmental Protection Agency's Butte Priority Soils Superfund Operable Unit.	Greb	Leland	Butte, MT	Resident - Butte	129b.10	Non-technical	Residential Metals	Attic and/or Interior Dust	Concerned about Health Effects/Risks	If all of the smelter dust is not removed from the buildings in the OU, how will that affect the health of the residents?
129b	23-Mar-05	letter	I must herby (sic) say that I am very disappointed in the work that has been done to this point on the proposed remedy for the U.S. Environmental Protection Agency's Butte Priority Soils Superfund Operable Unit.	Greb	Leland	Butte, MT	Resident - Butte	129b.11	Non-technical	Residential Metals	Attic and/or Interior Dust	Economic Effects	If the smelter dust is not completely removed, how will that affect the economic health of the area?
129b	23-Mar-05	letter	I must herby (sic) say that I am very disappointed in the work that has been done to this point on the proposed remedy for the U.S. Environmental Protection Agency's Butte Priority Soils Superfund Operable Unit.	Greb	Leland	Butte, MT	Resident - Butte	129b.12	Non-technical	Site-Wide	Human Health Risk	Concerned about Health Effects/Risks	The people involved in the cleanup seemed to have lost sight of the fact that their top priority is to protect human health.
129b	23-Mar-05	letter	I must herby (sic) say that I am very disappointed in the work that has been done to this point on the proposed remedy for the U.S. Environmental Protection Agency's Butte Priority Soils Superfund Operable Unit.	Greb	Leland	Butte, MT	Resident - Butte	129b.13	Non-technical	Site-Wide	General Comment	Concerned about Health Effects/Risks	The proposed plan has many problems, the most important being that public health concerns are given too little value.
129b	23-Mar-05	letter	I must herby (sic) say that I am very disappointed in the work that has been done to this point on the proposed remedy for the U.S. Environmental Protection Agency's Butte Priority Soils Superfund Operable Unit.	Greb	Leland	Butte, MT	Resident - Butte	129b.14	Non-technical	Site-Wide	General Comment	Perceived Data Gap	The EPA and other agencies have not gathered and published the data needed to fully answer the questions posed by those reviewing the project.
129b	23-Mar-05	letter	I must herby (sic) say that I am very disappointed in the work that has been done to this point on the proposed remedy for the U.S. Environmental Protection Agency's Butte Priority Soils Superfund Operable Unit.	Greb	Leland	Butte, MT	Resident - Butte	129b.15	Non-technical	Site-Wide	Long-term Operations and Maintenance	Funding	ARCO should review and recalculate the funds it proposes to place in trust for cleanup.
129b	23-Mar-05	letter	I must herby (sic) say that I am very disappointed in the work that has been done to this point on the proposed remedy for the U.S. Environmental Protection Agency's Butte Priority Soils Superfund Operable Unit.	Greb	Leland	Butte, MT	Resident - Butte	129b.16	Non-technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	Removing smelter dust from all of the houses in the county and efforts to improve the general health of those living in the area should be the top priorities.
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.1	Legal	Site-Wide	Arbitrary and Capricious	Consistency with other Clark Fork River Sites or similar NPL sites	To the extent that EPA's selection of a remedy is inconsistent with or more stringent than remedies implemented at other sites in the CFR Basin with conditions similar to the BPSOU, the selected remedy would be inconsistent with the NCP and would be arbitrary and capricious
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.2	Technical	Site-Wide	General Comment	Consistency with other Clark Fork River Sites or similar NPL sites	There is no rational, plausible basis to select a different remedial approach for the remediation of similar conditions at the BPSOU than at other CFR sites
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.3	Legal	Site-Wide	Arbitrary and Capricious	Consistency with other Clark Fork River Sites or similar NPL sites	A remedy requiring source excavation and removal would be an inconsistent remedy selected for similar conditions
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.4	Legal	Residential Metals	Multipathway Lead Abatement Program	Against Non-Targeted Sampling	Where EPA's proposed remedy goes beyond a programmatic approach and requires non-targeted sampling and cleanup of residential contamination, the remedy would be inconsistent with other remedies
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.5	Legal	Granite Mountain Memorial Area	Reclamation	Consistency with other Clark Fork River Sites or similar NPL sites	Remedy for GMMIA is consistent with portions of remedies implemented for public use areas at other CFR sites
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.6	Legal	Surface Water - Storm Water	BMPs	Consistency with other Clark Fork River Sites or similar NPL sites	The storm water BMP program is consistent with remedies implemented for storm water runoff at other CFR sites
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.7	Legal	Groundwater	Waste left in place	Consistency with other Clark Fork River Sites or similar NPL sites	Leaving saturated soils in place as waste management units as long as the soils are not in an active stream corridor is consistent with other CFR sites
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.8	Legal	Groundwater	Capture and Treatment	Consistency with other Clark Fork River Sites or similar NPL sites	Capture and treatment of contaminated groundwater before it leaves the WMU is consistent with Warm Springs Ponds OU
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.9	Legal	Groundwater	Institutional Controls	Consistency with other Clark Fork River Sites or similar NPL sites	Groundwater use controls within a WMU or other area deemed not suitable for use is consistent with other CFR sites
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.10	Legal	Site-Wide	Institutional Controls	Consistency with other Clark Fork River Sites or similar NPL sites	Zoning and permit requirements, deed restrictions, and other ICs to compliment, support, and protect various engineered remedies is consistent with other CFR sites
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.11	Legal	Parrott Tailings/MSD	Evaluation of NCP Criteria	Technical record	CERCLA and the NCP require EPA to identify a preferred remedial alternative based on numerous criteria including protection of human health and the environment, attainment of ARARs and cost effectiveness. EPA has done so.

