IMPLEMENTATION PLAN IN SUPPORT OF PETITION FOR ADOPTION OF TEMPORARY WATER QUALITY STANDARDS UPPER BLACKFOOT MINING COMPLEX

-Lewis and Clark County, Montana-

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1.0 INTRODUCTION

The Upper Blackfoot Mining Complex (UBMC) is an area of historic mining activity located at the headwaters of the Blackfoot River in Lewis and Clark County, Montana. A number of historic mines and related features are located at the UBMC on properties of mixed ownership. From 1993-1998, ASARCO Incorporated (Asarco), in partnership with ARCO, implemented a voluntary reclamation program at the UBMC focusing on mitigation of environmental impacts from historic mining disturbance on Asarco's patented mining claims. In October 1999, Asarco submitted a petition and support document to the Montana Department of Environmental Quality (MDEQ) and the Montana Board of Environmental Review (Board) seeking adoption of temporary water quality standards in portions of Mike Horse Creek, Beartrap Creek, and the Upper Blackfoot River. Water quality in these stream reaches has been impacted by historic mining activities and may have been impacted by other potential sources, (e.g., natural sources). Adoption of temporary water quality standards was sought by Asarco to allow additional in-stream reclamation activities to occur, and to provide time for optimization of a passive water treatment system constructed in 1996 by Asarco and regulated under the Montana Pollutant Discharge Elimination System (MPDES) program. The Board approved adoption of the temporary standards as of June 1, 2000 for a period of eight years, with up to two additional years allotted if land access and other negotiations between the U.S.D.A. Forest Service and Asarco require more than one year to complete.

In accordance with MCA §75-5-312 (3)(c) and (3)(d), Asarco has prepared this implementation plan and schedule outlining a remedial action plan for identification and mitigation of remaining causes of water quality impairment in the three petitioned stream segments. As required under the temporary standards regulations, the plan addresses all potential sources of water quality impairment in the three petitioned stream segments, including potential sources not associated with Asarco properties, or mining activities not associated with Asarco or their predecessors. As such, implementation of the plan will likely require the involvement of other landowners along the stream segments if sources are found to originate from these properties.

The implementation plan briefly summarizes current water quality conditions in the three petitioned stream segments and identifies potential sources impacting water quality. The implementation plan also outlines a conceptual scope of work to first characterize each potential source area, and then address each area appropriately. The ultimate goal of the implementation plan and schedule is to mitigate water quality limiting factors in the three

petitioned stream segments to the extent considered achievable. Detailed work plans, including sampling plans and remedial design plans, will be prepared annually to address specific yearly activities and will be provided to MDEQ for review and approval prior to initiation of field activities.

In conjunction with source characterization, the first step of the plan will involve negotiation with other landowners, primarily the U.S. Forest Service. Negotiations will address access issues as well as responsibility for overall plan implementation. Asarco will conduct the characterization and identification of each source.

Section 2 of this plan summarizes current water quality conditions in each petitioned stream segment and potential sources of water quality impairment. Section 3 describes site characterization and potential reclamation activities for each drainage, and Section 4 includes an implementation plan schedule.

2.0 WATER QUALITY TRENDS IN PETITIONED STREAM SEGMENTS

Asarco has conducted extensive water quality monitoring at the UBMC since 1991. The resulting water quality data have been used in the planning and design of mine reclamation activities performed from 1993-1998 as part of Asarco's voluntary mine reclamation program. Following is a drainage by drainage discussion of current water quality conditions in the three petitioned stream segments, and a summary of potential sources of water quality impairment based on the observed water quality trends and field observations. This information forms the basis for the implementation plan and associated schedule presented in Sections 3 and 4. Figure 2-1 includes a map of the UBMC delineating the three petitioned stream segments, water quality monitoring sites, and potential sources of metals loading to the streams.

2.1 MIKE HORSE CREEK

Loads of most metals (aluminum, cadmium, copper, iron, lead, manganese and zinc) increase consistently in a downstream direction through the petitioned segment of Mike Horse Creek. This trend persists during both high streamflow and low streamflow conditions, although the magnitude of load increases through the stream reach is much greater in the spring than in the fall. The metals loads vary seasonally over several orders of magnitude through Mike Horse Creek; for example, the 1999 zinc load varied from 64 lbs/day in April, to 81 lbs/day in May, to 0.5 lbs/day in October at monitoring site BRSW-35 near the mouth of Mike Horse Creek. During April and May 1999 synoptic water sampling events, significant load increases occurred in Mike Horse Creek both upstream and downstream of site BRSW-22; in October, however, load increases in Mike Horse Creek were of greater magnitude, upstream of BRSW-22.

Metals concentrations were particularly high in Mike Horse Creek during April 1999. The highest concentrations were recorded in the middle section of the creek near monitoring site BRSW-4 (Figure 2-1). Metals concentrations at that time include 5.2 mg/L aluminum, 4.5 mg/L copper, and 27.6 mg/L zinc. These high metals concentrations were traced, at least in part, to a seep emanating from the hillside southwest of BRSW-4. Identification of the source of this water is addressed in the implementation plan.

2.1.1 Potential Loading Sources to Mike Horse Creek

Based on current site knowledge, possible sources of metals loading in Mike Horse Creek include:

- Historic Mine Waste:
  Historic mine waste specific to Mike Horse Creek drainage includes the upper Mike Horse mine waste rock facilities which were reclaimed in-place in 1998, and historic mine waste rock facilities located on National Forest lands in lower Mike Horse drainage (Figure 2-1).

BRSW-14
BRSW-11
BRSW-15
UBMB-1
BRSW-31
BMSP-1
BRSW-32
BRSW-33
BRSW-12
BRSW-43
BRSW-37
BRSW-9
BRSW-6
BRSW-42
BRSW-34
BRSW-29
BRSW-28
BRSW-38
BRSW-39
BRSW-30
BRSW-40
BRSW-41
BRSW-23
BRSW-3
BRSW-02
BRSW-35
BRSW-44
BRSW-22
BRSW-45
BRSW-4
BRSW-47
BRSW-19
BRSW-01
SGSW-1
SGSW-8
SGSW-2
SGSW-3
SGSW-7
SGSW-4
SGSW-5
SGSW-6
PCSW-1
PCSW-2
PCSW-3
PCSW-4
PCSW-5

SHAVE CREEK CONCENTRATED MINE TAILINGS

PETITIONED SEGMENT OF BLACKFOOT RIVER

WATER TREATMENT SYSTEM WETLAND CELLS

PETITIONED SEGMENT OF BLACKFOOT RIVER

FLOSSE AND LOUISE MINE DUMP

LOWER MIKE HORSE MINE WASTE FACILITY

PETITIONED SEGMENT OF MIKE HORSE CREEK

MIKE HORSE TAILINGS IMPOUNDMENT

FLOODED MIKE HORSE MINE WORKINGS

UPPER MIKE HORSE WASTE ROCK FACILITIES (RECLAIMED IN 1998)

NORTH

SCALE
0 (In Feet) 1200

LEGEND

△BRSW-45 SURFACE WATER MONITORING SITE

BRSW-40 SPRING OR SEEP MONITORING SITE

PETITIONED STREAM SEGMENT

MINE WASTE FACILITIES

TEMPORARY STANDARDS
IMPLEMENTATION PLAN
UPPER BLACKFOOT MINING COMPLEX
LEWIS & CLARK COUNTY, MONTANA

UPPER BLACKFOOT MINING COMPLEX PETITIONED STREAM SEGMENTS AND POTENTIAL METALS LOADING SOURCES

FIGURE
2-1

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Hydrometrics, Inc.

