

Champion PA# 12-003
 AMRB HAZARDOUS MATERIALS INVENTORY
 INVESTIGATOR: PIONEER - BULLOCK
 INVESTIGATION DATE: 07/16/93

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)
12-003-SE-1	49	175	1.7	71.9	14.5	32.6	25500	0.305	3560	42	24	7 UJ	143	NR
12-003-SE-2	7	67.2	0.6 U	7.2	4.5	8.3	11000	0.142	389	3 U	12	8 UJ	30	NR
12-003-TP-1	74	34	0.7	5.5	39.5	16.3	15700	0.869	238	9	37	7 UJ	33	NR
12-003-WR-1	54	30.4	1	9.5	22.6	39.5	26800	0.297	438	6	21	7 UJ	39	NR
BACKGROUND	24	289	1.6	17.4	7.8	17.2	17600	0.106	1760	5	11	7 UJ	64	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		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
12-003-WR-1	0.61	19.1	13.6	13.6	-5.5	-5.5	0.48	0.48	0.12	0.12	0.31	0.31	13.3	13.3

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)	(mg CaCO3/L)
12-003-GW-1	4.68 J	8.47	10.20 J	75.60	6.83 U	1.55 U	62800	0.038 U	11600	55.1	1.04 J	30.7 U	14	500	
12-003-SW-1	3.54	41.9	5.67 J	9.7 U	6.83 U	1.6	65	0.038 U	146	12.7 U	1.55 U	30.7 U	7.57 U	110	
12-003-SW-2	2.81 J	38.20	2.57 U	9.70 U	6.83 U	1.55 U	11.8	0.038 U	4.08 U	12.7 U	0.83 J	30.7 U	7.57 U	107	

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	
12-003-GW-1	984	< 5.3	539	< 0.05	NR					
12-003-SW-1	163	< 5.0	35	< 0.05	NR					
12-003-SW-2	151	< 5.0	18	< 0.05	NR					

LEGEND

- SE1 - 25' from tailings berm, downstream.
- SE2 - Upstream from old cabin and small collapsed adit.
- TP1 - Composite of TP1A-A through 1A-C, 1B-A through 1B-C, and 1C-A.
- WR1 - Composite of subsamples WR1A, 1B, 1C, 2A, 2B, and 2C.
- BACKGROUND - From the Champion Mine (12-003-SS-1)
- GW1 - Discharge from 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>Cable Mine</u>	County: <u>Deerlodge</u>
Legal Description: <u>T 5N R 13W</u>	Section(s): <u>SW 1/4, Sec. 10</u>
Mining District: <u>Silver Lake</u>	Mine Type: <u>Hardrock/Au, Ag, Cu, Tungsten</u>
Latitude: <u>N 46° 12' 02"</u>	Primary Drainage: <u>Warm Springs Creek</u>
Longitude: <u>W 113° 13' 00"</u>	USGS Code: <u>17010201</u>
Land Status: <u>Private</u>	Secondary Drainage: <u>Cable Creek</u>
Quad: <u>Silver Lake</u>	Date Investigated: <u>September 10, 1993</u>
Inspectors: <u>Babits/Pierson</u>	P.A. # <u>12-002</u>
Organization: <u>Pioneer Technical Services, Inc./Thomas, Dean and Hoskins, Inc.</u>	

- The site was active. No samples were collected.
- The tailings were piled for reprocessed.
- Most waste rock had already been reprocessed.
- The water from the discharging adit was piped to the reprocessing facility.
- Cable Creek was approximately 0.5 miles from the site. The active mine operation was approximately 1,000 feet from the creek.

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

Mine/Site Name: Gold Coin
Legal Description: T 5N R 13W
Mining District: Silver Lake
Latitude: N 46° 10' 31"
Longitude: W 113° 14' 45"
Land Status: Private
Quad: Silver Lake
Inspectors: Tuesday, Belanger, Lasher
Organization: Pioneer Technical Services
Inc.

County: Deerlodge
Section(s): SE 1/4, NE 1/4, Sec. 20
Mine Type: Private
Primary Drainage: Warm Springs Creek
USGS Code: 17010201
Secondary Drainage: Daily Gulch
Date Investigated: June 25, 1993
P.A. # 12-004

- The volume of tailings associated with this site was estimated to be approximately 9,367 cubic yards. The tailings were partially revegetated naturally. TP-1 was situated directly in a small wetland located near the highway, and TP-3 was situated directly in Daily Lake. Cyanide measurements varied from non-detect to 21.09 mg/kg in the tailings. The following elements were elevated at least three times background:
Arsenic: 207 to 270 mg/kg Antimony: 16 mg/kg
Iron: 79,700 to 90,100 mg/kg Zinc: 309 mg/kg
Mercury: 0.943J to 1.75J mg/kg

- The volume of waste rock associated with this site was estimated to be approximately 27,200 cubic yards. The following elements were elevated at least three times background:
Iron: 69,900 mg/kg Antimony: 15 mg/kg
Mercury: 0.729J mg/kg

- There were no flowing adits, filled shafts, seeps, or springs observed at the site during the investigation. A surface water sample was collected from Daily Lake, no MCLs or acute or chronic aquatic life criteria were exceeded. The pH measurement in the lake sample was 8.39.

- One potentially hazardous open adit was observed at the site, all other adits were closed and the shaft was fenced. The mill building was in relatively poor condition and potentially hazardous.

Gold Coin PA# 12-004
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - TUESDAY
INVESTIGATION DATE: 06/26/93

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)
12-004-TP-1	270	218 J	0.5 U	3.3	3.7	23.8	79700	1.75 J	392 J	8 J	13	16	80	0.276 U
12-004-TP-3	207	151 J	0.4 U	7.9	10.6	27.9	90100	0.943 J	401 J	12 J	20	6	309	21.1
12-004-WR-1	187	48.1 J	0.4 U	4.9	3.6	33.3	69900	0.729 J	387 J	8 J	21	15	68	NR
BACKGROUND	64	144	0.5 U	7.1	12.1	42.9	12800	0.025 J	597	13	27	5 J	92	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	U/10000	U/10000	
12-004-TP-1	<0.01	0	479	<0.01	479	0.01	0.01	0	479	0	479	
12-004-TP-1DUP	<0.01	0	472	<0.01	472	0.01	0.01	0	472	0	472	
12-004-TP-3	<0.01	0	172	<0.01	172	0.01	0.01	0	172	0	172	
12-004-WR-1	<0.01	0	924	<0.01	924	0.05	0.05	2.19	922	2.19	922	

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)
12-004-SW-1	41.7	60.5	2.57 U	9.7 U	6.83 U	3.2	718	0.038 U	39.2	12.7 U	3.25	30.7 U	7.57 U	181

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
12-004-SW-1	271	< 5.0	117	0.06	NR

LEGEND

TP1 - Composite of subsamples TP1A and 1B
 TP3 - Composite of subsamples 3A-1, 3A-2, 3A-3, and 3A-4
 WR1 - Composite of subsamples WR1A, 1B, 1C, 2A, 2B, and 2C
 BACKGROUND - From the Silver Lake Millsite (12-070-SS-1)
 TP1DUP - Duplicate of sample 12-004-TP-1
 SW1 - Daily Lake

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

Mine/Site Name: <u>Silver Lake Millsite</u>	County: <u>Deerlodge</u>
Legal Description: T <u>5N</u> R <u>13W</u>	Section(s): <u>SW 1/4, SW 1/4, Sec. 21</u>
Mining District: <u>Silver Lake</u>	Mine Type: <u>Mill/Wulferlite, Scheelite</u>
Latitude: <u>N 46° 09' 59"</u>	Primary Drainage: <u>Flint Creek</u>
Longitude: <u>W 113° 14' 22"</u>	USGS Code: <u>17010202</u>
Land Status: <u>Private/Public</u>	Secondary Drainage:
Quad: <u>Silver Lake</u>	Date Investigated: <u>June 25, 1993</u>
Inspectors: <u>Bullock, Flammang, Lasher</u>	P.A. # <u>12-070</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- The volume of tailings associated with this site was estimated to be approximately 11,170 cubic yards. The following elements were elevated at least three times background:
Mercury: 0.133J to 0.275J mg/kg
- No waste rock was observed at this site during the investigation.
- There were no adit discharges observed at the site during the investigation; however, a pond containing submerged tailings was located on-site. Surface water and sediment samples were collected from the pond. No MCLs or acute or chronic aquatic criteria were exceeded; however, the concentration of mercury in the pond sediment was significantly elevated (greater than three times) above background and was attributable to the site.
- A groundwater sample was collected from a residential well located 250 feet northwest of the site. No MCL/MCLGs were exceeded in this sample.
- Potentially hazardous structures associated with this site included the mill, two sheds, and a trailer.
- Several drums/containers containing petroleum products and unknown materials were located on site, one full 55-gallon barrel of unknown content was in poor condition and at risk of rupturing.

Silver Lake Millsite PA# 12-070
 AMRB HAZARDOUS MATERIALS INVENTORY
 INVESTIGATOR: PIONEER - BULLOCK
 INVESTIGATION DATE: 06/25/93

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)
12-070-SE-1	7	119 J	0.9	4.9	10.5	53.8	8850	0.206 J	157 J	11 J	41	6 U	106	NR
12-070-TP-1	6	68.4 J	1.4	1.7	3.4	37.2	3100	0.275 J	364 J	9 J	67	3 U	109	NR
12-070-TP-2	3 U	127 J	0.5 U	1.2 U	1.2	8.6	786	0.133 J	103 J	5 J	5	4 U	37	NR
BACKGROUND	64	144	0.5 U	7.1	12.1	42.9	12800	0.025 J	597	13	27	5 J	92	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 SULFUR ACID BASE		SULFUR POTENT.	
	%	U/1000K	U/1000K	U/1000K	%	U/1000K	%	U/1000K	%	U/1000K	%	U/1000K	%	U/1000K
12-070-TP-1	<0.01	0	855	<0.01	0.18	<0.01	<0.01	849	5.62	849				
12-070-TP-2	<0.01	0	919	<0.01	0.02	<0.01	<0.01	919	0.62	919				

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)
12-070-GW-1	0.96 U	18	2.57 U	9.7 U	6.83 U	4.77	11.8 U	0.1	4.4	12.7 U	0.38 U	30.7 U	7.57 U	88.2
12-070-GW-2	1.01	17.4	2.57 U	9.7 U	6.83 U	5.8	11.8 U	0.059	4.08 U	12.7 U	0.59	30.7 U	7.57 U	86.9
12-070-SW-1	2.93	23.5	2.57 U	9.7 U	6.83 U	2.43	79	0.038 U	4.08 U	12.7 U	1.41	30.7 U	7.57 U	87.8

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
12-070-GW-1	124	< 5.0	9	0.13	< 0.01
12-070-GW-2	137	< 5.0	9	0.12	< 0.01
12-070-SW-1	125	< 5.0	9	< 0.05	< 0.01

LEGEND

SE1 - North side of pond near overflow.
 TP1 - Composite of subsamples TP1A-A, 1A-B, 1A-C, 1B-A, 1B-B, and 1B-C.
 TP2 - Composite of subsamples TP2A and 2B.
 BACKGROUND - From Silver Lake Millsite (12-070-SS-1).
 GW1 - Residential well 250' Northwest of site.
 GW2 - QA duplicate of sample 12-070-GW-1.
 SW1 - Same as sample SE1.

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

Mine/Site Name: <u>Gilt Edge Tailings</u>	County: <u>Fergus</u>
Legal Description: <u>T 16N R 20E</u>	Section(s): <u>SW 1/4, SW 1/4, Section 17; SE 1/4, SE 1/4, Section 20</u>
Mining District: <u>Warm Springs</u>	Mine Type: <u>Millsite/Au, Ag, Pb, Cu</u>
Latitude: <u>N 47° 07' 53"</u>	Primary Drainage: <u>Chippewa Creek</u>
Longitude: <u>W 109° 12' 29"</u>	USGS Code: <u>10040204</u>
Land Status: <u>Private/Public</u>	Secondary Drainage: <u>Ox Frame Gulch/Chippewa Creek</u>
Quad: <u>Judith Peak</u>	Date Investigated: <u>July 14, 1994</u>
Inspectors: <u>Tuesday, Bisch, West</u>	P.A. # <u>14-008</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- The volume of tailings observed at the site was estimated to be 69,860 cubic yards. This volume includes a previously reclaimed tailings pond (located near the headwaters of Chippewa Creek at the Gilt Edge Mine), as well as an uncontained tailings pile located near the small community of Gilt Edge (approximately 1.5 miles downstream from the Gilt Edge Mine). The following elements were elevated to at least three times the background concentrations:
Arsenic: 928J mg/kg
Antimony: 21.0J to 128J mg/kg
Mercury: 2.23J mg/kg to 4.50J mg/kg
- A domestic well was sampled in the town of Gilt Edge downgradient of TP-2. No MCLs were exceeded in this groundwater sample.
- The headwaters of Chippewa Creek are located at the Gilt Edge Mine, and the creek flows adjacent to the large, uncontained tailings pile located downstream. Observed releases to Chippewa Creek (sediment) were documented for arsenic and mercury.
- No MCLs were exceeded in Chippewa Creek; however, the chronic aquatic life criteria for mercury was exceeded in the downstream sample. This exceedence was directly attributable to the site.
- Two, potentially hazardous, mine openings (adits) were observed in the mine area. Additional safety hazards at the site included two elevated, large metal vats and a wooden loadout structure located near the lower tailings pile.