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130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.12	Technical	Parrott Tailings/MSD	Evaluation of NCP Criteria	Technical record	EPA has developed a significant technical record that supports EPA's conclusion that the total removal alternative should not be the preferred remedy under CERCLA and the NCP remedy selection criteria
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.13	Legal	Parrott Tailings/MSD	NRDP	Technical record	MDEQ's position is the same as the litigation position of the NRD action and has not been supported by any definitive data or studies
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.14	Legal	Parrott Tailings/MSD	NRDP	Technical record	NRDP restoration plan assumed that the Parrott and MSD tailings would not be removed under CERCLA and that instead the tailings should be removed under the NRDP plan to restore the alluvial aquifer resource.
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.15	Legal	Parrott Tailings/MSD	Aquifer Restoration/Cleanup	Against Removal	The State's proposed remedy for removal would not restore groundwater to its baseline conditions.
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.16	Legal	Parrott Tailings/MSD	Evaluation of NCP Criteria	Technical record	MDEQ is asking EPA to ignore the technical record and requirements of CERCLA and the NCP in order to implement the State's natural resource restoration plan. CERCLA prohibits this
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.17	Legal	Parrott Tailings/MSD	NRDP	Lawsuit	The NRDP role under CERCLA is to consider whether the remedy will restore the groundwater to baseline conditions, and if not, to seek appropriate damages. Atlantic Richfield is entitled to raise defenses to resolve the state trustee's claims through litigation or settlement
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.18	Legal	Parrott Tailings/MSD	Evaluation of NCP Criteria	Lawsuit	EPA cannot lawfully select a remedy that ignores the distinction between remediation and restoration and deprive ARCO of its right to contest the trustee's restoration claims in court
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.19	Legal	Surface Water - General	Water Quality	WQB-7 standards in Silver Bow Creek	Copper concentrations should be measured using dissolved concentrations rather than total recoverable concentrations
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.20	Technical	Groundwater	Capture and Treatment	Commenter Supports	The groundwater components of EPA's BPSOU Cleanup Proposal are generally appropriate and will be protective of Silver Bow Creek water quality
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.21	Technical	Parrott Tailings/MSD	Characterization	Contaminant Transport	The MBMG report utilizes aquifer parameters that are not representative of the entire aquifer their bench scale studies emulate a coarse-grained, homogeneous aquifer cause the investigation to significantly underestimate the time frame to achieve cleanup levels
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.22	Technical	Parrott Tailings/MSD	Characterization	Inadequate characterization	Additional studies will not eliminate the uncertainties associated with predicting contaminant transport
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.23	Technical	Parrott Tailings/MSD	Extent of Removal	Against Removal	Large scale removal would entail unnecessary and disproportionately high short term safety risks
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.24	Technical	Parrott Tailings/MSD	Extent of Removal	Against Removal	Large scale removal would cause economic disruption which could be very damaging to the small town economy
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.25	Technical	Lower Area One	Conventional Lime Treatment	Commenter Opposes	EPA's identification of conventional treatment in the PP should be changed to lime treatment
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.26	Technical	Lower Area One	Treatment Lagoons	Performance - general	Treatment lagoons are preferable under the NCP selection criteria of long term effectiveness and permanence, short term effectiveness, implementability and costs
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.27	Technical	Lower Area One	Treatment Lagoons	Operations and Maintenance	Treatment lagoons are easier and less expensive to maintain
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.28	Technical	Lower Area One	Conventional Lime Treatment	Performance - general	Selection of the conventional lime treatment technology is incompatible with EPA's primary goal of protecting water quality in SBC
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.29	Technical	Lower Area One	Treatment Lagoons	Wetlands	Treatment lagoons meet EPA's ARAR requirement for no net loss of wetlands/enhancement and replacement of previous pre-mining wetlands...
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.30	Technical	Site-Wide	Human Health Risk	Specific Comment	EPA's cleanup proposal mischaracterizes and overstates human health risks from lead and arsenic in soil
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.31	Technical	Groundwater	Human Health Risk	Specific Comment	EPA's cleanup proposal mischaracterizes and overstates human health risks from lead and arsenic in water - the PP must make it clear that groundwater consumption is currently an incomplete exposure pathway with no current risks...
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.32	Technical	Residential Metals	Multipathway Lead Abatement Program	Against Non-Targeted Sampling	EPA's requirement for a non-targeted up-front sampling of all residential yards would not be as effective in protecting the public
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.33	Technical	Residential Metals	Multipathway Lead Abatement Program	Against Non-Targeted Sampling	EPA's requirement for a non-targeted up-front sampling of all residential yards would not be as ... cost effective as the programmatic approach
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.34	Technical	Residential Metals	Multipathway Lead Abatement Program	Against Non-Targeted Sampling	A program that requires sampling of each and every property is unprecedented...