FIGURE 2-1. UPPER BLACKFOOT MINING COMPLEX PETITIONED STREAM SEGMENTS (I:\LAND PROJECTS\0018B201\DWG\0018B201H003.DWG)

The Upper Mike Horse mine waste rock facilities include mine waste rock and overburden material placed on the hillsides and drainage bottoms during historic mine development. These mine facilities were reclaimed in-place in 1998 as part of Asarco's voluntary reclamation program. Reclamation included regrading of the waste rock facilities and construction of storm water diversion ditches to divert water around the mine waste, incorporation of soil amendments into the mine waste rock and partial covering of the regraded waste with growth medium soil, and seeding of the reclaimed facilities. The reclamation activities were intended to reduce infiltration into and potential metals leaching from the mine waste, and to reduce erosion. Water quality monitoring in 1999 showed continued metal load increases in Mike Horse Creek in the vicinity of the reclaimed waste rock facilities. It is likely that more than one year will be required for the full benefits of the 1998 reclamation activities to be realized in Mike Horse Creek.

The lower Mike Horse mine waste rock facilities are located adjacent to, and in some cases are bisected by, Mike Horse Creek. Based on their location and documented water quality trends in the vicinity of these facilities, the lower Mike Horse mine waste rock facilities are believed to contribute metals and possibly sediment to Mike Horse Creek. The facilities are located on U.S. Forest Service property and therefore were not addressed in Asarco's voluntary reclamation program. Reclamation of the lower Mike Horse mine waste rock facilities will require coordination with the Forest Service and with other federal and state permitting agencies (Section 3).

- Seepage of Water from the Mike Horse Mine Workings:
  In 1995/96, the Mike Horse Mine 300-Level Adit was fitted with a flow-through bulkhead plug intended to regulate flows from the adit and to flood a portion of the underground mine workings. By flooding the mine workings and excluding oxygen from the mineralized wall rock, the annual load of metals discharged from the Mike Horse Adit has been significantly reduced. The water level in the mine workings is generally maintained at an elevation of 5,650 feet to 5,750 above mean sea level. As such, a positive hydraulic gradient exists between the mine pool and the creek channel near and downstream of monitoring site BRSW-4 (Figure 2-1). Therefore, the potential for seepage of water from the Mike Horse Mine workings to negatively impact Mike Horse Creek will be assessed under this implementation plan.

2.2 BEARTRAP CREEK

Metals loading trends vary seasonally through the petitioned segment of Beartrap Creek (from the Mike Horse Tailings Impoundment to the confluence with Anaconda Creek, Figure 2-1). In April 1999, streamflow and metals loads increased in the upper portion of Beartrap Creek (between sites BRSW-23 and BRSW-39). Increases in metals loads were also apparent in April between sites BRSW-35 (Mike Horse Creek) and BRSW-23 (Beartrap Creek just downstream of the confluence with Mike Horse Creek). Further downstream,

between monitoring sites BRSW-39 and BRSW-38, streamflow, metals concentrations, and metals loads were all relatively constant.

Sampling conducted in May 1999, during high streamflow conditions, showed relatively little increase in flow, metals concentrations, or metals loads through Beartrap Creek. Iron, zinc, and manganese showed very modest concentration and load increases through this reach. For example, iron increased from 0.14 mg/L to 0.19 mg/L and from 10.7 lb/day to 14.9 lb/day between site BRSW-23 and site BRSW-38.

Low streamflow metals loading trends in Beartrap Creek, as documented through fall season sampling, show streamflow rates, metals concentrations and metals loads remain relatively constant in the upper stream reach (between monitoring sites BRSW-23 and BRSW-48, Figure 2-1). The fall season load of some metals in Beartrap Creek, particularly lead, iron and zinc, do increase by about three to four times further downstream between BRSW-48 and the mouth of Beartrap Creek.

2.2.1 Potential Loading Sources to Beartrap Creek

Based on the water quality data and other site information, potential sources of water quality impairment in Beartrap Creek include:

- Dispersed Mine Waste in Drainage Bottom:
  Dispersed tailings are evident along the petitioned segment of Beartrap Creek. These tailings generally occur in isolated pods along the floodplain, and are particularly evident in early spring when a white crust (presumably metal-salts forming from the oxidation of metal-sulfides) has been observed on the surface of the tailings. These dispersed tailings may be a source of metals loading to Beartrap Creek during the early stages of spring runoff due to flushing of metal-salts by snowmelt or rising stream levels. This could account for the relatively high metal concentrations and consistent load increases observed through Beartrap Creek in April 1999.

- Mine Waste and/or Discharges Associated with the Flosse and Louise Mining Claim:
  A mine waste rock facility is located in the Beartrap Creek floodplain on the Flosse and Louise mining claim (Figure 2-1). The Flosse and Louise claim is a patented mining claim not in Asarco's ownership. The mine waste rock facilities have the potential to contribute to metals and sediment loading to Beartrap Creek through erosion and leaching of metals during snowmelt and precipitation periods.

  A small, orange-stained seep emanates from the waste rock facility area near what appears to be a collapsed adit. The seep (monitoring site BRSW-30 on Figure 2-1) contains elevated concentrations of some metals including iron, lead, and zinc. The low flow rate of the seep results in a relatively small metals load contribution. It is possible, however, that metals load increases detected in Beartrap Creek through this area are attributable to subsurface loads contributed from these potential sources.

- The Mike Horse Tailings Impoundment
  Two potential mechanisms exist for metals loading from the Mike Horse Tailings Impoundment to Beartrap Creek (and possibly to lower Mike Horse Creek). The first is lateral seepage through the tailings impoundment dam and discharge to the head of the petitioned segment of Beartrap Creek. Such seepage does in fact occur and is monitored at the base of the dam (monitoring site BRSW-3, Figure 2-1). The second potential mechanism is via vertical seepage of tailings pond water through the pond bottom, commingling with the underlying groundwater, and subsequent lateral flow and recharge to Beartrap Creek downstream of the impoundment. These two mechanisms are discussed below.

  Based on seasonal water sampling during the period 1991 through 1999, the tailings dam seepage water as monitored at site BRSW-3 meets most water quality standards with only occasional exceedances for cadmium, manganese and zinc. The small flow at BRSW-3, as compared to that in Beartrap Creek, makes the dam seepage load relatively insignificant. However, other seeps do occur seasonally near the dam toe which flow directly to lower Mike Horse Creek or Beartrap Creek, and are not accounted for in the BRSW-3 samples. Additional seepage also could occur through the shallow subsurface, thus increasing the potential metals load from the tailings dam seepage. The implementation plan includes measures to quantify, and mitigate if necessary, seepage at the toe of the tailings dam (Section 3).

  No information is presently available to assess whether or not vertical seepage of pond water and subsequent metals loading to the underlying groundwater system is occurring. Historic water sampling of the pond surface water has consistently shown the pond water to be of excellent quality. The potential for seepage through the pond bottom sediments to contribute metals to the petitioned stream segments will be addressed through a detailed site evaluation (Section 3).

2.3 BLACKFOOT RIVER

Metal loads generally increase through the petitioned segment of the Blackfoot River, from the confluence of Beartrap and Anaconda Creeks downstream to the first natural marsh (Figure 2-1), although the magnitude of increases varies seasonally. In April 1999, there was little change in metals concentrations over the entire stream reach from BRSW-29 to BRSW-12, and most metals showed slight decreases in concentration. However, loads of zinc, iron, and lead all increased from BRSW-29 to BRSW-12. For iron and lead, loads increased about two to three times, and the majority of the load increase occurred between sites BRSW-9 and BRSW-12 in the vicinity of a concentrated deposit of floodplain tailings (Figure 2-1).

