Asarco Consulting, Inc.

September 3, 2004

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Ms. Bethany Ihle
U.S. Forest Service
Townsend Ranger District
415 South Front St.
Townsend, MT 69644

RE: Updated Revisions to 2003 Monitoring Report for the Upper Blackfoot Mining Complex, Lewis and Clark County, Montana

Dear Mr. Levine and Ms. Ihle:

Enclosed are replacement pages for the 2003 Monitoring Activities Report for the Upper Blackfoot Mining Complex. The revisions are based on comments received by MDEQ in its letters dated April 1, 2004 and May 18, 2004, and by USFS in its letter dated June 21, 2004. The enclosed replacement pages include the cover page; pages ii, iii, 2-3, 2-4, 2-7, 3-2, 3-3, 4-2, 4-3, 4-4, 4-5, 4-6, and 5-1; Tables 2-7 and 4-2; and Borehole logs P-5 and P-6 in Appendix 4. Please replace these pages in the report and discard the old ones. Feel free to call me with any questions you may have.

Sincerely,

Robert J. Miller
Manager, Earth Sciences

c: Chris Pfahl, Asarco; w/enclosures
Bob Anderson, Hydrometrics; w/enclosures

LIST OF TABLES

2003 MONITORING ACTIVITIES REPORT FOR THE UPPER BLACKFOOT MINING COMPLEX LEWIS AND CLARK COUNTY, MONTANA

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generally totaled from about 71 gpm (.19 cfs) to over 300 gpm (0.69 cfs). Ultimately the discharge from all seeps on the Toe of the tailings dam reports to Bear Creek.

2.1.4.2 Water Quality

Water quality results from surface water sampling sites are in Appendix 1 and are summarized in Table 2-4. Water quality results for key parameters are summarized in Table 2-4 and are shown graphically in Figure 2-4. Highest concentration of total recoverable metals occur in Mike Horse Creek (stations BRSW-4, BRSW-22 and BRSW-35), with concentrations of zinc, manganese aluminum and copper being highest of the metal parameters measured. Seeps and springs at the toe of the tailings dam on Bear Trap Creek (see BRSW-3A, BRSW-3B and BRSW-23) also show some elevated metal concentrations for zinc, manganese and sometimes aluminum and iron. Although data from seepage areas is inconsistent (sometimes more elevated than others), it seem likely that seepage water quality from the dam toe contributes to elevated metal concentrations in Bear Trap Creek as observed in Station BRSW-23. Downstream metal concentrations generally show an overall declining trend in metals, but some measurements at Blackfoot river sites BRSW-9 an BRSW-12, also show occasional increases in metals concentrations particularly for zinc and sometimes copper (see Figure 2-4).

Metal concentrations were highest in late April when overall stream flow was high and snowmelt was common. Metal concentrations generally decreased in May and June with generally declining flow rates but increased again to some degree with low flow conditions in October.

Physical parameters generally were variable form site to site. Sulfate and TDS generally followed a pattern that was somewhat similar to metal concentrations and showed concentration increases at the Tailings Dam seepage sites (BRSW-3A and BRSW-3B), and at Blackfoot River sites BRSW-9 and BRSW-12. Highest concentrations of total suspended solids, TDS and sulfate were observed at BRSW-3B in April. This was coincident with high metal concentrations and coincident in time with elevated surface runoff, which was probably a factor in elevated TSS concentrations at this site.

Total recoverable metal loads are shown in Table 2-6. Highest metal loads were observed during the May sampling event when spring snow-melt runoff is highest, and water turbidity, suspended solids and total recoverable metal concentrations are also high. Conversely, lowest concentrations occurred in fall when low flow conditions exist. Upper Blackfoot river stations generally show higher calculated loads and generally reflect the higher volume of flow compared to upstream sites.

2.1.5 Comparison to Temporary Water Quality Standards

Numeric temporary water quality standards are currently in effect at four locations at the UBMC: sites BRSW-12 and BRSW-9 on the Blackfoot River, BRSW-23 on Beartrap Creek, and BRSW-22 on Mike Horse Creek (see Figure 1). Table 2-7 summarizes the 2003 results of water quality sampling at these locations. Concentrations of metals at the temporary standards monitoring locations were consistently below the associated standards, with the exception of iron and lead at site BRSW-23 (Bear Trap Creek) for the May monitoring event.