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.35	Technical	Residential Metals	Multipathway Lead Abatement Program	Against Non-Targeted Sampling	Atlantic Richfield firmly believes that the programmatic approach would achieve cleanup within EPA's reasonable time frame criterion
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.36	Legal	Residential Metals	Multipathway Lead Abatement Program	Funding	EPA's discussion and description of requirements for a fully funded program is inappropriate for the proposed plan... should be reserved for the consent decree
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.37	Legal	Residential Metals	Multipathway Lead Abatement Program	Funding	The term sheet will be incorporated into a final agreement that will ensure EPA's requirement for an acceptable programmatic approach and agreement is in place
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.38	Legal	Residential Metals	Multipathway Lead Abatement Program	Against Non-Targeted Sampling	If EPA selects a final remedy that requires non-targeted sampling.... AR will complete the cleanup for metals from mining and smelting sources, but will not volunteer to abate other potential sources that AR is not liable for under CERCLA

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130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.39	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation specifications	EPA has appropriately accepted past reclamation performed to defined standards
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.40	Legal	Solid Media/Waste Left in Place	RASD	Past Response Action Sites	Requests modification/clarification of three sites granted "conditional limited no further action" (Colorado smelter, LAO, and lower RR one)
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.41	Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation needed	Generally supports identification of the sites requiring post ROD reclamation with clarifications
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.42	Technical	Solid Media/Waste Left in Place	Reclamation	Characterization	Additional data are necessary for each site prior to finalization of the scope of reclamation required (re: sites agreed to be reclaimed immediately after the ROD)
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.43	Technical	Solid Media/Waste Left in Place	Reclamation	Commenter Supports	Generally supports reclamation requirements for syndicate pit and GMMIA
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.44	Technical	Solid Media/Waste Left in Place	BRES	Modify BRES	BRES should be modified prior to finalizing
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.45	Technical	Solid Media/Waste Left in Place	BRES	Modify BRES	BRES does not include provisions for termination of monitoring
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.46	Technical	Solid Media/Waste Left in Place	BRES	Modify BRES	BRES relies on subjective evaluation for a number of monitoring parameters
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.47	Technical	Solid Media/Waste Left in Place	BRES	Modify BRES	BRES encourages subdivision of some reclaimed sites into smaller polygons
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.48	Technical	Solid Media/Waste Left in Place	BRES	Modify BRES	BRES does not include flexibility for site specific vegetation success
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.49	Non-technical	Solid Media/Waste Left in Place	Redevelopment	Land Use	Grading and capping of mine waste does not preclude future redevelopment or other productive land uses
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.50	Technical	Surface Water - Storm Water	BMPs	Supports BMP program	The BMP approach is the appropriate remedy for surface water components of the remedy
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.51	Technical	Surface Water - Storm Water	BMPs	Commenter Opposes	Storm water sites identified by EPA in the BPSOU cleanup proposal are inappropriately identified for reclamation at this time
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.52	Technical	Surface Water - Storm Water	BMPs	Commenter Opposes	Reclamation of these "storm water sites" has little potential to improve storm water quality and were instead identified for reclamation because they are "eyesores" - they should be removed from the ROD
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.53	Technical	Surface Water - General	Extent of Removal	Removal of streamside wastes	Streambank sediments - these materials should be removed only if storm water monitoring indicates that their presence is contributing to exceedances of water quality standards
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.54	Technical	Surface Water - General	Extent of Removal	Removal of streamside wastes	AR requests that EPA acknowledge in the ROD that any streambank sediment removal activities will be limited in depth and width because of the narrow stream corridor and slag walls...
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.55	Technical	Surface Water - Storm Water	BMPs	Timeframe	Ten to 20 years may be required to fully implement and evaluate the BMP approach
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.56	Technical	Surface Water - General	In-Stream Flow Augmentation	Commenter Supports	AR supports in-stream flow augmentation to improve flow and quality of SBC
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.57	Legal	Surface Water - General	In-Stream Flow Augmentation	Commenter Opposes	EPA ordering the use of Silver Lake water or HSB treated water to be used for flow augmentation would be an unlawful taking of water rights without just compensation
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.58	Technical	Surface Water - Storm Water	Storm Water Treatment	Commenter Opposes	Storm water treatment is not appropriate as a final BMP even if storm water quality periodically exceeds appropriate water quality standards
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.59	Technical	Surface Water - Storm Water	Storm Water Treatment	Feasibility or Technical Impracticability	AR requests that a TI evaluation be included as part of the storm water management process and specifically described in the ROD
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.60	Non-technical	Site-Wide	Consistency with Guidance	Environmental Justice	AR is confident that the proposed remedy has fully satisfied environmental justice considerations
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.61	Non-technical	Site-Wide	Consistency with Guidance	Environmental Justice	AR is confident that the proposed remedy was prepared in accordance with CERCLA and EPA guidance on environmental justice
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.62	Non-technical	Site-Wide	General Comment	Public Trust Doctrine not violated	AR is confident that the proposed remedy did not violate the public trust doctrine
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.63	Non-technical	General Comment	Proposed Plan	Past Response Action Sites	The figure on page 7 identifying areas of past and future response actions does not clearly distinguish between past and future actions
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.64	Non-technical	Site-Wide	Characterization	Specific Comment	The MSD should be identified as a man-made surface water conveyance constructed during the 1930's...to minimize flooding of residential and commercial areas of Butte
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.65	Non-technical	Site-Wide	Characterization	Specific Comment	The section would be more complete regarding description of the MSD - state that since the MSD was constructed, urban development occurred in the area
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.66	Technical	Groundwater	Characterization	Specific Comment	Estimates presented regarding the alluvial aquifer that extend far outside the BPSOU boundary are misleading...