Glitt Edge Tailings PA# 14-008
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - TUESDAY
INVESTIGATION DATE: 07/14/94

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)
14-008-SE1	1.7 JX	7.5 J	103	0.5 U	3.9	5.2	6.8	7530	0.02 UJ	619	8.9	23.2	5.4 UJ	70.6	NR
14-008-SE2	2.4 JX	147 J	221	0.7 U	9.0	9.9	16.9	15200	1.58 J	340	22.7	25.5	7.7 UJ	169	NR
14-008-SE3	1.8 JX	183 J	247	0.8 U	4.9	6.1	9.7	8900	1.59 J	309	9.0	11.2 U	33.4 J	94.8	NR
14-008-TP1	1.0 JX	369 J	325	0.5 U	3.9	3.7	11.8	10200	2.23 J	293	10.5	35.1 U	21.0 J	96.1	0.628
14-008-TP2	0.5 UX	928 J	257	0.4 U	13.9	11.9	14.8	15400	4.50 J	309	11.0	29.5 U	128 J	148	9.899
BACKGROUND	0.5 UX	131 J	124	0.5 U	7.0	13.4	14.5	17600	0.08 J	467	18.2	19.3	5.3 UJ	65.6	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. V/10000		SULFUR ACID BASE POTENT. V/10000		ORGANIC SULFUR %		PYRITIC SULFUR ACID BASE V/10000		SULFUR ACID BASE POTENT. V/10000	
	TOTAL SULFUR ACID BASE V/10000	%	NEUTRAL POTENT. V/10000	%	SULFUR ACID BASE POTENT. V/10000	%	ORGANIC SULFUR %	%	PYRITIC SULFUR ACID BASE V/10000	%	SULFUR ACID BASE POTENT. V/10000	%
14-008-TP1	0.05	1.56	439	0.03	438	0.06	0.06	0.94	0.00	0.94	438	0.00
14-008-TP2	0.27	8.43	253	<0.01	245	0.03	0.03	0.00	0.00	0.00	253	0.00

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)
14-008-GW1	0.12 U	2.0	33.8	2.6 U	8.7 U	4.7 U	4.6 U	766	0.08 U	163	8.0 U	2.3	29.4 U	4.5 U	471
14-008-SW2	0.12 U	98.9	141	2.6 U	8.7 U	5.1	4.6 U	363	0.08 U	194	8.0 U	2.5	29.4 U	10.2	385
14-008-SW3	0.12 U	51.5	127	2.6 U	8.7 U	4.7 U	4.6 U	189	0.10	32.6	8.0 U	1.8	29.4 U	4.5 U	419

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	NOS/NO2-N	CYANIDE
	NR	<5	NR	<0.05	<0.005	NR
14-008-GW1	NR	<5	NR	<0.05	<0.005	NR
14-008-SW2	423	<5	53	0.09	NR	NR
14-008-SW3	449	<5	89	0.23	NR	NR

LEGEND

- SE1 - Upstream 400' above TP1
- SE2 - Downstream of TP1, up from TP2 in Chippewa Creek
- SE3 - Downstream of TP2 in Chippewa Creek
- TP1 - Composite of subsamples TP1A and 1B
- TP2 - Composite of subsamples TP2A through 2E
- BACKGROUND - From the Pioneer John Mine (14-004-SE1)
- GW1 - Sampled with 1,000' depth gauge from site
- SW2 - Same as sample 14-004-SE2
- SW3 - Same as sample 14-004-SE3

Tail Holt PA# 14-010
 AMRB HAZARDOUS MATERIALS INVENTORY
 INVESTIGATOR: PIONEER - BULLOCK
 INVESTIGATION DATE: 09/11/93

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)
14-010-WR-1	283	112	0.8 U	9.2	1.43	61	31900	0.748 J	1080	4.17	69.4	5.77 UJ	152	NR
BACKGROUND	31.8	226	0.8 U	6.41	8.08	14.1	20700	0.039 J	3060	12	45.5	5.67 UJ	107	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		SULFUR ACID BASE POTENT.	
	%	1/1000x	%	1/1000x	%	1/1000x	%	1/1000x	%	1/1000x	%	1/1000x
14-010-WR-1	0.47	14.7	12.5	12.5	-2.2	-2.2	0.14	0.14	7.5	7.5	4.98	4.98

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)
14-010-GW-1	4.32 JX	31.2	2.57 U	9.7 U	6.83 U	36.4	857	0.14	82.6	12.7 U	6.6	30.7 UJX	38.6	106

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
14-010-GW-1	179	< 5.0	32	0.21	NR

LEGEND

WR1 - Composite of subsamples WR1A, 1B, 1C, and 2
 BACKGROUND - From Tail Holt (14-010-SS-1)
 GW1 - Add discharge at portal

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

Mine/Site Name: <u>Cumberland</u>	County: <u>Fergus</u>
Legal Description: T <u>16N</u> R <u>20E</u>	Section(s): <u>NE 1/4, NE 1/4, Sec. 5</u>
Mining District: <u>Warm Springs</u>	Mine Type: <u>Hardrock/Ag, Au</u>
Latitude: <u>N 47° 10' 58"</u>	Primary Drainage: <u>Maiden Creek</u>
Longitude: <u>W 109° 12' 30"</u>	USGS Code: <u>10040204</u>
Land Status: <u>Private</u>	Secondary Drainage: <u>Spotted Horse Creek</u>
Quad: <u>Judith Peak</u>	Date Investigated: <u>September 11, 1993</u>
Inspectors: <u>Bullock, S. Babits</u>	P.A. # <u>14-017</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- The volume of tailings associated with this site was estimated to be approximately 1,220 cubic yards. The following elements were elevated at least three times background:

Arsenic: 129 to 601 mg/kg	Nickel: 67.4 mg/kg
Copper: 46 mg/kg	Lead: 163 mg/kg
Mercury: 2.53J to 39.2J mg/kg	Antimony: 17.7J mg/kg
Zinc: 347 to 2,170 mg/kg	
- The volume of waste rock associated with this site was estimated to be approximately 2,935 cubic yards. The following elements were elevated at least three times background:

Arsenic: 154 mg/kg	Manganese: 16,600 mg/kg
Cadmium: 5 to 9 mg/kg	Lead: 1,190 to 1,270 mg/kg
Copper: 61.4 to 384 mg/kg	Zinc: 1,090 to 6,450 mg/kg
Mercury: 0.275J mg/kg	
- There were no adit discharges, seeps, or springs observed at this site during the investigation.
- Spotted Horse Creek flowed directly through the site, and surface water and sediment samples were collected both upstream and downstream from the site. No MCLs were exceeded in either of the samples; however, the chronic aquatic life criteria for mercury was exceeded in both upstream and downstream samples. The chronic aquatic life criteria for lead and iron were exceeded in the upstream sample.
- An observed release to Spotted Horse Creek (sediment) was documented for mercury which was directly attributable to the site.
- Potentially hazardous mine openings associated with this site included two open adits and a large glory hole with a 100 foot tall highwall.

Cumberland PA# 14-017
 AMRB HAZARDOUS MATERIALS INVENTORY
 INVESTIGATOR: PIONEER - BULLOCK
 INVESTIGATION DATE: 09/11/93

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)
14-017-SE-1	78.8	253	1.0 U	2.08	4.55	7.86	13800	0.566 J	305	6.18	53.9	6.85 UJ	208	NR
14-017-SE-2	29.8	157	1.2 U	2.67	3.68	6.5	10100	0.123 J	502	3.6	30.6	8.02 UJ	73.3	NR
14-017-TP-1	129	210	0.8 U	2.65	5.22	7.52	8130	2.53 J	233	14.3	19.6	5.55 UJ	347	2.55
14-017-TP-2	601	627	1.3 U	13.4	22.6	46	33500	39.2 J	1070	67.4	163	17.7 J	2170	1.57
14-017-WR-1	86.9	281	9.5	4.48	0.96 U	61.4	16900	0.275 J	4390	8.61	1270	4.87 UJ	1090	NR
14-017-WR-2	154	49.3	5.2	9.12	15.1	384	56500	0.03 U	16600	31.2	1190	6.4 UJ	6450	NR
BACKGROUND	31.8	226	0.8 U	6.41	8.08	14.1	20700	0.039 J	3060	12	45.5	5.67 UJ	107	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		PYRITIC SULFUR		ORGANIC SULFUR		PYRITIC SULFUR ACID BASE		SULFUR ACID BASE POTENT	
	%	1/1000x	1/1000x	1/1000x	%	1/1000x	%	1/1000x	%	1/1000x	%	1/1000x	%	1/1000x
14-017-TP-1	<0.01	0	317	317	<0.01	0.01	0.01	0.31	0.01	0.31	0.31	317	0.01	317
14-017-TP-1	<0.01	0	321	321	<0.01	0.01	0.01	0.31	0.01	0.31	0.31	320	0.01	320
14-017-TP-2	0.03	0.94	288	287	<0.01	0.04	0.04	0.62	0.04	0.62	287	0.62	287	
14-017-WR-1	1.01	31.6	53.9	22.3	0.05	0.59	0.37	18.4	0.37	18.4	35.4	7.5	35.4	
14-017-WR-2	0.62	19.4	94	74.6	0.03	0.24	0.35	7.5	0.35	7.5	86.5	0.35	86.5	

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)
14-017-SW-1	3.08 JX	115	2.57 U	9.7 U	6.83 U	1.7	475	0.2	6.6	12.7 U	2.62	30.7 UJ	17.5	103
14-017-SW-2	2.03 JX	114	2.57 U	9.7 U	6.83 U	2.57	1130	0.18	21.1	12.7 U	2.56	30.7 UJ	15.3	55.5

Wet Chemistry Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
14-017-SW-1	165	< 5.0	9	0.11	< 0.005
14-017-SW-2	128	< 5.0	5	< 0.05	0.008

LEGEND

SE1 - Downstream of lower tailings near Spotted Horse well.
 SE2 - Upstream of pond created by waste rock dump 3 on Spotted Horse well.

TP1 - Composite of subsamples TP1A-A and 1B.

TP2 - Sample of subsample TP1A-B.

WR1 - Composite of subsamples WR1 and 2.

WR2 - Composite of subsamples 3A and 3B.

BACKGROUND - From the Tail Haul Mine (14-010-SS-1).

SW1 - Same as sample SE1.

SW2 - Same as sample SE2.

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

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

Mine/Site Name: <u>Prester John</u>	County: <u>Fergus</u>
Legal Description: <u>T 16N R 20E</u>	Section(s): <u>S 1/2, SW 1/4, Section 30</u>
Mining District: <u>Warm Springs</u>	Mine Type: <u>Hardrock/Au</u>
Latitude: <u>N 47° 07' 4.6</u>	Primary Drainage: <u>Chippewa Creek</u>
Longitude: <u>W 109° 14' 30.5</u>	USGS Code: <u>10040204</u>
Land Status: <u>Private/Public</u>	Secondary Drainage: <u>South Fork of Chippewa Creek</u>
Quad: <u>Judith Peak/Horsethief Coulee West</u>	Date Investigated: <u>July 15, 1994</u>
Inspectors: <u>Tuesday, Bisch, West</u>	P.A. # <u>14-090</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- The volume of mill tailings observed at the site was estimated to be 20,835 cubic yards. The following elements were elevated to at least three times background concentrations:
Arsenic: 1,430J mg/kg Antimony: 45.0J mg/kg
Barium: 598 mg/kg Zinc: 199 mg/kg
Mercury: 3.26J mg/kg
- The volume of waste rock observed at the site was estimated to be 3,870 cubic yards. The following elements were elevated to at least three times background concentrations:
Arsenic: 781 mg/kg
Mercury: 0.98J mg/kg
Barium: 481 mg/kg
- No discharging adits, filled shafts, seeps, or springs were observed at the site during the investigation.
- The entire volume of tailings associated with the site are situated directly in an intermittent, unnamed tributary to the south fork of Chippewa Creek (dry during investigation). The tailings extend for more than 1/2-mile downstream along the drainage. Observed releases to the tributary (sediment) were documented for arsenic, mercury, barium, and antimony.
- Potential safety hazards observed at the site included two open adits (previously gated, but subsequently broken into), a fenced shaft, and a relatively large, open pit.