2.2 BIOLOGICAL MONITORING

Macroinvertebrate sampling was performed at two locations, UBBS-1 (BRSW-12) and UBBS-2 (BRSW-29) in the upper Blackfoot River by Hydrometrics on October 23, 2003. The purpose of this sampling was to collect additional baseline data on current macroinvertebrate populations for comparison to future (post-reclamation) monitoring results. Biological monitoring station UBBS-1 is located on the Blackfoot River and corresponds to surface water monitoring site BRSW-12 (Figure 2-2). UBBS-1 was established and sampled in September 2000, and was sampled again in October 2001. Additional monitoring sites were established in 2001 to increase baseline data coverage. Site UBBS-2, located immediately downstream of the confluence of Beartrap Creek and Anaconda Creek at surface water monitoring site BRSW-29 (Figure 2-2) was initially established and sampled in October 2001.

Station UBBS-1

A large portion of the total 2003 sample at UBBS-1 was EPT taxa (85%). EPT taxa included 77% Plecoptera and 7.6% Trichoptera (Table 2-9). The relative scarcity of Oligochaetae suggests that conditions favored by this family (soft mud bottoms and poor water quality) were not present. Macroinvertebrate species richness in 2003 sampling was 20 species, compared with 21 species in 2000 and 15 species in 2001 (Table 2-8). Diversity was average for this location, measuring 2.50 (Table 2-8). The 2003 impairment score for this sample was calculated at 0.52 (Partial Impairment), compared with a 2001 impairment score of 0.43 and a 2000 score of 0.57.

Similar to previous monitoring data, predators formed the dominant functional group, comprising 61% of the sample, with shredders the second most common functional group, comprising 27% of the sample (Table 2-9). Plecoptera was the most abundant order in the UBBS-1 sample in 2000, 2001, and 2003 (Table 2-8). Members of the Plecoptera order typically are characteristic of cold, fast flowing streams with high oxygen content and good water quality. Again, the lack of Oligocheata indicates that environmental conditions such as poor water quality and muddy stream bottoms are not prevalent. The lack of the order Ephemeroptera, however, indicates some water quality impairment.

Overall, the 2003 macroinvertebrate data for site UBBS-1 were similar to the 2000 and 2001 data sets in terms of species richness, abundance, community composition, diversity, and impairment scores.

Station UBBS-2

The community composition of the 2003 UBBS-2 macroinvertebrate sample consisted primarily of Diptera (47%), and Plecoptera (34%), which dominated the EPT taxa (Table 2-9). The percentage of EPT taxa increased from 27% in 2001 to 48% in 2003 (Table 2-9). Macroinvertebrate species richness in 2003 sampling was 32 species, as compared to 22 species noted in the 2001 sample (Table 2-8). The Shannon-Weaver diversity was higher than average for this location, measuring 3.78 (Table 2-8). The

3.4 MONITORING RESULTS

All 2003 sampling results are in Appendix 1 (Validation Summary Inorganic Analysis; Appendix 2, Data Base). Key parameters are also summarized in Table 3-2.

3.4.1 Water Level Measurements

Water level measurements from the 8 monitoring wells are summarized in Table 3-2. Bi-weekly water level measurements from the tailings dam piezometers measured in 2003 are summarized in a separate report, to be presented later as an addendum to this monitoring report. Water level measurement results show significant fluctuation occurs in response to seasonal recharge. Highest groundwater occurs during the spring, coincident with high spring runoff in the drainages. Lowest occurs in fall. Seasonal fluctuations of over 12 feet were observed in some monitoring wells.

3.4.2 Water Quality

Monitoring well water quality results for 2003 are in Appendix 1 and are summarized in Table 3-2. Of the wells monitored, UMHMW-1S, UMHMW-1D, UMHMW-2S, UMHMW-2D showed the highest concentrations of metals. UMHMW-1S and UMHMW-1D are located downgradient of the 200 Level Mike Horse Adit, while UMHMW-2S and UMHMW-2D are located further downgradient on the Mike Horse Drainage (see Figure 3-1). Monitoring well UMHMW-3 was located furthest downgradient in the Mike Horse drainage and while metal concentrations were also elevated, they were significantly lower than up-gradient monitoring well results for metals. Metal and common constituent concentrations from Tailings Dam monitoring wells (TDMW-1, TDMW-2D and TDMW-2S) were typically low, with concentrations of most metals below laboratory detection limits.

Of the metals analyzed, zinc, manganese and aluminum had the highest concentrations, with cadmium copper, iron and lead also being elevated. These wells also showed a pattern of elevated sulfate and TDS concentrations and somewhat low pH.

Review of 2003 data show a variable temporal pattern (see Table 3-2) with some metals showing higher concentrations in the spring at some deep aquifer sites (UMHMW-1D and UMHM-2D), while higher concentrations were observed in the fall in shallow aquifer sites (UMHMW-2S and UMHMW-3). Common constituents also show a similar variable pattern with higher sulfate and TDS concentrations in the spring in deep aquifer wells, while higher concentrations of sulfate and TDS concentrations were observed in the fall in shallow aquifer wells.