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.67	Technical	Groundwater	Characterization	Specific Comment	AR requests that the ROD clarify language regarding groundwater flux - 6gpm from bedrock...
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.68	Technical	Granite Mountain Memorial Area	General Comment	Characterization	It should be made clear that the GMMIA is not a drainage to SBC in addition to the statement that it is not in a residential area
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.69	Technical	Solid Media/Waste Left in Place	Railroad Beds	Specific Comment	Specific Comment: The paragraph implies nothing has been done to address railroad beds... a sentence should be added to clarify ... reclamation of these rail lines
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.70	Technical	Solid Media/Waste Left in Place	Railroad Beds	Specific Comment	Specific Comment: Paragraph indicates RR bed sampling conducted and concentrations exceeded arsenic action levels, but does not indicate RR TCRA was implemented to address these

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130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.71	Technical	Lower Area One	Capture and Treatment	Specific Comment	The ROD should make clear that the LAO ERA resulted in groundwater control to prevent contaminated groundwater from entering SBC such that the remedial goals for surface water can be met
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.72	Technical	Surface Water - General	Water Quality	Water quality improvements	The improvement in surface water quality is understated
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.73	Technical	Parrott Tailings/MSD	Characterization	Contaminant Sources	ROD should be clear that there are many sources of mine waste in the upper MSD
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.74	Technical	Parrott Tailings/MSD	Capture and Treatment	Specific Comment	Specific Comment: Reword text on MSD subdrain to be consistent with FFS
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.75	Technical	Lower Area One	Capture and Treatment	Specific Comment	Add text that water will be treated before entering SBC
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.76	Non-technical	Site-Wide	General Comment	Specific Comment	Active mine area is east and northeast of BPSOU, not west and northwest
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.77	Technical	Surface Water - General	Water Quality	Specific Comment	Text should be clarified regarding Missoula Gulch and MSD
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.78	Technical	Surface Water - General	Ecological Risk	Specific Comment	Bullet about risks to waterfowl is too general
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.79	Technical	Surface Water - General	Ecological Risk	Specific Comment	Extensive biomonitoring data at warm springs ponds indicates no risk to waterfowl or wildlife
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.80	Technical	Surface Water - Storm Water	BMPs	Specific Comment	Initial action should be revised to say past action in order to reflect the continuing O&M of existing BMPs
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.81	Technical	Lower Area One	Treatment Lagoons	Specific Comment	"During treatability studies" should be deleted because the alternative refers to future, permanent remedies
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.82	Legal	Residential Metals	Multipathway Lead Abatement Program	Specific Comment	Specific Comment: Specific CERCLA requirements should be cited referring to the programmatic approach
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.83	Technical	Residential Metals	Multipathway Lead Abatement Program	Specific Comment	Specific Comment: The paragraph does not describe the multi-pathway approach consistent with the current Lead abatement program
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.84	Technical	Solid Media/Waste Left in Place	Characterization	Specific Comment	Anaconda sampling works site 137 - not clear where soil samples were located that indicate metals above action levels
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.85	Legal	Solid Media/Waste Left in Place	General Comment	Specific Comment	Colorado Smelter site - AR provided data that it meets ARAR's
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.86	Technical	Surface Water - General	Extent of Removal	Removal of streamside wastes	Identification of remedial action in upper SBC at this time is inappropriate (i.e., sediment removal in SBC below MSD and above LAO)
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.87	Legal	Lower Area One	General Comment	Specific Comment	Walking trails and historical signage cannot be mandated as part of the CERCLA remedy
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.88	Technical	Residential Metals	Multipathway Lead Abatement Program	Specific Comment	Specific Comment: AR agrees with this paragraph but it is not consistently conveyed through rest of PP
130	18-Mar-05	letter	Transmittal of Atlantic Richfield Company Comments, EPA Cleanup Proposal for BPSOU...	Stilwell	Chuck	ARCO	PRP	130.89	Technical	Surface Water - Storm Water	Extent of Removal	Removal of streamside wastes	Streambank sediments - should be removed only if storm water monitoring indicates this BMP would improve stream quality
131	15-Mar-05	letter	The U.S. Fish and Wildlife Service has reviewed...	U.S. Fish and Wildlife Service		U.S. Fish and Wildlife Service	Agency	131.1	Technical	Site-Wide	Characterization	Wetlands	The CFR guidance requires a additional steps through remedial design and post-RA.
