

**MONTANA DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU  
HAZARDOUS MATERIALS INVENTORY  
SITE SUMMARY**

Mine/Site Name: <u>Iron Mountain Millsite</u>	County: <u>Mineral</u>
Legal Description: <u>T 17N R 26W</u>	Section(s): <u>NE 1/4, NW 1/4, Sec. 13</u>
Mining District: <u>Iron Mountain</u>	Mine Type: <u>Millsite/Cu, Pb, Au, Ag, Zn</u>
Latitude: <u>N 47° 14' 25"</u>	Primary Drainage: <u>Clark Fork River</u>
Longitude: <u>W 114° 51' 10"</u>	USGS Code: <u>17010204</u>
Land Status: <u>Private/Public</u>	Secondary Drainage: <u>Flat Creek</u>
Quad: <u>Idaho Gulch</u>	Date Investigated: <u>July 22, 1993</u>
Inspectors: <u>Tuesday, Belanger, Clark</u>	P.A. # <u>31-010</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- The volume of tailings associated with the site was estimated to be approximately 368 cubic yards for the upper two tailings piles. Tailings were observed in the Flat Creek floodplain for approximately three miles downstream. The following elements were elevated at least three times background:

Arsenic: 1470 to 2120 mg/kg	Cadmium: 43.3 to 210 mg/kg
Copper: 68 to 319 mg/kg	Iron: 54,000 mg/kg
Mercury: 6.66 to 32.6 mg/kg	Manganese: 2010J to 2080J mg/kg
Lead: 12,700 to 13,500 mg/kg	Antimony: 2390 to 3970 mg/kg
Zinc: 8990 to 44,600 mg/kg	
- The volume of waste rock associated with the site was estimated to be approximately 6,500 cubic yards. The following elements were elevated at least three times background:

Arsenic: 82 mg/kg	Mercury: 0.498 mg/kg
Manganese: 2780J mg/kg	Lead: 152 mg/kg
Antimony: 28 mg/kg	Zinc: 787 mg/kg
- There was one adit discharge observed at the site during the investigation. The MCL for arsenic was exceeded in the adit discharge, and the chronic aquatic life criteria for iron and zinc were exceeded. The acute aquatic life criteria for zinc was also exceeded in the adit discharge sample. No MCLs were exceeded in Flat Creek; however, the acute and chronic aquatic life criteria for zinc were exceeded in the downstream sample, which was directly attributed to the site.
- Flat Creek flowed southwest through the tailings to its confluence with the Clark Fork River approximately 3.5 miles downstream. An observed release to Flat Creek was documented for zinc. Additionally, significant increases in the concentrations of most metals were observed in the downstream Flat Creek sediments (when compared with the upstream sediment concentrations) which was directly attributed to the site. Observed releases to Hall Gulch (sediment) were documented for arsenic, cadmium, mercury, manganese, lead, antimony, and zinc.

**Iron Mountain Mill PA# 31-010  
AMRB HAZARDOUS MATERIALS INVENTORY  
INVESTIGATOR: PIONEER - TUESDAY  
INVESTIGATION DATE: 07/22/93**

**SOLID MATRIX ANALYSES**

FIELD ID	Metals in soils Results per dry weight basis													
	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
31-010-SE-1	428	46.4	27.5	5.5	1.6 U	51.3	32100	7.46	1800 J	7	7270	353	6240	NR
31-010-SE-2	15	58.7	0.5 U	3.9	1.5 U	8.6	12400	0.014 U	312 J	6	48	7 U	116	NR
31-010-SE-3	231	191	3.3	24.1	3.8	25.5	20300	0.652	3950 J	65	730	46	4110	NR
31-010-SE-4	18	49.1	0.5 U	6.9	1.7	12.6	9730	0.057	231 J	6	92	6 U	122	NR
31-010-TP-1	1470	5	210	2.8	5.4	319	36800	32.6	2080 J	3	13500	3970	44600	NR
31-010-TP-2	2120	3.2	43.3	1.5 U	1 U	68	54000	6.66	2010 J	2 U	12700	2390	8990	NR
31-010-WR-1	82	3.7	0.5 U	8.1	1.4 U	19.4	30600	0.498	2780 J	15	152	28	787	NR
BACKGROUND	13	257	0.5 U	8.5	2.7	15.5	17200	0.012 U	448 J	10	17	6 U	64	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

**Acid/Base Accounting**

FIELD ID	TOTAL SULFUR		ACID BASE		NEUTRAL POTENT		SULFUR POTENT		SULFUR ACID BASE		ORGANIC SULFUR		PYRITIC SULFUR		PYRITIC ACID BASE		SULFUR POTENT	
	%	1/1000x	%	1/1000x	%	1/1000x	%	1/1000x	%	1/1000x	%	1/1000x	%	1/1000x	%	1/1000x	%	1/1000x
31-010-TP-1	2.53	79	4.2	-75	0.52	0.52	0.48	15	1.53	1.53	1.53	0.48	15	-10.8	15	15	0.42	138
31-010-TP-2	1.52	47.5	6.67	-41	0.7	0.7	0.2	6.25	0.62	0.62	0.62	0.2	6.25	0.42	0.42	0.42	0.42	138
31-010-WR-1	0.11	3.44	139	136	<0.01	<0.01	0.03	0.09	0.09	0.09	0.09	0.03	0.09	0.94	0.94	0.94	0.94	138

**WATER MATRIX ANALYSES**

FIELD ID	Metals in Water Results in ug/L														HARDNESS CALC.	
	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	(mg CaCO3/L)	(mg CaCO3/L)	
31-010-GW-1	302	38.4 JX	2.57 U	9.7 U	6.83 U	2.7 J	1620 J	0.038 U	4850	30.2	1.9 J	30.7 U	3850 J	486	486	
31-010-SW-1	5.53	40.7 JX	2.57 U	9.7 U	6.83 U	2.63 J	26.7 J	0.038 U	4.08 U	12.7 U	2.97 J	30.7 U	268 J	150	150	
31-010-SW-2	3.63	40.2 JX	2.57 U	9.7 U	6.83 U	1.57 J	41.3 J	0.038 U	4.08 U	12.7 U	1.2 J	30.7 U	7.57 U	138	138	

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

**Wet Chemistry  
Results in mg/l**

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
31-010-GW-1	612	< 5.0	183	< 0.05	NR
31-010-SW-1	195	< 5.0	8	< 0.05	NR
31-010-SW-2	203	< 5.0	< 5.0	0.1	NR

**LEGEND**

- SE1 - Flat Creek below millsite.
- SE2 - Flat Creek above millsite
- SE3 - Hall Gulch below waste rock dump 1.
- SE4 - Hall Gulch above waste rock dump 1.
- TP1 - Composite of subsamples TP1A1, 1A2, and 1B1.
- TP2 - Composite of subsamples TP2A through 2E.
- WR1 - Composite of subsamples WR1A through 1C.
- BACKGROUND - From the Dillon Millsite (31-073-SS-1).

- GW1 - Aduit discharge into Hall Gulch
- SW1 - Same as sample SE1.
- SW2 - Same as sample SE2.

**MONTANA DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU  
HAZARDOUS MATERIALS INVENTORY  
SITE SUMMARY**

Mine/Site Name: <u>Belle of the Hills</u>	County: <u>Mineral</u>
Legal Description: <u>T 17N R 26W</u>	Section(s): <u>SW 1/4, SW 1/4, Sec. 1</u>
Mining District: <u>Iron Mountain</u>	Mine Type: <u>Hardrock/Pb, Zn, Ag</u>
Latitude: <u>N 47° 15' 20"</u>	Primary Drainage: <u>Flat Creek</u>
Longitude: <u>W 114° 51' 20"</u>	USGS Code: <u>17010204</u>
Land Status: <u>Private/Public</u>	Secondary Drainage: <u>Hall Gulch</u>
Quad: <u>Quinns Hot Springs</u>	Date Investigated: <u>July 22, 1993</u>
Inspectors: <u>Tuesday, Belanger, Clark</u>	P.A. # <u>31-072</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- There were no mill tailings observed at this site during the investigation.
- The volume of waste rock associated with this site was estimated to be approximately 7,770 cubic yards. The following elements were elevated at least three times background:

Arsenic: 244 to 1230 mg/kg	Cadmium: 102 to 130 mg/kg
Copper: 62 to 243 mg/kg	Iron: 66,000 mg/kg
Mercury: 7.8 to 47.7 mg/kg	Manganese: 2330J to 5580J mg/kg
Lead: 10,700 to 40,300 mg/kg	Antimony: 785 to 3540 mg/kg
Zinc: 1230 to 14,100 mg/kg	
- There were no adit discharges, filled shafts, seeps, or springs observed at the site during the investigation; consequently, no groundwater or surface water samples were collected. Intermittent Hall Gulch, located approximately 400 feet below the site, appeared to be the nearest surface water drainage to the site.
- Four potentially hazardous mine openings, including three adits and one shaft, were observed at the site during the investigation.

Belle of the Hills PA# 31-072  
 AMRB HAZARDOUS MATERIALS INVENTORY  
 INVESTIGATOR: PIONEER - TUESDAY  
 INVESTIGATION DATE: 07/22/83

SOLID MATRIX ANALYSES

Metals in soils  
 Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
31-072-WR-1	1230	16.3	102	2.8	1.2 U	243	33400	47.7	2330 J	3	40300	3540	1230	NR
31-072-WR-2	244	6.7	130	2.8	1 U	62	66000	7.8	5580 J	3	10700	785	14100	NR
BACKGROUND	13	257	0.5 U	8.5	2.7	15.5	17200	0.012 U	448 J	10	17	6 U	64	NR

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Reported

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENT.		SULFUR ACID BASE POTENT.		SULFATE		PYRITIC		ORGANIC		PYRITIC		SULFUR ACID BASE POTENT.	
	%	1/1000r	%	1/1000r	%	1/1000r	%	1/1000r	%	1/1000r	%	1/1000r	%	1/1000r	%	1/1000r
31-072-WR-2	0.64	20	11.7	-8.3	0.14	0.13	0.14	0.13	4.06	0.37	0.04	0.02	0.02	7.62		
31-072-WR-1	0.23	7.19	13.4	6.23	0.17	0.17	0.17	0.02	0.62	0.04	0.04	0.02	0.02	12.8		

LEGEND

WR1 - Composite of subsamples WR1, 2, and 3.  
 WR2 - Composite of subsamples WR4A, 5A, 4B, and 5B.  
 BACKGROUND - From the Dillon Mill site (31-073-SS-1).

**MONTANA DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU  
HAZARDOUS MATERIALS INVENTORY  
SITE SUMMARY**

Mine/Site Name: <u>Dillon Millsite</u>	County: <u>Mineral</u>
Legal Description: <u>T 17N R 26W</u>	Section(s): <u>NW 1/4, NW 1/4, Sec. 12</u>
Mining District: <u>Iron Mountain</u>	Mine Type: <u>Millsite/Unknown</u>
Latitude: <u>N 47° 15' 15"</u>	Primary Drainage: <u>Flat Creek</u>
Longitude: <u>W 114° 51' 30"</u>	USGS Code: <u>17010204</u>
Land Status: <u>Private/Public</u>	Secondary Drainage: <u>Hall Gulch</u>
Quad: <u>Plains</u>	Date Investigated: <u>July 22, 1993</u>
Inspectors: <u>Tuesday, Belanger, Clark</u>	P.A. # <u>31-073</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- There were no mill tailings observed at this site during the investigation.
- The volume of waste rock associated with this site was estimated to be approximately 3,000 cubic yards. Waste rock was observed in the intermittent Hall Gulch stream bed for approximately 1/4 mile downstream. The following elements were elevated at least three times background:

Arsenic: 863 mg/kg	Cadmium: 14 mg/kg
Copper: 67.9 mg/kg	Mercury: 1.43 mg/kg
Manganese: 4670J mg/kg	Lead: 3970 mg/kg
Antimony: 813 mg/kg	Zinc: 7710 mg/kg
- There were no adit discharges, filled shafts, seeps, or springs observed at the site during the investigation; consequently, no groundwater or surface water samples were collected.
- Observed releases to Hall Gulch (sediment) were documented for arsenic, cadmium, antimony, and zinc, and were directly attributed to the site.
- WR-1, which was cut by Hall Gulch, was extremely steep and potentially hazardous.

Dillon Millsite PA# 31-073  
 AMRB HAZARDOUS MATERIALS INVENTORY  
 INVESTIGATOR: PIONEER - TUESDAY  
 INVESTIGATION DATE: 07/22/93

SOLID MATRIX ANALYSES

Metals in soils  
 Results per dry weight basis

FIELD ID	Au (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
31-073-SE-1	41	190	0.7 U	6.1	2.9	17.2	24800	0.813	1040 J	8	395	9 U	275	NR
31-073-SE-2	396	38.3	6.5	8.4	1.5	22.4	22300	0.399	1480 J	19	498	45	3380	NR
31-073-WR-1	863	155	14	7.4	2.6	67.9	35300	1.43	4670 J	12	3970	813	7710	NR
BACKGROUND	13	257	0.5 U	8.5	2.7	15.5	17200	0.012 U	448 J	10	17	6 U	64	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Reported

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENT		SULFUR ACID BASE		SULFATE		PYRITIC		ORGANIC		PYRITIC		SULFUR ACID BASE		SULFUR ACID BASE	
	%	U/1000x	%	U/1000x	%	U/1000x	%	U/1000x	%	U/1000x	%	U/1000x	%	U/1000x	%	U/1000x	%	U/1000x
31-073-WR-1	0.48	15	131	116	0.07	0.21	0.2	6.56	124									

LEGEND

SE1 - Upstream in Hall Gulch.  
 SE2 - Downstream in Hall Gulch.  
 WR1 - Composite of subsamples WR1A through 1C.  
 BACKGROUND - Northwest of site along road.  
 From Dillon Millsite (31-073-SS-1).

**MONTANA DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU  
HAZARDOUS MATERIALS INVENTORY  
SITE SUMMARY**

Mine/Site Name: <u>Nancy Lee Mine</u>	County: <u>Mineral</u>
Legal Description: <u>T 18N R 26W</u>	Section(s): <u>SW 1/4, SE 1/4, Sec. 31</u>
Mining District: <u>Keystone</u>	Mine Type: <u>Hardrock/Au, Pb, Zn</u>
Latitude: <u>N 47° 16' 12"</u>	Primary Drainage: <u>Clark Fork River</u>
Longitude: <u>W 114° 57' 12"</u>	USGS Code: <u>17010204</u>
Land Status: <u>Public</u>	Secondary Drainage: <u>Keystone Creek</u>
Quad: <u>Keystone Peak</u>	Date Investigated: <u>August 2, 1993</u>
Inspectors: <u>Tuesday, Belanger, Lasher</u>	P.A. # <u>31-001</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- There were no mill tailings observed at this site during the investigation; however, tailings were observed in the stream bed approximately 3,000 feet downstream from the site.
- The volume of waste rock associated with this site was estimated to be approximately 30,875 cubic yards. The following elements were elevated at least three times background :

Arsenic: 143 to 445 mg/kg	Barium: 62.8 mg/kg
Copper: 55.4J to 161J mg/kg	Iron: 19,800 to 30,000 mg/kg
Mercury: 0.058J mg/kg	Manganese: 2050 to 2290 mg/kg
Nickel: 9.12 mg/kg	Lead: 266J to 340J mg/kg
Antimony: 27.1 to 46.2 mg/kg	Zinc: 184 to 324 mg/kg
- The water discharged from the adit associated with WR-4 exceeded the MCL and acute aquatic life criteria for arsenic and the chronic aquatic life criteria for arsenic and iron in samples collected near its mouth. After flowing through WR-4, the discharge exceeded the MCL for arsenic as well the chronic aquatic life criteria for arsenic and iron and the acute aquatic life criteria for iron.
- Two tunnels associated with the site, the Elander Tunnel and the Fawcett Tunnel, were fenced at the time of the investigation, but were open and potentially hazardous.