Water temperature showed an unusually high value (14.^{0} C) during the April sampling event for Tailings Pond well TDMW-1. This corresponds with elevated temperature measurements of nearby surface water monitoring sites (BRSW-3A – 11.4^0 C, BRSW-3B - 13.54^0 C and BRSW-23 - 11.3^0 C). The source of this temperature anomaly is not known; however, it is possible the elevated temperature is a reflection of the connection between the seeps and the adjacent tailings pond.

4.1.1 Sampling Methods and Analytical Parameters

The pond sediment sample collection and analysis program is summarized on Table 4-1. Sample analysis included analysis of arsenic, cadmium, copper, iron, lead, manganese and zinc using x-ray fluorescense (XRF) analytical technique. In addition to XRF analyses, one sample (UBTP-1) was split and analyzed using wet chemistry methods for aluminum, arsenic, cadmium, copper, iron, manganese and zinc.

4.1.2 Analytical Results

Analytical results are in Appendix 3. Sample descriptions and analytical results are summarized on Table 4-2. Sample stratigraphy showed some variability in color and texture within the 1-foot sample core increment obtained during the sampling effort. Sediment samples were typically fine-grained clay and silts, dark in color with organic matter evident. Field observations showed bottom sediment textures were a little coarser (more sand and gravel content) on the south end of the pond where sediment conditions are affected by upstream Bear Trap Creek (see Figure 3-1).

Of the metals analyzed, iron and manganese expectably had the highest concentrations, followed by concentrations of zinc, lead, aluminum, copper, arsenic and cadmium, respectively. Concentrations of zinc ranged from 1181 mg/kg to 8287 mg/kg, lead from 699 mg/kg to 4961 mg/kg, copper from 242 mg/kg to 1002 mg/kg. Highest concentrations of zinc, lead, copper and cadmium were measured in the center of the pond (UBTP-1) but metal concentrations were also elevated nearest the tailings dam (UBTP-2 and UBTP-3). Lowest metal concentrations were measured to the south, furthest from the dam. The concentration of aluminum was measured in one sample (UBTP-1) and was 5690 mg/kg.

4.2 MIKE HORSE DAM DESIGN AND STABILITY EVALUATION

Asarco completed a preliminary of the Mike Horse Tailings Dam Investigation Hydrometrics 2001b) with the objectives of:

1. Determining if the design, construction and operation of the dam meets applicable U.S.F.S and State of Montana Dam Safety Requirements; and

2. Providing a preliminary evaluation of the overall stability and integrity of the embankment structure.

As part of the Phase I investigation, several Phase II tasks were proposed for evaluation in 2003. These include:

- Task 1: Increase the depth of piezometers completed in the dam embankment to allow more complete monitoring of the embankment phreatic surface.
- Task 2: Increase the range of tailings pond stage measurements beyond that allowed by the current stage monitoring device.
- Task 3: Excavate exploratory pits into the foundation material along the toe of the dam to investigate signs of piping.

4.2.1 Tailings Dam Piezometer Installation

Two piezometers were installed in the Mike Horse Tailings Dam in accordance with the 2003 UBMC Work Plan (Hydrometrics, 2003). The piezometers were installed on December 2nd and 3rd, 2003 by O'Keefe Drilling with oversight by Hydrometrics. The purpose of the piezometers is to provide additional information on the seasonal position of the phreatic surface within the tailings dam. In particular, the new piezometers will allow determination of the phreatic surface elevation over a greater range of reservoir depths than is currently possible with the existing shallower piezometers. The piezometer locations are shown on Figure 2-2 and completion details are in Table 4-3. Borehole lithologic/piezometer completion logs are in Appendix 4. Detailed testing was not completed during the 2003 drilling since the dam fill materials were characterized during the 1975 dam repair program. Soil samples were collected and archived in 2003 for future testing if necessary.

Drilling was completed with a hollow stem auger drill rig. Although the target completion depth for the piezometers was first water (the phreatic surface), drilling was advanced to the bottom of the dam at each location to determine the total thickness of the dam fill. Both piezometers were completed with two-inch diameter schedule 40 PVC casing, and five-foot sections of 0.010-inch factory slotted PVC screen.