In contrast to April 1999, the May 1999 synoptic sampling (high flow conditions) showed consistent load increases (about two to three times) for all metals from BRSW-29 to BRSW-12. Iron (9 to 27 lb/day) and zinc (66 to 146 lb/day) showed the largest load increases. The May metals concentrations remained similar or increased slightly over this reach. Also in contrast to the April trends, load increases of similar magnitude were observed in the upper

portion of the reach (BRSW-29 to BRSW-9) and the lower portion of the reach (BRSW-9 to BRSW-12) for all metals except iron, which increased primarily in the lower reach (between BRSW-9 and BRSW-12).

Low streamflow synoptic sampling (typically performed in October) also has shown load and concentration increases for most metals through the petitioned reach of the Blackfoot River. Compared to April and May 1999 data, the October 1999 data showed the largest percent increases in load (generally from three to four times). Exceptions to the general increase in loads and concentrations included manganese, which increased only slightly in load and decreased in concentration from BRSW-29 to BRSW-9, and lead, which was below laboratory detection limits in the entire stream segment between BRSW-29 and BRSW-12. Similar to April 1999, load increases for all metals except zinc occurred in the lower portion of the reach, while the zinc load increase occurred upstream between BRSW-29 to BRSW-9.

2.3.1 Potential Loading Sources to Blackfoot River

Possible sources of metals loading to the petitioned segment of the Blackfoot River include:

- Concentrated Mine Waste Near the Confluence with Shave Creek
  An area of concentrated mine tailings is located along the Blackfoot River floodplain near the confluence of the Blackfoot River and Shave Creek (Figure 2-1). Concentrations and loads of most metals in the Blackfoot River increase through this tailings area, presumably due to leaching of metals from the tailings. Based on current knowledge, the tailings are located predominantly on Forest Service property, with a small fraction potentially located on Asarco patented mining claims. The precise origin and mode of deposition of these concentrated tailings is presently unknown, however, based on the condition of the tailings and vegetation patterns, the tailings may have been deposited several decades ago (i.e., before the 1975 Mike Horse Tailings Dam breach). The implementation plan scope of work includes characterization and delineation of the concentrated tailings deposit, including determination of the tailings source (Section 3). Subsequent details and the timing of reclamation of the concentrated tailings will be dependent on the source of the tailings, and access and other agreements as to the nature and scope of, as well as responsibility to carry out, the reclamation activity to be agreed upon with the U.S. Forest Service and other potentially responsible parties. Permitting requirements through various federal and state agencies may also be required, including a U.S. Army Corps of Engineers CWA Section 404 permit.

- Dispersed Tailings in Drainage Bottom
  Similar to Beartrap Creek, dispersed tailings are evident along the petitioned segment of the Blackfoot River. These tailings generally occur in isolated pods along the floodplain and may act as a source of metals loading to the Blackfoot River, especially during the early stages of spring runoff. These dispersed tailings are located both on National Forest lands, and Asarco patented mining claims.

The implementation plan scope of work includes characterization and delineation of the dispersed tailings. Subsequent details and the timing of reclamation of the Blackfoot River dispersed tailings will be dependent on the source of the tailings, and access and other agreements as to the nature and scope of, as well as responsibility to carry out, the reclamation activity to be agreed upon with the U.S. Forest Service and other potentially responsible parties. Permitting requirements through various federal and state agencies may also be required.

- Surface Water from Stevens Gulch Creek
  Surface water flow from Stevens Gulch Creek, a tributary to the Blackfoot River, contains elevated concentrations of some metals. As such, Stevens Gulch Creek serves as a loading source to the Blackfoot River for some petitioned parameters. Asarco has conducted reclamation activities on its property and considerable water quality monitoring in Stevens Gulch drainage as part of its voluntary reclamation program. Existing information will be reviewed, and new information obtained if needed, to delineate the remaining sources of metals loading in this drainage (Section 3).

- Water Treatment System Discharge
  Asarco constructed a wetlands-based passive water treatment system to treat discharge waters from the Mike Horse Mine and Anaconda Mine adits as part of the voluntary mine reclamation program. The treatment system discharge enters the petitioned segment of the Blackfoot River (Figure 2-1). Presently, the treatment system removes most of the cadmium, copper, iron and lead from the adit discharges, and the majority of manganese and zinc. However, each of these metals are periodically present in detectable concentrations in the treatment system discharge. Discharge of manganese and zinc are currently above B-1 standards. Additionally, although the passive wetland system has been in operation for several years, it has undergone continuous treatability testing and system refinements and thus, the reliability of consistent treatment of other metals, e.g., cadmium, copper, iron and lead, is still under review. This implementation plan requires Asarco to continue efforts to enhance the treatment system performance and thus reduce metals loading to the petitioned segment of the Upper Blackfoot River. Options for enhancing the water treatment system performance will focus on improving metals removal through the constructed wetlands and on reducing metals concentrations in the Mike Horse Adit discharge.

3.0 IMPLEMENTATION PLAN ACTIVITIES

Based on the water quality trends and potential loading sources summarized in Section 2, the following implementation plan components and activities have been developed. As required by MCA §75-5-312 (3)(c), this implementation plan has been prepared by Asarco to identify and address all potential sources of water quality impairment to the three petitioned stream segments, regardless of property ownership patterns, the origin of specific sources, or individual liability issues. Asarco will conduct the field investigations necessary to delineate individual sources and will mitigate those sources for which they are responsible. Reclamation of source areas which are Asarco's responsibility, but are located on Forest Service property, will require the granting of access by the Forest Service. Asarco will discuss with the Forest Service and other potentially responsible parties the need to develop and implement appropriate reclamation plans for those sources not found to be Asarco's responsibility. Based on current site knowledge, known potential sources and reclamation alternatives are described below with individual responsibilities specified where known.

The following discussion lists general implementation plan activities to be performed by Asarco. Based on site characterization results and negotiations with the Forest Service and other landowners and potentially responsible parties, annual work plans will be prepared detailing activities proposed each year. The plans will be submitted to MDEQ for review and comment prior to initiation of field activities. Following is a summary of proposed implementation plan activities. A preliminary implementation plan schedule is included in Section 4.

3.1 MIKE HORSE CREEK DRAINAGE

Based on current site knowledge, potential sources of water quality impairment in Mike Horse Creek drainage include historic mine waste, the hillside seepage near monitoring site BRSW-4, and seepage from the flooded underground mine workings. These potential sources, along with any other potential sources identified through field investigations and/or remedial activities, will be evaluated and addressed as appropriate. Proposed actions addressing each potential source area are discussed below.

Historic Mine Waste:

Lower Mike Horse Mine Waste Rock Facilities

Existing stream water quality data and field observations indicate that the lower Mike Horse mine waste rock facilities are a source of sediment and metals loading to Mike Horse Creek. The lower Mike Horse waste rock facilities are located on U.S. Forest Service property and most likely resulted from historic operations at the Mike Horse mine. Asarco will characterize these facilities to determine the volume of mine waste present, and physical and chemical parameters necessary to assess reclamation options. Physical and chemical parameters to be determined through sample collection and testing include total metals concentrations, acid-base accounting parameters, and total sulfur forms. Geotechnical parameters also will be determined for use in reclamation and closure design plans. Asarco

will conduct site characterization activities in 2000-2001, pending access from the Forest Service, so that this discrete source of metals loading can be addressed as soon as possible.