Nancy Lee Mine PA# 31-001  
 AMRB HAZARDOUS MATERIALS INVENTORY  
 INVESTIGATOR: PIONEER - TUESDAY  
 INVESTIGATION DATE: 08/02/93

SOLID MATRIX ANALYSES

Metals in soils  
 Results per dry weight basis

FIELD ID	Au (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
31-001-WR-1	445	4.95	0.5 U	2.55	1.41 U	60.3 J	27100	0.008 UJ	920	2.62 U	340 J	46.2	22.5	NR
31-001-WR-2	143	12	0.4 U	4.34	2.27	55.4 J	19800	0.015 J	2050	2.11 U	266 J	7.7	324	NR
31-001-WR-3	143	62.8	0.5 U	8.73	2.01	161 J	30000	0.059 J	2290	9.12	279 J	27.1	184	NR
BACKGROUND	7.89	8.8	0.5 U	3.31	1.2 U	2.44 J	3120	0.01 UJ	609	2.22 U	7.59 J	5.39 U	11.9	NR

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENT		SULFUR ACID BASE POTENT		ORGANIC SULFUR		PYRITIC SULFUR		PYRITIC SULFUR ACID BASE POTENT	
	%	U/1000x	%	U/1000x	%	U/1000x	%	U/1000x	%	U/1000x	%	U/1000x
31-001-WR-1	0.28	8.75	0.90	-7.84	0.21	0.02	0.05	0.62	0.28	0.62	0.31	4.66
31-001-WR-2	0.55	1.56	4.97	3.41	0.01	0.01	0.03	0.31	0.31	0.31	4.66	4.66
31-001-WR-3	0.29	9.06	1.15	-7.90	0.23	0.02	0.040	0.62	0.62	0.62	0.53	0.53

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Requested

WATER MATRIX ANALYSES

Metals in Water  
 Results in ug/L

FIELD ID	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn (mg CaCO3/L)	HARDNESS CALC.
31-001-SW-1	815	40.5	2.57 U	9.7 U	8.2	1.55 U	33900	0.038 U	8160	15.3	1.55 U	30.7 U	7.57 U	530
31-001-SW-2	274	28	2.57 U	9.7 U	14.6	1.55 U	13200	0.038 U	7300	27	1.55 U	30.7 U	7.57 U	540

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Requested

Wet Chemistry  
 Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
31-001-SW-1	694	16.0	213	< 0.05	NR
31-001-SW-2	684	5.7	214	< 0.05	NR

LEGEND

- WR1 - Composite of subsamples WR1A, 1B, and 1C.
- WR2 - Composite of subsamples WR2A, 2B, and 3.
- WR3 - Composite of subsamples WR3A, 4B, and 4C.
- BACKGROUND - West of waste rock dump 1 on divide near road.
- SW1 - Discharge from edit above waste rock dump 4.
- SW2 - Discharge from edit which flows through waste rock dump 4, taken below dump.

**MONTANA DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU  
HAZARDOUS MATERIALS INVENTORY  
SITE SUMMARY**

Mine/Site Name: <u>Little Anaconda</u>	County: <u>Mineral</u>
Legal Description: <u>T 18N R 26W</u>	Section(s): <u>SE 1/4, NW 1/4, Sec. 35</u>
Mining District: <u>Keystone</u>	Mine Type: <u>Hardrock/Au, Zn, Pb, Cu</u>
Latitude: <u>N 47° 16' 40"</u>	Primary Drainage: <u>Clark Fork River</u>
Longitude: <u>W 114° 52' 35"</u>	USGS Code: <u>17010204</u>
Land Status: <u>Private/Public</u>	Secondary Drainage: <u>Pardee Creek</u>
Quad: <u>Plains</u>	Date Investigated: <u>July 23, 1993</u>
Inspectors: <u>Tuesday, Belanger, Clark</u>	P.A. #: <u>31-077</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- There were no mill tailings observed at this site during the investigation.
- The volume of waste rock associated with this site was estimated to be approximately 9,230 cubic yards. The following elements were elevated at least three times background:

Arsenic: 39 mg/kg	Barium: 22.6J mg/kg
Cadmium: 3.6 mg/kg	Cobalt: 11.4J mg/kg
Copper: 15.4J mg/kg	Iron: 47,500 mg/kg
Mercury: 0.633J mg/kg	Manganese: 7,050 mg/kg
Nickel: 12J mg/kg	Lead: 2,720J mg/kg
- There was one adit discharge observed at the site during the investigation. The minor discharge flowed over WR-1 and combined with the drainage. No MCLs or acute or chronic aquatic life criteria were exceeded in the adit discharge sample.
- An unnamed intermittent tributary to Pardee Creek bisected the site directly through several of the waste rock dumps, the dumps were actively eroding into the drainage.

Little Anaconda PA# 31-077  
 AMRB HAZARDOUS MATERIALS INVENTORY  
 INVESTIGATOR: PIONEER - TUESDAY  
 INVESTIGATION DATE: 07/23/93

SOLID MATRIX ANALYSES

Metals in soils  
 Results per dry weight basis

FIELD ID	Au (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
31-077-WR-1	39	22.6 J	3.6	11.4 J	2.1	15.4 J	47500	0.633 J	7050	12 J	2720 J	15 J	301 J	NR
BACKGROUND	7.89	8.8	0.5 U	3.31	1.2 U	2.44 J	3120	0.01 UJ	609	2.22 U	7.59 J	5.39 U	11.9	NR

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	ACID BASE %	NEUTRAL POTENT. v/1000K	SULFUR ACID BASE POTENT. v/1000K	SULFATE %	PYRITIC SULFUR %	ORGANIC SULFUR %	PYRITIC ACID BASE v/1000K	SULFUR ACID BASE POTENT. v/1000K
31-077-WR-1	0.11	3.44	139	135	<0.01	0.04	0.1	1.25	137

WATER MATRIX ANALYSES

Metals in Water  
 Results in ug/L

FIELD ID	Au	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn (mg CaCO3/L)	HARDNESS CALC.
31-077-GW-1	6.39	2.01 UX	2.57 U	9.7 U	9.2 J	1.9 J	55.9 J	0.038 U	11.3	12.7 U	7.43 J	30.7 U	60.7 J	261

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Requested

Wet Chemistry  
 Results in r

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
31-077-GW-1	272	< 5.0	35	0.33	NR

LEGEND

WR1 - Composite of subsamples WR1A, 1B, 2A, and 2B  
 BACKGROUND - From the Nancy Lee Mine (31-001-88-1)  
 GW1 - Discharge from lower adit.

**MONTANA DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU  
HAZARDOUS MATERIALS INVENTORY  
SITE SUMMARY**

Mine/Site Name: Nancy Lee Millsite  
Legal Description: T 17N R 26W  
Mining District: Keystone  
Latitude: N 47° 15' 55"  
Longitude: W 114° 56' 21"  
Land Status: Public  
Quad: Keystone Peak  
Inspectors: Tuesday, Belanger, Lasher  
Organization: Pioneer Technical Services, Inc.

County: Mineral  
Section(s): NE 1/4, NW 1/4, Sec. 5  
Mine Type: Millsite/Cu, Ag, Pb, Zn, Au  
Primary Drainage: Clark Fork River  
USGS Code: 17010204  
Secondary Drainage: Keystone Creek  
Date Investigated: August 2, 1993  
P.A. # 31-082

- The volume of tailings associated with this site was estimated to be approximately 16,333 cubic yards. The tailings were observed in the floodplain of an unnamed drainage for approximately one mile downstream to confluence with Keystone Creek; however, the tailings were not observed in the Keystone Creek drainage. The following elements were elevated at least three times background:

Arsenic: 540 mg/kg	Barium: 27.6 mg/kg
Cadmium: 14.4 mg/kg	Cobalt: 15.9 mg/kg
Copper: 4630J mg/kg	Iron: 66,800 mg/kg
Mercury: 1.19J mg/kg	Manganese: 5340 mg/kg
Lead: 10,500J mg/kg	Antimony: 1230 mg/kg
Zinc: 9350 mg/kg	
  
- The flow in the unnamed drainage which travelled directly through the site consisted of the adit discharge originating at the Nancy Lee Mine located upstream. The MCL for arsenic and the chronic aquatic life criteria for arsenic and iron were exceeded in the upstream sample of this discharge; however, only the chronic aquatic life criteria for lead was exceeded in the downstream sample, just prior to where the water seeped into the ground. The chronic aquatic life criteria exceedance for lead was directly attributable to the site.
  
- Observed releases to surface water were documented for copper, lead, and zinc which were directly attributable to the site.

Nancy Lee Millsite PA# 31-082  
 AMRB HAZARDOUS MATERIALS INVENTORY  
 INVESTIGATOR: PIONEER - TUESDAY  
 INVESTIGATION DATE: 08/02/93

SOLID MATRIX ANALYSES

Metals in soils  
 Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
31-082-TP-1	540	27.6	14.4	15.9	2.58	4630 J	66800	1.19 J	5340	2.38 U	10500 J	1230	9350	NR
BACKGROUND	7.89	8.8	0.5 U	3.31	1.2 U	2.44 J	3120	0.01 UJ	609	2.22 U	7.59 J	5.39 U	11.9	NR

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	ACID BASE POTENTIAL %	NEUTRAL POTENTIAL %	SULFUR ACID BASE POTENTIAL %	SULFATE %	PYRITIC SULFUR %	ORGANIC SULFUR %	IRONIC ACID BASE POTENTIAL %	SULFUR %
31-082-TP-1	0.69	21.6	5.80	-15.8	<0.01	0.06	0.70	1.87	2.98

WATER MATRIX ANALYSES

Metals in Water  
 Results in ug/L

FIELD ID	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
31-082-SW-1	4.84	43.1	2.57 U	9.7 U	6.83 U	15.7	34.8	0.054 J	8.2	12.7 U	18.7	30.7 U	53.2	314
31-001-SW-2	274	28	2.57 U	9.8 U	14.6	1.55 U	13200	0.038 U	7300	27	1.55 U	30.7 U	7.57 U	540

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Requested

Wet Chemistry  
 Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
31-082-SW-1	404	5.7	120	< 0.05	NR
31-001-SW-2	684	5.7	214	< 0.05	NR

LEGEND

TP1 - Composite of subsamples TP1A, 1BA through 1BC, 1C, and 1D.  
 BACKGROUND - From the Nancy Lee Mine (31-001-SS-1).  
 SW1 - Middle of floodplain tailings just before water goes into ground.  
 31-001-SW-2 - Upstream sample for this site from the Nancy Lee Mine.

**MONTANA DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU  
HAZARDOUS MATERIALS INVENTORY  
SITE SUMMARY**

Mine/Site Name: <u>Nancy Lee Millsite-Slowey</u>	County: <u>Mineral</u>
Legal Description: T <u>17N</u> R <u>27W</u>	Section(s): <u>NW 1/4, Sec. 14</u>
Mining District: <u>Keystone</u>	Mine Type: <u>Millsite/Au, Ag, Pb, Cu</u>
Latitude: <u>N 47° 14' 19"</u>	Primary Drainage: <u>Clark Fork River</u>
Longitude: <u>W 115° 00' 25"</u>	USGS Code: <u>17010204</u>
Land Status: <u>Private</u>	Secondary Drainage: <u>Slowey Gulch</u>
Quad: <u>Wilson Gulch</u>	Date Investigated: <u>September 7, 1993</u>
Inspectors: <u>Bullock, Tuesday</u>	P.A. # <u>31-090</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- There were approximately 205,000 cubic yards of tailings on site. The following elements were elevated at least three times background:

Arsenic: 1,490J to 3,040J mg/kg	Cadmium: 9.3 to 14 mg/kg
Cobalt: 24.9 to 26.9 mg/kg	Chromium: 6.48 mg/kg
Copper: 299 to 316 mg/kg	Iron: 114,000 to 178,000 mg/kg
Mercury: 0.085J to 1.06J mg/kg	Manganese: 7,630 to 9,940 mg/kg
Lead: 1,080 to 2,320 mg/kg	Antimony: 85.4J to 123J mg/kg
Zinc: 2,180 to 3,440 mg/kg	
- There was no waste rock on site.
- There was no surface water on site; no surface water samples were collected. The nearest surface water was the Clark Fork River, approximately 200 feet away. A dry drainage existed on site. Observed releases of arsenic, cadmium, cobalt, mercury, lead, antimony, and zinc were documented in downstream sediments, but no direct pathway to the Clark Fork River was identified.
- There were no hazardous openings on site. There were four potentially hazardous structures identified on site.

Nancy Lee-Slowey PA# 31-090  
 AMRB HAZARDOUS MATERIALS INVENTORY  
 INVESTIGATOR: PIONEER - BULLOCK  
 INVESTIGATION DATE: 09/07/93

SOLID MATRIX ANALYSES

Metals in soils  
 Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
31-090-SE-1	1010 J	379	13.8	15.8	4.8	435	30400	2.38 J	1620	7.21	3360	78.6 J	4240 J	NR
31-090-SE-2	31.4 J	93.6	0.4 U	3.66	4.11	590	14100	0.028 U	906	6.03	35.4	5.13 UJ	69.9 J	NR
31-090-TP-1	1490 J	6.21	9.3	24.9	2.9	316	178000	0.066 J	9940	1.99 U	1080	85.4 J	2180 J	NR
31-090-TP-2	3040 J	22.3	14.0	26.9	6.48	299	114000	1.06 J	7630	2.36	2320	123 J	3440 J	NR
BACKGROUND	7.89	8.8	0.5 U	3.31	1.2 U	2.44 J	3120	0.01 UJ	609	2.22 U	7.59 J	5.39 U	11.9	NR

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Reported

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	TOTAL SULFUR ACID/BASE POTENTIAL /10000	NEUTRAL POTENTIAL /10000	SULFUR ACID/BASE POTENTIAL /10000	SULFATE SULFUR %	PYRITIC SULFUR %	ORGANIC SULFUR %	PYRITIC SULFUR ACID/BASE POTENTIAL /10000	PYRITIC SULFUR ACID/BASE POTENTIAL /10000
31-090-TP-1	0.66	20.6	9.15	-12	<0.01	0.74	0.19	23.1	-14
31-090-TP-2	0.78	24.4	9.07	-15	0.04	0.56	0.18	17.5	-8.42

LEGEND

SE1 - Intermittent drainage between tailings and cabin.  
 SE2 - Upgradient intermittent drainage.  
 TP1 - Composite of subsamples TP1A, 1B, 1C, 2A, 2B, 3A, 3B, and 3C  
 TP2 - Composite of subsamples TP1D, 2C, 3C, and 4C.  
 BACKGROUND - From the Nancy Lee (31-001-SS-1)

**MONTANA DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU  
HAZARDOUS MATERIALS INVENTORY  
SITE SUMMARY**

Mine/Site Name: Tarbox-Mineral King  
Legal Description: T 20N R 31W  
Mining District: Packer Creek  
Latitude: N 47° 27' 05"  
Longitude: W 115° 29' 55"  
Land Status: Public  
Quad: Haugan  
Inspectors: Bullock, Flammang, Clark  
Organization: Pioneer Technical Services, Inc.

County: Mineral  
Section(s): SE 1/4, NE 1/4, Sec. 35  
Mine Type: Hardrock/Pb, Zn, Ag, Au  
Primary Drainage: St. Regis River  
USGS Code: 17010204  
Secondary Drainage: Packer Creek  
Date Investigated: August 2, 1993  
P.A. # 31-003

- There were no mill tailings associated with this site.
- The volume of waste rock associated with this site was estimated to be approximately 5300 cubic yards. The following elements were elevated at least three times background:

Arsenic: 244 to 4030 mg/kg	Cadmium: 45.8 mg/kg
Copper: 209J mg/kg	Iron: 142,000 mg/kg
Manganese: 6570 mg/kg	Lead: 158J to 10,100J mg/kg
Antimony: 279 mg/kg	Zinc: 443 to 26,400 mg/kg
- There was one adit discharge associated with this site. The small flow of approximately five gpm seeps from the adit portal through rock, discharging at the base of the dump. At this discharge point, the pH is 6.39 and the specific conductance was 140 umhos/cm. The MCLs/MCLGs were not exceeded in this discharge. The acute aquatic life criteria for zinc was exceeded and the chronic aquatic life criteria for lead and zinc were exceeded. The discharge flowed through a small wetlands prior to discharge into a tributary to Packer Creek.
- The Packer Creek tributary flowed north to south through the site, bisecting the waste rock dumps associated with the adit and shaft. Observed releases were documented for iron, manganese, and zinc. No MCL/MCLGs were exceeded in the stream. The acute and chronic aquatic life criteria for zinc were exceeded and directly attributable to this site.
- The headframe of the shaft was a hazardous structure. The shaft was covered at the time of this investigation, but was accessible and potentially hazardous.