Piezometer P-5 is located near the upstream dam crest in line with existing piezometers P-1 and P-3. Drilling at P-5 advanced to a total depth of 64 feet with the borehole lithology including: clean earthen fill (zone 1 fill of Dames and Moore, 1975) from ground surface to 26 feet below ground surface (bgs); mill tailings from 26 to 62 feet bgs; and sandy gravelly native sediments (Beartrap Creek alluvium) from 62 to 64 feet bgs. The piezometer was completed to a total depth of 51 feet bgs, and screened from 45.5 to 50.5 feet bgs. The borehole annulus (space between borehole wall and piezometer casing) was backfilled from 51 to 42.5 feet bgs with silica sand, and from 42.5 to 8.0 feet bgs with drill cuttings. The annulus was sealed with bentonite grout from 8.0 to 1.5 feet bgs to prevent infiltration of storm water down the borehole annulus. The over-drilled portion of the borehole, from 51 to 64 feet bgs, was backfilled with a mixture of bentonite chips and drill cuttings. P-5 was completed with a 2.9-foot PVC stickup (height of well casing above ground surface) and locking cap. Upon completion, the phreatic surface at P-5 was measured at 44.38 feet below the top of casing, or 41.48 feet bgs.

Piezometer P-6 is located near the upstream dam crest in line with existing piezometers P-2 and P-4. The borehole lithology includes: clean zone 1 earthen fill from ground surface to 57 feet bgs; and shotcrete (resulting from the 1975 tailings dam breach repairs; Dames and Moore, 1975) from 57 to 58 feet bgs. Piezometer P-6 is completed to a total depth of 50 feet bgs, and screened from 44.5 to 49.5 feet bgs. The borehole annulus was backfilled from 50 to 42.5 feet bgs with silica sand, from 42.5 to 20 feet bgs with drill cuttings, and from 20 to 2.0 feet bgs with bentonite grout. The over-drilled portion of the borehole was backfilled with bentonite chips from 51 to 55 feet bgs, and drill cuttings from 55 to 58 feet bgs. P-6 was completed with a 2.6-foot PVC stickup and locking cap. Upon completion, the phreatic surface was measured at 42.51 feet below the top of casing, or 39.91 feet bgs.

The new piezometers will be surveyed for horizontal and vertical control in spring 2004. Asarco will also continue monitoring the dam phreatic surface in 2004 with frequent

water level monitoring in all six tailings dam piezometers, and monitoring of the corresponding tailings pond stage.

4.2.2 Monitoring Pond Stage

Tailings pond/stage readings are recorded from a staff gage attached to the emergency spillway inlet (Figure 3-1). Pond-stage readings are summarized in Table 4-3. When the pond water levels recede below the spillway, pipe elevation, pond stage readings were not obtainable. In 2003, a shoreline measuring point (t-bar fence post) was to be established to provide a reference point for pond stage measurements using a graduated tape and subsequently establishment of a distance elevation profile. However, pond stage measurements below the spill way were inadvertently not obtained in 2003, and the fence post measurement point did not survive (either knocked down or removed).

A more permanent reference point(s) will be established in early 2004 using one of the new monitoring wells and/or the existing spillway as a more reliable reference point. Distance/elevation profiles to the high elevation shoreline will be established through site surveys, and one or more new fence-post reference points will be established. Subsequent below-spillway pond elevation measurements can be made from the fence-post reference points (if they survive) or from the more permanent piezometer and/or spillway reference points as necessary using a graduated measuring tape. Below-spillway pond elevation measurements will be conducted concurrently with measurement of piezometer water levels (either weekly or biweekly as described in the 2004 Work Plan [in progress]). A subsequent distance/profile surveys will be conducted during the low water season (August-September) to provide necessary elevation reference for pond elevation field measurements.

4.2.3 Exploratory Test Pits for Piping Investigation

One concern noted in the preliminary tailings dam evaluation (Hydrometrics, 2001b) was the potential for piping of the dam fill material due to excessive seepage velocities within the dam. In order to assess the potential that piping may be occurring in the Mike Horse

Tailings Dam, four test pits were excavated near the dam toe on November 7th, 2003. Results of the test pit evaluation was previously described in a November 12, 2003 memorandum submitted to the U.S. Forest Service and MDEQ by Hydrometrics. The tailings dam memo is included in Appendix 5. Asarco has subsequently received comments dated January 28th, 2004 on the November 12th Memorandum. These comments and Asarco's responses are also in Appendix 5.

5.0 DEVIATIONS FROM WORK PLAN

Deviations from the Work Plan in 2003 have been discussed in the previous sections. In summary Work Plan deviations included:

- The omission of aluminum from pond bottom sediment samples (see Table 3-1). Aluminum was not originally proposed for pond bottom sediment sampling (as per the draft (February 2003) work plan. It was added as an additional parameter in the June 2003 Work Plan, but could not be analyzed using XRF techniques without significant and uneconomical modifications to the analytical instrumentation. In addition, the amount of sample available for split samples for wet chemistry was limited. In accordance with the latest work plan, one split sample was submitted for wet chemistry analysis and this sample was analyzed for aluminum (see Table 3-2).