Prester John PA# 14-090
 AMRB HAZARDOUS MATERIALS INVENTORY
 INVESTIGATOR: PIONEER - TUESDAY
 INVESTIGATION DATE: 07/15/94

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)
14-090-SE1	0.6 UX	174 J	158	0.6 U	9.1	12.8	22.4	19800	0.16 J	649	27.5	23.2	6.3 UJ	68.5	NR
14-090-SE2	0.5 UX	614 J	478	0.5 U	2.7	8.8	21.1	6260	2.83 J	171	7.9	35.6 U	29.6 J	114	NR
14-090-TP1	1.0 JX	1430 J	598	0.4 U	5.0	14.9	10.4	10600	3.26 J	147	12.0	30.6 U	45.0 J	199	0.734
14-090-WR1	0.4 UX	781 J	481	0.4 U	3.1	5.4	14.5	9540	0.98 J	141	8.5	25.2 U	5.9 J	99.1	NR
BACKGROUND	0.5 UX	131 J	124	0.5 U	7.0	13.4	14.5	17600	0.08 J	467	18.2	19.3	5.3 UJ	65.6	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	NEUTRAL POTENTIAL	SULFUR ACID BASE POTENTIAL	SULFUR %	SULFATE SULFUR %	PYRITIC SULFUR %	ORGANIC SULFUR %	PYRITIC ACID BASE POTENTIAL	SULFUR ACID BASE POTENTIAL	SULFUR ACID BASE POTENTIAL
14-090-TP1	0.01	345	345	345	<0.01	<0.01	<0.01	0.01	0.00	345	345
14-090-WR1	<0.01	362	362	362	0.01	<0.01	0.01	0.01	0.31	362	362

LEGEND

- SE1 - Dry Storage above water and soil.
- SE2 - Dry Storage NOT below finished floor.
- TP1 - Composite of subsamples TP1A through ID.
- WR1 - Composite of subsamples WR1, 2, 3A, and 3B.
- BACKGROUND - From the Prester John Mine (14-090-SE1).

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

Mine/Site Name: Flathead Mine Complex County: Flathead
Legal Description: T 25N R 23W Section(s): Sec. 17 and 18
Mining District: Hog Heaven Mine Type: Hardrock/Ag. Au, Pb
Latitude: N 47° 55' Primary Drainage: Sullivan Creek
Longitude: W 114° 34' USGS Code: 17010212
Land Status: Private Secondary Drainage: Sullivan Creek
Quad: Koffard Ridge Date Investigated: August 5, 1993
Inspectors: Bullock, Tuesday, Belanger, P.A. # 15-012
Flammang, Clark
Organization: Pioneer Technical Services, Inc.

- There were approximately 455 cubic yards of tailings on site. The following elements were elevated at least three times background:

Arsenic: 160J mg/kg	Cadmium: 12.2 mg/kg
Copper: 348 mg/kg	Mercury: 1.58 mg/kg
Lead: 3,330 mg/kg	Antimony: 130 mg/kg
Zinc: 3,470 mg/kg	

- There were approximately 89,980 cubic yards of waste rock on site. The following elements were elevated at least three times background:

Arsenic: 134J to 3,690J mg/kg	Barium: 1,000 to 2,160 mg/kg
Cadmium: 5.94 to 21.3 mg/kg	Copper: 34 to 5,760 mg/kg
Iron: 139,000 mg/kg	Mercury: 0.734 to 6.1 mg/kg
Lead: 1,700 to 21,100 mg/kg	Antimony: 114 to 438 mg/kg
Zinc: 2,030 to 2,070 mg/kg	

- There were three discharging adits on site and none directly entered surface water. One adit was sampled as GW-1 and had a flowrate of approximately 1 gpm, a pH 2.83 and a specific conductance of 2410 umhos/cm. Arsenic, cadmium, nickel, and antimony exceeded MCL/MCLGs in this discharge. There was a pipe at the West Flathead Nine that discharged to the creek. This discharge was sampled as GW-2 and had a flowrate of approximately 25 gpm, a pH 5.8, and a specific conductance of 1880 umhos/cm. No MCL/MCLGs were exceeded in this discharge. The acute aquatic life criteria for zinc as well as the chronic aquatic life criteria for iron, lead, and zinc were exceeded at the pipe discharge.

- There was no flowing surface water on site; no surface water samples were collected. A dry creek ran adjacent to tailings. There were observed releases of barium, cadmium, mercury, antimony, and zinc in downstream sediments.

- There are ten open adits, five open stopes, numerous hazardous structures, and highwalls on site.

Flathead Mine PA# 15-012
 AMRB HAZARDOUS MATERIALS INVENTORY
 INVESTIGATOR: PIONEER - BULLOCK
 INVESTIGATION DATE: 08/05/83

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)
15-012-SE-1	20 J	262	9.05	13.3	5.52 U	21.4	11700	0.243	1520	10.2 U	48.1	24.8 U	1270	NR
15-012-SE-2	15.4 J	70.9	0.54 U	2.03 U	1.43 U	26	13100	0.031	64.3	2.65 U	27.1	6.43 U	80	NR
15-012-TP-1	160 J	711	12.2	1.78 U	1.87	348	15800	1.58	3.19	2.32 U	3330	130	3470	NR
15-012-WR-1	310 J	1000	5.94	1.96 U	1.38 U	116	22800	1.91	72.5	2.56 U	3460	125	2070	NR
15-012-WR-2	778 J	2160	2.85	1.57 U	1.1 U	84.7	20600	6.1	30.7	2.05 U	16500	114	201	NR
15-012-WR-3	134 J	89.1	1.12	1.66 U	1.87	34	13800	0.734	92	2.16 U	1700	89.3	119	NR
15-012-WR-4	3690 J	82.4	21.3	6.03	1.94	5760	139000	1.84	12.1	5.77	21100	438	2030	NR
BACKGROUND	7.17 J	283	1.28	4.96	3.23	9.38	14100	0.046	1220	5.12	20.7	5.23 U	149	NR

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENT.		SULFUR ACID BASE POTENT.		ORGANIC SULFUR		PYRITIC SULFUR		PYRITIC SULFUR ACID BASE POTENT.		MECHANICAL ANALYSIS AND % COARSE MATERIAL		Cation Exchange Capacity milliequiv./10
	%	1/1000	1/1000	1/1000	1/1000	%	%	1/1000	1/1000	%	%	% silt	% sand	% clay	
15-012-TP-1	1.89	59.0	-3.55	-62.6	0.25	1.37	0.27	42.8	-46.3	6	54	40	0	0.63	
15-012-WR-1	3.00	93.7	-5.49	-99.2	0.57	1.12	1.31	35.0	-40.5						
15-012-WR-2	1.62	50.6	-2.23	-52.8	0.77	0.06	0.79	1.87	-4.11						
15-012-WR-3	0.86	27.0	-1.51	-28.5	0.35	0.30	0.21	9.37	-10.9						
15-012-WR-4DUP	25.3	791	-5.35	-796	<0.01	12.1	15.1	378	-384						
15-012-WR-4	25.6	798	-5.21	-803	<0.01	11.8	15.4	367	-373						

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)
15-012-GW-1	102 J	13.9	1710	187 U	6.83 U	1170	71800 J	0.310 JX	6060	121	826 J	73.6	62300 J	793
15-012-GW-2	32.6 J	16.5	2.57 U	9.7	7.63	1.55 U	15100 J	0.220 JX	4040	12.7 U	3.79 J	30.7 U	4830 J	94.1

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

Wet Chemistry Results in mg/l

FIELD ID	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
15-012-GW-1	2200	7.7	1320	1.9
15-012-GW-2	292	<	5.0	< 0.05

LEGEND

- SE1 - Sullivan Ck. downstream from Flathead & W. Flathead area
- SE2 - Sullivan Ck. upstream from the W. Flathead area
- TP1 - Composite of subsamples TP1A, 1B, 1C, 2A, 2B, and 2C
- WR1 - Composite of subsamples WR1A, 1B, 1C, 2A, 2B, and 2C
- WR2 - Composite of subsamples WR3A, 4A, 5A, and 5B
- WR3 - Composite of subsamples WR6, 7A, 7B, 8, and 12B
- WR4 - Composite of subsamples WR9, 10A, and 11
- BACKGROUND - From the Flathead Mine (15-012-SS-1).
- GW1 - Flathead Mine western adit assoc w/ WR2
- GW2 - West Flathead Mine from pipe at mine.

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

Mine/Site Name: <u>Karst Asbestos</u>	County: <u>Gallatin</u>
Legal Description: <u>T 5S R 4E</u>	Section(s): <u>NW 1/4, SW 1/4, Sec. 36</u>
Mining District: <u>West Gallatin</u>	Mine Type: <u>Hardrock/Asbestos</u>
Latitude: <u>N 45° 21' 25"</u>	Primary Drainage: <u>Gallatin River</u>
Longitude: <u>W 111° 10' 60"</u>	USGS Code: <u>10020008</u>
Land Status: <u>Public</u>	Secondary Drainage: <u>Gallatin River</u>
Quad: <u>Hidden Lake</u>	Date Investigated: <u>August 13, 1993</u>
Inspectors: <u>Babits, Flammang, Lasher</u>	P.A. # <u>16-018</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- An asbestos mine and washing mill were located at this site. Anthophyllite asbestos was detected on-site.
- An unnamed tributary to the Gallatin River flowed adjacent to the washing mill. An observed release to the tributary was documented for asbestos. However, the MCL for asbestos was not exceeded; and no acute or chronic aquatic life criteria exist for asbestos. Asbestos was not detected in upstream or downstream sediment samples.

Karst Asbestos PA# 16-018
 AMRB HAZARDOUS MATERIALS INVENTORY
 INVESTIGATOR: PIONEER - BABITS
 INVESTIGATION DATE: 08/13/93

SOLID MATRIX ANALYSES

FIELD ID	Homogeneity	Color	Texture	Sample Description	Analysis	Asbestos Type Identified	% Anthrophyllite (Conc. on area basis)	% Total Asbestos (Conc. on area basis)	% Cellulose	% Other Non-Fibrous (Range)
16-018-SE-1*	Heterogeneous	Brown	Granular	Soil	PLM	-	NR	ND	Trace	90-100
16-018-SE-2*	Heterogeneous	Brown	Granular	Soil	PLM	-	NR	ND	Trace	90-100
16-018-WR-1*	Heterogeneous	Brown	Granular	Soil	PLM	100% Anthro.	5-10	5-10	Trace	90-100
16-018-WR-2*	Heterogeneous	Brown	Granular	Soil	PLM	100% Anthro.	5-10	5-10	Trace	90-100
Karst Mine**	Homogeneous	Grey	Fibrous	-	PLM	100% Anthro.	-	NR	-	0
Karst Mill**	Homogeneous	Grey	Fibrous	-	PLM	95% Anthro. 5% OTHER	-	NR	-	5

NR - Not Reported; ND - Not Detected; Trace - <1%
 * Data obtained from DATACHEM Laboratories

** Data obtained from EMSL.

WATER MATRIX ANALYSES

FIELD ID	Chrysotile (MFL)	Grunerite (MFL)	Riebeckite (MFL)	Actinolite-Tremolite (MFL)	Anthrophyllite (MFL)	Total Fibers Detected	Total Asbestos Conc (MFL)	Limit of Detection (MFL)
16-018-SW-1*	<LOD	<LOD	<LOD	<LOD	<LOD	0	<LOD	0.09
16-018-SW-2*	<LOD	<LOD	<LOD	0.38	0.38	4	0.76	0.19

LOD - Less than limit of detection.
 MFL - Millions of fibers per liter.

LEGEND

SE1 - 200' upgradient of mill in unnamed tributary
 SE2 - 200' downgradient of mill in unnamed tributary
 WR1 - In waste rock pile in front of adit #1.
 WR2 - In downgradient washing mill in waste rock
 SW1 - Same location as SE1. Sample also contained asbestos fiber <10um long and many non-asbestos fibers.
 SW2 - Same location as SE2

(NOTE: EPA regulations specify that drinking water must contain less than 7MFL asbestos)

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

Mine/Site Name: <u>Alps</u>	County: <u>Granite</u>
Legal Description: <u>T 10N R 16W</u>	Section(s): <u>SE 1/4, Sec. 27</u>
Mining District: <u>Alps</u>	Mine Type: <u>Hardrock/Unknown</u>
Latitude: <u>N 46° 35' 35"</u>	Primary Drainage: <u>Brewster Creek</u>
Longitude: <u>W 113° 35' 10"</u>	USGS Code: <u>17010202</u>
Land Status: <u>Private</u>	Secondary Drainage: <u>Unnamed tributary to Brewster Creek</u>
Quad: <u>Spink Point</u>	Date Investigated: <u>June 30, 1993</u>
Inspectors: <u>Babits/Pierson</u>	P.A. # <u>20-065</u>
Organization: <u>Pioneer Technical Services, Inc./Thomas, Dean and Hoskins, Inc.</u>	

- There were no tailings on site.
- There were approximately 14,023 cubic yards of uncovered waste rock on site. The following were elevated at least three times background:
Arsenic: 63JX mg/kg Iron: 99,700J mg/kg
Mercury: 0.355 mg/kg
- There was one discharging adit that did not have a surface route to water. The sample from the adit had a pH measured at 4.13. There were no MCLs or MCLGs exceeded.
- The nearest surface water was approximately 1,000 feet from the site. No surface water or sediment samples were collected.
- There was one open shaft and two open adits on site.