132	14-Mar-05	email attachment	CTEC Program Proposal	Larson	Jill	CTEC	Citizen Group	132.1	Technical	Residential Metals	Multipathway Lead Abatement Program	General Comment	Entire document is a proposal for a lead abatement program
132	14-Mar-05	email attachment	CTEC Program Proposal	Larson	Jill	CTEC	Citizen Group	132.2	Technical	Residential Metals	Multipathway Lead Abatement Program	Protectiveness of human health	Combining remediation of lead contaminated soil and dust with lead-based paint abatement will reduce total lead exposure
132	14-Mar-05	email attachment	CTEC Program Proposal	Larson	Jill	CTEC	Citizen Group	132.3	Technical	Residential Metals	Multipathway Lead Abatement Program	Timeframe	Lead abatement program actions should be implemented as soon as possible
132	14-Mar-05	email attachment	CTEC Program Proposal	Larson	Jill	CTEC	Citizen Group	132.4	Technical	Residential Metals	Multipathway Lead Abatement Program	Timeframe	lead abatement program should actively seek homes to remediate
132	14-Mar-05	email attachment	CTEC Program Proposal	Larson	Jill	CTEC	Citizen Group	132.5	Technical	Residential Metals	Soils and/or Interior/Attic Dust	Characterization	Comprehensive testing needed for soil and dust
132	14-Mar-05	email attachment	CTEC Program Proposal	Larson	Jill	CTEC	Citizen Group	132.6	Technical	Residential Metals	Attic and/or Interior Dust	Pathways	Exposure pathways exist for contaminated dust in living spaces
132	14-Mar-05	email attachment	CTEC Program Proposal	Larson	Jill	CTEC	Citizen Group	132.7	Technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	All dust should be removed
132	14-Mar-05	email attachment	CTEC Program Proposal	Larson	Jill	CTEC	Citizen Group	132.8	Technical	Residential Metals	Human Health Risk	Risk assessment flawed	PRGs for lead did not consider drinking water/ambient dust/lead-based paint
132	14-Mar-05	email attachment	CTEC Program Proposal	Larson	Jill	CTEC	Citizen Group	132.9	Technical	Residential Metals	Attic and/or Interior Dust	Action Levels	cancer risk for arsenic should be zero
132	14-Mar-05	email attachment	CTEC Program Proposal	CTEC		CTEC	Citizen Group	132.10	Technical	Residential Metals	Human Health Risk	Action Levels	Lead RGs should consider paint ingestions rates from appropriate reference area
132	14-Mar-05	email attachment	CTEC Program Proposal	CTEC		CTEC	Citizen Group	132.11	Technical	Residential Metals	Human Health Risk	Action Levels	Lead RGs should consider lead in Butte drinking water
132	14-Mar-05	email attachment	CTEC Program Proposal	CTEC		CTEC	Citizen Group	132.12	Technical	Residential Metals	Human Health Risk	Action Levels	Lead RGs should consider site-specific airborne lead concentrations
132	14-Mar-05	email attachment	CTEC Program Proposal	CTEC		CTEC	Citizen Group	132.13	Technical	Residential Metals	Human Health Risk	Action Levels	Lead RGs should consider remediation of various lead sources in a 10-year timeframe
132	14-Mar-05	email attachment	CTEC Program Proposal	CTEC		CTEC	Citizen Group	132.14	Technical	Residential Metals	Human Health Risk	Action Levels	Lead RGs should not use site-specific bioavailability factors but should use generic values
132	14-Mar-05	email attachment	CTEC Program Proposal	CTEC		CTEC	Citizen Group	132.15	Technical	Site-Wide	Human Health Risk	Action Levels	Arsenic risk value of 10-4 is too high; should use 10-5
132	14-Mar-05	email attachment	CTEC Program Proposal	CTEC		CTEC	Citizen Group	132.16	Technical	Site-Wide	Human Health Risk	Action Levels	Agrees with RGs for mercury
132	14-Mar-05	email attachment	CTEC Program Proposal	CTEC		CTEC	Citizen Group	132.17	Technical	Residential Metals	Soils and/or Interior/Attic Dust	Property Resale - Disclosure of Contamination/Remediation	A certificate should be issued following residential remediation
132	14-Mar-05	email attachment	CTEC Program Proposal	CTEC		CTEC	Citizen Group	132.18	Technical	Residential Metals	Multipathway Lead Abatement Program	Timeframe	Suggests a schedule for residential remediation at 100 houses per year
132	14-Mar-05	email attachment	CTEC Program Proposal	CTEC		CTEC	Citizen Group	132.19	Technical	Residential Metals	Multipathway Lead Abatement Program	Timeframe	Lead abatement should be funded for 30 years
132	14-Mar-05	email attachment	CTEC Program Proposal	CTEC		CTEC	Citizen Group	132.20	Technical	Residential Metals	Multipathway Lead Abateme	Public Education/Technical Communic	Suggests several elements of public outreach program
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.1	Non-Technical	Site-Wide	General Comment	Commenter Opposes	Commenter states the PP is "band-aid aspirin cleanup philosophy"
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.2	Non-Technical	Parrott Tailings/MSD	Extent of Removal	For Removal	Supports removal of Parrott tailings and restoration of Silver Bow Creek
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.3	Non-Technical	Site-Wide	General Comment	Economic Effects	The decision will have negative economic and social consequences

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133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.4	Non-Technical	Site-Wide	Public Involvement	EPA disregards comments	EPA has ignored public input
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.5	Non-Technical	Site-Wide	General Comment	General Comment	Supports local government and dislikes EPA/DEQ
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.6	Non-Technical	Site-Wide	General Comment	Commenter Opposes	Proposed Plan is inadequate
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.7	Non-Technical	Site-Wide	General Comment	General Comment	Attic dust and Storm water repairs should be part of the decision
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.8	Non-Technical	Surface Water - General	Unrelated Topic	Out of scope	Surface water should be diverted around mine permit areas
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.9	Non-Technical	Site-Wide	General Comment	Long-Term Effectiveness and Permanence	The remedy should be permanent and effective
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.10	Non-Technical	Surface Water - Storm Water	Storm Water Conveyances	Funding	Butte should be compensated for water system upgrades
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.11	Non-Technical	Parrott Tailings/MSD	Aquifer Restoration/Cleanup	Agency Coordination	Restoration (NRD) and reclamation should be completed simultaneously
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.12	Non-Technical	Parrott Tailings/MSD	Extent of Removal	For Removal	Silver Bow Creek should be reconstructed and all flood plain wastes should be removed.