Tarbox-Mineral King PA# 31-003  
 AMRB HAZARDOUS MATERIALS INVENTORY  
 INVESTIGATOR: PIONEER - BULLOCK  
 INVESTIGATION DATE: 08/02/93

SOLID MATRIX ANALYSES

Metals in soils  
 Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
31-003-SE-1	1210	45.1	1.7	5.61	2.9	42.6 J	87000	0.009 UJ	9650	2.1 U	3060 J	5.08 U	2440	NR
31-003-SE-2	17.3	31.9	0.6 U	3.43	1.47 U	8.12 J	21800	0.009 UJ	711	7.99	37.9 J	6.61 U	55.4	NR
31-003-WR-1	4030	33.4	45.8	6.57	3.34	209 J	142000	0.308 J	6570	2.59 U	10100 J	279	28400	NR
31-003-WR-2	244	26.9	1.1	6.53	2.55	18 J	18700	0.071 J	1180	8.63	158 J	4.16 U	443	NR
BACKGROUND	4.52 U	241 J	0.5 U	6.09 J	4.83	16.2 J	12500	0.047 J	1020 J	9.02	22.2 J	5.89 U	59.3 J	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENT.		SULFUR ACID BASE POTENT.		ORGANIC SULFUR		PYRITIC SULFUR		SULFUR ACID BASE POTENT.	
	%	1/1000r	1/1000r	%	1/1000r	%	%	1/1000r	1/1000r	1/1000r	1/1000r	1/1000r
31-003-WR-1	3.14	98.1	3.19	0.01	-94.9	2.30	25.9	-22.7				
31-003-WR-2	0.14	4.37	14.2	0.01	9.82	0.09	1.25	12.9				

WATER MATRIX ANALYSES

Metals in Water  
 Results in ug/L

FIELD ID	Au	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS
														CALC. (mg CaCO3/L)
31-003-GW-1	1.69 U	16.2	2.57 U	9.7 U	6.83 U	1.55 U	594	0.038 U	793	13.5	1.97	30.7 U	307	57.5
31-003-SW-1	3.46	8.9	2.57 U	9.7 U	6.83 U	1.55 U	378	0.039 J	178	14.4	2.85	30.7 U	256	27.2
31-003-SW-2	1.69 U	6.37	2.57 U	9.7 U	6.83 U	1.55 U	53.4	0.049 J	5.6	12.7 U	1.86	30.7 U	7.57 U	11.5

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Wet Chemistry  
 Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS		CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
	99 <	55				
31-003-GW-1	99 <	5.0	5.0	22	< 0.05	NR
31-003-SW-1	55	5.7	8	< 0.05	< 0.05	NR
31-003-SW-2	43	5.7	5	< 0.05	< 0.05	NR

LEGEND

- SE1 - Downgradient of waste rock dump 1, approx. 30' below lower shaft dump.
- SE2 - Upgradient of waste rock dump 2 on South Fork of Creek.
- WR1 - Sample of the WR1A subsample.
- WR2 - Composite of subsamples WR1B, 1C, 2A, 2B, and 2C.
- BACKGROUND - From the Saltex Consolidate (31-021-SS-1).
- GW1 - At seep below adit #1.
- SW1 - Same as sample SE1.
- SW2 - Same as sample SE2.

**MONTANA DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU  
HAZARDOUS MATERIALS INVENTORY  
SITE SUMMARY**

Mine/Site Name: <u>Saltese Consolidate</u>	County: <u>Mineral</u>
Legal Description: T <u>19N</u> R <u>30W</u>	Section(s): <u>SE 1/4, NW 1/4, Sec. 4</u>
Mining District: <u>Packer Creek</u>	Mine Type: <u>Hardrock/Unknown</u>
Latitude: <u>N 47° 26' 10"</u>	Primary Drainage: <u>St. Regis River</u>
Longitude: <u>W 115° 25' 40"</u>	USGS Code: <u>17010204</u>
Land Status: <u>Public</u>	Secondary Drainage: <u>Timber Creek</u>
Quad: <u>Haugan</u>	Date Investigated: <u>August 2, 1993</u>
Inspectors: <u>Bullock, Flammang, Clark</u>	P.A. # <u>31-021</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- There were no mill tailings observed at this site during the investigation.
- The volume of waste rock associated with this site was estimated to be approximately 1,300 cubic yards. The following elements were elevated at least three times background:  
Mercury: 0.228J mg/kg
- One discharging adit was observed at the site during the investigation. No MCLs were exceeded in the adit discharge; however, chronic aquatic life criteria were exceeded for mercury and lead. The adit discharge was sampled farther downstream after flowing over the waste rock dump, the sample exceeded the chronic aquatic life criteria for mercury.
- A potentially hazardous highwall was identified behind Adit #1, and a cabin located east of the site was collapsing and potentially hazardous.

Salteste Consolidate PA# 31-021  
 AMRB HAZARDOUS MATERIALS INVENTORY  
 INVESTIGATOR: PIONEER - BULLOCK  
 INVESTIGATION DATE: 08/02/93

SOLID MATRIX ANALYSES

Metals in soils  
 Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
31-021-WR-1	4.17 U	41	0.5 U	2.2	1.31	12.8 J	5740	0.228 J	255	4.27	29.7 J	5.42 U	39.3	NR
BACKGROUND	4.52 U	241	0.5 U	6.09	4.83	16.2 J	12500	0.047 J	1020	9.02	22.2 J	5.89 U	59.3	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	ACID BASE %	NEUTRAL POTENT %	SULFUR POTENT %	SULFATE SULFUR %	PYRITIC SULFUR %	ORGANIC SULFUR %	PYRITIC SULFUR %	SULFUR ACID BASE %	SULFUR POTENT %
31-021-WR-1	<0.01	0.00	3.14	3.14	<0.01	<0.01	<0.01	0.00	0.00	3.14

WATER MATRIX ANALYSES

Metals in Water  
 Results in ug/L

FIELD ID	Au	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn (mg CaCO3/L)	HARDNESS CALC
31-021-GW-1	1.69 U	2.83	2.57 U	9.7 U	7.2	1.55 U	18.6	0.052 J	4.08 U	12.7 U	3.07	30.7 U	7.57 U	23
31-021-SW-1	1.69 U	16.5	2.57 U	9.7 U	6.83 U	1.55 U	65	0.056 J	11.2	12.7 U	1.55 U	30.7 U	7.57 U	21.5

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Wet Chemistry  
 Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3ANO2-N	CYANIDE
31-021-GW-1	48	6.2	< 5.0	< 0.05	NR
31-021-SW-1	56	5.2	< 5.0	< 0.05	NR

LEGEND

WR1 - Composite of subsamples WR1A, 1B, and 2  
 BACKGROUND - From the Salteste Consolidate Mine (31-021-SS-1)  
 GW1 - Approx 10' from the mouth of adit #1 where it appears out of a vegetated area.  
 SW1 - Approx 30' below lower adit - downgradient.

**MONTANA DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU  
HAZARDOUS MATERIALS INVENTORY  
SITE SUMMARY**

Mine/Site Name: <u>Wallace Creek Millsite</u>	County: <u>Missoula</u>
Legal Description: <u>T 12N R 17W</u>	Section(s): <u>SW 1/4, SE 1/4, Section 24</u>
Mining District: <u>Clinton</u>	Mine Type: <u>Millsite/Au, Ag, Cu, Pb</u>
Latitude: <u>N 46° 47' 44"</u>	Primary Drainage: <u>Clark Fork River</u>
Longitude: <u>W 113° 40' 27"</u>	USGS Code: <u>17010201</u>
Land Status: <u>Private</u>	Secondary Drainage: <u>Wallace Creek</u>
Quad: <u>Clinton</u>	Date Investigated: <u>June 30, 1994</u>
Inspectors: <u>Bisch, Flammang, Clark, West</u>	P.A. # <u>32-019</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- The volume of tailings observed at the site was estimated to be 10,020 cubic yards. The following elements were elevated to at least three times the background concentrations (cyanide was detected in the tailings at 0.281 mg/kg):  
Arsenic: 67.5J to 118J mg/kg                      Lead: 322 to 544 mg/kg  
Barium: 300 mg/kg                                      Antimony: 12.8 mg/kg  
Cadmium: 1.8J mg/kg                                  Zinc: 242J to 442J m/kg  
Mercury: 1.05 to 4.52 mg/kg
- No waste rock was observed at the site.
- There were no discharging adits or filled shafts observed at the site. A spring that emanated near the mill complex was sampled. No MCLs or acute or chronic aquatic life criteria were exceeded. Another spring located approximately 800 feet downstream from the site was piped to a residence and used as a drinking water source. Using the spring located near the mill complex as the upgradient sample, and the drinking water spring as the downgradient sample, observed releases to groundwater were documented for zinc and cyanide; however, no MCLs were exceeded in the drinking water spring.
- Intermittent Wallace Creek flows adjacent to the site on the north side. Water was flowing in Wallace Creek for a short distance downstream from the site; however, no water was present in the drainage upstream from the site. No observed releases to Wallace Creek were documented, and no MCLs or aquatic life criteria were exceeded.
- Potential safety hazards observed at the site included the collapsing mill building and various scattered debris.

Wallace Creek Millisite PAF 32-019  
 AMRB HAZARDOUS MATERIALS INVENTORY  
 INVESTIGATOR: PIONEER - BISCH  
 INVESTIGATION DATE: 06/30/94

SOLID MATRIX ANALYSES

Metals in soils  
 Results per dry weight basis

FIELD ID	Ag (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
32-019-SE1	1.6 JX	6.9 UJ	256	0.7 UJ	2.3 U	5.3 J	52.9 J	5040	0.09	166 J	20.7 JX	17.8	7.7 U	54.9 J	NR
32-019-SE2	0.5 UJX	6.0 J	314	1.6 J	8.6 J	12.0 J	49.5 J	10500	0.08	628 J	9.6 JX	31.2	4.9 U	31.7 J	NR
32-019-TP1	3.6 JX	67.5 J	278	0.5 J	1.4 U	6.0 J	34.5 J	9590	1.05	695 J	2.6 JX	322	4.9 U	242 J	0.281
32-019-TP2	11.8 JX	118 J	300	1.8 J	2.9 J	12.9 J	52.7 J	14000	4.52	988 J	14.6 JX	544	12.8	442 J	<0.222
BACKGROUND	NR	17 JX	95	0.5 U	1.9 J	5.4 J	17.6	8760 J	0.081	747	9 J	63 J	4 U	57 J	NR

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Reported

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	ACID BASE POTENTIAL U/10000	NEUTRAL POTENTIAL U/10000	SULFUR ACID BASE POTENTIAL U/10000	SULFATE		PYRITIC		ORGANIC		PYRITIC		SULFUR	
					%	U/10000	%	U/10000	%	U/10000	%	U/10000	%	U/10000
32-019-TP1	0.09	2.81	437	434	<0.01	0.13	0.15	4.06	4.33					
32-019-TP2	0.06	1.87	383	382	<0.01	0.14	0.03	4.37	379					

WATER MATRIX ANALYSES

Metals in Water  
 Results in ug/L

FIELD ID	Ag	Au	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
32-019-GW1	0.12 U	1.3 UX	301	2.6 U	8.7 U	4.7 U	21.3	30.0	0.11 U	4.4 U	8.0 U	1.2	29.4 U	930 J	81.8
32-019-SW1	0.12 U	1.3 UX	295	2.6 U	8.7 U	4.7 U	4.6 U	11.1	0.11 U	4.4 U	8.0 U	1.1 U	29.4 U	50 J	92.9
32-019-SW3	0.12 U	1.3 UX	252	2.6 U	8.7 U	4.7 U	4.6 U	9.4 U	0.11 U	4.4 U	9.4	1.1 U	29.4 U	45 U	74.4

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Reported

Wet Chemistry  
 Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NOS3OR-N	CYANIDE
32-019-GW1	90	<5.0	7.0	0.09	0.01
32-019-SW1	124	<5.0	7.0	0.07	<0.005
32-019-SW3	86	<5.0	8.0	0.07	<0.005

LEGEND

- SE1 - Determination from the site in Wallace Creek
- SE2 - Upstream in Wallace Creek under power line (see notes)
- TP1 - Composite of subsamples TP1A-A through 1A-C and 1B-A through 1B-B
- TP2 - Composite of subsamples TP2A and 2B
- BACKGROUND - From the Larson Mine (32-017-SE1) (1993 Data)
- GW1 - Background spring from 2B Wellhead and residence located 800 ft upstream of site, used as a drinking water source.
- SW1 - Same as sample 32-019-SE1
- SW3 - Spring 80' north of job building

**MONTANA DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU  
HAZARDOUS MATERIALS INVENTORY  
SITE SUMMARY**

Mine/Site Name: <u>Copper Cliff</u>	County: <u>Missoula</u>
Legal Description: <u>T 12N R 15W</u>	Section(s): <u>NW 1/4, SW 1/4, Section 11</u>
Mining District: <u>Copper Cliff</u>	Mine Type: <u>Hardrock/Cu, Ag, Au</u>
Latitude: <u>N 46° 48' 0.0"</u>	Primary Drainage: <u>Union Creek</u>
Longitude: <u>W 113° 27' 14.7"</u>	USGS Code: <u>17010203</u>
Land Status: <u>Private</u>	Secondary Drainage: <u>Union Creek</u>
Quad: <u>Union Peak</u>	Date Investigated: <u>June 28, 1994</u>
Inspectors: <u>Bisch, Flammang, Clark, West</u>	P.A. # <u>32-001</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- No mill tailings were observed at the site.
- The volume of waste rock observed at the site was estimated to be 3,490 cubic yards. The following elements were elevated to at least three times the background concentrations:

Arsenic: 175J to 2,590J mg/kg	Mercury: 0.40 mg/kg
Chromium: 61.0J mg/kg	Nickel: 40.1JX mg/kg
Copper: 462J to 5,200J mg/kg	Lead: 48.4 to 167 mg/kg
Iron: 79,900 mg/kg	
- An intermittent drainage (dry during the investigation) meandered through the site before merging with Union Creek. Observed releases to the intermittent drainage (sediment) were documented for arsenic, copper, mercury, and lead.
- Potential safety hazards observed at the site included an unstable metal loadout structure and scattered wooden and metal debris in the area of the collapsed shaft.

Copper Clift PA# 32-001  
 AMRB HAZARDOUS MATERIALS INVENTORY  
 INVESTIGATOR: PIONEER - BISCH  
 INVESTIGATION DATE: 06/28/94

SOLID MATRIX ANALYSES

Metals in soils  
 Results per dry weight basis

FIELD ID	Ag (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
32-001-SE1	0.6 UJX	135 J	103	0.5 UJ	10.6 J	12.9 J	1140 J	21000	0.22	206 J	27.0 JX	50.9	5.8 U	76.0 U	NR
32-001-SE2	0.4 UJX	17.4 J	225	0.6 J	10.5 J	12.9 J	49.5 J	24000	0.04	482 J	19.7 JX	16.1	4.6 U	46.9 J	NR
32-001-WR1	0.6 JX	250 J	74.3	0.5 UJ	1.8 U	6.29 J	548 J	14800	0.09	67.4 J	4.3 JX	167	8.4	11.6 J	NR
32-001-WR3	0.6 UJX	175 J	303	0.6 UJ	3.2 J	34.7 J	482 J	79900	0.09	59.3 J	21.9 JX	130	6.7 U	61.9 J	NR
32-001-WR4	0.6 UJX	2590 J	90.5	0.6 UJ	10.3 J	61.0 J	5200 J	45000	0.40	102 J	40.1 JX	48.4	6.7 U	38.2 J	NR
BACKGROUND	0.4 UJX	3.9 UJ	219	0.4 UJ	6.5 J	14.4 J	12.4 J	18900	0.04	442 J	9.4 JX	8.6	4.4 U	33.5 J	NR

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Reported

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		SULFUR ACID/BASE POTENTIAL		ORGANIC SULFUR		PYRITIC SULFUR		PYRITIC SULFUR ACID/BASE POTENTIAL	
	%	1/1000	%	1/1000	%	1/1000	%	1/1000	%	1/1000
32-001-WR1	1.09	34.1	-0.55	-35	1.16	0.62	0.62	-1.17	0.62	-1.17
32-001-WR3	0.25	7.81	-8.16	-16.0	0.09	0.62	0.62	-8.78	0.62	-8.78
32-001-WR4	0.99	30.9	-3.43	-34	0.15	2.19	2.19	-5.61	2.19	-5.61

LEGEND

- SE1 - Approximately 5% increment of WR1.
- SE2 - Duplicate of site just below confidence with a dry discharge from the well.
- WR1 - Composite of subsamples WR1A and 1B.
- WR3 - Composite of subsamples WR3A and 3B.
- WR4 - Grab sample of the WR4 subsample.
- BACKGROUND - From the Copper Cliff Mine (D2 061 851).