- Collection of pond stage water levels below the pond spillway was not conducted in 2003. See the discussion in Section 4.3.2.

- Some seep locations could not be properly sampled during the June 2003 even because of low flow or no flow conditions at the time of sample collection. In accordance with the work plan, no samples were collected. However, these sites were sampled during the April, May and June 2004 sampling events where flow conditions allowed representative sample collection. These results will be presented in the 2004 Monitoring Activities Report.

Table 2-7 Temporary Standards and Concentratios (mg/l)

Date	Site	Cd (TRC)	Cu (TRC)	Fe (TRC)	Pb (TRC)	Mn (TRC)	Zn (TRC)	pH
BRSW-22 (Mike Horse Creek)								
Temporary Standard		**0.135**	**3.0**	**0.9**	**0.23**	**6.0**	**22**	**<6.5**
4/29/2003	BRSW-22	0.051	1.3	0.11	0.078	2.4	7.6	6.04
5/28/2003	BRSW-22	0.013	0.27	0.13	0.049	0.5	1.8	6.79
6/25/2003	BRSW-22	0.013	0.24	0.02	0.017	0.41	1.8	7.71
10/21/2003	BRSW-22	0.017	0.03	0.029	0.01	0.017	3.8	7.78
5/6/2002	BRSW-22	0.11	1.2	0.26	0.074	3.9	19	6.2
5/29/2002	BRSW-22	0.021	0.55	0.086	0.043	0.9	3.2	6.4
7/11/2002	BRSW-22	0.021	0.3	0.046	0.045	0.68	2.8	7.1
10/3/2002	BRSW-22	0.026	0.21	0.038	0.029	0.34	5.6	7.2
4/26/2001	BRSW-22	0.11	0.24	0.95	0.016	3.1	20	7.3
5/22/2001	BRSW-22	0.017	0.23	0.05	0.016	0.53	2.3	7.7
5/23/2001	BRSW-22	0.016	0.22	0.05	0.016	0.5	2.2	7.7
6/26/2001	BRSW-22	0.026	0.28	0.05	0.016	0.75	3	7.3
10/17/2001	BRSW-22	0.022	0.024	0.02	0.016	0.12	5.4	7.5
10/12/2000	BRSW-22	0.028	0.034	0.05	0.016	0.27	6.3	7.8
BRSW-23 (Beartrap Creek)								
Temporary Standard		**0.05**	**0.7**	**0.5**	**0.08**	**3.7**	**7.5**	**<6.5**
4/28/2003	BRSW-23	0.016	0.3	0.25	0.04	1.4	2.7	6.65
5/28/2003	BRSW-23	0.0041	0.09	0.63	0.096	0.41	0.64	6.65
6/25/2003	BRSW-23	0.004	0.047	0.32	0.024	0.68	0.77	7.57
10/21/2003	BRSW-23	0.0041	0.081	1.5	0.12	1.1	0.94	7.78
5/6/2002	BRSW-23	0.039	0.3	0.66	0.058	3	7.4	6.4
5/29/2002	BRSW-23	0.0079	0.15	0.16	0.032	0.62	1.3	6.29
7/10/2002	BRSW-23	0.006	0.045	0.046	0.021	0.63	0.92	7.12
10/3/2002	BRSW-23	0.005	0.015	0.084	0.01	0.91	1	7.6
4/25/2001	BRSW-23	0.067	0.35	2	0.16	3.9	12	6.79
4/25/2001	BRSW-23	0.067	0.36	2.3	0.15	4.3	13	6.79
5/22/2001	BRSW-23	0.007	0.072	0.074	0.028	0.62	1.2	7.63
6/26/2001	BRSW-23	0.0066	0.053	<0.05	0.022	0.46	0.99	8.03
10/4/2001	BRSW-23							6.81
10/17/2001	BRSW-23	0.0031	0.004	0.045	0.006	0.52	0.74	7.9
10/11/2000	BRSW-23	0.004	0.005	<0.05	0.004	0.36	1.1	7.46
10/12/2000	BRSW-23	0.004	0.007	<0.05	<0.006	0.4	0.92	7.46

Table 2-7 Temporary Standards and Concentratios (mg/l)
(continued)