Following collection of required information, Asarco will develop and implement an appropriate reclamation plan for the lower Mike Horse mine waste facilities. Potential reclamation options include:

1. Complete or partial mine waste removal and placement in an off-site repository (such as the existing Paymaster Repository);
2. Consolidation of mine waste with local closure;
3. In-place reclamation through mine waste amendment and revegetation, and associated improvements to Mike Horse Creek channel; and
4. No action. Based on existing information however, a no action response likely will not be deemed appropriate for the lower Mike Horse mine waste facilities.

Asarco will conduct the necessary waste characterization and reclamation actions at the lower Mike Horse mine waste facilities. Preliminary scheduling calls for the lower Mike Horse mine waste to be reclaimed in 2002 and 2003 (see Section 4). The exact schedule is dependent on results of the waste facility characterization, coordination with the U.S. Forest Service for access to the area, and attainment of necessary permits including, but not limited to, a 310 permit from the Lewis and Clark County Conservation District, a 3A permit and storm water permit from MDEQ, and a Section 404 permit from the U.S. Army Corp of Engineers. Detailed sampling and analysis plans and engineering design plans will be prepared and submitted to MDEQ prior to initiation of any activities in lower Mike Horse Creek.

Upper Mike Horse Mine Waste Rock Facilities

The Upper Mike Horse waste rock facilities include historic mine waste situated on the hillsides in Mike Horse Creek drainage (Figure 2-1). These facilities were reclaimed in-place by Asarco in 1998 and are located in the middle reach of Mike Horse Creek where an increase in metals loads was observed in 1999.

Asarco will further evaluate the potential relationship between Mike Horse Creek water quality and the reclaimed upper Mike Horse mine waste facilities. Year 2000 activities will include stream water quality monitoring in the vicinity of the reclaimed mine waste to further evaluate water quality trends and possible sources, and possible sampling of runoff water and shallow groundwater immediately downstream of the mine waste facilities. If the reclaimed waste rock is in fact a source of metals loading to Mike Horse Creek, future monitoring may show a decreasing trend in metal loads as the reclaimed waste rock stabilizes and a complete vegetation cover is established. Full impacts to water quality from the 1998 reclamation activities may take a number of years to be realized.

Characterization of the upper Mike Horse mine waste facilities will closely complement characterization of the hillside seepage as described below. If field investigations indicate that the upper Mike Horse mine waste facilities continue to be a source of metals loading to

Mike Horse Creek, Asarco will develop and implement an appropriate reclamation plan. Potential reclamation actions may include:

1. Complete or partial removal of portions of the mine waste facilities found to be contributing to metal loading in Mike Horse Creek;
2. Additional mine waste amendment to enhance vegetation establishment and reduce metals mobility; and
3. Selective capping of mine waste with soil or synthetic materials to inhibit water infiltration and subsequent metals leaching.

Field investigations of the upper Mike Horse waste rock facilities will commence in 2000 with detailed water quality monitoring in Mike Horse Creek and other potential activities as described above. Additional reclamation activities, if needed, are currently scheduled to occur between 2002 and 2004 (Section 4). Because the upper Mike Horse waste rock facilities are located on Asarco property, scheduling of these activities is not contingent upon access agreements or negotiations with other parties.

Hillside Seepage:
Based on 1999 water quality monitoring activities, seepage from the hillside in middle Mike Horse Creek (site BRSW-47 on Figure 2-1) is a significant contributor of metal loading to Mike Horse Creek. On May 21, 1999, the small surface flow at seep BRSW-47 (approximately 4.5 gpm) accounted for approximately 25% of the sulfate load, 50% of the aluminum load, 45% of the copper load and 20% of the zinc load present at monitoring site BRSW-4, located in Mike Horse Creek downstream of the seep (Figure 2-1). It is possible that additional loading to Mike Horse Creek may be attributable to shallow subsurface flow associated with the seep. Based on the location, the source of metals loading to the seep may be the reclaimed mine waste rock located immediately uphill of the seep. Alternatively the seep chemistry may result from groundwater impacted by historic mining disturbances or natural geochemical processes. The seepage area is located in the vicinity of a mineralized vein system associated with the Mike Horse ore body.

Asarco will initiate field investigations in 2000 to quantify the total metal load attributable to the seep area, and to identify the source of water and of the metal load in the seep. The field investigation may include trenching in the seep area to identify the source of seepage and quantify the potential subsurface component of flow, installation of piezometers and/or monitoring wells to delineate groundwater flow paths and groundwater chemistry near the seep, and possible tracer testing to identify seep recharge zones.

Following source identification, Asarco will develop and implement an appropriate reclamation plan for the seep area. Reclamation actions may include:

1. Reclamation of portions of the upper Mike Horse waste rock facilities as described above;
2. Construction of surface water and/or groundwater diversions around source area(s);

3. In-situ treatment of seepage water with reactive barrier wall or other appropriate technology; and
4. No action (if the seepage chemistry is found to be caused by natural conditions).

Field investigations of the seepage area are scheduled for 2000-2002, with reclamation scheduled for 2002 to 2004. Because the upper Mike Horse seepage area is located on Asarco property, scheduling of these activities is not contingent upon access agreements or negotiations with other parties. Scheduling of reclamation activities, if required, may be dependent on attainment of necessary permits including a 310 permit from the Lewis and Clark County Conservation District, a 3A permit and storm water permit from MDEQ, and a Section 404 permit from the U.S. Army Corps of Engineers.

Seepage from Mine Workings:

Seepage from Mike Horse Mine Workings

Although there are no indications that seepage of water from the flooded Mike Horse Mine workings is impacting water quality in Mike Horse Creek, the location of the workings and the mine water level resulting from plugging of the adit indicate that seepage of water from the workings to Mike Horse Creek is possible. Despite the fact that the locations suggest that seepage of mine water could be the cause of the metal load increases observed through the middle reach of Mike Horse Creek, and the high metals concentrations in seep BRSW-47 (Figure 2-1), water quality trends in both the seep and in Mike Horse Creek contradict this scenario. For instance, both seep BRSW-47 and site BRSW-4 in middle Mike Horse Creek contained very little iron (less than 1 mg/L in spring and fall 1999). This compares to an iron concentration in the adit water of approximately 100 mg/L. Conversely, the May 1999 copper and aluminum concentrations in seep BRSW-47 (66 and 128 mg/L, respectively) compare to concentrations of approximately 1 mg/L or less in the Mike Horse Adit for both these metals. Nonetheless, Asarco will investigate the potential for seepage of water to occur from the mine workings, and take corrective actions if this seepage is found to significantly contribute to water quality impairment in Mike Horse Creek.

The mine seepage evaluation will be conducted in conjunction with the upper Mike Horse waste rock facility and hillside seepage investigations described above. The water sampling, trenching, and piezometer and/or monitoring well installations proposed for those sites also will be used to evaluate seepage from the workings. In addition, tracer testing may be performed to further address the potential mine seepage issue. If seepage from the mine workings is found to be a significant cause of water quality impairment in Mike Horse Creek, mitigative measures would most likely involve lowering of the mine pool level to minimize outward seepage. These actions will be conducted concurrently with the other activities proposed above for Mike Horse drainage.

3.2 BEARTRAP CREEK DRAINAGE

Potential sources of metals loading in Beartrap Creek drainage include the Mike Horse Tailings Impoundment, dispersed floodplain tailings, and the mine waste rock and possible adit discharge located on private property (the Flosse and Louise claim). These potential

sources, along with any other potential sources identified through field investigations and/or remedial activities, will be evaluated and addressed as appropriate. Proposed actions addressing each potential source area are discussed below.