**MONTANA DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU  
HAZARDOUS MATERIALS INVENTORY  
SITE SUMMARY**

Mine/Site Name: <u>Frogs Diner</u>	County: <u>Missoula</u>
Legal Description: <u>T 12N R 15W</u>	Section(s): <u>SE 1/4, NW 1/4, Section 11</u>
Mining District: <u>Copper Cliff</u>	Mine Type: <u>Hardrock/Unknown</u>
Latitude: <u>N 46° 48' 44"</u>	Primary Drainage: <u>Union Creek</u>
Longitude: <u>W 113° 27' 00"</u>	USGS Code: <u>17010203</u>
Land Status: <u>Private</u>	Secondary Drainage: <u>Union Creek</u>
Quad: <u>Union Peak</u>	Date Investigated: <u>June 28, 1994</u>
Inspectors: <u>Bisch, Flammang, Clark, West</u>	P.A. # <u>32-027</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- No mill tailings were observed at the site.
- The volume of waste rock observed at the site was estimated to be 315 cubic yards. The following elements were elevated to at least three times the background concentrations:

Arsenic: 129J mg/kg	Mercury: 0.70 mg/kg
Cobalt: 37.0J mg/kg	Nickel: 36.1JX mg/kg
Copper: 203J mg/kg	Lead: 34.7 mg/kg
Iron: 59,300 mg/kg	
- One discharging adit was observed at the site. No MCLs were exceeded in the adit discharge; however, the chronic aquatic life criteria for iron was exceeded.
- Union Creek flows through the center of the site. An observed release to Union Creek was documented for iron; however, no MCLs or acute or chronic aquatic life criteria were exceeded in the stream.

Frogs Diner PA# 32-027  
 AMRB HAZARDOUS MATERIALS INVENTORY  
 INVESTIGATOR: PIONEER - BISCH  
 INVESTIGATION DATE: 06/28/94

SOLID MATRIX ANALYSES

Metals in soils  
 Results per dry weight basis

FIELD ID	Ag (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
32-027-SE1	1.4 JX	53.3 J	166	0.5 UJ	15.8 J	22.2 J	203 J	24300	0.04	365 J	33.9 JX	24.1	5.2 U	63.3 J	NR
32-027-SE2	2.0 JX	74.4 J	187	0.5 UJ	38.1 J	17.7 J	281 J	18800	0.03	416 J	38.4 JX	22.7	7.1	62.9 J	NR
32-027-WR1	0.5 UJX	129 J	138	0.5 UJ	37.0 J	6.2 J	203 J	59300	0.70	556 J	36.1 JX	34.7	5.5 U	66.0 J	NR
BACKGROUND	0.4 UJX	3.9 UJ	219	0.4 UJ	6.5	14.4 J	12.4 J	18900	0.04	442 J	9.4 JX	8.6	4.4 U	33.5 J	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Reported

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	ACID BASE POTENT V1000R	NEUTRAL POTENT V1000R	SULFUR ACID BASE POTENT V1000R	SULFUR %	ORGANIC SULFUR %	PYRITIC SULFUR %	PYRITIC ACID BASE POTENT V1000R	SULFUR ACID BASE POTENT V1000R
32-027-WR1	0.84	26.2	-2.92	-2.9	0.17	0.08	0.59	2.50	-5.42

WATER MATRIX ANALYSES

Metals in Water  
 Results in ug/L

FIELD ID	Ag	As	Ba	Cd	Co	Cr	Cs	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
32-027-GW1	0.12 U	20.2 JX	12.4	2.6 U	12.2	4.7 U	12.5	14200	0.11 U	273	25.3	1.1 U	29.4 U	21.3 J	136
32-027-SW1	0.12 U	3.2 JX	97.3	2.6 U	8.7 U	4.7 U	6.8	472	0.11 U	132	12.4	1.1 U	29.4 U	5.6 J	138
32-027-SW2	0.12 U	1.3 UX	98.6	2.6 U	8.7 U	4.7 U	5.9	94.8	0.11 U	6.13	8.0 U	1.1 U	29.4 U	4.5 U	135

Wet Chemistry  
 Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2/N	CYANIDE
32-027-GW1	171	<5.0	89	<0.05	NR
32-027-SW1	155	<5.0	17	0.05	NR
32-027-SW2	155	<5.0	14	0.07	NR

LEGEND

SE1 - 15 discharges in Union Creek from confluence with salt discharge  
 SE2 - 59 discharges in Union Creek from road crossing  
 WR1 - Composite of subsamples WR1A and 1B  
 BACKGROUND - From the Copper Cliff Mine (32-061-281)  
 GW1 - Add #1 discharge  
 SW1 - Same as sample 32-027-SE1  
 SW2 - Same as sample 32-027-SE2

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Reported

**MONTANA DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU  
HAZARDOUS MATERIALS INVENTORY  
SITE SUMMARY**

Mine/Site Name: <u>Linton Mine and Millsite</u>	County: <u>Missoula</u>
Legal Description: <u>T 12N R 15W</u>	Section(s): <u>NW 1/4, NE 1/4, Sec. 30</u>
Mining District: <u>Unincorporated</u>	Mine Type: <u>Hardrock/Pb, Ag</u>
Latitude: <u>N 46° 46' 30"</u>	Primary Drainage: <u>Cramer Creek</u>
Longitude: <u>W 113° 32' 36"</u>	USGS Code: <u>17010201</u>
Land Status: <u>Public</u>	Secondary Drainage: <u>Cramer Creek</u>
Quad: <u>Mineral Ridge</u>	Date Investigated: <u>July 1, 1993</u>
Inspectors: <u>Bullock, Flammang, Clark</u>	P.A. # <u>32-017</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- The volume of tailings associated with this site was estimated to be approximately 23,000 cubic yards. The tailings were severely eroded by Cramer Creek. The following elements were elevated at least three times background:

Arsenic: 1090JX mg/kg	Manganese: 34,300 mg/kg
Barium: 7340 mg/kg	Nickel: 151J mg/kg
Cobalt: 43.1J mg/kg	Lead: 210J mg/kg
Copper: 105 mg/kg	Mercury: 1.41 mg/kg
- The volume of waste rock associated with this site was estimated to be approximately 6,500 cubic yards. The following elements were elevated at least three times background:

Arsenic: 136 mg/kg	Manganese: 3,620J mg/kg
Barium: 694JX mg/kg	Lead: 4,890J to 14,100 mg/kg
Copper: 155 to 183JX mg/kg	Antimony: 28J to 34 mg/kg
Mercury: 7.88 mg/kg	
- No discharging adits, filled shafts, seeps, or springs were observed at the site during the investigation.
- Cramer Creek was flowing east to west adjacent to the site on the south side. The tailings and one of the waste rock dumps (WR-4) were situated next to the creek and tailings were actively eroding into the stream. There was not an observed release to surface water documented in the water samples. No MCL/MCLGs or acute or chronic aquatic life criteria were exceeded in upstream or downstream surface water samples. Observed releases of arsenic, barium, cobalt, copper, mercury, manganese, and lead were documented in the stream sediment samples.
- Six potentially hazardous mine openings were identified at the site. The loadout structure located in the east-central section of the site was also potentially hazardous and the southern part of the tailings pile was severely undercut by Cramer Creek.

Linton PA# 32-017  
 AMRB HAZARDOUS MATERIALS INVENTORY  
 INVESTIGATOR: PIONEER - BULLOCK  
 INVESTIGATION DATE: 07/01/93

SOLID MATRIX ANALYSES

Metals in soils  
 Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
32-017-SE-1	168 J	2420 JX	0.5 U	14.8 JX	4.1	57.2 JX	6220	0.552 J	11400 J	15	5830	21	60 J	NR
32-017-SE-2	6 U	87.7 JX	0.6 U	2.5 UJX	6.6	10.4 JX	8010	0.16 J	410 J	9	88	8 U	65 J	NR
32-017-TP-1	1090 JX	7340	0.6 U	43.1 J	13.1 J	105	25900 J	1.41	34300 J	151 J	210 J	9 J	85 J	NR
32-017-WR-1	30 JX	12.2	0.5 U	1.1 U	2.2 J	155	3970 J	7.88	711 J	6 J	4890 J	28 J	56 J	NR
32-017-WR-4	136 J	694 JX	0.5 U	3.1 JX	1.7	183 JX	4690	0.04 J	3620 J	7	14100	34	36 J	NR
BACKGROUND	17 JX	95	0.5 U	1.9 J	5.4 J	17.6	8760 J	0.081	747 J	9 J	63 J	4 U	57 J	NR

U. - Not Detected; J. - Estimated Quantity; X. - Outlier for Accuracy or Precision; NR. - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENT.		SULFUR ACID BASE POTENT.		ORGANIC SULFUR		PYRITIC SULFUR		PYRITIC SULFUR ACID BASE POTENT.	
	%	U/10000	%	U/10000	%	U/10000	%	U/10000	%	U/10000	%	U/10000
32-017-TP-1	<0.01	0	309	309	<0.01	0	0.01	0	<0.01	0	309	309
32-017-WR-1	0.01	0.31	960	960	0.01	0	<0.01	0	<0.01	0	960	960
32-017-WR-4	0.03	0.94	912	911	0.03	0	<0.01	0	<0.01	0	912	912

WATER MATRIX ANALYSES

Metals in Water  
 Results in ug/L

FIELD ID	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn (mg CaCO3/L)	HARDNESS CALC.
32-017-SW-1	5.11 J	50 JX	2.57 U	9.7 U	6.83 U	1.55 U	66.4	0.038 U	4.9	12.7 U	1.25	30.7 U	7.57 U	213
32-017-SW-2	5.13 J	52.1 JX	2.57 U	9.7 U	6.83 U	1.55 U	51.6	0.038 U	4.08 U	12.7 U	1 U	30.7 U	7.57 U	214

U. - Not Detected; J. - Estimated Quantity; X. - Outlier for Accuracy or Precision; NR. - Not Requested

Wet Chemistry  
 Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
32-017-SW-1	237	6.7	10	0.11	NR
32-017-SW-2	242	6.7	8	0.13	NR

LEGEND

SE1 - Downstream Cramer Creek  
 SE2 - Upstream Cramer Creek  
 TP1 - Composite of subsamples TP1A-A, 1A-B, and 1B-A  
 WR1 - Composite of subsamples WR1A, 1B, 1C, 2A, 2B, and 2C  
 WR4 - Sample of the WR4 subsample.  
 BACKGROUND - From the Linton Mine (32-017-SS-1).

SW1 - Same as sample SE1.  
 SW2 - Same as sample SE2

**MONTANA DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU  
HAZARDOUS MATERIALS INVENTORY  
SITE SUMMARY**

Mine/Site Name: <u>Morse and Kennedy</u>	County: <u>Missoula</u>
Legal Description: <u>T 13N R 14W</u>	Section(s): <u>N 1/2, Sec. 15</u>
Mining District: <u>Elk Creek</u>	Mine Type: <u>Hardrock/Cu</u>
Latitude: <u>N 46° 23' 20"</u>	Primary Drainage: <u>Elk Creek</u>
Longitude: <u>W 113° 21' 20"</u>	USGS Code: <u>17010203</u>
Land Status: <u>Public</u>	Secondary Drainage: <u>North Fork of Elk Creek</u>
Quad: <u>Bata Mountain</u>	Date Investigated: <u>July 1, 1993</u>
Inspectors: <u>Babits, Lasher/Pierson</u>	P.A. # <u>32-033</u>
Organization: <u>Pioneer Technical Services, Inc./ Thomas, Dean and Hoskins, Inc.</u>	

- There were no mill tailings associated with this site.
- There were approximately 65,700 cubic yards of uncovered waste rock at the site. The following were elevated at least 3 times background:  
Barium: 3,810JX mg/kg  
Mercury: 1.08J mg/kg  
Lead: 111 mg/kg
- There were no discharging adits at the site.
- There was no surface water on the site. The nearest surface water was 0.5 mile away.
- There were no hazardous openings at the site; but, there were highwalls associated with the pits.

Morse & Kennedy PA# 32-033  
 AMRB HAZARDOUS MATERIALS INVENTORY  
 INVESTIGATOR: PIONEER - BABITS  
 INVESTIGATION DATE: 07/01/93

SOLID MATRIX ANALYSES

Metals in soils  
 Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
32-033-WR-1	4 U	3810 JX	0.4 U	5.4 JX	18.5	10.8 JX	10400	0.051 J	290 J	11	7 U	6	11 J	NR
32-033-WR-2	12 J	166 JX	0.5 U	6 JX	5.6	29.6 JX	9160	1.08 J	815 J	11	111	13	64 J	NR
BACKGROUND	5 U	322 JX	0.6 U	5.6 JX	10	10.4 JX	9450	0.071 J	640 J	8	9 U	7 U	30 J	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL ACID BASE		SULFUR ACID BASE		SULFATE SULFUR		PYRITIC SULFUR		ORGANIC SULFUR		PYRITIC SULFUR		SULFUR ACID BASE	
	%	1/10000	POTENT.	1/10000	POTENT.	1/10000	%	%	%	%	%	%	%	%	POTENT.	1/10000
32-033-WR-1	<0.01	0	29.7	<0.01	29.7	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	0	29.7	506	506
32-033-WR-2	<0.01	0	506	<0.01	506	<0.01	<0.01	<0.01	<0.01	0	0.01	0.01	0	506	506	506

LEGEND

WR1 - Composite of subsamples WR1, 2, 3, and 4.  
 WR2 - Composite of subsamples WR5A and 5B  
 BACKGROUND - From Morse and Kennedy Mine (32-033-SS-1)

**MONTANA DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU  
HAZARDOUS MATERIALS INVENTORY  
SITE SUMMARY**

Mine/Site Name: <u>Joe Wallit Mine</u>	County: <u>Missoula</u>
Legal Description: <u>T 17N R 24W</u>	Section(s): <u>NW 1/4, NW 1/4, Sec. 8</u>
Mining District: <u>Nine Mile</u>	Mine Type: <u>Hardrock/Unknown</u>
Latitude: <u>N 47° 15' 11"</u>	Primary Drainage: <u>Nine Mile Creek</u>
Longitude: <u>W 114° 41' 11"</u>	USGS Code: <u>17010204</u>
Land Status: <u>Public</u>	Secondary Drainage: <u>St. Louis Creek</u>
Quad: <u>Knowles</u>	Date Investigated: <u>July 2, 1993</u>
Inspectors: <u>Babits, Lasher/Pierson</u>	P.A. # <u>32-010</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- There were no mill tailings associated with this site.
- There were approximately 68,300 cubic yards of uncovered waste rock on site. The following were elevated at least 3 times background:  
Arsenic: 31J mg/kg  
Copper: 338JX mg/kg
- There were no discharging adits at the site.
- The East Fork of St. Louis Creek flows through the waste rock dumps and St. Louis Creek flows adjacent to the waste rock dumps. There were observed releases of arsenic and copper in downstream sediment; there were no observed releases to downstream surface water. No MCL/MCLGs were exceeded, but the chronic fresh water aquatic life criteria for lead was exceeded in downstream surface water.
- There were no hazardous openings at the site, but there was a highwall at the pit.