Alps PA# 20-065
 AMRB HAZARDOUS MATERIALS INVENTORY
 INVESTIGATOR: PIONEER - BABITS
 INVESTIGATION DATE: 06/30/93

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)
20-065-WR-1	51 JX	287	0.4 U	1 U	0.8 U	4.6	29000 J	0.159	140 J	2 J	6 J	3 U	10 J	NR
20-065-WR-2	63 JX	961	0.4 U	2.6 J	1.6 J	7.9	99700 J	0.355	1390 J	12 J	16 J	3 U	16 J	NR
BACKGROUND	19 JX	415	0.6 U	2.4 J	4.6 J	5.6	17300 J	0.067	985 J	8 J	12 J	4 U	26 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		SULFATE		PYRITIC SULFUR		ORGANIC SULFUR		PYRITIC SULFUR ACID BASE POTENT	
	%	U/1000x	%	U/1000x	%	U/1000x	%	U/1000x	%	U/1000x	%	U/1000x	%	U/1000x
20-065-WR-1	0.14	4.37	-0.5	1.01	0.11	-4.8	0.07	0.07	<0.01	0.03	0.03	0	-0.45	-0.87
20-065-WR-2	0.52	16.2	1.01	1.01	0.07	-15	0.07	0.07	0.06	0.39	0.39	1.87	-0.87	-0.87

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)
20-065-GW-1	4.22 J	65.2 JX	2.57 U	9.7 U	6.83 U	1.55 U	4930	0.038 U	1130	12.7 U	1.36	30.7 U	14.1	40.3

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
20-065-GW-1	109	< 5.0	62	< 0.05	NR

LEGEND

- WR1 - Composite of subsamples WR1 and 2.
- WR2 - Sample of the subsample WR4.
- BACKGROUND - Approx. 100 feet above waste rock dump 4.
- From the Alps Mine (20-065-SS-1)
- GW1 - Discharging edit at waste rock dump 1

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

Mine/Site Name: <u>Argo</u>	County: <u>Granite</u>
Legal Description: <u>T 10N R 16W</u>	Section(s): <u>SW 1/4, NE 1/4, Section 35</u>
Mining District: <u>Alps</u>	Mine Type: <u>Hardrock/Au, Ag</u>
Latitude: <u>N 46° 34' 50"</u>	Primary Drainage: <u>Clark Fork River</u>
Longitude: <u>W 113° 34' 10"</u>	USGS Code: <u>17010201</u>
Land Status: <u>Private</u>	Secondary Drainage: <u>Harvey Creek</u>
Quad: <u>Spink Point</u>	Date Investigated: <u>July 6, 1994</u>
Inspectors: <u>Tuesday, Belanger, West</u>	P.A. # <u>20-081</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- The volume of tailings observed at the site was estimated to be 10 cubic yards. The following elements were elevated to at least three times the background concentrations:
Barium: 2,840 mg/kg
Lead: 460 mg/kg
Mercury: 0.29J mg/kg
- The volume of waste rock observed at the site was estimated to be 1,700 cubic yards. The following element was elevated to at least three times the background concentrations:
Mercury: 0.33J mg/kg
- One discharging adit was associated with the site. The MCL for antimony and the chronic aquatic life criteria for lead were exceeded in the adit discharge.
- Harvey Creek flows adjacent to the site on the southwest side. No observed releases to Harvey Creek were documented. The acute and chronic aquatic life criteria for cadmium were exceeded in the downstream sample, although not attributable to this site.
- Potential safety hazards observed at the site included one open adit.

Argo PA# 20-081
 AMRB HAZARDOUS MATERIALS INVENTORY
 INVESTIGATOR: PIONEER - TUESDAY
 INVESTIGATION DATE: 07/06/94

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)
20-081-SE1	0.5 U	9.8 J	345	0.6 J	66.7	3.5 J	23.3 J	24700	0.08 J	2570	44.3 JX	7.2 U	5.8 UJX	54.7	NR
20-081-SE2	0.6 U	10.5 J	556	0.8 UJ	14.0	2.5 J	16.8 J	18300	0.06 J	1290	13.3 JX	8.2 U	6.6 UJX	16.8	NR
20-081-TP1	1.3	36.0 J	2840	0.5 UJ	1.6 U	9.5 J	13.8 J	25600	0.29 J	27.3	1.5 UJX	460	5.3 UJX	28.2	NR
20-081-WR1	0.4 U	29.3 J	316	0.4 UJ	2.6	1.2 J	3.6 J	23100	0.33 J	183	1.5 JX	33.4	4.5 UJX	29.1	NR
BACKGROUND	NR	19 JX	415	0.6 U	2.4 J	4.6 J	5.6	17300 J	0.067	985 J	8 J	12 J	4 U	26 J	NR

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENT		SULFUR ACID BASE POTENT		PYRITIC SULFUR		ORGANIC SULFUR		PYRITIC SULFUR ACID BASE POTENT	
	%	1/1000	%	1/1000	%	1/1000	%	1/1000	%	1/1000	%	1/1000
20-081-TP1	0.23	7.19	-0.71	-7.90	0.16	0.04	0.03	1.25	-1.96			
20-081-WR1	0.24	7.50	-0.59	-8.1	0.21	0.01	0.02	0.31	-0.90			

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	Ag	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC (mg CaCO3/L)
20-081-AD1	0.12 U	1.1 U	184	2.6 U	8.7 U	4.7 U	4.6 U	438	0.11 U	108	8.0 U	0.6	34.1 JX	10.5 JX	18.7
20-081-SW1	0.12 U	1.1 U	80.2	2.7	8.7 U	4.7 U	4.6 U	61.1	0.11 U	18.3	8.0 U	0.4 U	31.0 JX	4.5 UJX	12.3
20-081-SW2	0.12 U	1.1 U	90.5	2.6 U	8.7 U	4.7 U	4.6 U	24.4	0.11 U	4.4 U	8.2	0.5	50.0 JX	4.5 UJX	9.0
20-081-SW3	0.12 U	1.1 U	80.5	2.6 U	8.7 U	4.7 U	4.6 U	360	0.11 U	11.0	8.0 U	0.8	45.4 JX	10.5 JX	11.9

Wet Chemistry
 Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
20-081-AD1	49	<5.0	11	11	NR
20-081-SW1	44	<5.0	8.0	0.05	NR
20-081-SW2	34	<5.0	<5.0	0.07	NR
20-081-SW3	15	<5.0	7.0	0.12	NR

LEGEND

SE1 - Designation of the site in Harvey County
 SE2 - Upgrade of the site in Harvey County
 TP1 - Composite of the subsamples TP1A and 1B
 WR1 - Composite of the subsamples WR1A, 1B, 2A, and 2B
 BACKGROUND - From the Argo Mine (22-662-881) (1993 Data)

AD1 - Discharge from acid associated with WR1 and WR2
 SW1 - Same as sample 20-081-SE1
 SW2 - Same as sample 20-081-SE2
 SW3 - Same as sample 20-081-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>Silver King</u>	County: <u>Granite</u>
Legal Description: T <u>6N</u> R <u>15W</u>	Section(s): <u>Sec. 5</u>
Mining District: <u>Antelope Creek</u>	Mine Type: <u>Hardrock/Ag, Au</u>
Latitude: <u>N 46° 18' 05"</u>	Primary Drainage: <u>Rock Creek</u>
Longitude: <u>W 113° 30' 00"</u>	USGS Code: <u>17010202</u>
Land Status: <u>Private</u>	Secondary Drainage: <u>Sluice Gulch</u>
Quad: <u>Cornish Gulch</u>	Date Investigated: <u>June 30, 1993</u>
Inspectors: <u>Bullock, Flammang, Clark</u>	P.A. # <u>20-186</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 29,255 cubic yards. The following elements were elevated at least three times background:

Arsenic: 444JX to 575JX mg/kg	Manganese: 1,440 mg/kg
Copper: 122 to 287 mg/kg	Lead: 43J to 137J mg/kg
Iron: 44,500J to 47,600J mg/kg	Antimony: 80J to 269J mg/kg
Mercury: 1.47 to 4.9 mg/kg	
- There was one flowing adit associated with the site. No MCLs were exceeded in the adit discharge; however, acute and chronic aquatic life criteria were exceeded for copper.
- Sluice Gulch Creek was flowing adjacent to the site on the west side during the investigation, and upstream and downstream surface water samples were collected. No observed releases were documented and MCL/MCLGs were not exceeded. No aquatic life criteria were exceeded that were attributable to the site.
- Potentially hazardous mine openings associated with the site included five open adits, one collapsed adit, and an open stope. Another adit had been secured by a metal door.

**Silver King PA# 20-186
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - BULLOCK
INVESTIGATION DATE: 06/30/93**

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)
20-186-SP-1	575 JX	465	0.5 U	2.2 J	4.4 J	122	22900 J	1.47	365 J	6 J	43 J	80 J	23 J	NR
20-186-WR-1	444 JX	214	0.6 U	6.4 J	6.8 J	287	44500 J	2.27	1440 J	13 J	89 J	99 J	56 J	NR
20-186-WR-4	450 JX	718	0.6 U	6.9 J	12.7 J	185	47600 J	4.9	407 J	17 J	137 J	269 J	42 J	NR
BACKGROUND	11 J	267	1.7	11	8.7	7.8	12800	0.08 JX	250	9	15	5 UJ	62	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 POTENT		SULFUR ACID BASE POTENT	
	%	v/1000x	v/1000x	%	v/1000x	%	v/1000x	%	v/1000x	%	v/1000x	%	v/1000x	v/1000x
20-186-SP-1	0.11	3.44	2.08	0.05	-1.4	0.02	0.04	0.62	0.04	0.55	0.82	0.04	1.46	0.84
20-186-WR-1	3.22	101	46.7	0.54	-54	2.13	0.55	66.5	0.55	-19.8	66.5	0.55	-19.8	0.84
20-186-WR-4	0.4	12.5	0.84	0.38	-12	<0.01	0.03	0	0.03	0	0	0.03	0.84	0.84

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)
20-186-GW-1	6.95 J	7.83 JX	2.57 U	9.7 U	6.83 U	197 J	273	0.038 U	901	12.7 U	1 U	30.7 U	86.9	284
20-186-SW-1	15.1 J	58.2 JX	2.57 U	9.7 U	6.83 U	1.55 U	428	0.038 U	14.8	12.7 U	1.64	30.7 U	7.57 U	141
20-186-SW-2	14.7 J	56.4 JX	2.7 J	9.7 U	7.97	1.55 U	361	0.038 U	10.4	12.7 U	1 U	30.7 U	7.57 U	140

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
20-186-GW-1	402	8.7	144	0.3	NR
20-186-SW-1	182	<	10	0.12	NR
20-186-SW-2	160	7.7	10	0.12	NR

LEGEND

SP1 - Composite of subsamples SP1A and 1B.
WR1 - Composite of subsamples WR1A, 1B, 2, and 3.
WR4 - Composite of subsamples WR4 and 5.
BACKGROUND - From the Montana Process Mine (41-004-SS-1)

QW1 - End of pipe pumping water from acid #1.
SW1 - 100' upstream of acid #1.
SW2 - 100' downstream of last structure to the North.

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

Mine/Site Name: <u>Lori No. 13</u>	County: <u>Granite</u>
Legal Description: <u>T 6 N R 15 W</u>	Section(s): <u>SE 1/4, NW 1/4, Sec. 4</u>
Mining District: <u>Antelope Creek</u>	Mine Type: <u>Hardrock/Unknown</u>
Latitude: <u>N 46° 18' 17"</u>	Primary Drainage: <u>Rock Creek</u>
Longitude: <u>W 113° 29' 00"</u>	USGS Code: <u>17010202</u>
Land Status: <u>Public</u>	Secondary Drainage: <u>Sluice Gulch</u>
Quad: <u>Antelope Creek</u>	Date Investigated: <u>September 10, 1993</u>
Inspectors: <u>Babits/Pierson</u>	P.A. # <u>20-191</u>
Organization: <u>Pioneer Technical Services, Inc./Thomas, Dean and Hoskins, Inc.</u>	

- No mill tailings were identified at this site during the investigation.
- The volume of waste rock associated with this site was estimated to be approximately 700 cubic yards. The waste rock pile was well vegetated; consequently, no samples were collected.
- No discharging adits, filled shafts, seeps, or springs were observed at the site during the investigation; and no surface water was identified on or near the site, the nearest surface water was located approximately 800 feet south of the site. No groundwater or surface water samples were collected.
- One potentially hazardous open adit was identified at the site.

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

Mine/Site Name: <u>Ant</u>	County: <u>Granite</u>
Legal Description: <u>T 6 N R 15 W</u>	Section(s): <u>NE 1/4, NE 1/4, Sec. 34</u>
Mining District: <u>Antelope Creek</u>	Mine Type: <u>Hardrock/Unknown</u>
Latitude: <u>N 46° 14' 08" or 09"</u>	Primary Drainage: <u>Rock Creek</u>
Longitude: <u>W 113° 27' 12"</u>	USGS Code: <u>17010202</u>
Land Status: <u>Private</u>	Secondary Drainage: <u>South Fork Antelope Creek</u>
Quad: <u>Potato Lakes</u>	Date Investigated: <u>September 9, 1993</u>
Inspectors: <u>M. Babits, S. Babits/Pierson</u>	P.A. # <u>20-194</u>
Organization: <u>Pioneer Technical Services, Inc./Thomas, Dean and Hoskins, 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 2,300 cubic yards. The following elements were elevated at least three times background:

Arsenic: 1,060 mg/kg	Barium: 3,420J mg/kg
Copper: 50.6J mg/kg	Iron: 67,200 mg/kg
Mercury: 0.312 mg/kg	
- One adit which contained water was identified at the site; however, the water was not flowing. The pH measurement in the ponded water was 2.9. No MCLs were exceeded in the water; however, the chronic aquatic life criteria for iron was exceeded.
- No surface water was identified on or adjacent to the site. The nearest surface water, South Fork of Antelope Creek, was located approximately 450 feet east of the site. No surface water or sediment samples were collected.
- Four potentially hazardous open adits were identified at the site.