Date	Site	(TRC)	(TRC)	Fe (TRC)	Pb (TRC)	Mn (TRC)	(TRC)	pH
BRSW-9 (Black Foot River, Upper)								
Temporary Standard		**0.016**	**0.22**	0.3*	**0.025**	**4.3**	**6.0**	**<6.5**
4/28/2003	BRSW-9	0.0079	0.098	0.12	0.02	0.72	1.6	6.27
5/28/2003	BRSW-9	0.0029	0.03	0.1	0.018	0.23	0.44	6.45
6/24/2003	BRSW-9	0.0025	0.013	0.042	0.008	0.28	0.56	7.13
10/21/2003	BRSW-9	0.0038	0.005	0.02	0.003	0.28	1.9	8.03
5/3/2002	BRSW-9	0.0115	0.053	0.4	0.024	0.9	2.6	6.52
5/21/2002	BRSW-9	0.009	0.096	0.62	0.044	0.76	1.6	6.6
7/9/2002	BRSW-9	0.004	0.014	0.044	0.008	0.22	0.69	6.59
10/3/2002	BRSW-9	0.0046	0.008	0.041	0.003	3.8	1.6	7.66
4/24/2001	BRSW-9	0.01	0.052	0.57	0.034	0.82	2.3	7.06
5/21/2001	BRSW-9	0.005	0.028	0.054	0.013	0.34	0.96	6.5
6/25/2001	BRSW-9	0.0044	0.018	0.05	0.01	0.27	0.8	8.2
10/16/2001	BRSW-9	0.004	0.006	0.04	0.003	0.3	2.1	7.85
10/10/2000	BRSW-9	0.004	0.008	0.05	<0.003	0.46	0.85	7.02
BRSW-12 (Black Foot River, Lower)								
Temporary Standard		**0.01**	**0.07**	**0.34**	**0.023**	**0.9**	**2.7**	**<6.5**
4/28/2003	BRSW-12	0.0063	0.066	0.12	0.014	0.55	1.3	5.71
5/28/2003	BRSW-12	0.0024	0.026	0.11	0.014	0.21	0.46	5.7
6/24/2003	BRSW-12	0.0032	0.014	0.037	0.007	0.21	0.74	6.68
10/21/2003	BRSW-12	0.0037	0.007	0.02	0.003	0.12	1.2	7.35
5/21/2002	BRSW-12	0.01	0.11	0.86	0.05	0.9	1.8	6.6
7/9/2002	BRSW-12	0.004	0.015	0.051	0.006	0.23	0.88	6.55
10/3/2002	BRSW-12	0.0048	0.01	0.032	<0.003	0.75	1.4	7.32
4/24/2001	BRSW-12	0.006	0.022	0.33	0.008	0.42	1.5	7.39
5/21/2001	BRSW-12	0.005	0.024	0.066	0.009	0.29	1	7.06
6/25/2001	BRSW-12	0.004	0.017	<0.05	0.006	0.23	0.83	7.91
10/4/2001	BRSW-12							6.69
10/16/2001	BRSW-12	0.004	0.008	0.041	<0.003	0.14	1.3	7.41
10/10/2000	BRSW-12	0.003	0.007	<0.05	<0.003	0.11	0.81	7.12

* Not a temporary Standard. Value shown is potential guidance value specified in MDEQ Circular WQB-7.

Highlighted values indicated exceeding applicable temporary standard.

TABL. TAILINGS POND BOTTOM SAMPLE ANALYTICAL RESULTS

Site/ Sample #	Location Descripton/ GPS Survey Coordinates	Water Depth/ Sample Depth (ft)	Sample Interval (ft)	Sample Description	Metals Concentrations (mg/kg) **							
					Al*	As	Cd	Cu	Fe	Pb	Mn	Zn
UBTP-1	- Tailings Pond, 380' from upstream site.	5	0 to 1	0-0.2', SILT, organic, black, low density, soft,		191	62	1,002	60,000	4,961	7,254	8,287
UBMC-0307-400	N47° 01' 516", W112° 21' 196" , 5490 ft	5 to 6		saturated, with roots and angular rock fragments, strong sulfur oder 0.2-1.0' SILT-CLAY, plastic, saturated, very soft, fine pyrite grains in siltier layers.	5,690	152	47	1,210	56,200	4,960	7,830	6,610
UBTP-2	- Tailings Pond, 0.13 miles from upstream site.	13	0 to 1	0-0.1', SILT, organic, dark brown, low density,		214	50	917	60,000	3,792	9,877	7,108
UBMC-0307-401	N47° 01' 579", W112° 21' 218" , 5479 ft	13 to 14		soft, saturated, with organic roots. 0.1-1.0' SILT-CLAY, gray, plastic, saturated, very soft, low density, pushed easy..								
UBTP-3	- Tailings Pond, 680 feet from south bank.	5	0 to 0.9	0-0.5', CLAY, Silty, soft but stiffer than other,		246	29	633	80,000	2,926	10,876	5,019
UBMC-0307-402	N47° 01' 577", W112° 21' 126"	5 to 5.9		site samples, general yellow-brown color with gray mottling, thin silt layers-brown. 0.5-0.9 feet, CLAY, silty, soft as above but predominately gray with brown motteling.								
UBTP-4	- Tailings Pond, about 100 ft. from south bank.	3	0 to 0.3	0-0.3', SILT, organic, dark brown, with roots,		58	<10	242	30,000	699	928	1,181
UBMC-0307-403	N47° 01' 480", W112° 21' 169"	3 to 3.3		angular gravel and sand at 0.2 to 0.3 feet. 0.03 to 1', SAND AND GRAVEL, no sample retained in spoon, description assumed based on observed transition to sandier materials in retrived portion of drive.								