Joe Wallit PA# 32-010  
 AMRB HAZARDOUS MATERIALS INVENTORY  
 INVESTIGATOR: PIONEER - BABITS  
 INVESTIGATION DATE: 07/02/93

SOLID MATRIX ANALYSES

Metals in soils  
 Results per dry weight basis

FIELD ID	Au (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
32-010-SE-1	10 J	44.7 JX	0.5 U	5.3 JX	3.5	11.4 JX	15300	0.066 J	251 J	14	12	6	64 J	NR
32-010-SE-2	32 J	49.5 JX	0.5 U	7.5 JX	2.1	739 JX	18100	0.062 J	1000 J	9	20	12	74 J	NR
32-010-WR-1	31 J	64.6 JX	0.5 U	6.7 JX	2.3	338 JX	16000	0.137 J	807 J	9	98	13	136 J	NR
BACKGROUND	8 J	336 JX	0.9	5.9 JX	2.2 U	12.1 JX	8140	0.18 J	1730 J	8	41	10 U	57 J	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Reported

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENT.		SULFUR ACID/BASE POTENT.		ORGANIC SULFUR		PYRITIC SULFUR		PYRITIC SULFUR ACID/BASE POTENT		56
	%	U/10000	%	U/10000	%	U/10000	%	U/10000	%	U/10000	%	U/10000	
32-010-WR-1	0.01	0.31	56.7	56.3	<0.01	0.02	<0.01	0.62					

WATER MATRIX ANALYSES

Metals in Water  
 Results in ug/L

FIELD ID	Au	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC	
														(mg CaCO3/L)	(mg CaCO3/L)
32-010-SW-1	3.65 J	4.8 JX	2.57 U	9.7 U	6.83 U	1.55 U	12.3	0.120	4.08 U	12.7 U	1.5	30.7 U	12.9	37.8	
32-010-SW-2	3.7 J	2.01 UJX	2.57 U	9.7 U	8.83	1.55 U	19.7	0.160	4.08 U	12.7 U	3.43	30.7 U	7.57 U	16.1	
32-010-SW-3	3.82 J	3.17 JX	2.57 U	9.7 U	6.83 U	1.7 J	54	0.200	23.1	12.7 U	1 U	30.7 U	7.57 U	30.7	
32-010-SW-4	3.01 J	2.3 JX	2.57 U	9.7 U	6.83 U	1.5 J	39.3	0.190	4.4	12.7 U	2.88	30.7 U	7.57 U	19.6	

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Reported

Wet Chemistry  
 Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS		CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
32-010-SW-1	77	< 5.0	< 5	< 0.05	NR	
32-010-SW-2	56	< 5.0	< 5	< 0.05	NR	
32-010-SW-3	61	< 5.0	< 5	< 0.05	NR	
32-010-SW-4	59	6.7	< 5	< 0.05	NR	

LEGEND

- SE1 - Upgradient in St. Louis Creek.
- SE2 - Below confluence of East Fork St. Louis Creek in St. Louis Creek.
- WR1 - Composite of subsamples WR1, 2, 3, and 4.
- BACKGROUND - From the Joe Wallit Mine (32-010-SS-1).
- SW1 - Same as sample SE1
- SW2 - Same as sample SE2
- SW3 - Downgradient of last dump in St. Louis Creek
- SW4 - Upgradient in East Fork of St. Louis Creek



Lost Cabin PA# 32-011  
 AMRB HAZARDOUS MATERIALS INVENTORY  
 INVESTIGATOR: PIONEER - BULLOCK  
 INVESTIGATION DATE: 07/02/93

SOLID MATRIX ANALYSES

Metals in soils  
 Results per dry weight basis

FIELD ID	Au (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
32-011-SE-1	26 J	43.6 JX	0.6 U	10.1 JX	5.4	177 JX	24300	0.199 J	548 J	16	346	7 U	293 J	NR
32-057-SE-1	11 J	41.8 JX	0.6 U	6.1 JX	5.4	37.1 JX	15500	0.025 J	298 J	11	17	7 U	56 J	NR
32-011-WR-1	98 J	17.2 JX	1.2	7.8 JX	4.3	1150 JX	21700	0.318 J	398 J	11	3370	8	478 J	NR
BACKGROUND	14 J	689 JX	0.8	7 JX	3.9	17.8 JX	13100	0.1 J	3380 J	16	43	6	329 J	NR

U - Not Detected J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Reported

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENT.		SULFUR ACID BASE		ORGANIC SULFUR		PYRITIC SULFUR		PYRITIC SULFUR ACID BASE	
	%	U/10000	%	U/10000	%	U/10000	%	U/10000	%	U/10000	%	U/10000
32-011-WR-1	0.21	6.56	3.29	3.29	-3.3	0.08	0.12	0.31	0.01	0.12	0.31	2.98

WATER MATRIX ANALYSES

Metals in Water  
 Results in ug/L

FIELD ID	Au	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. Zn (mg CaCO3/L)
32-011-SW-1	1.49 U	4.27 JX	2.57 U	9.7 U	6.83 U	7.73 J	31	0.056 J	4.08 U	12.7 U	2.24 J	30.7 U	37.7 J	23
32-057-SW-1	1.81	2.13 JX	2.57 U	9.7 U	6.83 U	2.63 J	36.1	0.097 J	4.08 U	12.7 U	1.29 J	30.7 U	19.9 J	20.3

Wet Chemistry  
 Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS		CHLORIDE		SULFATE		NOMNO2-N		CYANIDE	
	93	< 5.0	< 5	< 5	< 0.05	NR	NR	NR	NR	NR
32-011-SW-1	93	< 5.0	< 5	< 5	< 0.05	NR	NR	NR	NR	NR
32-057-SW-1	49	< 5.0	< 5	< 5	< 0.05	NR	NR	NR	NR	NR

LEGEND

32-011-SE1 - 20' below bridge, also below confluence of unnamed tributary  
 32-057-SE1 - Downgradient of Hautalla mine, upgradient for Lost Cabin  
 WR1 - Composite of subsamples WR1A, 1B, 1C, and 2  
 BACKGROUND - From the Lost Cabin Mine (32-001-SS-1)  
 SW1 - Same as sample 32-011-SE-1  
 SW2 - Same as sample 32-057-SE-1

**MONTANA DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU  
HAZARDOUS MATERIALS INVENTORY  
SITE SUMMARY**

Mine/Site Name: <u>Nugget</u>	County: <u>Missoula</u>
Legal Description: <u>T 16N R 23W</u>	Section(s): <u>NW 1/4, SE 1/4, Sec. 13</u>
Mining District: <u>Nine Mile</u>	Mine Type: <u>Hardrock/Au, Ag, Cu, Pb, Zn</u>
Latitude: <u>N 47° 08' 50"</u>	Primary Drainage: <u>Kennedy Creek</u>
Longitude: <u>W 114° 26' 45"</u>	USGS Code: <u>17010204</u>
Land Status: <u>Public</u>	Secondary Drainage: <u>Kennedy Creek</u>
Quad: <u>McCormick Peak</u>	Date Investigated: <u>July 2, 1993</u>
Inspectors: <u>Bullock, Flammang, Clark</u>	P.A. # <u>32-042</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- There were no mill tailings associated with this site.
- The volume of waste rock associated with this site was estimated to be 1300 cubic yards. The following elements were elevated at least three times background:  
Arsenic: 150J mg/kg                      Copper: 9378J mg/kg  
Lead: 2340 mg/kg
- The waste rock dumps were 75% unvegetated.
- One discharging adit had a small flow of approximately 1.3 gpm. The adit water was sampled as GW-1 and had a neutral pH of 7.09, and a moderate specific conductance of 108.6 umhos/cm. The adit discharge flowed into a small settling pond constructed in the waste rock prior to discharging directly to Kennedy Creek. No MCL/MCLGs were exceeded. Chronic aquatic life criteria were exceeded for mercury, copper, lead, and zinc, and the acute aquatic life criteria were exceeded for copper and zinc in the adit discharge.
- Surface water samples were collected upstream and downstream on Kennedy Creek which bisected the site. There were no observed releases to surface water documented and the samples did not exceed MCL/MCLGs. Acute and chronic aquatic life criteria were exceeded in Kennedy Creek but could not be attributed to this site due to upgradient sources (the Lost Cabin and Hautilla Mines). Stream sediment samples did document observed releases of copper and lead, attributable to this site.
- The discharging adit was open and hazardous. WR-1 was being undercut by Kennedy Creek.

**Nugget PA# 32-042**  
**AMRB HAZARDOUS MATERIALS INVENTORY**  
**INVESTIGATOR: PIONEER - BULLOCK**  
**INVESTIGATION DATE: 07/02/93**

**SOLID MATRIX ANALYSES**

**Metals in soils**  
**Results per dry weight basis**

FIELD ID	Au (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
32-042-SE-1	32 J	17.6 JX	0.4 U	4.6 JX	2	642 JX	12400	0.015 J	238 J	7	227	5 U	301 J	NR
32-011-SE-1	26 J	43.6 JX	0.6 U	10.1 JX	5.4	177 JX	24300	0.199 J	548 J	16	346	7 U	293 J	
32-042-WR-1	150 J	10.1 JX	0.5 U	4 JX	1.3 U	378 JX	21600	0.196 J	143 J	9	2340	11	330 J	NR
BACKGROUND	14 J	689 JX	0.8	7 JX	3.9	17.8 JX	13100	0.1 J	3380 J	16	43	6	329 J	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

**Acid/Base Accounting**

FIELD ID	TOTAL SULFUR %	ACID BASE %	NEUTRAL POTENT %	SULFUR ACID BASE POTENT %	SULFATE %	PYRITIC SULFUR %	ORGANIC SULFUR %	PYRITIC ACID BASE POTENT %	HARDNESS CALC. (mg CaCO3/L)
32-042-WR-1	0.24	7.5	3.65	-3.9	0.19	<0.01	0.06	0	3.65

**WATER MATRIX ANALYSES**

**Metals in Water**  
**Results in ug/L**

FIELD ID	Au	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC.
32-042-GW-1	2.63	7.23 JX	2.57 U	9.7 U	6.83 U	38.6 J	377	0.096 J	88.1	12.7 U	6.1 J	30.7 U	1370 J	33
32-042-SW-1	1.49 U	4.03 JX	2.57 U	9.7 U	6.83 U	6.7 J	25.8	0.071 J	4.08 U	12.7 U	1.67 J	30.7 U	60.1 J	23.2
32-011-SW-1	1.49 U	4.27 JX	2.57 U	9.7 U	6.83 U	7.73 J	31	0.056 J	4.08 U	12.7 U	2.24 U	30.7 U	37.7 J	23

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

**Wet Chemistry**  
**Results in mg/l**

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
32-042-GW-1	76	< 5.0	9	< 0.05	NR
32-042-SW-1	63	< 5.0	< 5	< 0.05	NR
32-057-SW-1	49	< 5.0	< 5	< 0.05	NR

**LEGEND**

32-042-SE1 - Downstream of site.  
 32-011-SE1 - 20' below bridge, below Lost Cabin Mine.  
 WR1 - Composite of subsamples WR1A, 1B, 1C, and 1D.  
 BACKGROUND - From the Lost Cabin Mine (32-011-SS-1).  
 GW1 - At mouth of adit #1.  
 32-042-SW1 - Same as corresponding SE1 sample.  
 32-011-SW1 - Same as corresponding SE1 sample.

**MONTANA DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU  
HAZARDOUS MATERIALS INVENTORY  
SITE SUMMARY**

Mine/Site Name: <u>Ward Lode</u>	County: <u>Missoula</u>
Legal Description: T <u>11N</u> R <u>22W</u>	Section(s): <u>NE 1/4, SE 1/4, Sec. 21</u>
Mining District: <u>Woodman</u>	Mine Type: <u>Hardrock/Ag, Pb</u>
Latitude: <u>N 46° 41' 42"</u>	Primary Drainage: <u>South Fork Lolo Creek</u>
Longitude: <u>W 114° 21' 40"</u>	USGS Code: <u>17010205</u>
Land Status: <u>Public</u>	Secondary Drainage: <u>Dick Creek</u>
Quad: <u>Dick Creek</u>	Date Investigated: <u>September 8, 1993</u>
Inspectors: <u>Bullock, Tuesday</u>	P.A. # <u>32-005</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- No mill tailings were observed at this site during the investigation.
- The volume of waste rock associated with this site was estimated to be approximately 321,200 cubic yards. The following elements were elevated at least three times background:

Arsenic: 68.3 to 89.8 mg/kg	Cadmium: 2.5 to 12.1 mg/kg
Chromium: 55.2 to 86.9 mg/kg	Copper: 70.5J to 77.9J mg/kg
Nickel: 55.5 to 79.1 mg/kg	Lead: 588 to 590 mg/kg
Zinc: 1990 to 7660 mg/kg	
- One possible adit discharge was observed at this site during the investigation. No MCLs were exceeded in the adit discharge; however, acute and chronic aquatic life criteria were exceeded for cadmium, copper, lead and zinc.
- A sediment sample was collected just below the settling basin associated with the adit discharge. Arsenic, lead, and zinc concentrations were significantly elevated (greater than three times background) in the sediment sample.
- Potential safety hazards identified at the site included a 50 feet tall highwall associated with the trench and an over-steepened waste rock dump (WR-1) which was actively eroding.

Ward Lode Mine PA# 32-005  
 AMRB HAZARDOUS MATERIALS INVENTORY  
 INVESTIGATOR: PIONEER-BULLOCK  
 INVESTIGATION DATE: 09/08/93

SOLID MATRIX ANALYSES

Metals in soils  
 Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	Cyanide (mg/Kg)
32-005-SE-1	39.2 J	190	1.8	3.47	7.24	11	5680	0.031 U	638	9.2	104	6.96 UJ	385 J	NR
32-005-WR-1	68.3	618 J	2.5	8.78 J	55.2	70.5 J	21900	0.061	1750 J	55.5	590	5.27 UJ	1990	NR
32-005-WR-2	89.8	806 J	12.1	7.97 J	86.9	77.9 J	26700	0.036	2790 J	79.1	588	9.36 J	7660	NR
BACKGROUND	5.04 U	357 J	0.6 U	8.34 J	8.69	5.95 J	10700	0.144	2320 J	7.66	18.4	6.56 UJ	58.9	NR

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Reported

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	ACID BASE %/1000	NEUTRAL POTENT. %/1000	TOTAL SULFUR ACID BASE POTENT. %/1000	SULFATE SULFUR %	PYRITIC SULFUR %	ORGANIC SULFUR %	PYRITIC SULFUR ACID BASE POTENT. %/1000	PYRITIC SULFUR ACID BASE POTENT. %/1000
32-005-WR-1	0.04	1.25	7.29	6.04	<0.01	0.03	0.01	0.94	6.36
32-005-WR-2	0.62	19.4	32.5	13.1	0.13	0.15	0.34	4.69	27.8
32-005-WR-2DUP	0.61	19.1	32.6	13.6	0.13	0.15	0.33	4.69	28

WATER MATRIX ANALYSES

Metals in Water  
 Results in ug/L

FIELD ID	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
32-005-SW-1	3.34	81.7	2.9 J	9.7 U	6.83 U	10.3 J	238	0.12 UJX	77.1	12.7 UX	12.8	30.7 U	243 J	6.8

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Reported

Wet Chemistry  
 Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	TOTAL CYANIDE
32-005-SW-1	65	< 5.0	< 5.0	< 0.05	NR

LEGEND

- SE1 - Below outlet of settling pond in drainage
- WR1 - Composite of subsamples WR1A through 1D.
- WR2 - Composite of subsamples WR2A and 2B.
- BACKGROUND - From the Mill Creek Mine (32-049-88-1)
- WR2DUP - Duplicates of the 32-005-WR-2 sample.

SW1 - In trench prior to entering settling pond.