Ant PA# 20-194
 AMRB HAZARDOUS MATERIALS INVENTORY
 INVESTIGATOR: PIONEER - BABITS
 INVESTIGATION DATE: 09/09/93

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)
20-194-WR-1	1060	3420 J	0.6 U	2.13 U	4.65	50.6 J	67200	0.312	321 J	2.78 U	25.2	11.4 J	26.9	NR
BACKGROUND	11 J	267	1.7	11	8.7	7.8	12800	0.08 JX	250	9	15	5 UJ	62	NR

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENT.		SULFUR ACID BASE POTENT.		ORGANIC SULFUR		PYRITIC SULFUR		SULFUR ACID BASE POTENT.	
	%	U/1000	%	U/1000	%	U/1000	%	U/1000	%	U/1000	%	U/1000
20-194-WR-1	0.63	19.7	3.94	-16	0.01	0.07	0.55	2.19	1.75			

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	HARDNESS CALC. (mg CaCO3/L)
20-194-SW-1	3.5	2.01 U	2.57 U	9.7 U	6.83 U	3.1 J	1700	0.12 UJX	604	19.6 JX	2.83	30.7 U	13.7 J	639

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
20-194-SW-1	960	< 5.0	519	0.63	NR

LEGEND

WRI - Composite of subsamples WRI A and 1B.
 BACKGROUND - From Montana Prince (41-004-SS-1).

SW1 - Adit discharge at waste rock dump 1

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

Mine/Site Name: <u>Combination Millsite</u>	County: <u>Granite</u>
Legal Description: <u>T 8N R 14W</u>	Section(s): <u>SE 1/4, E 1/2, Sec. 7</u>
Mining District: <u>Combination</u>	Mine Type: <u>Hardrock/Cu, Pb, Zn, Ag, Au</u>
Latitude: <u>N 46° 27' 30"</u>	Primary Drainage: <u>Flint Creek</u>
Longitude: <u>W 113° 23' 30"</u>	USGS Code: <u>17010202</u>
Land Status: <u>Private/Public</u>	Secondary Drainage: <u>South Fork Lower Willow Creek</u>
Quad: <u>Black Pine Ridge</u>	Date Investigated: <u>July 21, 1993</u>
Inspectors: <u>Tuesday, Belanger, Clark</u>	P.A. # <u>20-009</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- The mill tailings associated with this site were not impounded but were in the floodplains of both Mill Creek and South Fork Lower Willow Creek; the tailings extended one half mile downstream from the site in the S. F. Lower Willow Creek floodplain. The volume of these tailings were estimated at 69,500 cubic yards and were 20% revegetated. Some reclamation/ revegetation work was done by Inspiration Mining on the floodplain tailings. The following elements were elevated at least three times background:

Arsenic : 2,050 mg/kg	Barium: 1,100 mg/kg
Cadmium: 89.5 mg/kg	Copper: 9,620 mg/kg
Mercury: 306J mg/kg	Lead: 14,400 mg/kg
Antimony: 2,210 mg/kg	Zinc: 584 mg/kg
- There was no waste rock associated with this site.
- An observed release to surface water (S. F. Lower Willow Creek) was documented in sediments for arsenic, cadmium, copper, mercury, lead, antimony, and zinc, and in water samples for copper and lead. No exceedances of drinking water standards were found in either creek.
- Aquatic life criteria for copper and lead (acute) and copper, lead, and mercury (chronic) were exceeded in downstream samples; criteria for copper (acute) and copper and lead (chronic) were also exceeded in upstream samples. A possible upstream contaminant source (e.g. Combination Mine) may be responsible for the exceedances.
- The old mill foundation could be hazardous. A vat of unknown contents (15 cubic yards), and a pile of white powder may be hazardous materials.
- No adit discharges, springs or seeps were observed at the site.

Combination PA# 20-009
 AMRB HAZARDOUS MATERIALS INVENTORY
 INVESTIGATOR: PIONEER - TUESDAY
 INVESTIGATION DATE: 07/21/93

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)
20-009-SE-1	311	105	6.9	6.01	1.74	830	10800	52.3 J	372 J	2.8 U	1550	337	241	NR
20-009-SE-2	37.1	286	2.4	6.5	10.2	250	13400	1.07 J	605 J	13.7	91.2	27.4	80.1	NR
20-009-SE-3	10.2	94.9	0.9	2.93	2.45	18.8	3710	0.083 J	206 J	2.49 U	21	6.07	32.6	NR
20-009-TP-1	2050	1100	89.5	3.33	4.51	9620	28300	306 J	462 J	3.29	14400	2210	584	NR
BACKGROUND	76.3	329	1.6	6.18	6.06	116	11700	1.33 J	1530 J	6.77	85.8	33.3	47.4	NR

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

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	TOTAL SULFUR ACID BASE %	NEUTRAL POTENT. %	SULFUR ACID BASE POTENT. %	SULFATE %	PYRITIC SULFUR %	ORGANIC SULFUR %	PYRITIC SULFUR ACID BASE POTENT. %	HARDNESS CALC
20-009-TP-1	0.06	2.5	1.81	-0.7	0.06	<0.01	0.02	0	1.81

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
20-009-SW-1	3.25	78.5	2.57 U	9.7 U	6.83 U	21.9	410	0.081	20.9	12.7 U	9.93	30.7 U	7.57 U	15.1
20-009-SW-2	2.4	69.7	2.57 U	9.7 U	6.83 U	17.2	1280	0.038 U	17.4	12.7 U	3.3	30.7 U	7.57 U	21
20-009-SW-3	1.69 U	78.2	2.57 U	9.7 U	6.83 U	1.9	264	0.038 U	15.6	12.7 U	1.55 U	30.7 U	7.57 U	14.3

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
20-009-SW-1	89	< 5.0	7	0.16	NR
20-009-SW-2	112	< 5.0	14	< 0.05	NR
20-009-SW-3	95	< 5.0	6	0.18	NR

LEGEND

- SE1 - Downstream from junction of Mill Creek and Willow Creek
- SE2 - Upstream in Mill Creek
- SE3 - Upstream in S. Fork Lower Willow Creek
- TP1 - Composite of subsamples TP1A1, 1B2, 1C3, and 1D1.
- BACKGROUND - From the Combination Mine (20-009-SS-1).
- SW1 - Same as sample SE1.
- SW2 - Same as sample SE2.
- SW3 - Same as sample SE3.

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

Mine/Site Name: <u>Forest Rose</u>	County: <u>Granite</u>
Legal Description: <u>T 9N R 12W</u>	Section(s): <u>NW 1/4, SE 1/4, Sec. 22</u>
Mining District: <u>Dunkleburg</u>	Mine Type: <u>Hardrock/Pb, Zn, Ag</u>
Latitude: <u>N 46° 30' 29"</u>	Primary Drainage: <u>Clark Fork River</u>
Longitude: <u>W 113° 05' 21"</u>	USGS Code: <u>17010202</u>
Land Status: <u>Private/Public</u>	Secondary Drainage: <u>Dunkleburg Creek</u>
Quad: <u>Dunkleburg Creek</u>	Date Investigated: <u>June 29, 1993</u>
Inspectors: <u>Bullock, Flammang, Clark</u>	P.A. # <u>20-004</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 dam at the lower impoundment failed just prior to this investigation. The following elements were elevated at least three times background:

Arsenic: 330JX to 444JX mg/kg	Mercury: 0.342 to 0.377 mg/kg
Cadmium: 58.2J to 143J mg/kg	Lead: 690J to 6,8810J mg/kg
Copper: 404 to 563 mg/kg	Antimony: 28J to 49J mg/kg
Iron: 109,000J to 113,000J mg/kg	Zinc: 6,590J to 16,800J 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: 227 to 801JX mg/kg	Mercury: 0.648J to 2.93 mg/kg
Cadmium: 3.2J to 477J mg/kg	Lead: 242J to 60,400J mg/kg
Copper: 208 to 1,770 mg/kg	Antimony: 24J to 470J mg/kg
Iron: 75,700 to 164,000 mg/kg	Zinc: 2,840J to 51,500J mg/kg
- One discharging adit was identified at the site. No MCLs were exceeded in the adit discharge; however, acute and chronic aquatic life criteria were exceeded for zinc, and the chronic aquatic life criteria for cadmium were exceeded in the adit discharge.
- Three surface water and sediment samples were collected at the site from Dunkleburg Creek. One sample was collected from the toe of WR-1, to determine potential impacts from the waste rock and samples were collected both upstream and downstream from the site, proper. Observed releases to Dunkleburg Creek were documented for arsenic, copper, iron, and lead. The MCL/MCLG for antimony was exceeded in both upstream and downstream samples. The chronic aquatic life criteria exceedances for iron and lead were directly attributable to the site. Other aquatic life criteria were exceeded, but not directly attributable to this site. Dunkleburg Creek was very turbid at the time of the investigation due to a recent breach in the tailings impoundment.
- Potential safety hazards identified at the site included an open adit, 12 collapsing structures, and two unstable tailings dams.

Forest Rose PA# 20-004
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - BULLOCK
INVESTIGATION DATE: 06/29/93

SOLID MATRIX ANALYSES

FIELD ID	Metals in soils														CYANIDE (mg/Kg)
	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)		
20-004-SE-1	116 JX	65.8	14.8 J	11.1 J	19.9 J	125	45600 J	0.13	1370 J	34 J	1010 J	4 U	2040 J	NR	
20-004-SE-2	51 JX	25.6	22 J	3 J	3.3 J	53.7	13700 J	0.1	1310 J	17 J	428 J	4 U	1270 J	NR	
20-004-SE-3	67 JX	118	13.5 J	9.5 J	16.2 J	41.7	43200 J	0.049	819 J	34 J	2820 J	6 J	2230 J	NR	
20-004-TP-1	336 JX	37.6	58.2 J	2 J	3.8 J	444	38800 J	0.342	2090 J	15 J	6810 J	49 J	7430 J	NR	
20-004-TP-2	444 JX	15	14.3 J	11.2 J	4.4 J	563	109000 J	0.377	1720 J	28 J	1820 J	28 J	16800 J	NR	
20-004-TP-3	330 JX	12.2	65.1 J	14.3 J	3.4 J	404	113000 J	0.052	1730 J	29 J	690 J	9 J	6590 J	NR	
20-004-WR-1	227	13.1	40.9	8.6	2.9	208	39200	0.648 J	1110	29	4570	24 J	5660	NR	
20-004-WR-3	801 JX	31.2	47.7 J	3.5 J	4 J	1770	75700 J	2.93	1760 J	15 J	60400 J	470 J	51500 J	NR	
20-004-WR-4	350 JX	23.1	3.2 J	4 J	3 J	526	164000 J	0.934	165 J	16 J	242 J	7 J	2840 J	NR	
BACKGROUND	17 JX	122	0.8 J	10.4 J	34.2 J	34.6	23500 J	0.06	1040 J	36 J	38 J	5 U	106 J	NR	

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENT		SULFUR ACID BASE POTENT		ORGANIC SULFUR		PYRITIC SULFUR		PYRITIC SULFUR		SULFUR ACID BASE POTENT	
	%	U/10000	%	U/10000	%	U/10000	%	U/10000	%	U/10000	%	U/10000	%	U/10000
20-004-TP-1	5.86	167	590	423	1.94	0.94	2.48	77.5	513					
20-004-TP-2DUP	13.8	430	265	-165	-0.01	2.8	16	499	-234					
20-004-TP-2	13.7	429	265	-163	-0.01	2.8	16	500	-235					
20-004-TP-3	13.3	415	191	-224	-0.01	1.94	14.6	456	-265					
20-004-TP-3DUP	13.3	416	186	-230	-0.01	1.96	14.5	453	-267					
20-004-WR-1	4.76	149	355	206	3.31	1.36	0.09	2.81	352					
20-004-WR-3	7.87	240	64.3	-175	2.71	2.07	2.89	90.3	-28					
20-004-WR-4	6.63	207	-5.6	-213	0.06	1.62	4.95	155	-160					

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

WATER MATRIX ANALYSES

FIELD ID	Metals in Water														HARDNESS	
	Results in ug/L														CALC.	
	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn			
20-004-GW-1	3 J	22.6 JX	4.1 J	9.7 J	6.83 U	4.1 J	113	0.038 U	35.5	12.7 U	3.86	30.7 U	1700	258		
20-004-SW-1	6.45	82.2	3.7 J	7.63 JX	17.9	31.9	16100	0.038 U	453	24.2	68.7	23.8	474	358		
20-004-SW-2	1.92	13.3	2.55 U	5.99 UX	8.83	1.43	104	0.038 U	7.47	9	9.13	18.3 U	374	199		
20-004-SW-3	1.41	11.3	3.3 J	5.99 UX	5.27	5.7	54.5	0.038 U	6.07	8.78 U	1.73	19.4	346	175		