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.13	Non-Technical	Surface Water - General	Unrelated Topic	Out of scope	Cleanup should include Columbia Gardens Creek
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.14	Non-Technical	Lower Area One	Development of Alternatives	No Innovative Technology	Should remove the treatment lagoons at LAO and replace them with treatment facility
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.15	Non-Technical	Parrott Tailings/MSD	Extent of Removal	For Removal	Parrott tailings should be removed or Butte should be compensated. Should include a new Civic Center and shops
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.16	Non-Technical	Solid Media/Waste Left in Place	Reclamation	Long-Term Effectiveness and Permanence	Prior reclamation and cleanup should be re-examined and cleaned up as appropriate
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.17	Non-Technical	Surface Water - Storm Water	Storm Water Conveyances	Detention/Retention Basins	Storm water ponds at Syndicate pit and Excelsior street should be drained and cleaned up
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.18	Non-Technical	Solid Media/Waste Left in Place	Railroad Beds	Reclamation specifications	Railroad reclamation with shale along Iron street should be remeoved and reclaimed properly
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.19	Non-Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation specifications	Caps should be thick enough to plant trees
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.20	Non-Technical	Site-Wide	Redevelopment	Land Use	Future land use should be considered when selecting cleanup solution
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.21	Non-Technical	Surface Water - Storm Water	Storm Water Conveyances	Design Criteria	The entire storm water system should be re-examined
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.22	Non-Technical	Site-Wide	General Comment	General Comment	Butte-Silver Bow should be compensated for loss of infrastructure
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.23	Non-Technical	Parrott Tailings/MSD	Aquifer Restoration/Cleanup	Agency Coordination	NRD restoration and CERCLA reclamation should be conducted simultaneously
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.24	Non-Technical	Residential Metals	Multipathway Lead Abatement Program	Supports Lead Program	Multiple Pathway Approach in the Lead Program should be continued
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.25	Non-Technical	Surface Water - General	Water Quality	Meeting WQB-7 standards in Silver Bow Creek	Why is cleanup standard lower in Silver Bow Creek?
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.26	Non-Technical	Parrott Tailings/MSD	Aquifer Restoration/Cleanup	General Comment	Why is there a pipeline to Montana Street rather than discharging water the Silver Bow Creek?
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.27	Non-Technical	Parrott Tailings/MSD	General Comment	General Comment	Removal criteria for Milltown Dam should be applied in Butte
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.28	Non-Technical	Site-Wide	General Comment	General Comment	Wants a restoration plan for Butte Hill like Clark Fork River and Big Blackfoot
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.29	Non-Technical	Site-Wide	General Comment	General Comment	Dislikes EPA, DEQ, NRD
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.30	Non-Technical	Surface Water - General	General Comment	General Comment	supports cleanup of Colorado tailings, Silver Bow Creek and Parrott Tailings, not just one or two of these
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.31	Non-Technical	Surface Water - General	Unrelated Topic	Out of scope	Supports restoration of Silver Bow Creek and Columbia Gardens Creek to fishable condition
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.32	Non-Technical	Parrott Tailings/MSD	Capture and Treatment	Long-Term Effectiveness and Permanence	MSD subdrain will eventually fail and will be a future cleanup expense
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.33	Non-Technical	Parrott Tailings/MSD	Extent of Removal	Removal of Accessible Wastes	Supports removal of accessible tailings
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.34	Non-Technical	Site-Wide	Institutional controls	Funding	Wants a trust fund to cover future cleanups and costs to implement ICs
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.35	Non-Technical	Surface Water - General	General Comment	Aesthetics	Wants a meandering channel for Silver Bow creek
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.36	Non-Technical	Surface Water - Storm Wat	Liability	Local Government Liability	Butte Silver Bow should not be PRP
133	1-Mar-05	letter	I would like to submit the following statement and related information...	Daily	Fritz	Butte, MT	Resident - Butte	133.37	Non-Technical	Solid Media/Waste Left in Place	Reclamation	Reclamation specifications	Concerned that the future site of Destination Montana was not reclaimed to current standards
134	25-Jan-05	letter	A recent community assessment of households in the priority soils area raised strong concerns about the safety	Miller	Barbara	Butte, MT	Resident - Butte	134.1	Non-technical	Residential Metals	Attic and/or Interior Dust	Funding	Removing attic dust cost her more than $20,000, which most Butte residents won't be able to afford.
134	25-Jan-05	letter	A recent community assessment of households in the priority soils area raised strong concerns about the safety	Miller	Barbara	Butte, MT	Resident - Butte	134.2	Non-technical	Residential Metals	Attic and/or Interior Dust	Funding	The proposed plan has no provision to help homeowners pay the cost of removing attic dust.