**MONTANA DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU  
HAZARDOUS MATERIALS INVENTORY  
SITE SUMMARY**

Mine/Site Name: <u>Allison</u>	County: <u>Park</u>
Legal Description: <u>T 7S R 9E</u>	Section(s): <u>SW 1/4, NE 1/4, Sec. 6</u>
Mining District: <u>Emigrant</u>	Mine Type: <u>Hardrock/Au, Ag, Cu, Mo</u>
Latitude: <u>N 45° 15' 28"</u>	Primary Drainage: <u>Yellowstone River</u>
Longitude: <u>W 110° 40' 02"</u>	USGS Code: <u>10070002</u>
Land Status: <u>Private/Public</u>	Secondary Drainage: <u>Emigrant Creek</u>
Quad: <u>Emigrant</u>	Date Investigated: <u>August 12, 1993</u>
Inspectors: <u>Bullock, Belanger, Clark</u>	P.A. # <u>34-018</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- There were no mill tailings associated with this site.
- The volume of waste rock associated with this site was estimated to be 5660 cubic yards. Mercury (0.114-1.14 mg/kg) was the only element elevated at least three times background.
- The waste rock dumps were mostly unvegetated.
- The discharging adit, sampled as GW-1, was flowing at approximately 100 gpm, with a pH of 9.30, and a specific conductance of 80 umhos/cm. The discharge did not exceed any MCL/MCLGs; however, acute aquatic life standards for cadmium, copper, and zinc and chronic aquatic life standards for iron, cadmium, copper, lead, and zinc were exceeded in the adit discharge. A borehole at the base of WR-1 was also discharging at about 20 gpm. The pH from the discharge was neutral at 6.87, and had a specific conductance of 300 umhos/cm. This discharge, sampled as GW-2, did not exceed drinking water standards; however, it did exceed the acute aquatic life criteria for cadmium and zinc as well as the chronic aquatic life criteria for iron, cadmium, lead, and zinc.
- There were no direct runoff pathways from this site to Emigrant Creek in the drainage below, therefore, no samples were collected in the Creek.

**Allison PA# 34-018**  
**AMRB HAZARDOUS MATERIALS INVENTORY**  
**INVESTIGATOR: PIONEER - BULLOCK**  
**INVESTIGATION DATE: 08/12/93**

**SOLID MATRIX ANALYSES**

Metals in soils  
 Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
34-018-WR-1	15.5	59.1 J	0.92 J	2.63	1.54	416	25800	0.114	365	3.17	232	6.24 UJ	80.5	NR
34-018-WR-2	31.1	72.6 J	1.01 J	7.44	3.89	385	46800	1.14	329	4.55	126	5.41 UJ	119	NR
BACKGROUND	32.8	175 J	1.32 J	3.87	10.4	165	29500	0.028 U	484	9.84	242	6.52 UJ	96.5	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENT.		SULFATE SULFUR		PYRITIC SULFUR		ORGANIC SULFUR		PYRITIC SULFUR		SULFUR ACID BASE POTENT	
	%	U/1000K	U/1000K	%	%	U/1000K	%	U/1000K	%	U/1000K	%	U/1000K	%	U/1000K
34-018-WR-1	0.65	20.3	-0.21	0.30	0.02	0.33	0.62	-0.83						
34-018-WR-2	0.21	6.56	-0.26	0.14	<0.01	0.08	0.00	-0.26						

**WATER MATRIX ANALYSES**

Metals in Water  
 Results in ug/L

FIELD ID	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn (mg CaCO <sub>3</sub> /L)	HARDNESS CALC.
34-018-GW-1	4.1	9.57	2.83	12.1	6.83 U	268 J	12500	0.120 U	989	25.7	1.84	30.7 U	1050	20.2
34-018-GW-2	18.3	18.4	4.63	9.7 U	6.83 U	2.3 J	15100	0.120 U	684	20.2	21.5	30.7 U	2190	111

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Wet Chemistry  
 Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO <sub>3</sub> /NO <sub>2</sub> -N	CYANIDE
34-018-GW-1	189	< 5.0	77	< 0.05	NR
34-018-GW-2	216	< 5.0	77	< 0.05	NR

**LEGEND**

WR1 - Composite of subsamples WR1A, 1B, 1C, and 1D.  
 WR2 - Composite of subsamples WR2A and 2B.  
 BACKGROUND - From the Allison Mine (34-018-SS-1).  
 GW1 - Discharging acid associated with waste rock dump 1  
 SW1 - Discharge from bore hole at base of waste rock dump 1

**MONTANA DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU  
HAZARDOUS MATERIALS INVENTORY  
SITE SUMMARY**

Mine/Site Name: <u>Great Republic Smelter</u>	County: <u>Park</u>
Legal Description: <u>T 9S R 14E</u>	Section(s): <u>SW 1/4, NE 1/4, NW 1/4, Section 36</u>
Mining District: <u>New World</u>	Mine Type: <u>Smelter, Au, Ag, Cu, Pb, Zn</u>
Latitude: <u>N 45° 00' 59"</u>	Primary Drainage: <u>Soda Butte Creek</u>
Longitude: <u>W 109° 56' 13"</u>	USGS Code: <u>10070001</u>
Land Status: <u>Private/Public</u>	Secondary Drainage: <u>Woody Creek</u>
Quad: <u>Cooke City</u>	Date Investigated: <u>August 17, 1994</u>
Inspectors: <u>Tuesday, Bisch, West</u>	P.A. # <u>34-000</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- No mill tailings were observed at the site; however, the volume of smelter slag observed e was estimated to be 3,840 cubic yards. The following elements were elevated to at least three times the background concentrations in the slag:

Arsenic: 1,150 mg/kg	Manganese: 68,700J mg/kg
Cadmium: 23.9 mg/kg	Lead: 38,200 mg/kg
Copper: 939 mg/kg	Antimony: 91.0J mg/kg
Iron: 81,400 mg/kg	Zinc: 23,700 mg/kg
- The volume of waste rock observed at the site was estimated to be 15 cubic yards. The following elements were elevated to at least three times the background concentrations:

Arsenic: 9,220 mg/kg	Manganese: 69,000J mg/kg
Cadmium: 210 mg/kg	Lead: 42,100 mg/kg
Copper: 1,600 mg/kg	Antimony: 95.7J mg/kg
Iron: 121,000 mg/kg	Zinc: 18,300 mg/kg
Mercury: 1.17 mg/kg	
- There were no discharging adits, filled shafts, seeps, or springs observed at the site during the investigation.
- Woody Creek flows adjacent to the site on the north side. The slag pile was on the bank of Woody Creek and was being actively undercut by the stream. No observed releases were documented. The chronic aquatic life criteria for iron, mercury, and lead were exceeded both upstream and downstream from the site.
- The severely undercut slag pile was the only safety hazard observed at the site.

**Great Republic Smelter PA# 34-000**  
**AMRB HAZARDOUS MATERIALS INVENTORY**  
**INVESTIGATOR: PIONEER - TUESDAY**  
**INVESTIGATION DATE: 08/17/94**

**SOLID MATRIX ANALYSES**

**Metals in soils**  
**Results per dry weight basis**

FIELD ID	Ag (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cz (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
34-000-SE1	0.7 U	5.6 U	157	1.0	13.2	19.7	24.8	21800	0.07	374 J	34.4	7.4 U	8.7 UJ	44.2	NR
34-000-SE2	1.8	7.0 U	152	1.4	13.9	20.8	24.3	20800	0.06	371 J	39.7	9.2 U	10.8 UJ	41.8	NR
34-000-SL1	86.0	1150	187	23.9	4.4	23.9	939	81400	0.02 U	68700 J	2.9 U	38200	91.0 J	23700	NR
34-000-WR1	97.3	9220	70.0	2.10	15.7	17.0	1600	121000	1.17	69000 J	3.2 U	42100	95.7 J	18300	NR
BACKGROUND	NR	14.6 J	89	0.4 U	10.5 J	30.7	40	23300	0.058 J	1450 J	20.7	158 J	5.17 U	181	NR

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Reported

**Acid/Base Accounting**

FIELD ID	TOTAL SULFUR %	TOTAL SULFUR ACID BASE %/10000	NEUTRAL POTENT %/10000	SULFUR ACID BASE POTENT %/10000	SULFUR %	SULFATE SULFUR %	PYRITIC SULFUR %	ORGANIC SULFUR %	Fe %/10000	Pyritic Acid Base %/10000	Pyritic Acid Base POTENT %/10000	Hg %/10000	Cyanide
34-000-WR1	2.32	72.5	25.1	-47	<0.01	2.17	1.82	67.8	-42.7				

**WATER MATRIX ANALYSES**

**Metals in Water**  
**Results in ug/L**

FIELD ID	Ag	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC (mg CaCO3/L)
34-000-SW1	0.12 U	1.7 JX	17.1	4.0 U	8.4 U	10.0	6.2	1800	0.24	18.1	22.0 JX	2.8	51.6 U	15.6 U	58.4
34-000-SW2	0.12 U	1.7 JX	21.9	4.0 U	8.4 U	6.8 U	5.9 U	2340	0.22	33.5	14.4 UX	2.7	51.6 U	17.4	60.5

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Reported

**Wet Chemistry**  
**Results in mg/l**

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3NO2-N	CYANIDE
34-000-SW1	8	<5	7.0	<0.05	NR
34-000-SW2	10	<5	7.0	<0.05	NR

**LEGEND**

- SE1 - Woody Creek, downstream from site, above bridge
- SE2 - Woody Creek, upstream from site, approx. 150'
- SL1 - Composite of subsurface SL1A and SL1B
- WR1 - A grab sample from subsurface WR1
- BACKGROUND - From the Little Deep Mine (SL-009-SE1) (0993 Data)
- SW1 - Same as sample 34-009-SE1
- SW2 - Same as sample 34-009-SE2

**MONTANA DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU  
HAZARDOUS MATERIALS INVENTORY  
SITE SUMMARY**

Mine/Site Name: <u>McLaren Tailings</u>	County: <u>Park</u>
Legal Description: <u>T 19S R 14E</u>	Section(s): <u>S 1/2, NE 1/4, Sec. 25</u>
Mining District: <u>Cooke City</u>	Mine Type: <u>Mill Tailings</u>
Latitude: <u>N 45° 01' 34"</u>	Primary Drainage: <u>Yellowstone River</u>
Longitude: <u>W 109° 55' 29"</u>	USGS Code: <u>10070001</u>
Land Status: <u>Private/Public</u>	Secondary Drainage: <u>Soda Butte Creek</u>
Quad: <u>Cooke City</u>	Date Investigated: <u>August 10, 1993</u>
Inspectors: <u>Bullock, Belanger, Clark</u>	P.A. # <u>34-004</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- Previous reclamation work has been conducted on this site which included dam stabilization, run-on control, grading, covering and revegetation.
- The volume of tailings associated with this site was estimated to be approximately 370,000 cubic yards. The following elements were elevated at least three times background:

Cadmium: 2.58 to 3.0 mg/kg	Copper: 1700 to 3680 mg/kg
Iron: 107,000 to 163,000 mg/kg	Mercury: 0.179 mg/kg
- The volume of waste rock associated with this site was estimated to be approximately 8,000 cubic yards. The following elements were elevated at least three times background:

Arsenic: 45.3 mg/kg	Cadmium: 1.99 mg/kg
Copper: 846 mg/kg	Iron: 105,000 mg/kg
- A groundwater seep was identified at the toe of the tailings. No MCLs were exceeded in the seep; however, the chronic aquatic life criteria for iron was exceeded. In addition, no MCLs were exceeded in a sample collected from a monitoring well located at the west end of the tailings. Residents living directly downgradient of this site were serviced by a municipal water supply.
- Surface water samples were collected upstream and downstream from the site in Soda Butte Creek, and in Miller Creek prior to its confluence with Soda Butte Creek. An observed release to Soda Butte Creek was documented for iron; however, the concentration of iron in the downstream sample did not exceed any established standards. No MCLs were exceeded in any of the samples. The only aquatic life criteria exceedance observed was the chronic lead standard in the Miller Creek sample.

McLaren Tailings PA# 34-004  
 AMRB HAZARDOUS MATERIALS INVENTORY  
 INVESTIGATOR: PIONEER - BULLOCK  
 INVESTIGATION DATE: 08/10/93

SOLID MATRIX ANALYSES

Metals in soils Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
34-004-SE-1	10.6 J	86.2	0.61 U	11.9	14.4 J	214	20400	0.047	557	19.7	59.1	7.24 UJ	98.2	NR
34-004-SE-2	7.37 J	93.5	0.60 U	12.9	17 J	243	15400	0.035 U	504	23.1	55.1	7.11 UJ	98.7	NR
34-004-SE-3	4.12 U	88	0.45 U	7.91	13 J	103	20500	0.04 U	658	14.3	116	5.36 UJ	102	NR
34-004-TP-1	26.3 J	73.8	2.58	6.79	17.5 J	1700	107000	0.105	217	10.4	69	7.16 UJ	81.9	NR
34-004-TP-2	41.6 J	69.3	3.00	12.8	21.6 J	3680	163000	0.179	576	14.4	104	6.71 UJ	162	NR
34-004-WR-1	45.3 J	101	1.99	5.13	17.5 J	846	105000	0.099	191	8.87	208	6.18 UJ	80.1	NR
BACKGROUND	14.6 J	89	0.4 U	10.5 J	30.7	40	23300	0.058 J	1450 J	20.7	158 J	5.17 U	181	NR

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENTIAL		SULFUR ACID BASE POTENTIAL		ORGANIC SULFUR		PYRITIC SULFUR		PYRITIC ACID BASE POTENTIAL	
	%	U/1000x	%	U/1000x	%	U/1000x	%	U/1000x	%	U/1000x	%	U/1000x
34-004-TP-1	6.10	191	116	-74.9	<0.01	0.82	220	-105				
34-004-TP-2	14.1	440	9.83	-431	2.89	7.00	132	-122				
34-004-WR-1	1.14	35.6	-3.22	-38.8	0.76	0.37	0.31	-3.53				

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Reported

WATER MATRIX ANALYSES

Metals in Water Results in ug/L

FIELD ID	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC (mg CaCO3/L)
34-004-GW-1	1.57 JX	58.7	2.57 U	32	6.83 U	4.37 JX	117000	0.29	4240	26.5 J	2.28 J	30.7 U	79	731
34-004-GW-2	1.43 JX	25	2.57 U	9.7 U	17.1	3.1 JX	96200	0.22	2010	12.7 U	2.95 J	30.7 U	7.57 U	2850
34-004-SW-1	1.12 UJX	45.7	2.57 U	9.7 U	6.83 U	8.87 JX	827	0.22	82.8	12.7 U	3.2 J	30.7 U	9.1	119
34-004-SW-2	1.14 JX	29.3	2.57 U	9.7 U	6.83 U	8.5 JX	75.6	0.22	5.03	12.7 U	3.05 J	30.7 U	13.8	78.7
34-004-SW-3	1.84 JX	54.8	2.57 U	9.7 U	6.83 U	4.1 JX	32.8	0.4	5.77	15.7 J	2.3 J	30.7 U	11.3	125

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Reported

Wet Chemistry Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
34-004-GW-1	1180	5	692	< 0.05	NR
34-004-GW-2	4360	5	2660	< 0.05	NR
34-004-SW-1	165	< 5.0	25	< 0.05	NR
34-004-SW-2	115	7	21	< 0.05	NR
34-004-SW-3	155	< 5.0	7	< 0.05	NR

LEGEND

- SE1 - Downgradient on Soda Butte Creek
- SE2 - Miller Cr. just above confluence with Soda Butte Creek
- SE3 - Upgradient on Soda Butte Creek
- TP1 - Composite of subsamples TP1A-A, 1B-A, and 1C-A
- TP2 - Composite of subsamples TP1A-B, 1B-B, 1C-C, 1B-D, 1B-E, 1C-B, and 1C-C
- WR1 - Composite of subsamples WR1A and 1B
- BACKGROUND - From the Little Daisy Mine (34-009-SS-1)
- GW1 - Seepage at toe of tailings
- GW2 - Monitor well at West end of tailings
- SW1 - Same as sample SE1
- SW2 - Same as sample SE2
- SW3 - Same as sample SE3



Lower Glengarry PA# 34-006  
 AMRB HAZARDOUS MATERIALS INVENTORY  
 INVESTIGATOR: PIONEER - BULLOCK  
 INVESTIGATION DATE: 08/09/93

SOLID MATRIX ANALYSES

Metals in soils  
 Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
34-006-SE-1	86.6 J	113	0.6 U	4.14 J	9.39	371	57500	0.066 J	492 J	2.76 U	92.1 J	6.69 U	74	NR
34-006-SE-2	20.1 J	76.2	0.7 U	5.5 J	11.8	601	93900	0.051 J	494 J	5.45	377 J	8.46 U	197	NR
34-006-SE-3	74.6 J	98.8	0.7 U	2.83 J	6.21	415	54500	0.042 J	319 J	5.21	73.1 J	8.39 U	67.9	NR
34-006-TP-1	22.6 J	33.4	0.7 U	3.96 J	32.1	377	141000	0.036 J	73.7 J	5.1	106 J	8.42 U	41.1	NR
34-006-WR-1	50.2 J	142	0.5 U	2.11 J	4.67	421	60000	2.14 J	233 J	2.34 U	109 J	5.67 U	29.1	NR
34-006-WR-2	53.6 J	11.8	3.6	1.96 U	1.38 U	1260	185000	0.038 J	1.45 J	2.56 U	116 J	6.2 U	50.1	NR
BACKGROUND	8.61 J	71.7	0.9	12.4 J	27	66.9	17100	0.02 J	461 J	23.9	28.3 J	5.49 U	69.9	NR