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

Wet Chemistry

FIELD ID	Results in mg/l			
	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
20-004-GW-1	< 5.0	78	0.1	NR
20-004-SW-1	< 5.0	160	0.07	NR
20-004-SW-2	< 5.0	77	< 0.05	NR
20-004-SW-3	< 5.0	50	0.06	NR

LEGEND

- SE1 - Downstream of breached dam on tailings pond 3
- SE2 - At toe of waste rock dump 1
- SE3 - Approx. 400' upstream of end of waste rock dump 2
- TP1 - Composite of subsamples TP1A-A, 1A-B, 1A-C, 1A-D, 1B-A, 1B-B, 1B-C, 1B-D, 1B-E, and 1B-F
- TP2 - Composite of subsamples TP2A-A, 2A-B, 2A-C, 2B-A, 2B-B, and 2B-C
- TP3 - Composite of subsamples TP3A-A, 3A-B, 3B-A, 3B-B, and 3B-C
- WR1 - Composite of subsamples WR1A, 1B, 1C, 2A, and 2B
- WR3 - Composite of subsamples WR3A, 3B, and 3C
- WR4 - Composite of subsamples WR4A and 4B
- BACKGROUND - From the Jackson Park Mine (20-027-SS-1)
- TP2DUP - Duplicate of sample 20-004-TP-2
- TP3DUP - Duplicate of sample 20-004-TP-3
- GW1 - Discharge from well #1
- SW1 - Same as sample SE1
- SW2 - Same as sample SE2
- SW3 - Same as sample SE3

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

Mine/Site Name: <u>Wasa</u>	County: <u>Granite</u>
Legal Description: <u>T 9N R 12W</u>	Section(s): <u>SW 1/4, SW 1/4, Sec. 27</u>
Mining District: <u>Dunkleburg</u>	Mine Type: <u>Hardrock/Zn, Au, Ag, Pb, Cu</u>
Latitude: <u>N 46° 29' 53"</u>	Primary Drainage: <u>Douglas Creek</u>
Longitude: <u>W 113° 05' 38"</u>	USGS Code: <u>17010202</u>
Land Status: <u>Private/Public</u>	Secondary Drainage: <u>North Fork of Douglas Creek</u>
Quad: <u>Pikes Peak</u>	Creek
Inspectors: <u>Babits, Lasher/Pierson</u>	Date Investigated: <u>June 29, 1993</u>
Organization: <u>Pioneer Technical Services, Inc./Thomas, Dean and Hoskins, Inc.</u>	P.A. # <u>20-023</u>

- There were no tailings on site.
- There were approximately 14,000 cubic yards of uncovered waste rock on site. The following were elevated at least three times background:

Arsenic: 53 to 108 mg/kg	Cadmium: 10 to 25.3 mg/kg
Copper: 116 to 736 mg/kg	Iron: 98,500 mg/kg
Mercury: 0.328J to 0.452J mg/kg	Lead: 293 mg/kg
Zinc: 382 to 5,670 mg/kg	
- There were two discharging adits on site that entered surface water. The samples had pH measurements of 2.57 and 7.50. There was also a pit that held groundwater. This sample had a pH 7.94. The low pH adit exceeded MCLs for cadmium, copper, and antimony. The other adit and pit exceeded MCLs for cadmium and antimony. The chronic aquatic life criteria for iron, nickel, and lead was exceeded in the low pH adit. The chronic and acute aquatic life criteria for copper and zinc was exceeded in the low pH adit. The acute aquatic life criteria was exceeded for cadmium in the neutral pH adit. The chronic and acute aquatic life criteria for zinc was exceeded in the neutral pH adit. The acute and chronic aquatic life criteria for copper zinc was exceeded in the pit.
- The creek ran through waste rock. There were observed releases of cadmium, copper, and zinc in downstream surface water. The acute aquatic life criteria for cadmium was exceeded in downstream surface water. The acute and chronic aquatic life criteria for copper and zinc was exceeded in downstream surface water; however, none of the exceedances were directly attributable to the site.
- There was one open adit and one highwall on site.

Wasa PA# 20-023
 AMRB HAZARDOUS MATERIALS INVENTORY
 INVESTIGATOR: PIONEER - BABITS
 INVESTIGATION DATE: 06/29/93

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)
20-023-SE-1	166	95.9	5.7	67.9	9.2	973	21600	0.028 J	1960	35	72	4 J	308	NR
20-023-SE-2	77	67.4	54.4	78.8	7.9	833	39100	0.058 J	3860	110	94	15 J	8720	NR
20-023-WR-1	81	113	19.2	16.3	8.5	588	35700	0.066 J	1490	28	86	11 J	4010	NR
20-023-WR-2	102	40.7	0.5 U	1.3	6.2	72	20900	0.452 J	45.7	3	293	14 J	67	NR
20-023-WR-3	53	88.9	25.3	29	8.8	736	55400	0.038 J	1460	52	88	12 J	5670	NR
20-023-WR-4	108	25.8	0.4 U	4.6	8.2	408	98500	0.328 J	210	5	44	4 J	382	NR
20-023-WR-5	60	29.6	10	4.8	1.7	116	46300	0.386 J	664	21	72	4 J	1760	NR
BACKGROUND	17 JX	122	0.8 J	10.4 J	34.2 J	34.6	23500 J	0.06	1040 J	36 J	38 J	5 U	106 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		PYRITIC SULFUR %		ORGANIC SULFUR %		PYRITIC SULFUR ACID BASE POTENT	
	%	1/1000	%	1/1000	%	1/1000	%	1/1000	%	1/1000	%	1/1000
20-023-WR-1	0.03	0.94	6.86	5.93	<0.01	0.06	0	6.86				
20-023-WR-2	0.63	19.7	0.79	-19	0.41	0.14	2.5	-1.71				
20-023-WR-3	0.06	1.87	7.91	6.04	0.02	0.04	0	7.91				
20-023-WR-4	2.25	70.3	-3.1	-73	2.08	0.11	1.56	-4.64				
20-023-WR-5	1.59	49.7	58.3	8.66	0.95	0.28	14.4	44				

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)
20-023-GW-1	28.9	11	208 J	69.6 JX	5 U	3330	11500	0.038 U	309	189	1.77	18.3 U	4540	32.2
20-023-GW-2	1.36	6.33	19.1 J	5.99 UX	5 U	10.5	303	0.038 U	93.2	29.4	1.41	20	3160	289
20-023-GW-3	0.98 U	9.73	26 J	6.7 JX	6.93	19.4	125	0.038 U	51.4	22.5	0.7	28.7	1770	74.5
20-023-SW-1	6.19	20.1	2.57 J	5.99 UX	5 U	17.4	55.7	0.038 U	19.3	9.07	2.63	18.3 U	89.5	17.2
20-023-SW-2	2.89	8.2	51.7 J	7.77 JX	6.5	95.9	112	0.044	120	43.9	1.47	28.4	5250	274

Wet Chemistry Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
20-023-GW-1	260	< 5.0	179	0.06	NR
20-023-GW-2	400	< 5.0	187	0.19	NR
20-023-GW-3	139	< 5.0	52	NR	NR
20-023-SW-1	58	< 5.0	13	< 0.05	NR
20-023-SW-2	409	< 5.0	178	< 0.05	NR

LEGEND

- SE1 - Upgradient in North Fork Douglas Creek.
- SE2 - Downgradient in North Fork Douglas Creek.
- WR1 - Composite of subsamples WR1 and 3.
- WR2 - Sample of subsample WR2.
- WR3 - Sample of subsample WR4.
- WR4 - Composite of subsamples WR3 and 6.
- WR5 - Composite of subsamples WR7A and 7B.
- BACKGROUND - From Jackson Peak Mine (20-0271-SS-1)
- GW1 - Adit discharge at waste rock dump 2. Discharge goes to N Fork Douglas Creek.
- GW2 - Adit discharge at waste rock dump 6.
- GW3 - From pit.
- SW1 - Same as subsample SE1
- SW2 - Same as subsample SE1

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>Jackson Park</u>	County: <u>Granite</u>
Legal Description: <u>T 9 N R 12 W</u>	Section(s): <u>SW 1/4, SW 1/4, Sec. 13</u>
Mining District: <u>Dunkleburg</u>	Mine Type: <u>Hardrock/Unknown</u>
Latitude: <u>N 46° 31' 50"</u>	Primary Drainage: <u>Dunkleburg Creek</u>
Longitude: <u>W 113° 03' 23"</u>	USGS Code: <u>17010202</u>
Land Status: <u>Private/Public</u>	Secondary Drainage: <u>Unnamed tributary to Dunkleburg Creek</u>
Quad: <u>Drummond</u>	Date Investigated: <u>July 1, 1993</u>
Inspectors: <u>Babits, Lasher/Pierson</u>	P.A. # <u>20-027</u>
Organization: <u>Pioneer Technical Services, Inc./Thomas, Dean and Hoskins, Inc.</u>	

- No tailings were observed at this site during the investigation.
- There were approximately 2,900 cubic yards of waste rock on site. The majority of the waste rock was covered. The following were elevated at least three times background:

Arsenic: 685JX to 1,860JX mg/kg	Cadmium: 17.4J to 18.3J mg/kg
Cobalt: 31.5J mg/kg	Chromium: 125J to 139J mg/kg
Mercury: 0.751 to 1.11 mg/kg	Manganese: 3,890J mg/kg
Nickel: 122J mg/kg	Lead: 2,870J to 8,070J mg/kg
Antimony: 61J to 230J mg/kg	Zinc: 3,080J to 3,250J mg/kg
- No discharging adits, filled shafts, seeps, or springs were identified at the site.
- No surface water was flowing on or near the site during the investigation; consequently, no surface water or sediment samples were collected.
- No hazardous openings or structures were identified at the site.

Jackson Park PA# 20-027
 AMRB HAZARDOUS MATERIALS INVENTORY
 INVESTIGATOR: PIONEER - BABITS
 INVESTIGATION DATE: 06/29/93

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)
20-027-WR-1	685 JX	152	18.3 J	29.2 J	139 J	856	44500 J	0.751	2230 J	122 J	2870 J	61 J	3080 J	NR
20-027-WR-2	1860 JX	101	17.4 J	31.5 J	125 J	902	49900 J	1.11	3890 J	104 J	8070 J	230 J	3250 J	NR
BACKGROUND	17 JX	122	0.8 J	10.4 J	34.2 J	34.6	23500 J	0.06	1040 J	36 J	38 J	5 U	106 J	NR

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

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	TOTAL SULFUR	ACID BASE POTENT. %	ACID BASE POTENT.	NEUTRAL POTENT. %	NEUTRAL POTENT.	SULFUR ACID BASE POTENT. %	SULFUR ACID BASE POTENT.	ORGANIC SULFUR %	ORGANIC SULFUR	PYRITIC SULFUR %	PYRITIC SULFUR	PYRITIC ACID BASE POTENT. %	PYRITIC ACID BASE POTENT.
20-027-WR-1	0.31	9.68	<0.01	0	73.9	64.2	0.3	0.3	0.01	0.01	<0.01	0	0	73.9
20-027-WR-2	<0.01	0	<0.01	45.4	45.4	45.4	<0.01	<0.01	0.01	0.01	<0.01	0	0	45.4

LEGEND

WR1 - Composite of subsamples WR1, 2, and 3.
 WR2 - Sample of the subsample WR4
 BACKGROUND - From the Jackson Park Mine (20-027-SS-1).

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

Mine/Site Name: <u>Millers Mine</u>	County: <u>Granite</u>
Legal Description: <u>T 3N R 17W</u>	Section(s): <u>NE 1/4, NW 1/4, Section 11</u>
Mining District: <u>Frog Pond</u>	Mine Type: <u>Hardrock/Au, Ag, Cu, Pb, Zn</u>
Latitude: <u>N 46° 01' 49"</u>	Primary Drainage: <u>Copper Creek</u>
Longitude: <u>W 113° 40' 50"</u>	USGS Code: <u>17010202</u>
Land Status: <u>Private</u>	Secondary Drainage: <u>Lutz Creek</u>
Quad: <u>Whetstone Ridge</u>	Date Investigated: <u>July 7, 1994</u>
Inspectors: <u>Tuesday, Belanger, West</u>	P.A. # <u>20-176</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 9,045 cubic yards. The following elements were elevated to at least three times the background concentrations:

Cadmium: 17.1J to 29.5J mg/kg	Lead: 1,980 to 4,020 mg/kg
Copper: 274J to 473J mg/kg	Zinc: 2,020 to 2,570 mg/kg
Arsenic: 68.6J to 92.3J mg/kg	Mercury: 0.78J to 1.73J mg/kg
- A surface water sample was collected downstream from the site after flowing from a bog area. The MCL for cadmium and the acute and chronic aquatic life criteria for cadmium, copper, and zinc were exceeded in the sample.
- One discharging adit and two filled shafts were observed at the site during the investigation. No MCLs were exceeded in the adit discharge; however, the acute and chronic aquatic life criteria for cadmium and zinc and the chronic aquatic life criteria for iron and lead were exceeded. The MCL for cadmium was exceeded in one of the shafts.
- Potential safety hazards observed at the site included three open shafts, a collapsing headframe, and two collapsing cabins.