134	25-Jan-05	letter	A recent community assessment of households in the priority soils area raised strong concerns about the safety	Miller	Barbara	Butte, MT	Resident - Butte	134.3	Non-technical	Residential Metals	Attic and/or Interior Dust	Funding	It doesn't seem right that homeowners will have to pay $15,000 to $20,000 to cleanup smelter dust.
134	25-Jan-05	letter	A recent community assessment of households in the priority soils area raised strong concerns about the safety	Miller	Barbara	Butte, MT	Resident - Butte	134.4	Technical	Residential Metals	Attic and/or Interior Dust	Pathways	Cleaning only a home's attic leaves toxic dust in the walls, which is more likely to enter the living area. See her attached lab results from Ashe Analytics, Inc.
134	25-Jan-05	letter	A recent community assessment of households in the priority soils area raised strong concerns about the safety	Miller	Barbara	Butte, MT	Resident - Butte	134.5	Non-technical	Residential Metals	Attic and/or Interior Dust	Funding	The owner's cost of cleaning up a home is not affordable for most Butte residents.

BPSOU Responsiveness Summary Comment Index

Document ID No.	Date	Type	Title/Opening Sentence	Last Name	First Name	Location/ Affiliation	Sector	Comment ID.	Technical/ Non-Technical/ Legal	Tier I Topic	Tier II Topic	Tier III Topic	Brief Comment Description
134	25-Jan-05	letter	A recent community assessment of households in the priority soils area raised strong concerns about the safety	Miller	Barbara	Butte, MT	Resident - Butte	134.6	Non-technical	Residential Metals	Attic and/or Interior Dust	Timeframe	Most families won't be able to have their homes cleaned, particularly if the EPA-Butte plan to clean 30 homes a year is put in place.
134	25-Jan-05	letter	A recent community assessment of households in the priority soils area raised strong concerns about the safety	Miller	Barbara	Butte, MT	Resident - Butte	134.7	Technical	Residential Metals	Attic and/or Interior Dust	Pathways	The EPA assertion that the thousands of homes built before 1980 have effective naturally occurring "barriers" from the smelter dust or that there are no pathways of delivery of the toxin has not been scientifically documented, nor does it ring true with current indoor air quality research and field study.
134	25-Jan-05	letter	A recent community assessment of households in the priority soils area raised strong concerns about the safety	Miller	Barbara	Butte, MT	Resident - Butte	134.8	Technical	Residential Metals	Attic and/or Interior Dust	Pathways	Smelter dust is not just in attics; it can be found wherever air flows though buildings.
134	25-Jan-05	letter	A recent community assessment of households in the priority soils area raised strong concerns about the safety	Miller	Barbara	Butte, MT	Resident - Butte	134.9	Non-technical	Residential Metals	Attic and/or Interior Dust	Pathways	Cleaning smelter dust out of the attics does not make the entire house clean of contaminants.
134	25-Jan-05	letter	A recent community assessment of households in the priority soils area raised strong concerns about the safety	Miller	Barbara	Butte, MT	Resident - Butte	134.10	Technical	Residential Metals	Attic and/or Interior Dust	Pathways	Tests show that significant effort is needed in new construction to make homes tight enough to block wind from bringing in dust.
134	25-Jan-05	letter	A recent community assessment of households in the priority soils area raised strong concerns about the safety	Miller	Barbara	Butte, MT	Resident - Butte	134.11	Technical	Residential Metals	Attic and/or Interior Dust	Pathways	When cracks and leaks in a home are sites of toxic dust, a major delivery mechanism is the wind.
134	25-Jan-05	letter	A recent community assessment of households in the priority soils area raised strong concerns about the safety	Miller	Barbara	Butte, MT	Resident - Butte	134.12	Non-technical	Residential Metals	Attic and/or Interior Dust	Agency Coordination	It is our recommendation that a far more aggressive, fair, cost-effective program to test and comprehensively and effectively abate smelter dust in buildings be developed in partnership with local building, housing, and lending communities, making provisions for citizens to be allowed to borrow funds to perform the cleanups and allow the county environmental program to make significant investments in assisting in the costs of cleaning these homes, or effectively bonding the smelter dust in place in a way that stops air transmission through the building envelope.
134	25-Jan-05	letter	A recent community assessment of households in the priority soils area raised strong concerns about the safety	Miller	Barbara	Butte, MT	Resident - Butte	134.13	Non-technical	Residential Metals	Attic and/or Interior Dust	Agency Coordination	Abatements should be coordinated with all housing agencies so the "cleanup tax" people pay is limited to the amount needed to bring their buildings up to code.
134	25-Jan-05	letter	A recent community assessment of households in the priority soils area raised strong concerns about the safety	Miller	Barbara	Butte, MT	Resident - Butte	134.14	Non-technical	Residential Metals	Attic and/or Interior Dust	Agency Coordination	Environmental cleanup funds should not cover housing rehabilitation costs, so a multi-agency approach is needed to lessen the burden on citizens and property owners.
134	25-Jan-05	letter	A recent community assessment of households in the priority soils area raised strong concerns about the safety	Miller	Barbara	Butte, MT	Resident - Butte	134.15	Non-technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	Abatement activities should be focused on occupied buildings.