** All results analyzed by XRF except for UBTP-1, which also includes results analyzed using wet chemistry techniques.

HYDROMETRICS INC.
Consulting Scientists and Engineers
Helena, Montana

P-5

Hole Name: P-5

Date Hole Started: 12/3/03 Date Hole Finished: 12/3/03

Client: ASARCO, Incorporated

Project: Upper Blackfoot Mining Complex

County: Lewis & Clark State: Montana

Property Owner: U S Forest Service

Legal Description: T15N, R6W, Sec 27

Descriptive Location: Mike Horse Tailings Impoundment

Recorded By: Greg Bryce

Drilling Company: O'Keef Drilling

Driller: Dave Crowley

Drilling Method: Hollow Stem Auger

Drilling Fluids Used: None

Purpose of Hole: Install Piezometer

Target Aquifer: First Water

Hole Diameter (in): 6"

Total Depth Drilled (ft): 64

WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	2-inch, flush threaded, Sch 40, PVC	+2 9 to 51
Surface Casing Used?	N		
Screen/Perforations?	Y	0 010-inch slot, Sch 40, PVC	45 5' to 50 5'
Sand Pack?	Y	10/20 silica sand	42 5' to 51'
Annular Seal?	Y	Bentonite Chips	1 5' to 8'
Surface Seal?	N		
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	Y	0' to 10'; 26' to 35'; 36' to 41'; 62' to 64'	

Static Water Level Below MP: 44 38

Date: 12/3/03

MP Description: Top of PVC

MP Height Above or Below Ground (ft): +2 9

Surface Casing Height (ft):

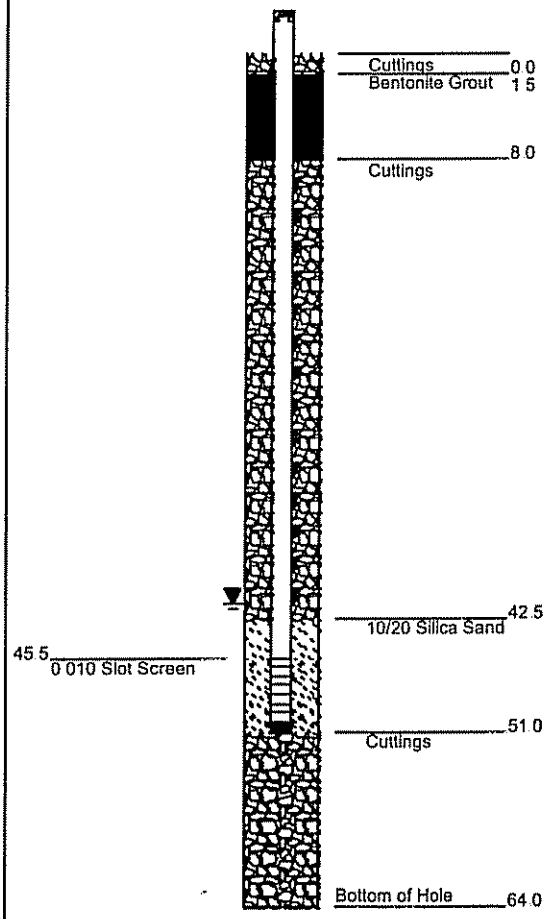
Riser Height (ft): 2 9

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Advanced hole to native alluvium Hole clapsed to 51 feet

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 26.0' **Fill (SC)**
Compacted Zone 1 Fill: Brown, Silty/Gravely Sand, sand is well graded fine to coarse grained. 20% Silt, 10% fine gravel with a trace of coarse gravel. Dry Tree roots at 4'. Predominately same lithology to 26' with slight changes in color and percent of silts and sand gravel.

26.0 - 36.0' **Mine Tailings (SM)**
Mill Tailings; Grey unoxidized tailings. Fine sand texture Dry.