**Millers Mine PA# 20-176
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - TUESDAY
INVESTIGATION DATE: 07/07/94**

SOLID MATRIX ANALYSES

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

FIELD ID	As (mg/Kg)	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)
20-176-WR1	6.1	68.6 J	179	17.1 J	18.3	6.1 J	473 J	15400	1.73 J	495	4.6 JX	1980	6.8 JX	2570	NR
20-176-WR2	15.7	92.3 J	34.1	29.5 J	1.5 U	1.9 J	274 J	12700	0.78 J	61.0	1.4 UJX	4020	5.2 UJX	2020	NR
BACKGROUND	NR	11 J	267	1.7	11.0	8.7	7.8	12600	0.08 JX	250	9.0	15	5.0 UJ	62	NR

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

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %		NEUTRAL POTENT. v/1000r		SULFUR ACID BASE POTENT. v/1000r		PYRITIC SULFUR ACID BASE POTENT. v/1000r	
	TOTAL SULFUR %	ACID BASE POTENT. v/1000r	NEUTRAL POTENT. v/1000r	ACID BASE POTENT. v/1000r	SULFUR %	ACID BASE POTENT. v/1000r	PYRITIC SULFUR %	ACID BASE POTENT. v/1000r
20-176-WR1	0.66	21.6	1.85	-19	0.55	0.09	0.62	1.23
20-176-WR2	0.31	9.68	-1.60	-11	0.23	0.06	0.62	-2.23

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)
20-176-AD1	0.12 U	5.7	26.1	4.6	8.7 U	4.7 U	4.6 U	1230	0.11 U	578	8.0 U	16.0 J	29.4 UJ	183 JX	56.1
20-176-GW1	0.12 U	1.7 U	16.3	28.9	8.7 U	4.7 U	17.3	60.5	0.11 U	117	8.0 U	39.7	29.4 U	1060	40.5
20-176-GW2	0.12 U	1.7 U	24.8	2.8	8.7 U	4.7 U	4.6 U	336	0.11 U	136	8.8	1.3 U	29.4 U	21.4	21.7
20-176-SW1	0.12 U	1.1 U	22.1	7.4	8.7 U	4.7 U	17.4	97.8	0.11 U	12.6	8.0 U	0.4 U	29.4 UJ	471 JX	21.7

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

**Wet Chemistry
Results in mg/l**

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NOS/NO2-N	CYANIDE
20-176-AD1	75	<5.0	5.0	0.10	NR
20-176-GW1	70	<5.0	12	0.07	NR
20-176-GW2	15	<5.0	5.0	0.05	NR
20-176-SW1	44	<5.0	7.0	<0.05	NR

LEGEND

WR1 - Composite of subsamples WR1A through 1E
WR2 - Composite of subsamples WR2A and 2B
SAC/GR/CR/ND - Probe for Maximum Probe Value (41-500-003)(1993 Data)

AD1 - Discharge from collapsed adit, collected where maximum flow ground
GW1 - Upper Adit at WR1
GW2 - Lower Adit in bog (flooded)
SW1 - Surface bog where surface flow under trail

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

Mine/Site Name: <u>Free Coin/Red Cloud</u>	County: <u>Granite</u>
Legal Description: <u>T 12N R 14W</u>	Section(s): <u>SW 1/4, SE 1/4, Section 3</u>
Mining District: <u>Garnet</u>	Mine Type: <u>Hardrock, Millsite/Au</u>
Latitude: <u>N 46° 49' 12"</u>	Primary Drainage: <u>Bear Creek</u>
Longitude: <u>W 113° 20' 44"</u>	USGS Code: <u>17010201</u>
Land Status: <u>Private</u>	Secondary Drainage: <u>First Chance Gulch</u>
Quad: <u>Elevation Mountain</u>	Date Investigated: <u>June 29, 1994</u>
Inspectors: <u>Bisch, Flammang, Clark, West</u>	P.A. # <u>20-134</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- The overall volume of mill tailings associated with the site could not be determined during the investigation. Tailings were observed in several scattered and very small (shallow) pockets near the mill building during the investigation. Additional tailings may be deposited at depth beneath the large waste rock dumps at the site; however, attempts to bore through the waste rock were unsuccessful.
- The volume of waste rock observed at the site was estimated to be 22,325 cubic yards. The following elements were elevated to at least three times the background concentrations:

Silver: 4.8JX mg/kg	Mercury: 2.08 to 2.44 mg/kg
Arsenic: 37.4J mg/kg	Lead: 137 to 171 mg/kg
Copper: 61.4J to 104J mg/kg	
- One discharging adit, which flowed directly into First Chance Gulch, was observed at the site. The MCL for antimony, as well as the chronic aquatic life criteria for lead, were exceeded in the adit discharge.
- First Chance Gulch flows into a constructed, lined pond located near the center of the site. The pond appeared to be part of a diversion structure which directs the flow underground (directly beneath the site). The stream re-emerges downstream from the lowermost workings at the site. No observed releases were documented, and no MCLs or acute or chronic aquatic life criteria were exceeded in the stream.
- Hazardous mine openings observed at the site included four open adits and an open pit with a 30-foot highwall. Additionally, the mill building was in a state of collapse.

Free Coin/Red Cloud PA# 20-134
 AMRB HAZARDOUS MATERIALS INVENTORY
 INVESTIGATOR: PIONEER - BISCH
 INVESTIGATION DATE: 06/29/94

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)
20-134-SE1	0.6 JX	7.2 J	662	0.7 J	7.0 J	14.6 J	41.4 J	17500	1.03	500 J	9.0 JX	48.2	6.1 U	44.1 J	NR
20-134-SE2	1.0 UJX	9.1 UJ	254	0.9 UJ	10.5 J	32.8 J	54.3 J	29500	0.51	712 J	16.8 JX	40.9	10.2 U	134 J	NR
20-134-SE3	1.3 UJX	12.0 UJ	378	3.5 J	197 J	13.9 J	1150 J	31000	1.59	20800 J	70.2 JX	48.9	13.3 U	161 J	NR
20-134-WR1	4.8 JX	9.3 J	164	0.6 J	9.1 J	10.1 J	61.4 J	23600	2.44	565 J	6.7 JX	171	5.2 U	38.1 J	NR
20-134-WR5	3.3 JX	37.4 J	40.0	0.5 UJ	5.8 J	13.6 J	104 J	37900	2.08	322 J	10.8 JX	137	13.9	37.7 J	NR
BACKGROUND	1.3 JX	7.8 J	209	0.4 UJ	6.2 J	12.1 J	10.9 J	15300	0.06	797 J	9.4 JX	6.0 U	5.0	40.2 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		PYRITIC SULFUR		ORGANIC SULFUR		PYRITIC SULFUR		SULFUR ACID BASE POTENT	
	%	U/10000	%	U/10000	%	U/10000	%	U/10000	%	U/10000	%	U/10000	%	U/10000
20-134-WR1	0.42	13.1	20.7	7.61	0.02	0.02	0.21	0.19	0.12	6.56	14.2	0.31	1.97	
20-134-WR5	0.17	5.31	2.29	-3	0.04	0.01	0.01	0.12	0.31	0.31	1.97			

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)
20-134-GW1	0.12 U	2.3 JX	25.4	2.6 U	8.7 U	4.7 U	4.6 U	6040	0.11 U	1320	8.0 U	1.6	29.4 U	4.5 U	329
20-134-SW1	0.12 U	2.0 JX	43.6	2.6 U	8.7 U	4.7 U	5.8	74.3	0.11 U	9.4	8.0 U	1.5	29.4 U	4.5 U	195
20-134-SW2	0.12 U	1.3 UJX	50.6	2.6 U	8.7 U	4.7 U	4.6 U	480	0.11 U	29.1	8.0 U	1.3	29.4 U	7.4	185
20-134-SW3	0.12 U	1.5 JX	30.2	2.6 U	8.7 U	4.7 U	10.3	212	0.11 U	91.2	8.0 U	1.3	29.4 U	8.1	167

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
20-134-GW1	401	<5.0	184	0.07	NR
20-134-SW1	233	<5.0	67	0.12	NR
20-134-SW2	191	<5.0	41	<0.05	NR
20-134-SW3	241	<5.0	143	<0.05	NR

LEGEND

- SE1 - Decontaminant 25' of last drilling point in First Chance Ouhls.
- SE2 - Upstream in First Chance Ouhls.
- SE3 - Fish vegetation of WR3 in unexcavated tributary.
- WR1 - Composite of subsamples WR1A, 1B, 2A, and 2B.
- WR3 - Grab sample of subsample WR3.
- BACKGROUND - From the Free Coin/Red Cloud Mine (20-134-851).
- GW1 - Discharge associated with Adu #1; discharge flows 25' over diked material and discharges into First Chance Ouhls.
- SW1 - Same as sample 20-134-SE1.
- SW2 - Same as sample 20-134-SE2.
- SW3 - Same as sample 20-134-SE3.

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

Mine/Site Name: Maxville Tailings/
Londonderry
Legal Description: T 8 N R 13 W
Mining District: Maxville
Latitude: N 46° 28' 27"
Longitude: W 113° 14' 33"
Land Status: Private/Public
Quad: Maxville
Inspectors: M. Babits, S. Babits/Pierson
Organization: Pioneer Technical Services,
Inc./Thomas, Dean and Hoskins, Inc.

County: Granite
Section(s): SW 1/4, NW 1/4, NW 1/4, Sec. 4
Mine Type: Hardrock/Ag, Au
Primary Drainage: Flint Creek
USGS Code: 17010202
Secondary Drainage: Boulder Creek
Date Investigated: September 9, 1993
P.A. # 20-209

- The volume of tailings associated with this site was estimated to be approximately 10,550 cubic yards. The following elements were elevated at least three times background:
Arsenic: 1,480 to 4,260 mg/kg Cadmium: 4.9 to 6.1 mg/kg
Zinc: 708 to 898 mg/kg
- The volume of waste rock associated with this site was estimated to be approximately 8,400 cubic yards. The following elements were elevated at least three times background:
Arsenic: 1,340 to 1,790 mg/kg Antimony: 124J to 135J mg/kg
Zinc: 151 to 205 mg/kg
- One discharging adit, associated with WR-2, was identified at the site. The pH measurement in the adit discharge was 7.3. MCLs for arsenic and cadmium were exceeded in the adit discharge. Additionally, acute and chronic aquatic life criteria were exceeded for arsenic and zinc, and chronic aquatic life criteria were exceeded for iron and cadmium.
- Flint Creek was flowing directly adjacent to WR-1 and WR-2. An observed release to Flint Creek (sediment) was documented for mercury. Surface water samples were not collected due to extremely high flow and likely excessive dilution.
- A potentially hazardous wooden ore chute was identified at the site.

Maxville/Londonderry PA# 20-209
 AMRB HAZARDOUS MATERIALS INVENTORY
 INVESTIGATOR: PIONEER - BABITS
 INVESTIGATION DATE: 09/09/93

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)
20-209-SE-1	214	975 J	1.3	3.32 J	4.87	64.4 J	8310	0.591	5280 J	3.3 U	246	13.3 J	863	NR
20-209-SE-2	196	1030 J	1.5	3.19 J	3.03	61.9 J	6950	17.9	5270 J	2.6 U	217	16.5 J	795	NR
20-209-TP-1	4260	150 J	4.9	1.88 U	1.33 U	30 J	10500	0.45	245 J	2.46 U	523	151 J	898	NR
20-209-TP-2	1480	187 J	6.1	11.5 J	10.1	117 J	22900	0.284	697 J	11.6	190	20.7 J	708	NR
20-209-WR-1	1790	180 J	0.5	1.6 U	1.13 U	14.4 J	8000	0.41	8.47 J	2.09 U	760	124 J	151	NR
20-209-WR-2	1340	116 J	0.6	1.57 U	1.55	15.3 J	7240	0.826	9.4 J	2.1	1120	135 J	205	NR
BACKGROUND	76.3	329	1.6	6.18	6.06	116	11700	1.33 J	1530 J	6.77	85.8	33.3	47.4	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	
	%	1/1000K	1/1000K	%	1/1000K	%	1/1000K	%	1/1000K	%	1/1000K	
20-209-TP-1	0.42	13.1	2.19	0.31	-11	0.09	0.02	2.81	0.02	-0.62		
20-209-TP-2	0.69	21.6	36.5	0.69	14.9	<0.01	0.02	0	0.02	36.5		
20-209-WR-1	0.08	2.5	0.28	0.07	-2.2	<0.01	0.01	0	0.28	-0.16		
20-209-WR1-DUP	0.07	2.19	0.15	0.05	-2	0.01	0.01	0.31	0.01	-0.16		
20-209-WR-2	0.1	3.12	0.74	0.08	-2.4	0.01	0.01	0.31	0.01	0.43		

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)
20-209-SW-1	2350 JX	28.1	5.57	9.7 U	6.83 U	2	11600	0.12 U	1090	25.9	2.15	30.7 UJ	2630	251

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
20-209-SW-1	392	3.9	137	0.11	NR

LEGEND

- SE1 - 150 feet upgradient from waste rock dump 2
- SE2 - 200 feet downgradient from waste rock dump 1
- TP1 - Composite of subsamples TP1A-A, 1A-B, 2A-A, and 2A-B
- TP2 - Composite of subsamples TP1A-C and 1B-B
- WR1 - Composite of subsamples WR1, 2A, 2B, and 3
- WR2 - Sample of the WR3 subsample
- WR1-DUP - Duplicates of 20-209-WR-1
- BACKGROUND - From the Combination Mine. (20-009-SS-1)
- SW1 - Acid discharge at waste rock dump 2.