Mike Horse Tailings Impoundment:
Asarco will undertake a field investigation program to evaluate the geotechnical stability of the Mike Horse Tailings Impoundment, and to determine if seepage from the tailings impoundment is a significant source of metal loading to Beartrap Creek (or lower Mike Horse Creek). Following the tailings impoundment field investigation, Asarco will develop and implement appropriate reclamation plans if warranted. Because the tailings impoundment is located on properties administered by the Helena National Forest (and is covered by a special use permit), all activities associated with the tailings impoundment are contingent on obtaining access and other agreements from the Forest Service to conduct field investigations and reclamation actions.

Following negotiations between Asarco and the Forest Service, Asarco will evaluate the suitability of the tailings impoundment design from a geotechnical stability standpoint, and implement a field investigation to assess potential seepage and metals loading from the impoundment. The design review also will be used to design and construct an emergency overflow spillway in the dam that meets current U.S. Forest Service design standards. Pending agreements with the Forest Service, Asarco intends to construct the overflow spillway in 2000 or 2001.

Asarco also will implement a field investigation program to determine if seepage and associated metals loading is occurring either through the impoundment dam or through the pond bottom. Field investigations associated with potential dam seepage will include; a comprehensive inventory of all dam face seeps including measurement of seep flow rates and metals concentrations, and installation of shallow piezometers at the dam toe to evaluate potential seepage through the shallow subsurface. Field activities designed to determine if seepage through the pond bottom and metals loading to the underlying groundwater body and/or Beartrap Creek is occurring may include; installation of nested bedrock groundwater monitoring wells at the dam toe and elsewhere in Beartrap Creek drainage to delineate groundwater flow paths and chemistry in the vicinity of the tailings impoundment; characterization of tailings along the pond beach where periodic wetting and drying of the tails may occur; and sampling of pond bottom tailings and/or pond water at depth to assess water quality at the water/tailings interface. The tailings impoundment field investigations are scheduled for 2000 to 2002.

Based on field investigation results, Asarco will develop and implement an appropriate reclamation plan if the impoundment is found to contribute significantly to metals loading in Beartrap Creek. Possible reclamation alternatives include:

1. Establish vegetation on dam face to stabilize slope (this action was proposed by Asarco in 1998 but site access was denied by the Forest Service);
2. Seal inner dam face to reduce dam seepage;

3. Treat dam seepage with passive treatment cell at dam toe;
4. Complete or partial removal of seasonally exposed tailings along the pond beach;
5. Controlling pond water levels to manipulate seepage rates and/or geochemical conditions within the pond;
6. Partial sealing of pond bottom to reduce potential seepage;
7. Partial or complete removal of the impoundment and tailings; and
8. No action.

Tailings impoundment reclamation activities are tentatively scheduled for 2002-2006 (Section 4), pending results of the field investigations, access and other agreements with the Forest Service, and obtaining required permits including a U.S. Army Corps of Engineers Section 404 permit.

Dispersed Floodplain Tailings:
Dispersed tailings are present along the Beartrap Creek channel and floodplain from the Mike Horse Tailings Impoundment to the confluence with Anaconda Creek (Figure 2-1). The tailings occur in isolated pods through this reach of stream. Potential sources of these tailings include historic disposal of the Mike Horse Mill tailings prior to construction of the tailings impoundment in 1941, or material washed downstream from the 1975 Mike Horse tailings dam breach. Existing water quality data indicate that these dispersed tailings may act as a source of metals to Beartrap Creek at least seasonally. The majority of dispersed tailings are located on U.S. Forest Service lands.

Asarco will implement a field investigation program to determine if the dispersed tailings act as a metal loading source, and to quantify the location, the volume, and the chemical and physical properties of the dispersed tailings. Metals loading from the dispersed tailings will be assessed through detailed water sampling in the tailings area, including sampling of Beartrap Creek and runoff water from the tailings. The locations and volume of tailings will be determined through detailed mapping and sampling to delineate the lateral extent and depth of tailings. Field investigations along Beartrap Creek may also include stream sediment sampling. Determination of physical and chemical tailings characteristics will be determined through sampling of tailings and testing for total metals content, acid-base accounting, and other properties determining reclamation and closure options. Investigation of the dispersed tailings is scheduled for 2000 to 2001.

Following the field investigation program, Asarco will develop appropriate reclamation plans for the dispersed tailings. Asarco will then discuss with other interested parties, possibly including the Forest Service and ARCO, the responsibility to implement an appropriate reclamation plan. Potential reclamation options include:

1. Complete or partial tailings removal and placement in an off-site repository;
2. Consolidation of tailings with local closure in Beartrap Creek drainage;
3. In-place reclamation through mine waste amendment and revegetation;
4. Partial tailings removal with construction of settling basins and/or wetlands structures to enhance water quality in the drainage; and
5. No action.

Reclamation of the Beartrap Creek dispersed tailings is scheduled for 2002-2004. The exact schedule is dependent on results of the field investigation, timing of upstream reclamation activities, obtaining access to the property from the U.S. Forest Service and agreement with other interested parties (the Forest Service and ARCO), and obtaining the required construction and environmental permits including a U.S. Army Corps of Engineers Section 404 permit.

Mining Disturbance on Private Property (Flosse and Louise Claim):
Beartrap Creek flows through the west corner of a patented claim (the Flosse and Louise mining claim) not owned by Asarco. A mine dump and apparent collapsed adit are located on the this property and may impact water quality in Beartrap Creek. Pending access and agreement with the property owner, Asarco will conduct a field investigation to quantify potential metals loading from this site. Site investigations may include sampling of runoff water from the site, continued sampling of Beartrap Creek immediately upstream and downstream of the property, characterization of mine waste material, and possible investigation of the apparent collapsed adit. Pending access agreements, Asarco will conduct these investigative activities between 2000 and 2001.

Following site characterization, Asarco will develop an appropriate reclamation plan for the Flosse and Louise mine facilities and will discuss with the landowner and any other interested parties the responsibility to implement the plan. The preliminary schedule calls for reclamation of the site between 2002 and 2004. The exact schedule is dependent on obtaining access and other agreements with the landowner, obtaining required construction permits, and the timing of upstream reclamation activities.

3.3 BLACKFOOT RIVER DRAINAGE

Potential sources of water quality impairment in the petitioned segment of the Blackfoot River include an area of concentrated tailings near the confluence with Shave Creek, dispersed tailings located along the Blackfoot River floodplain, loading from surface water in Stevens Gulch, and discharge from the water treatment system. These potential sources, along with any other potential sources identified through field investigations and/or remedial activities, will be evaluated and addressed under this implementation plan as appropriate. Similar to Beartrap Creek, most of the petitioned segment of the Blackfoot River is located on National Forest lands. Therefore, proposed activities on the Blackfoot River will require access agreements from the Forest Service and agreements with the Forest Service and possibly other parties as to responsibility for individual sources of water quality impairment and related reclamation activities. Proposed actions for the Blackfoot River drainage are discussed below.

Concentrated Tailings Near Confluence with Shave Creek:
An area of concentrated mine tailings is present along the Blackfoot River near the confluence with Shave Creek (Figure 2-1). These concentrated tailings differ from the dispersed tailings along the Blackfoot River and Beartrap Creek in their lateral extent (the

tailings are continuous over an area of more than an acre), and their appearance (the concentrated tailings support mature vegetation indicating they have been in place for a considerable length of time). The concentrated tailings are located predominantly on National Forest lands.