134	25-Jan-05	letter	A recent community assessment of households in the priority soils area raised strong concerns about the safety	Miller	Barbara	Butte, MT	Resident - Butte	134.16	Non-technical	Residential Metals	Attic and/or Interior Dust	Funding	There should be a redevelopment trust fund to help homeowners pay for removing smelter dust.
134	25-Jan-05	letter	A recent community assessment of households in the priority soils area raised strong concerns about the safety	Miller	Barbara	Butte, MT	Resident - Butte	134.17	Non-technical	Residential Metals	Attic and/or Interior Dust	Funding	A redevelopment trust fund under local control can help meet the needs of Butte residents in a fair and timely manner.
135	19-Mar-05	letter	I am offering my comments on the EPA's proposed cleanup for the Butte Priority Soils.	Simonich	Edward	Butte, MT	Resident - Butte	135.1	Non-technical	Site-Wide	General Comment	Commenter Opposes	Butte deserves more than the EPA plan outlines.
135	19-Mar-05	letter	I am offering my comments on the EPA's proposed cleanup for the Butte Priority Soils.	Simonich	Edward	Butte, MT	Resident - Butte	135.2	Non-technical	Site-Wide	General Comment	Commenter Opposes	It appears the EPA plan is a minimalist approach.
135	19-Mar-05	letter	I am offering my comments on the EPA's proposed cleanup for the Butte Priority Soils.	Simonich	Edward	Butte, MT	Resident - Butte	135.3	Non-technical	Site-Wide	General Comment	Economic Effects	For Butte to progress economically, it can't drag the "millstone of superfund stigma" around its neck.
135	19-Mar-05	letter	I am offering my comments on the EPA's proposed cleanup for the Butte Priority Soils.	Simonich	Edward	Butte, MT	Resident - Butte	135.4	Non-technical	Site-Wide	General Comment	Concerned about Health Effects/Risks	The people of Butte have a moral right to feel environmentally safe in the city where they live.
135	19-Mar-05	letter	I am offering my comments on the EPA's proposed cleanup for the Butte Priority Soils.	Simonich	Edward	Butte, MT	Resident - Butte	135.5	Non-technical	Residential Metals	Attic and/or Interior Dust	Attic Dust should be removed	The EPA should order a more aggressive cleanup of attic dust.
135	19-Mar-05	letter	I am offering my comments on the EPA's proposed cleanup for the Butte Priority Soils.	Simonich	Edward	Butte, MT	Resident - Butte	135.6	Non-technical	Site-Wide	General Comment	Action Levels	The EPA should establish higher standards for acceptable levels of metals in soil and water.
135	19-Mar-05	letter	I am offering my comments on the EPA's proposed cleanup for the Butte Priority Soils.	Simonich	Edward	Butte, MT	Resident - Butte	135.7	Non-technical	Solid Media/Waste Left in Place	Reclamation	Reclamation specifications	There needs to be assurances that the caps won't fail.
136	20-Mar-05	letter	As citizens of Butte we are concerned about the EPA's plan to handle the contaminated soils and water in our area.	Brilliant	Kitty and David	Butte, MT	Resident - Butte	136.1	Non-technical	Residential Metals	Attic and/or Interior Dust	Concerned about Health Effects/Risks	What is being done to help people who have contaminated dust in their attics?
136	20-Mar-05	letter	As citizens of Butte we are concerned about the EPA's plan to handle the contaminated soils and water in our area.	Brilliant	Kitty and David	Butte, MT	Resident - Butte	136.2	Non-technical	Parrott Tailings/MSD	Extent of Removal	For Removal	What happens when the caps on the Parrott Tailings fail? And they will. (inferring they are for removal)
136	20-Mar-05	letter	As citizens of Butte we are concerned about the EPA's plan to handle the contaminated soils and water in our area.	Brilliant	Kitty and David	Butte, MT	Resident - Butte	136.3	Non-technical	Site-Wide	General Comment	General Comment	If the plan does not work sufficiently, what safeguards are going to be put in place to the next round of cleanup?
136	20-Mar-05	letter	As citizens of Butte we are concerned about the EPA's plan to handle the contaminated soils and water in our area.	Brilliant	Kitty and David	Butte, MT	Resident - Butte	136.4	Non-technical	Site-Wide	General Comment	Funding	ARCO should have to pay for fixing cleanup solutions that fail.
136	20-Mar-05	letter	As citizens of Butte we are concerned about the EPA's plan to handle the contaminated soils and water in our area.	Brilliant	Kitty and David	Butte, MT	Resident - Butte	136.5	Non-technical	Site-Wide	General Comment	General Comment	Please don't take advantage of the people of Butte; this city has been "raped" too many times already.
137	11-Jan-05	email attachment	Complaints and input into the public comment period for Priority Soils	Ray	Dr. John W.	Butte, MT	Resident - Butte	137.1	Non-technical	Residential Metals	Attic and/or Interior Dust	Environmental Justice	EPA's lack of pathways argument for indoor dust violates environmental justice
137	11-Jan-05	email attachment	Complaints and input into the public comment period for Priority Soils	Ray	Dr. John W.	Butte, MT	Resident - Butte	137.2	Non-technical	Superfund Procedural Issues	Public involvement	EPA disregards comments	EPA ignored public input in developing its proposed plan for priority soils