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENT.		SULFUR ACID BASE POTENT.		ORGANIC SULFUR		PYRITIC SULFUR		PYRITIC ACID BASE POTENT.		SULFUR ACID BASE POTENT.	
	%	µ/1000r	%	µ/1000r	%	µ/1000r	%	µ/1000r	%	µ/1000r	%	µ/1000r	%	µ/1000r
34-006-WR-1	0.77	24.1	-1.68	-25.7	0.23	0.16	0.38	5.00	-6.68					
34-006-WR-2	45.6	1426	-4.79	-1431	0.31	<0.01	47.2	0.00	-4.79					
34-006-WR-3	0.75	23.4	-4.13	-27.6	0.32	<0.01	0.53	0.00	-4.13					

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Reported

WATER MATRIX ANALYSES

Metals in Water  
 Results in ug/L

FIELD ID	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Min	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
34-006-GW-1	7.31	8.3	2.57 U	46.1	10.6	7730 JX	85600 JX	0.09 J	5610	99.2 J	40.1	30.7 U	671	202
34-006-GW-2	2.27	13.7	2.57 U	21.4	6.83 U	121 JX	14200 JX	0.11 J	1020	20.5 J	2.45	30.7 U	127	38.8
34-006-SW-1	1.21	28.6	2.57 U	11.7	6.83 U	1340 JX	7960 JX	0.25 J	794	26 J	9.56	30.7 U	133	47.2
34-006-SW-2	1.89	20.1	2.57 U	15.4	6.83 U	1170 JX	3160 JX	0.08 J	722	32.5 J	8.2	30.7 U	137	42.6
34-006-SW-3	1.93	37.1	2.57 U	9.7 U	6.83 U	761 JX	187 JX	0.07 J	56.4	12.7 U	3.17	30.7 U	34.7	7.1
34-006-SW-4	0.96 U	42.5	2.57 U	9.7 U	6.83 U	646 JX	3750 JX	0.09 J	346	13.9 J	6.49	30.7 U	55.9	24.9

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Reported

Wet Chemistry  
 Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
34-006-GW-1	763	10	489	< 0.05	NR
34-006-GW-2	165	< 5.0	77	< 0.05	NR
34-006-SW-1	168	< 5.0	87	< 0.05	NR
34-006-SW-2	186	< 5.0	94	< 0.05	NR
34-006-SW-3	98	< 5.0	26	0.11	NR
34-006-SW-4	121	< 5.0	56	0.05	NR

LEGEND

- SE1 - Downgradient of site on Fisher Creek.
- SE2 - Upgradient of site on headwaters of Fisher Creek.
- SE3 - Upgradient stream (unnamed).
- TP1 - Composite of subsamples TP1A, 1B, and 1C.
- WR1 - Composite of subsamples WR1A, 1B, and 1C.
- WR2 - Sample of the WR2 subsample.
- BACKGROUND - From the Lower Glengarry Mine (34-006-SB-1).
- GW1 - Discharge from adit #1.
- GW2 - Discharge from adit #2.
- SW1 - Downgradient of site on Fisher Creek.
- SW2 - Discharge from waste rock dump 1 base.
- SW3 - Upgradient of site on headwaters of Fisher Creek.
- SW4 - Upgradient stream (unnamed).

**MONTANA DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU  
HAZARDOUS MATERIALS INVENTORY  
SITE SUMMARY**

Mine/Site Name: <u>Gold Dust</u>	County: <u>Park</u>
Legal Description: <u>T 9S R 14E</u>	Section(s): <u>SE 1/4, SE 1/4, Sec. 11</u>
Mining District: <u>New World</u>	Mine Type: <u>Hardrock/Au</u>
Latitude: <u>N 45° 04' 01"</u>	Primary Drainage: <u>Clark Fork Yellowstone River</u>
Longitude: <u>W 109° 56' 33"</u>	USGS Code: <u>10070006</u>
Land Status: <u>Private/Public</u>	Secondary Drainage: <u>Fisher Creek</u>
Quad: <u>Cooke City</u>	Date Investigated: <u>August 9, 1993</u>
Inspectors: <u>Bullock, Belanger, Clark</u>	P.A. # <u>34-007</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- There were no mill tailings observed at this site during the investigation.
- The volume of waste rock associated with this site was estimated to be approximately 8,000 cubic yards. The following elements were elevated at least three times background:  
Arsenic: 34.9J to 40.3J mg/kg    Mercury: 0.256J to 1.15J mg/kg
- One discharging adit was identified at the site. No MCLs were exceeded in the adit discharge; however, the chronic aquatic life criteria for mercury was exceeded.
- An unnamed tributary to Fisher Creek was observed flowing adjacent to the waste rock dump at the site and received the adit discharge. There were no documented releases to this drainage and no MCL/MCLGs were exceeded in surface water samples collected upstream and downstream from the site. The stream sediment samples documented an observed release to the tributary for mercury.
- A potentially hazardous wooden loadout structure was identified at the site, and explosives may have been stored in the newer mine buildings.

Gold Dust PA# 34-007  
 AMRB HAZARDOUS MATERIALS INVENTORY  
 INVESTIGATOR: PIONEER - BULLOCK  
 INVESTIGATION DATE: 08/09/93

SOLID MATRIX ANALYSES

Metals in soils  
 Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
34-007-SE-1	20.2 J	76.8	1.3	12.8 J	19.7	378	33200	0.065 J	835 J	25.9	245 J	6.51 U	403	NR
34-007-SE-2	19.1 J	48.3	1.9	24.1 J	11.4	547	23500	0.014 J	1580 J	33.8	309 J	8.13 U	472	NR
34-007-WR-1	40.3 J	85.8	0.8	4.2 J	14.1	180	47600	1.15 J	157 J	8.74	68.2 J	5.93 U	66.1	NR
34-007-WR-2	34.9 J	56.9	0.5 U	10.6 J	20.4	98.4	30500	0.256 J	339 J	24.8	51.2 J	5.45 U	83.3	NR
BACKGROUND	8.61 J	71.7	0.9	12.4 J	27	66.9	17100	0.02 J	461 J	23.9	28.3 J	5.49 U	69.9 JX	NR

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENT.		SULFUR ACID BASE POTENT.		ORGANIC SULFUR		PYRITIC SULFUR		PYRITIC ACID BASE POTENT.	
	%	1/10000	%	1/10000	%	1/10000	%	1/10000	%	1/10000	%	1/10000
34-007-WR-1	0.27	8.43	0.35	-8.08	0.12	0.04	0.11	1.25	0.11 J	1.25	-0.90	-2.76
34-007-WR-2	4.67	146	61.6	-84.3	<0.01	2.06	2.83	64.4	40 JX	0.1 J		

WATER MATRIX ANALYSES

Metals in Water  
 Results in ug/L

FIELD ID	TOTAL SULFUR		NEUTRAL POTENT.		SULFUR ACID BASE POTENT.		ORGANIC SULFUR		PYRITIC SULFUR		PYRITIC ACID BASE POTENT.		HARDNESS CALC.	
	%	1/10000	%	1/10000	%	1/10000	%	1/10000	%	1/10000	%	1/10000	Mn	Zn (mg CaCO3/L)
34-007-GW-1	3.06	16.9	2.57 U	9.7 U	6.83 U	6.53 JX	144 JX	0.11 J	55.7	13.5 J	2.17	30.7 U	11.1	381
34-007-SW-1	1.81	38.4	2.57 U	9.7 U	6.83 U	11.4 JX	58.7 JX	0.06 J	13	15 J	2.9	30.7 U	70	152
34-007-SW-2	1.39	38	2.57 U	9.7 U	6.83 U	11.5 JX	40 JX	0.1 J	11.3	12.7 U	3.58	30.7 U	96.1	138

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Requested

Wet Chemistry  
 Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
34-007-GW-1	581	< 5.0	282	0.07	NR
34-007-SW-1	256	< 5.0	117	0.06	NR
34-007-SW-2	231	< 5.0	109	0.18	NR

LEGEND

- SE1 - Downgradient of site in unamassed stream.
- SE2 - Upgradient of site in unamassed stream.
- WR1 - Composite of subsamples WR1A and 1D.
- WR2 - Composite of subsamples WR1B and 1C.
- BACKGROUND - From the Lower Glegary (34-006-SS-1).
- GW1 - Discharge from adit.
- SW1 - Same as sample SE1.
- SW2 - Same as sample SE2.

**MONTANA DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU  
HAZARDOUS MATERIALS INVENTORY  
SITE SUMMARY**

Mine/Site Name: <u>Little Daisy</u>	County: <u>Park</u>
Legal Description: <u>T 9S R 14E</u>	Section(s): <u>NW 1/4, NW 1/4, Sec. 14</u>
Mining District: <u>New World</u>	Mine Type: <u>Hardrock/Au, Ag, Cu, Zn, Pb</u>
Latitude: <u>N 45° 03' 10"</u>	Primary Drainage: <u>Soda Butte Creek</u>
Longitude: <u>W 109° 57' 09"</u>	USGS Code: <u>10070001</u>
Land Status: <u>Private/Public</u>	Secondary Drainage: <u>Miller Creek</u>
Quad: <u>Cooke City</u>	Date Investigated: <u>August 9, 1993</u>
Inspectors: <u>Babits, Flammang, Lasher</u>	P.A. # <u>34-009</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- There were no mill tailings associated with this site.
- There were approximately 3,220 cubic yards of mostly covered waste rock on site. The following were elevated at least 3 times background:
  - Cadmium: 1.7 to 2.3 mg/kg
  - Copper: 138 to 1,520 mg/kg
  - Iron: 78,200 to 80,500 mg/kg
  - Mercury: 0.222J to 1.08J mg/kg
  - Zinc: 546 mg/kg
- There were two discharging adits on site, but neither entered surface water directly; pH's were 7.24 and 7.60. One adit was sampled; no MCL/MCLG's were exceeded.
- Miller Creek flows adjacent to waste rock. There were no observed releases to downstream surface water or sediment. No MCL/MCLG's were exceeded in downstream surface water. Chronic fresh water aquatic life criteria for mercury and lead were exceeded in both upstream and downstream surface water, indicating an upstream source.
- There were no hazardous openings on site.

Little Daisy PA# 34-009  
 AMRB HAZARDOUS MATERIALS INVENTORY  
 INVESTIGATOR: PIONEER - BABITS  
 INVESTIGATION DATE: 08/09/93

SOLID MATRIX ANALYSES

Metals in soils  
 Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
34-009-SE-1	12.7 U	136	1.4 U	22.4 J	43.9	279	38200	0.097 J	2610 J	42.7	72.9 J	16.5 U	380	NR
34-009-SE-2	11.4 J	46.5	0.6 U	7.9 J	12.4	146	22100	0.105 J	593 J	11.6	92.4 J	6.8 U	106	NR
34-009-WR-1	19.1 J	26.3	1.7	3.94 J	27.7	1520	80500	1.08 J	1510 J	19.3	238 J	4.69 U	201	NR
34-009-WR-2	17.4 J	71.2	2.3	9.91 J	24.8	763	78200	0.175 J	2520 J	19.9	431 J	6.28 U	546	NR
34-009-WR-3	7.22 J	29	0.5 U	12.5 J	17.1	138	29400	0.222 J	618 J	17.1	49.3 J	5.99 U	35.1	NR
BACKGROUND	14.6 J	89	0.4 U	10.5 J	30.7	40	23300	0.058 J	1450 J	20.7	158 J	5.17 U	181	NR

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENT		SULFUR ACID BASE POTENT		PYRITIC SULFUR		ORGANIC SULFUR		PYRITIC SULFUR ACID BASE		SULFUR ACID BASE POTENT	
	%	v/1000x	v/1000x	%	v/1000x	%	v/1000x	%	v/1000x	%	v/1000x	%	v/1000x	
34-009-WR-1	3.59	112	48.6	-63.6	-0.01	2.00	1.87	62.5	13.9					
34-009-WR-2	0.35	10.9	15.8	4.90	0.01	0.06	0.28	1.87	14.0					
34-009-WR-3	0.51	15.9	74.7	58.7	0.13	0.07	0.31	2.19	72.5					

WATER MATRIX ANALYSES

Metals in Water  
 Results in ug/L

FIELD ID	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
	34-009-GW-1	3.17	9.03	2.57 U	9.7 U	6.83 U	96.1 JX	4150 JX	0.07 J	1480	37.2 J	526	30.7 U	167
34-009-SW-1	2.08	19.6	2.57 U	9.7 U	6.83 U	4.97 JX	11.8 UJX	0.12 J	10.4	12.7 U	1.79	30.7 U	7.57 U	161
34-009-SW-2	1.5	19.5	2.57 U	9.7 U	6.83 U	5.27 JX	24 JX	0.09 J	5.97	12.7 U	2.96	30.7 U	7.57 U	155

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Requested

Wet Chemistry  
 Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS		CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
	730	234	<	<	5.0	NR
34-009-GW-1	730	234	<	<	5.0	NR
34-009-SW-1	730	234	<	<	5.0	NR
34-009-SW-2	730	234	<	<	5.0	NR

LEGEND

- SE1 - Headwaters of unnamed tributary of Miller Creek.
- SE2 - In unnamed tributary at PPE of waste rock dump 6.
- WR1 - Composite of subsamples WR1A and 1B.
- WR2 - Composite of subsamples WR2A, 2B, 3, and 4.
- WR3 - Composite of subsamples WR5 and 6.
- BACKGROUND - 100' West, 50' North of adit #1 (WR-1).
- From Little Daisy Mine (34-009-SS-1).

- SW1 - Same as sample SE1.
- SW2 - Same as sample SE2.

**MONTANA DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU  
HAZARDOUS MATERIALS INVENTORY  
SITE SUMMARY**

Mine/Site Name: <u>McLaren Mine</u>	County: <u>Park</u>
Legal Description: <u>T 9S R 14E</u>	Section(s): <u>NW 1/4, SW 1/4, Sec. 11</u>
Mining District: <u>New World</u>	Mine Type: <u>Hardrock/Unknown</u>
Latitude: <u>N 45° 03' 35"</u>	Primary Drainage: <u>Stillwater River</u>
Longitude: <u>W 109° 57' 30"</u>	USGS Code: <u>10070005</u>
Land Status: <u>Private/Public</u>	Secondary Drainage: <u>Stillwater River</u>
Quad: <u>Cooke City</u>	Date Investigated: <u>August 9, 1993</u>
Inspectors: <u>Babits, Flammang, Lasher</u>	P.A. # <u>34-010</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- There were no mill tailings associated with this site.
- There were approximately 351,500 cubic yards of uncovered waste rock on site. The following were elevated at least three times background:

Cadmium: 1.9 to 2.81 mg/kg	Cobalt: 47J mg/kg
Copper: 885 to 1,030 mg/kg	Iron: 92,000 to 152,000 mg/kg
- There was one discharging adit on site, but it did not enter surface water directly. There were seeps emanating from the waste rock which entered surface water. One seep was sampled and had a pH of 3.21. The MCL/MCLGs for cadmium, copper, and nickel were exceeded, as was the chronic fresh water aquatic life criteria for iron. The chronic and acute fresh water aquatic life criteria for cadmium, copper, and zinc were exceeded.
- The seeps entered Daisy Creek 1,000 feet from the site. The seeps made up the flow of the creek, hence, no upstream surface water samples were collected. At the location the seeps entered Daisy Creek, cadmium and lead exceeded MCL/MCLGs, and the chronic fresh water aquatic life criteria for iron was exceeded. The chronic and acute fresh water aquatic life criteria for copper was also exceeded.
- There were no hazardous openings on site; but, there was one large highwall.