Pending access and other agreements with the Forest Service, Asarco will initiate a field investigation to characterize and determine the source of the concentrated tailings. The investigation will include mapping of the tailings to determine the lateral extent and volume of tailings, and sampling of the tailings to determine metals content, acid-base accounting, total sulfur species, and geotechnical properties required for reclamation and closure design. Asarco will conduct the site investigation between 2001 and 2002.

Following the site investigation, Asarco will develop an appropriate reclamation plan for the concentrated tailings. Possible reclamation actions include:

1. Complete or partial tailings removal and placement in an off-site repository (such as the Paymaster Repository);
2. Consolidation and local closure of tailings;
3. In-place closure through incorporation of amendments and revegetation; and
4. No action (based on existing water quality information, a no action alternative most likely would not be deemed appropriate).

The schedule outlined in Section 4 includes reclamation of the concentrated mine tailings between 2003 and 2005. The reclamation action selected and the timing of reclamation activities will be dependent on access and other agreements with the Forest Service and other potentially responsible parties related to responsibility for carrying out the reclamation action, the timing of upstream reclamation activities, and obtaining permits which may be required including a U.S. Army Corp of Engineers Section 404 Permit.

Dispersed Floodplain Tailings:
Similar to Beartrap Creek, dispersed tailings are present along portions of the petitioned segment of the Blackfoot River. These dispersed tailings occur in isolated pods and may have originated from historic mining operations predating construction of the Mike Horse Tailings Impoundment, or may have been deposited during the 1975 tailings dam breach. Unlike Beartrap Creek, the Blackfoot River dispersed tailings are located among dense vegetation, including grasses, brush and trees, thus limiting vehicular access to the site. The tailings are located on both Asarco patented mining claims and U.S. Forest Service lands.

Asarco will implement a field investigation program to characterize the dispersed tailings and determine if they act as a significant source of metals loading to the Blackfoot River. The characterization will include mapping the location and volume of tailings on both Asarco and Forest Service lands, and sampling of the tailings to determine chemical and physical properties. Tailings samples will be tested for metals content, acid-base accounting, total sulfur forms, and geotechnical properties required for reclamation and closure design. Investigation of the Blackfoot River dispersed tailings is scheduled for 2001 to 2002.

Following the field investigation program, Asarco will develop appropriate reclamation plans for the dispersed tailings. Potential reclamation options include:

1. Complete or partial tailings removal and placement in an off-site repository;
2. Consolidation of tailings with local closure;
3. In-place reclamation through mine waste amendment and revegetation; and
4. No action.

Asarco will discuss with the Forest Service and other interested parties the responsibility to implement the reclamation plan. Reclamation of the Blackfoot River dispersed tailings is presently scheduled for 2003 to 2005. The exact schedule is dependent on results of the field investigation, timing of upstream reclamation activities, and agreement with the Forest Service and other interested parties. Scheduling of reclamation activities also will be dependent on obtaining the required construction and environmental permits, possibly including a U.S. Army Corp of Engineers Section 404 permit.

Loading from Stevens Creek:
Concentrations of some metals in Stevens Creek, a tributary to the petitioned segment of the Blackfoot River, are elevated and thus contribute to the load of some petitioned parameters in the Blackfoot River. Typical metals concentrations in Stevens Creek include; 1 to 2 mg/L aluminum, 0.2 mg/L copper, and 0.25 mg/L zinc. Coupled with the low flow rates typical of Stevens Creek, these concentrations result in a relatively small load contribution to the Blackfoot River (i.e. 0.2 lbs/day for zinc in April 1999 compared to 230 lbs/day in the Blackfoot River immediately downstream of the confluence). Although the associated metals load contribution is small, this implementation plan includes provisions to identify sources of metals loading in Stevens Gulch, and to mitigate those sources if warranted. Asarco has previously conducted water quality monitoring in Stevens Gulch, and in 1997 completed mine reclamation activities on their properties in Stevens Gulch. Actions conducted under this implementation plan will focus on remaining potential loading sources located predominantly on U.S. Forest Service property. It also is possible that remaining metals loads in Stevens Creek are caused at least in part by recharge to the creek of naturally mineralized groundwater.

Asarco will implement a field program to quantify remaining metals loading sources and rates in Stevens Gulch. Field activities may include detailed mapping of mine waste facilities, additional surface water sampling to augment existing data, installation of shallow piezometers or monitoring wells to assess groundwater quality and flow directions, and an assessment of natural water quality within the drainage. Based on results of the field program, Asarco will evaluate reclamation alternatives if warranted and discuss with land owners and other potentially responsible parties the responsibility to implement appropriate reclamation activities. Potential activities may include complete or partial removal of waste rock facilities, in-place reclamation of waste rock facilities, or no action. The field investigation program presently is scheduled for 2001 to 2002, with reclamation activities scheduled for 2003-2006, if necessary. The exact timing of Stevens Gulch activities is

dependent on access agreements with the Forest Service, and coordination with other potentially interested parties.

Water Treatment System Discharge:
The passive wetlands-based water treatment system removes metals from the historic Mike Horse Mine and Anaconda Mine adits. Asarco identified the Mike Horse Adit as a significant contributor of metals to the upper Blackfoot River early in their investigations at the UBMC. Collection and treatment of the adit discharge became a central focus of the mining company's voluntary reclamation program. The treatment system has been operating since October 1996 and has reduced the loads of most metals entering the River system from the two adits by 90% or more.

Asarco will continue efforts to enhance the water treatment system performance and thus reduce the load of metals entering the Blackfoot River. Efforts will be focused on two fronts; reducing the load of metals in the Mike Horse Adit discharge, and improving metals removal rates through the water treatment system. Efforts to reduce metal loads in the Mike Horse Adit discharge will include continued flooding of the mine workings to limit the oxidation of sulfide minerals, optimization of water management strategies within the mine workings to reduce seasonal variations in adit discharge quality, and evaluation of alternative mine discharge scenarios. Efforts to enhance metals removal through the treatment system will include evaluation of active carbon addition to enhance wetlands biological activity, increasing the hydraulic residence time within the wetlands by increasing the substrate thickness, or other measures identified through the ongoing treatability testing program. Improvements to the water treatment system will be conducted under the direction of the facility MPDES discharge permit.

3.4 ENVIRONMENTAL MONITORING

An environmental monitoring program consisting of surface water quality monitoring and biological monitoring will be implemented in the three petitioned stream segments. The following monitoring program represents a minimum scope of monitoring to be implemented for the first three-year period that temporary standards are in effect (2000 through 2003). Additional monitoring may be implemented during this three-year period pending conditions encountered in the field during sampling, sampling results, and discussions between Asarco, MDEQ, and other interested parties. At the end of the first three-year period, the environmental monitoring program will be reviewed and revised as appropriate. Monitoring protocol will be consistent throughout the period that temporary standards are in effect to ensure comparability of data collected throughout the entire period. Monitoring details will be provided in annual work plans to be submitted by Asarco to MDEQ for review and comment. Year 2000 monitoring will begin upon finalization of this implementation plan and the 2000 work plan.

3.4.1 Surface Water Quality Monitoring

Surface water monitoring will be conducted in the petitioned segments of Mike Horse Creek, Beartrap Creek, and the upper Blackfoot River. The purpose of surface water monitoring is to provide current water quality data for assessment of long-term water quality trends through comparison to historic water quality data, and to provide data for comparison to the temporary water quality standards.