36.0 - 62.0' **Mine Tailings (SM)**
Mill tailings; gray unoxidized tailings, fine sand texture, trace of silt and clay. Moist at 36', increasing moisture with depth Saturated around 40'.

62.0 - 64.0' **Alluvium**
Alluvium: Brown, Sandy Gravel; Well graded. 75% fine to coarse gravel 25% medium to coarse sand. Saturated.

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HYDROMETRICS INC.
Consulting Scientists and Engineers
Helena, Montana

P-6

Hole Name: P-6

Date Hole Started: 12/2/03 Date Hole Finished: 12/2/03

Client: ASARCO, Incorporated

Project: Upper Blackfoot Mining Complex

County: Lewis & Clark State: Montana

Property Owner: U.S. Forest Service

Legal Description: T15N, R6W, Sec 27

Descriptive Location: Mike Horse Tailings Impoundment

Recorded By: Greg Bryce

Drilling Company: O'Keef Drilling

Driller: Dave Crowley

Drilling Method: Hollow Stem Auger

Drilling Fluids Used: None

Purpose of Hole: Install Piezometer

Target Aquifer: First Water

Hole Diameter (in): 6"

Total Depth Drilled (ft): 58

WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	2-inch, flush threaded, Sch 40, PVC	+2.6 to 50 ft
Surface Casing Used?	N		
Screen/Perforations?	Y	0.010-inch slot, Sch 40, PVC	44.5' to 49.5'
Sand Pack?	Y	10/20 silica sand	42.5' to 50'
Annular Seal?	Y	Bentonite Chips	2' to 20'
Surface Seal?	N		
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	Y	0' to 10'; 10' to 15'; 35' to 40'; 51' to 55'; 56' to 58'	

Static Water Level Below MP: 42.51

Date: 12/3/03

MP Description: Top of PVC

MP Height Above or Below Ground (ft): +2.6

Surface Casing Height (ft):

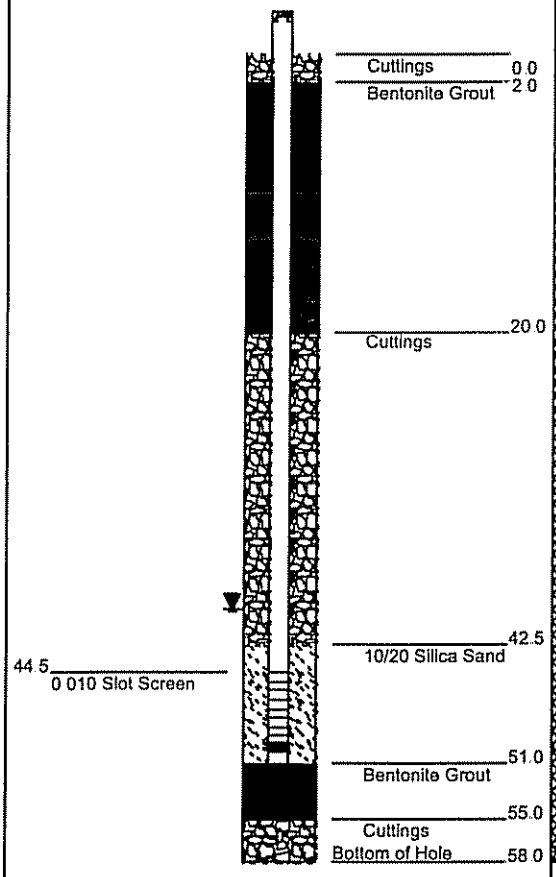
Riser Height (ft): 2.6

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Hole advanced to bottom of dam fill where shotcrete was encountered. Backfilled hole below piezometer with bentonite

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 10.0' **Fill (SC)**
Compacted Zone 1 Fill- Dark Brown Silty/Gravely Sand; moderately graded fine to medium grained with trace of coarse sand. 20% Silt; 10% fine to coarse gravel up to 2". Dry.

10.0 - 35.0' **Fill (SC)**
Compacted Zone 1 Fill - brown, silty/gravely sand, sand is well graded fine to coarse. 20% fine gravel with some coarse gravel. 5-10% silt. Dry to damp.

35.0 - 50.0' **Fill (SC)**
Compacted Zone 1 Fill - Tannish brown, silty/gravely/sand. Sand is fine to medium grained. 20-25% silt. 10% fine gravel, trace of coarse gravel. Moisture increasing with depth, saturated at approximately 40'.

50.0 - 58.0' **Fill (SC)**
Compacted Zone 1 Fill - Dark brown, gravely sand, sand is well graded fine to coarse. 20% fine gravel, trace of silt.

57.0 - 58.0' **Shotcrete**
Shotcrete

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