McLaren PA# 34-010  
 AMRB HAZARDOUS MATERIALS INVENTORY  
 INVESTIGATOR: PIONEER - BABITS  
 INVESTIGATION DATE: 08/09/93

SOLID MATRIX ANALYSES

Metals in soils  
 Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
34-010-SE-1	33.5 J	41.1	2.0	3.14 J	14.7	1110	131000	0.257 J	196 J	4.7	107 J	6.79 U	123	NR
34-010-WR-1	36.3 J	45.6	1.9	47 J	1.51	1030	152000	0.077 J	27.6 J	21.7	35.4 J	5.92 U	7.71	NR
34-010-WR-2	32.9 J	143	2.81	3.51	11.1 J	887	120000	0.091	117	7.57	112	7.43 UJ	50.2	NR
34-010-WR-3	27.4 J	71.5	2.68	5.37	23.4 J	885	92000	0.049	242	9.9	222	6.76 UJ	192	NR
BACKGROUND	14.6 J	89	0.4 U	10.5 J	30.7	40	23300	0.058 J	1450 J	20.7	158 J	5.17 U	181	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENT.		SULFUR ACID BASE		ORGANIC SULFUR		PYRITIC SULFUR		PYRITIC ACID BASE		SULFUR ACID BASE	
	%	1/1000	1/1000	1/1000	POTENT.	%	%	%	%	POTENT.	%	%	POTENT.	%
39-010-WR-1	18.2	567	-14.5	-582	8.18	1.23	8.75	38.4	-53.0					
39-010-WR-2	1.33	41.5	-3.30	-44.8	0.59	<0.01	0.80	0.00	-3.30					
39-010-WR-3	0.55	17.2	5.47	-11.7	0.19	<0.01	0.36	0.00	5.47					

WATER MATRIX ANALYSES

Metals in Water  
 Results in ug/L

FIELD ID	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CAL.C. (mg CaCO3/L)
	34-010-SW-1	1.34 JX	27.4	6.3 J	35.8	14.2	6520 JX	24300	1.93	2240	63.8 J	5.08 J	30.7 U	817
34-010-SW-5	1.12 UJX	2.01 U	20.3 J	133	41.7	26700 JX	192000	0.48	7150	141 J	6.47 J	30.7 U	3000	344

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Wet Chemistry  
 Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS		CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
	34-010-SW-1	583	< 5.0	356	< 0.05	NR
34-010-SW-5	1870	55	1210	< 0.05	NR	

LEGEND

- SE1 - At confluence of three mine drainages, approx. 1000' from pit at Daisy Pass Road.
- SW1 - Same as sample SE1.
- SW5 - Discharge emanating from dump.
- WR1 - Composite of subsamples WR1A and 1B
- WR2 - Composite of subsamples WR2A, 2B, and 2D.
- WR3 - Sample of the WR2C subsample
- BACKGROUND - From the Little Daisy Mine (34-009-SS-1).

**MONTANA DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU  
HAZARDOUS MATERIALS INVENTORY  
SITE SUMMARY**

Mine/Site Name: <u>Black Warrior</u>	County: <u>Park</u>
Legal Description: <u>T 9S R 14E</u>	Section(s): <u>NE 1/4, SE 1/4, Sec. 15</u>
Mining District: <u>New World</u>	Mine Type: <u>Hardrock/Ag, Au, Zn, Pb</u>
Latitude: <u>N 45° 02' 05"</u>	Primary Drainage: <u>Soda Butte Creek</u>
Longitude: <u>W 109° 57' 55"</u>	USGS Code: <u>10070001</u>
Land Status: <u>Private/Public</u>	Secondary Drainage: <u>Miller Creek</u>
Quad: <u>Cooke City</u>	Date Investigated: <u>August 9, 1993</u>
Inspectors: <u>Babits, Flammang, Lasher</u>	P.A. # <u>34-079</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- There were no mill tailings associated with this site.
- There were approximately 1,100 cubic yards of mostly uncovered waste rock on site. The following were elevated at least 3 times background:
  - Arsenic: 54J mg/kg
  - Cadmium: 7.76 mg/kg
  - Copper: 981 mg/kg
  - Mercury: 0.93 mg/kg
  - Lead: 14,600 mg/kg
  - Antimony: 25.2J mg/kg
  - Zinc: 2,490 mg/kg
- There were two discharging adits on site and both entered surface water directly. One adit discharge sample was collected; the pH was 7.22. The MCL for lead was exceeded, as was the chronic fresh water aquatic life criteria for iron and lead. The chronic and acute fresh water aquatic life criteria were exceeded for copper and zinc.
- Miller Creek flows adjacent to waste rock and there was an observed release of zinc documented to downstream surface water. No MCL/MCLGs were exceeded. The fresh water aquatic life criteria for mercury and lead were exceeded in both upstream and downstream surface water, indicating an upstream source.
- There was one open shaft with subsidence, one open adit, one hazardous loadout structure, and one collapsing cabin on site.

Black Warrior PA# 34-079  
 AMRB HAZARDOUS MATERIALS INVENTORY  
 INVESTIGATOR: PIONEER - BABITS  
 INVESTIGATION DATE: 08/09/93

SOLID MATRIX ANALYSES

Metals in soils  
 Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
34-079-SE-1	10.9 J	62	0.92	9.67	17.8 J	35.5	17600	0.041	494	23	168	8.14 UJ	131	NR
34-079-SE-2	7.82 U	67.1	5.55	8.14	20.2 J	37.8	10000	0.055 U	61.8	20.8	78.5	10.2 UJ	743	NR
34-079-WR-1	54 J	52.3	7.76	6.34	11.2 J	981	65000	0.93	736	13.2	14600	25.2 J	2490	NR
BACKGROUND	14.6 J	89	0.4 U	10.5 J	30.7	40	23300	0.058 J	1450 J	20.7	158 J	5.17 U	181	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	ACID BASE %	NEUTRAL POTENT. U/000K	SULFUR ACID BASE POTENT. U/000K	ORGANIC SULFUR %	PYRITIC SULFUR %	PYRITIC SULFUR ACID BASE POTENT. U/000K	Hg	Mn	Ni	Pb	Sb	Zn	CYANIDE
34-079-WR-1	5.56	174	166	-8.17	4.36	3.22	101	64.9						

WATER MATRIX ANALYSES

Metals in Water  
 Results in ug/L

FIELD ID	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
34-079-SW-1	1.12 UJX	18.2	2.57 U	9.7 U	6.83 U	5.53 JX	308	0.38	26.1	12.7 U	6.24 J	30.7 U	11.7	82.8
34-079-SW-2	1.12 UJX	20.7	2.57 U	9.7 U	6.83 U	9.33 JX	297	0.29	15.1	12.7 U	5.48 J	30.7 U	49.2	102
34-079-SW-3	1.12 UJX	22.2	2.57 U	9.7 U	7.73	23.4 JX	1320	0.27	65.8	12.7 U	89.8 J	30.7 U	430	127

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Wet Chemistry  
 Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
34-079-SW-1	115	7	49	< 0.05	NR
34-079-SW-2	135	< 5.0	15	< 0.05	NR
34-079-SW-3	168	7	25	< 0.05	NR

LEGEND

- SE1 - Upgradient on Miller Creek. Approx. 75' upgradient from waste rock dump 2.
- SE2 - Downgradient of waste rock dump 2 on Miller Creek. Approx. 3' from confluence of acid discharge in creek.
- WR1 - Composite of subsamples WR1A, 1B, and 2. BACKGROUND - From the Little Dairy Mine (34-009-SS-1).
- SW1 - Same as sample SE1.
- SW2 - Same as sample SE2.
- SW3 - Acid discharge at waste rock dump 1.

**MONTANA DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU  
HAZARDOUS MATERIALS INVENTORY  
SITE SUMMARY**

Mine/Site Name: <u>Upper Alice E.</u>	County: <u>Park</u>
Legal Description: <u>T 9S R 14E</u>	Section(s): <u>NW 1/4, SE 1/4, Sec. 24</u>
Mining District: <u>New World</u>	Mine Type: <u>Hardrock/Au</u>
Latitude: <u>N 45° 01' 58"</u>	Primary Drainage: <u>Soda Butte Creek</u>
Longitude: <u>W 109° 55' 38"</u>	USGS Code: <u>10070001</u>
Land Status: <u>Private/Public</u>	Secondary Drainage: <u>Miller Creek</u>
Quad: <u>Cooke City</u>	Date Investigated: <u>August 10, 1993</u>
Inspectors: <u>Babits, Flammang, Lasher</u>	P.A. # <u>34-085</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- There were no mill tailings associated with this site.
- There were approximately 6,600 cubic yards of uncovered waste rock on site. The following were elevated at least 3 times background:  
Copper: 120 to 174 mg/kg  
Iron: 81,800 mg/kg  
Mercury: 0.215 to 0.651 mg/kg  
Lead: 3,440 mg/kg
- There were no discharging adits at the site.
- There was no surface water at the site. The nearest surface water was approximately 200 feet away. No surface water or sediment samples were collected.
- There was one hazardous subsidence feature at the site.

Upper Alice East PA# 34-085  
 AMRB HAZARDOUS MATERIALS INVENTORY  
 INVESTIGATOR: PIONEER - BABITS  
 INVESTIGATION DATE: 08/10/93

SOLID MATRIX ANALYSES

Metals in soils  
 Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
34-085-WR-1	17.4 J	80.4	0.80	4.23	1.4 U	174	81800	0.651	45.2	3.51	252	6.29 UJ	104	NR
34-085-WR-2	41.6 J	80.1	0.59 U	3.07	12.3 J	120	46100	0.215	63.2	6.72	3440	7.04 UJ	68	NR
BACKGROUND	14.6 J	89	0.4 U	10.5 J	30.7	40	23300	0.058 J	1450 J	20.7	158 J	5.17 U	181	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENT		SULFUR ACID BASE		SULFATE		PYRITIC		ORGANIC		PYRITIC		SULFUR ACID BASE	
	%	u/10000	u/10000	u/10000	%	u/10000	%	u/10000	%	u/10000	%	u/10000	%	u/10000	u/10000	u/10000
34-085-WR-1	11.3	354	-3.11	-357	3.11	2.65	5.56	82.8	-85.9							
34-085-WR-2	0.77	24.1	-2.68	-26.7	0.53	0.09	0.15	2.81	-5.49							

LEGEND

WR1 - Composite of subsamples WR1A, 1B, 1C, 1D, 2A, and 2B  
 WR2 - Composite of subsamples WR3 and 4  
 BACKGROUND - From the Little Daisy Mine (34-009-SS-1)

**MONTANA DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU  
HAZARDOUS MATERIALS INVENTORY  
SITE SUMMARY**

Mine/Site Name: <u>Fisher Creek No. 1</u>	County: <u>Park</u>
Legal Description: <u>T 9S R 15E</u>	Section(s): <u>NW 1/4, SW 1/4, Sec. 18</u>
Mining District: <u>New World</u>	Mine Type: <u>Hardrock/Unknown</u>
Latitude: <u>N 45° 02' 15"</u>	Primary Drainage: <u>Clark Fork Yellowstone River</u>
Longitude: <u>W 109° 55' 11"</u>	USGS Code: <u>10070006</u>
Land Status: <u>Public</u>	Secondary Drainage: <u>Fisher Creek</u>
Quad: <u>Cooke City</u>	Date Investigated: <u>August 10, 1993</u>
Inspectors: <u>Babits, Flammang, Lasher</u>	P.A. # <u>34-090</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- There were no mill tailings associated with this site.
- There were approximately 3,330 cubic yards of mostly uncovered waste rock on site. The following were elevated at least three times background:

Arsenic: 82.3J to 207J mg/kg	Iron: 65,900 mg/kg
Barium: 228 to 333 mg/kg	Mercury: 1.98 mg/kg
Cadmium: 3.26 mg/kg	Lead: 213 to 920 mg/kg
Copper: 255 to 449 mg/kg	Zinc: 732 mg/kg
- There were two discharging adits on site, and one enters Fisher Creek directly (SW-3); pH 6.95. Both discharges were sampled; the MCL for lead was exceeded in sample SW-3. Both discharges exceeded the acute and chronic fresh water aquatic criteria for copper.
- Fisher Creek was 1,300 feet from discharging adit SW-3. There was an observed release of mercury in the downstream sediments. No MCL/MCLGs were exceeded in downstream surface water. The chronic and acute fresh water aquatic life criteria for copper was exceeded in both the upstream and downstream surface water samples. The chronic fresh water aquatic life criteria was exceeded for lead in both upstream and downstream surface water samples, indicating an upstream source.
- There were three open adits at the site.

Fisher Creek PA# 34-090  
 AMRIB HAZARDOUS MATERIALS INVENTORY  
 INVESTIGATOR: PIONEER - BABITS  
 INVESTIGATION DATE: 08/10/93

SOLID MATRIX ANALYSES

FIELD ID	Au (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
34-090-SE-1	16.3 J	104	0.76 U	17.6	19.8 J	1220	33900	0.092	885	21.2	59.6	9.12 UJ	159	NR
34-090-SE-2	10.7 J	76.4	0.80 U	14.6	13.9 J	1020	24600	0.641	515	17.6	54.5	9.58 UJ	121	NR
34-090-WR-1	207 J	228	3.26	3.07	1.17 U	449	65900	1.98	799	6.24	920	10.4 J	732	NR
34-090-WR-2	82.3 J	333	0.49 U	15.4	19.2 J	255	32900	0.055	673	25.5	213	5.8 UJ	188	NR
BACKGROUND	8.61 J	71.7	0.9	12.4 J	27	66.9	17100	0.02 J	461 J	23.9	28.3 J	5.49 U	69.9 JX	NR

U - Not Detected, J - Background Quantity, X - Outlier for Accuracy or Precision, NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENT		SULFUR ACID BASE POTENT		ORGANIC SULFUR		PYRITIC SULFUR		PYRITIC SULFUR ACID BASE POTENT	
	%	U/1000x	%	U/1000x	%	U/1000x	%	U/1000x	%	U/1000x	%	U/1000x
34-090-WR-1	6.64	207	-3.57	-211	0.72	2.91	3.01	90.9	-94.5			
34-090-WR-2DUP	0.27	8.43	4.15	-4.29	0.10	0.03	0.14	0.94	3.21			
34-090-WR-2	0.25	7.81	3.81	-4.00	0.07	0.03	0.15	0.94	2.88			

WATER MATRIX ANALYSES

FIELD ID	Metals in Water Results in ug/L													HARDNESS CALC (mg CaCO3/L)
	Au	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	
34-090-GW-1	4.48 JX	40.6	2.57 U	9.7 U	6.83 U	23.4 JX	1610	0.27	102	12.7 U	5.68 J	30.7 U	36.6	75.8
34-090-GW-2	6.44 JX	38.5	2.67 J	9.7 U	6.83 U	37 JX	2190	0.23	107	34.8 J	9.21 J	30.7 U	65.9	67.2
34-090-SW-1	1.18 U	32.7	2.57 U	9.7 U	6.83 U	180	655	0.27	112	12.7 U	1.85 J	30.7 U	49.3	50.7
34-090-SW-2	1.18 U	34.6	2.57 U	9.7 U	6.83 U	169	647	0.12 U	102	12.7 U	1.86 J	30.7 U	43	48.6
34-090-SW-3	6.5	102	2.57 U	9.7 U	6.83 U	51.1	756	0.15	91.6	14.8	38.1 J	30.7 U	64	74.2

U - Not Detected, J - Background Quantity, X - Outlier for Accuracy or Precision, NR - Not Requested

Wet Chemistry Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
34-090-GW-1	110	8	72	0.3	NR
34-090-GW-2	112	12	30	0.32	NR
34-090-SW-1	89	10	47	0.14	NR
34-090-SW-2	88	5	44	< 0.05	NR
34-090-SW-3	89	5	17	< 0.05	NR

LEGEND

- SE1 - Upgradient sediment sample in Fisher Creek
- SE2 - Downgradient sediment sample in Fisher Creek
- WR1 - Composite of subsamples WR1 and 2.
- WR2 - Sample of the WR4 subsample.
- WR2DUP - Duplicates of the 34-090-WR-2 sample.
- GW1 - Groundwater in adit at waste rock dump 1
- GW2 - Duplicates of sample GW1
- SW1 - Same as sample SE1.
- SW2 - Same as sample SE2.
- SW3 - Adit discharge of waste rock dump 4.