3.4.1.1 Surface Water Monitoring Sites

Surface water monitoring will be conducted at several pre-established monitoring sites (Figure 2-1) including:

- BRSW-12 in the downstream portion of the petitioned segment of the Blackfoot River;
- BRSW-9 and BRSW-29 in the upstream portion of the petitioned segment of the Blackfoot River;
- BRSW-23 and BRSW-38 in the petitioned segment of Beartrap Creek;
- BRSW-22 and BRSW-35 in the petitioned segment of Mike Horse Creek.

All of these sites have been monitored in the past, thus providing historic water quality data for assessment of water quality trends. Water quality data from sites BRSW-12, BRSW-9, BRSW-23 and BRSW-22 will also be used for comparison to the temporary standards, since data from these sites were used to calculated the standards.

3.4.1.2 Surface Water Monitoring Schedule

Surface water monitoring will be conducted in April, May, June and October to provide information during various hydrologic conditions and seasons. The April, May and June sampling will coincide with spring runoff when water quality is generally most variable. The April and May sampling will coincide with the early and late stages of the rising limb of the spring runoff hydrograph, respectively, and the June sampling will coincide with the falling limb of the hydrograph. The October sampling event will quantify water quality during baseflow, or low flow conditions, when surface water quality generally exhibits less variability. The May and October sampling data will be particularly useful for assessment of temporal water quality trends since the majority of existing water quality data was collected during these periods.

3.4.1.3 Analytical Parameter List

Water quality samples will be analyzed for the same suite of parameters employed in recent (1997-1999) surface water monitoring programs at the UBMC. Field-measured parameters will include pH, specific conductance, water temperature and dissolved oxygen. Laboratory parameters will include the metals aluminum, cadmium, copper, iron, lead, manganese and zinc, and total dissolved solids, total alkalinity (as $CaCO_3$), calcium, magnesium, sodium,

potassium and sulfate. Metals analyses will include both total recoverable and dissolved metals concentrations. Stream flow will also be measured at each monitoring site.

3.4.2 Biological Monitoring

Biological monitoring will be conducted in the Blackfoot River to assess the current state of benthic macroinvertebrate community composition at the downstream end of the petitioned stream segments. The monitoring will initially be restricted to site BRSW-12 (Figure 2-1), near the downstream portion of the petitioned stream reaches, since this is the portion of the petitioned stream segments most likely to show improved biological conditions over the next few years. One monitoring event will be conducted per year for the first three-year period (2000 to 2003), starting in 2000. The resulting biological data will be used to establish a baseline of aquatic community conditions for comparison to historic and future biological monitoring data. This comparison will determine how past reclamation activities, and future reclamation activities as described in this implementation plan, affect the aquatic community structure.

3.4.2 Evaluation of Monitoring Data

The surface water and biological monitoring data will be used to assess temporal trends in water quality and biological conditions in the petitioned stream segments. The 2000-2003 data will provide a baseline for comparison to future monitoring results to assess improvements resulting from reclamation activities to be conducted under the implementation plan. The data will also be compared to pre-reclamation (pre 1995) data to assess overall improvements in aquatic conditions in response to reclamation activities already completed by Asarco during the period the temporary standards are in effect.

The surface water quality data collected under the implementation plan will also be used to assess in-stream concentrations of the temporary standards parameters. Concentrations of the temporary standards parameters measured at monitoring sites BRSW-12 (downstream segment of Blackfoot River), BRSW-9 (upstream segment of Blackfoot River), BRSW-23 (Beartrap Creek) and BRSW-22 (Mike Horse Creek) will be compared to the numeric temporary standards applicable to those sites on an annual basis. In addition, mean parameter concentrations will be calculated following the first three-year monitoring period (6/00-6/03) for a site by site comparison to mean concentrations from the baseline period (1997-1999). The comparison of mean concentrations will be used to assure that overall water quality is not allowed to worsen during the period that temporary water quality standards are in effect, accounting for natural variability in the dataset. The comparison of mean concentrations will begin in 2003 once a sufficient dataset is established to allow a statistical comparison to the baseline data. As additional data is collected in subsequent years (after 2003), a rolling average will be calculated using data from the three previous years for annual comparisons to the baseline period concentrations. For example, mean concentrations for the period 6/01-6/04 will be used for comparison to the baseline period at the end of 2004.

The comparison of parameter concentrations to the numeric temporary standards, and the three-year rolling mean concentrations to the baseline period mean concentrations, will be included in the annual project monitoring reports to be submitted to the Montana Department of Environmental Quality. This information will also be presented to the Montana Board of Environmental Review during the Board's triennial reviews of temporary standards, or more frequently if requested by the Department or the Board.

4.0 IMPLEMENTATION PLAN SCHEDULE

Table 4-1 includes a preliminary schedule for the implementation plan activities outlined in Section 3. The schedule calls for source characterization activities to begin in 2000, pending necessary access agreements for those potential source areas not on Asarco property. Reclamation activities will commence as soon as the required information, access and other agreements related to specific responsibility for carrying out planned action, and necessary construction and environmental permits are obtained. Pending the necessary agreements, Asarco intends to construct an emergency overflow spillway in the Mike Horse Tailings Impoundment in 2000 or 2001. Reclamation activities will then proceed in a general upstream to downstream direction to minimize potential negative impacts to reclaimed areas from upstream sources. Reclamation activities in Mike Horse Creek are scheduled to commence in 2002, and will proceed downstream to Beartrap Creek and the Blackfoot River. Preference also will be given to more significant sources of water quality impairment when determining precise reclamation schedules. The following schedule allots one year for negotiations with the U.S. Forest Service, and possibly other landowners and/or responsible parties, to finalize access and other agreements for sources not on Asarco property. As provided for in the temporary standards rule, the reclamation schedule may be extended for up to two years if negotiations with the Forest Service extend beyond one year. It is assumed that site characterization and certain reclamation activities can be implemented concurrently with negotiations.

Following adoption of temporary water quality standards, Asarco will prepare annual sampling and analysis plans and engineering design plans for each year's activities. The annual plans will be submitted to MDEQ and other interested parties for review and comment prior to initiation of field activities. Annual reports will also be prepared and submitted to all interested parties detailing results of activities during the previous year. Following is a schedule for work plan and reporting requirements starting in 2001:

Submittal	Submittal Date
Draft Annual Data Summary Reports	January 15
Final Annual Data Summary Reports	20 business days from receipt of all agency comments
Draft Annual Work Plans (including SAP)	January 31
Final Annual Work Plans	20 business days from receipt of all agency comments
Draft Engineering Design Plans	February 28
Final Engineering Design Plans	20 business days from receipt of all agency comments

TABLE 4-1. IMPLEMENTATION PLAN SCHEDULE, UPPER BLACKFOOT MINING COMPLEX

MIKE HORSE CREEK DRAINAGE

Potential Source	TASK	SCHEDULE
Lower Mike Horse Creek Mine Waste (waste rock facilities located on Forest Service property)	Negotiate access and other agreements with Forest Service and other party(ies).	2000 to 2001
	Quantify load contribution from mine waste. Actions may include, but may not be limited to: • Detailed water quality sampling. • Characterization of mine waste chemistry and volume.	2000 to 2001
	Develop and Implement Reclamation Plan. Actions may include, but may not be limited to: • Mine waste removal and placement in repository • In-place reclamation • No Action	2002-2003 Pending access from and other agreements with Forest Service
Middle Mike Horse Creek (Area of significant load increases near monitoring site BRSW-4 and upper Mike Horse reclaimed waste piles).	Investigate source of high metals concentration water to BRSW-47 seep and ultimately to Mike Horse Creek. Actions may include, but may not be limited to: • Excavate trenches in seep area. • Install wells/piezometers to delineate deep and shallow groundwater flow directions and quality and interactions with Mike Horse Creek. • Possible tracer testing to delineate source areas	2000-2002
	Conduct Reclamation Actions as appropriate. Reclamation actions may include: • Removal of reclaimed Mine Waste if it acts as source. • Construct surface water and/or groundwater diversions around source area(s). • In-situ treatment of groundwater with reactive wall or other technology. • No Action	2002-2004
Seepage from Flooded Mike Horse Mine Workings to Mike Horse Creek	Investigate whether seepage occurs. Actions may include, but may not be limited to: • Continuous monitoring of mine pool level, Mike Horse Creek flow, and Mike Horse Creek quality. • Conduct tracer testing if warranted.	2000-2002
	Implement Corrective Measures. May include: • Modify mine water management strategies.	Continuous

BEARTRAP CREEK DRAINAGE

Potential Source	TASK	SCHEDULE
Mike Horse Tailings Impoundment: Evaluate Impoundment for Potential Source of Metals Loading and for Dam Stability	Negotiate access and other agreements with Forest Service and other party(ies).	2000-2001
	Evaluate Tailings Impoundment Stability and Integrity. Perform Corrective Measures if needed: • Evaluate dam stability. • Design and construct emergency overflow spillway.	2000-2001 pending access from and other agreements with Forest Service
	Quantify Metals Loading to Beartrap Creek from Tailings Dam Seepage. Actions may include, but may not be limited to: • Quantify total seepage rate, seepage water quality, and seepage loading rate to Beartrap Creek accounting for seasonal variability. • Install shallow piezometers to quantify subsurface seepage rates and quality.	2000-2001 pending access from and other agreements with Forest Service

TABLE 4-1. IMPLEMENTATION PLAN SCHEDULE, UPPER BLACKFOOT MINING COMPLEX (continued)

BEARTRAP CREEK DRAINAGE - continued

Potential Source	TASK	SCHEDULE
Tailings Impoundment (continued)	Investigate Potential Seepage Through Tailings Pond Bottom and Possible Metals Loading to Groundwater and Downgradient Surface Waters. Actions may include, but may not be limited to: • Install nested bedrock monitoring wells at base of tailings dam, along Beartrap Creek, and possible other locations to document groundwater flow paths and groundwater quality in vicinity of impoundment. • Map and sample tailings pond beach tailings. • Sampling of pond water at depth to quantify water quality at water/tailings interface.	2000-2002 Pending access from and other agreements with Forest Service
	Develop and Implement Tailings Impoundment Reclamation Plan if required. Actions may include, but may not be limited to: • Establish vegetation cover on dam face. • Seal inner dam face to reduce seepage. • Treat dam seepage with passive wetland at base of dam. • Removal of seasonally exposed tailings along beach if present. • Controlling pond water levels to manipulate seepage and/or geochemical conditions within the pond. • Partial sealing of pond bottom. • Partial or complete removal of impoundment. • No action	2002-2006 Pending access from and other agreements with Forest Service
Dispersed Floodplain Tailings	Negotiate access and other agreements with Forest Service and other party(ies).	2000 to 2001
	Map and Sample Dispersed Tailings Deposited Along Beartrap Creek Floodplain from Mike Horse Creek to Anaconda Creek. Quantify locations, depths and volumes of tailings. Characterize for metals content, acid-base accounting, and sulfur forms.	2000-2001
	Develop and Implement Appropriate Reclamation Plans. Actions may include, but may not be limited to: • Complete or partial tailings removal and placement in off-site repository. • Consolidation and local closure of tailings. • In-place reclamation through amendment and revegetation. • Partial removal with construction of settling basins, wetland structures along drainage bottom. • No action	2002-2004 Pending access from and other agreements with Forest Service, and ARCO, and timing of upstream reclamation activities at the tailings impoundment and Mike Horse Creek drainage.
Mine Waste and Possible Adit Discharge on private property (Flosse and Louise Patented Claim)	Quantify Metals Load Contribution to Beartrap Creek: • Conduct detailed water sampling of seepage and Beartrap Creek to document seasonal load increases. • Characterize mine waste rock facilities through mapping and sampling, pending land owners permission.	2000-2001 Pending access from and other agreements with landowner(s).
	• Develop and implement appropriate reclamation plan.	2002-2004 Pending access from and other agreements with landowner(s).

TABLE 4-1. IMPLEMENTATION PLAN SCHEDULE, UPPER BLACKFOOT MINING COMPLEX (continued)

UPPER BLACKFOOT RIVER

Potential Source	TASK	SCHEDULE
Concentrated Tailings near Confluence with Shave Creek	Negotiate access and other agreements with Forest Service and other party(ies).	2000 to 2001
	Characterize Concentrated Tailings: • Delineate lateral extent, depth and volume of tailings. • Sample and analyze tailings chemistry. • Determine source of tailings.	2001-2002 Pending access from and other agreements with Forest Service
	Develop Reclamation Alternatives. Alternatives may include, but may not be limited to: • Complete or partial tailings removal and placement in off-site repository. • Consolidation of tailings with local closure. • In-place closure through soil amendment and revegetation. • No action Reclamation activities to be implemented pursuant to agreement with responsible party(ies).	2003-2005 Pending access from and other agreements with Forest Service and timing of upstream reclamation activities
Dispersed Floodplain Tailings	Negotiate access and other agreements with Forest Service and other party(ies).	2000 to 2001
	Characterize Dispersed Tailings Along Blackfoot River Floodplain from Anaconda Creek to the First Marsh: • Delineate lateral extent, depth and volume of tailings. • Sample and analyze tailings chemistry. • Determine source of tailings.	2001-2002
	Develop Reclamation Alternatives. Alternatives may include, but may not be limited to: • Complete or partial tailings removal and placement in off-site repository. • Consolidation of tailings with local closure. • In-place closure through soil amendment and revegetation. • No action Reclamation activities to be implemented pursuant to agreement with responsible party(ies).	2003-2005 Pending access from and other agreements with Forest Service, and ARCO, and timing of upstream reclamation activities at the tailings impoundment and Mike Horse Creek drainage.
Stevens Gulch	Negotiate access and other agreements with Forest Service and other party(ies).	2000 to 2001
	Quantify remaining loading sources from drainage: • Conduct additional water sampling as needed to augment existing data. • Delineate remaining metals loading sources. • Evaluate natural water quality in creek.	2001-2002
	Develop Reclamation Alternatives: • Complete or partial source removal. • In-place reclamation. • No action Reclamation activities to be implemented pursuant to agreement with responsible party(ies).	2003-2006 Pending access from and other agreements with Forest Service
Water Treatment System Discharge	Continue treatment system optimization through: • Enhancing metals removal through treatment system components. • Reducing metals concentrations in Mike Horse Adit discharge.	Ongoing

TABLE 4-1. IMPLEMENTATION PLAN SCHEDULE, UPPER BLACKFOOT MINING COMPLEX (continued)

WATER QUALITY MONITORING

Program	TASK	SCHEDULE
Compliance Monitoring	Surface water monitoring for the period that temporary standards are in place to evaluate compliance. • Seasonal monitoring at frequency to be determined in consultation with MDEQ.	During period that temporary standards are in affect.
Post Reclamation Water Quality Monitoring	Surface water monitoring after completion of reclamation activities to asses ultimate achievable water quality. • Seasonal monitoring at frequency to be determined in consultation with MDEQ.	2007-2008 1-2 years after completion of reclamation activities, or until temporary standards expire.