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

Mine/Site Name: <u>Banner Tailings</u>	County: <u>Granite</u>
Legal Description: <u>T 4N R 16W</u>	Section(s): <u>SE 1/4, SW 1/4, Sec. 36</u>
Mining District: <u>Moose Lake</u>	Mine Type: <u>Hardrock/Au, Ag</u>
Latitude: <u>N 46° 03' 04"</u>	Primary Drainage: <u>Middle Fork Rock Creek</u>
Longitude: <u>W 113° 32' 04"</u>	USGS Code: <u>17010202</u>
Land Status: <u>Private/Public</u>	Secondary Drainage: <u>Middle Fork Rock Creek</u>
Quad: <u>Moose Lake</u>	Date Investigated: <u>June 21, 1993</u>
Inspectors: <u>Tuesday, Belanger, Lasher</u>	P.A. # <u>20-175</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- The volume of tailings associated with this site was estimated to be 2,500 cubic yards. The following elements were elevated at least three times background:

Arsenic : 155J mg/kg	Copper: 65.1 mg/kg
Mercury: 1.46JX mg/kg	Lead: 898 mg/kg
Antimony: 220J mg/kg	Cyanide: 0.265 mg/kg
- Tailings were recently dozed and were mostly enclosed in a basin with no apparent outlet; however, there was no impoundment structure and the tails were unvegetated.
- The volume of waste rock associated with this site was estimated to be 15,000 cubic yards. The following elements were elevated at least three times background:

Arsenic : 140J mg/kg	Copper: 114 mg/kg
Lead: 424 mg/kg	Antimony: 125J mg/kg
- The waste rock dumps were being undercut by and actively eroded into the Middle Fork Rock Creek. No observed releases or exceedances of drinking water standards or aquatic life criteria were documented during this investigation.
- No adit discharges, seeps or springs were observed. No hazardous structures, mine openings, or highwalls were present.

**Banner PA# 20-175
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - TUESDAY
INVESTIGATION DATE: 06/21/93**

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)
20-175-SE-1	11 J	81.8	0.6 U	1.5 U	5.8	8.2	4660	0.055 JX	88	4	6 U	4 UJ	22	NR
20-175-SE-2	7 J	102	0.7 U	2.3	6.8	11.7	5580	0.052 JX	121	6	14	5 UJ	32	NR
20-175-TP-1	155 J	38.1	1.1	1.3 U	1 U	65.1	3990	1.46 JX	7.8	2 U	898	220 J	36	0.265
20-175-WR-1	140 J	84.6	0.5	1.2	0.9 U	114	17800	1 JX	223	4	424	125 J	35	NR
BACKGROUND	11 J	267	1.7	11	8.7	7.8	12800	0.08 JX	250	9	15	5 UJ	62	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	NEUTRAL POTENTIAL	SULFUR ACID/BASE POTENTIAL	SULFATE SULFUR %	PYRITIC SULFUR %	ORGANIC SULFUR %	PYRITIC SULFUR ACID/BASE POTENTIAL	SULFUR ACID/BASE POTENTIAL
20-175-TP-1	0.04	1.25	0.93	-0.3	0.03	<0.01	0.01	0	0.93
20-175-WR-1	0.23	7.19	1.9	-5.3	0.22	<0.01	0.02	0	1.9

LEGEND

SE1 - Upstream of dumps
SE2 - Downstream of dumps
TP1 - Composite of subsamples TP1A through 1D
WR1 - Composite of subsamples WR1A through 1E
BACKGROUND - From the Montana Prince Mine (41-004-SS-1)

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

Mine/Site Name: <u>Old Dominion Mine</u>	County: <u>Granite</u>
Legal Description: <u>T 4N R 16W</u>	Section(s): <u>SE 1/4, SE 1/4, Sec. 36</u>
Mining District: <u>Moose Lake</u>	Mine Type: <u>Hardrock/Au</u>
Latitude: <u>N 46° 02' 55"</u>	Primary Drainage: <u>Middle Fork Rock Creek</u>
Longitude: <u>W 113° 31' 30"</u>	USGS Code: <u>17010202</u>
Land Status: <u>Private/Public</u>	Secondary Drainage: <u>Middle Fork Rock Creek</u>
Quad: <u>Moose Lake</u>	Date Investigated: <u>June 21, 1993</u>
Inspectors: <u>Tuesday, Belanger, Lasher</u>	P.A. # <u>20-180</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- The volume of tailings associated with this site was estimated to be 5,600 cubic yards. The following elements were elevated at least three times background:
Copper: 28.5 mg/kg Mercury: 0.445JX mg/kg
Lead: 103 mg/kg Cyanide: 0.282 mg/kg
- Tailings were within an enclosed basin with no apparent outlet or impoundment structure and the tailings were mostly (75%) revegetated
- The volume of waste rock associated with this site was estimated to be 6,700 cubic yards. The following element was elevated at least three times background:
Lead: 68 mg/kg
- One observed release of lead was documented in downgradient well. No exceedances of drinking water standards or aquatic life criteria were documented during this investigation.
- No adit discharges, seeps or springs were observed. Two hazardous structures were on site: the mill building and an old generator building. No mine openings, or highwalls were present.

Old Dominion PA# 20-180
 AMRB HAZARDOUS MATERIALS INVENTORY
 INVESTIGATOR: PIONEER - TUESDAY
 INVESTIGATION DATE: 06/21/93

SOLID MATRIX ANALYSES

Metals in soils
 Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Ca (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)
20-180-TP-1	13 J	225	0.6 U	1.4 U	4	28.5	6080	0.445 JX	29	3	103	4 UJ	9	0.282
20-180-WR-1	6 J	22.4	0.5 U	1.2 U	1 U	6.7	2280	0.195 JX	8.2	3	68	4 UJ	8	NR
BACKGROUND	11 J	267	1.7	11	8.7	7.8	12800	0.08 JX	250	9	15	5 UJ	62	NR

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

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENTIAL		SULFUR ACID BASE POTENTIAL		PYRITIC SULFUR		ORGANIC SULFUR		PYRITIC SULFUR ACID BASE POTENTIAL	
	%	u/1000r	%	u/1000r	%	u/1000r	%	u/1000r	%	u/1000r	%	u/1000r
20-180-TP-1	0.01	0.31	1.06	0.75	<0.01	<0.01	<0.01	0	<0.01	<0.01	1.06	2.26
20-180-WR-1	0.01	0.31	2.58	2.26	<0.01	<0.01	0.01	0.31	<0.01	<0.01	0.31	2.26

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	HARDNESS CALC. (mg CaCO3/L)
20-180-GW-1	0.98 U	116	2.57 U	9.7 U	6.83 U	55.5	15.3	0.038 U	4.08 U	12.7 U	0.38 U	30.7 U	12.8	101
20-180-GW-2	0.98 U	313	2.57 U	9.7 U	6.83 U	8.93	102	0.038 U	4.3	12.7 U	0.38 U	30.7 U	8.43	93.6

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
20-180-GW-1	127	< 5.0	5	0.08	NR
20-180-GW-2	139	< 5.0	6	0.09	NR

LEGEND

TP1 - Composite of subsamples TP1A-A, 1B-A, 1B-B, 1C-A, and 1D-A
 GW1 - Peterson residence (upgradient) West of site
 WR1 - Composite of subsamples WR1A, 1B, 2A, 2B, and 2C
 GW2 - Floyd's residence (downgradient) North of site
 BACKGROUND - From the Montana Prince Mines (41-004-SS-1)

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

Mine/Site Name: <u>Bi-Metallic/Old Red</u>	County: <u>Granite</u>
Legal Description: <u>T 7N R 13W</u>	Section(s): <u>NE 1/4, SW 1/4, Sec. 33</u>
Mining District: <u>Philipsburg</u>	Mine Type: <u>Hardrock/Ag, Au, Pb</u>
Latitude: <u>N 46° 18' 44"</u>	Primary Drainage: <u>Flint Creek</u>
Longitude: <u>W 113° 16' 16"</u>	USGS Code: <u>17010202</u>
Land Status: <u>Private/Public</u>	Secondary Drainage: <u>Douglas Creek</u>
Quad: <u>Fred Burr Lake/Philipsburg</u>	Date Investigated: <u>June 22, 1993</u>
Inspectors: <u>Tuesday, Belanger, Lasher</u>	P.A. # <u>20-002</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- The mill tailings associated with this site were slurried in flumes down a dry tributary to Douglas Creek, and were probably the source of the Douglas Creek Tailings. The total volume of tailings was roughly estimated at 40 cubic yards, but may be significantly more. The tailings in the drainage were 90% revegetated, while those at the mill site were not. The following elements were elevated at least three times background:

Arsenic: 3,270 mg/kg	Cadmium: 3.2 mg/kg
Copper: 126 mg/kg	Mercury: 1.5 mg/kg
Manganese: 3,760	Lead: 667J mg/kg
Antimony: 112J mg/kg	Zinc: 469 mg/kg
- The volume of waste rock associated with this site was estimated to be 62,000 cubic yards. The following elements were elevated at least three times background:

Arsenic: 2,860 to 8,230J mg/kg	Cadmium: 1.7 mg/kg
Copper: 72.5J mg/kg	Mercury: 2.02 mg/kg
Lead: 667J mg/kg	Antimony: 78J to 79J mg/kg
Zinc: 387 to 568 mg/kg	
- The Bimetallic site was intimately associated with the Granite Mine site to the east. No real boundary exists separating the two sites. For the investigation, the access road was the dividing line between the two.
- No observed releases, exceedances of drinking water standards or aquatic life criteria were documented at this site.
- No discharging adits, springs or seeps were observed.
- No hazardous structures or openings existed at the site.

**Bimetallic/Old Red PA# 20-002
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - BULLOCK
INVESTIGATION DATE: 06/22/93**

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)
20-002-TP-1	3270	201	3.2	2.4	2.3	126 J	18100	1.5	3760	15 J	667 J	112 J	469	0.292 U
20-002-WR-1	8230 J	108	0.6 U	1.8	1.1	32.4	26900	0.801 JX	179	2 U	386	79 J	387	NR
20-002-WR-2	2860	114	1.7	3.9	2.8	72.5 J	20200	2.02	2200	12 J	413 J	78 J	568	NR
BACKGROUND	25 J	286	0.5 U	9.8	4.6	9	13900	0.161 JX	1230	11	9	4 UJ	41	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 POTENT. v/1000x	NEUTRAL POTENT. v/1000x	SULFUR ACID BASE POTENT. v/1000x	SULFATE SULFUR %	PYRITIC SULFUR %	ORGANIC SULFUR %	PYRITIC SULFUR ACID BASE v/1000x	SULFUR ACID BASE POTENT. v/1000x
20-002-TP-1	0.19	5.94	5.62	-0.3	0.12	<0.01	0.07	0	5.62
20-002-WR-1	0.74	23.1	-2.1	-25	0.59	0.01	0.14	0.31	-2.36
20-002-WR-2	1.17	36.6	5.19	-31	0.32	0.62	0.23	19.4	-14.2

LEGEND

TP1 - Composite of subsamples TP1, 2, and 3
WR1 - Composite of subsamples WR1A, 1B, and 1C
WR2 - Composite of subsamples WR2A and 2B
BACKGROUND - From the Granite Mountain Mine (20-110-SS1)

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

Mine/Site Name: <u>Douglas Creek</u>	County: <u>Granite</u>
Legal Description: <u>T 7N R 13W</u>	Section(s): <u>SE 1/4, SE 1/4, Sec. 31</u>
Mining District: <u>Philipsburg</u>	Mine Type: <u>Tailings/Au, Ag, Pb</u>
Latitude: <u>N 46° 18' 38"</u>	Primary Drainage: <u>Douglas Creek</u>
Longitude: <u>W 113° 15' 50"</u>	USGS Code: <u>17010202</u>
Land Status: <u>Private</u>	Secondary Drainage: <u>None</u>
Quad: <u>Philipsburg</u>	Date Investigated: <u>June 23, 1993</u>
Inspectors: <u>Bullock, Flammang, Lasher</u>	P.A. # <u>20-003</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- The volume of tailings associated with this site was estimated to be approximately 295,000 cubic yards. The following elements were elevated at least three times background:

Arsenic: 1,520 to 2,950 mg/kg	Manganese: 4,270 to 13,700 mg/kg
Cadmium: 2.4 to 5.7 mg/kg	Nickel: 44J to 56J mg/kg
Copper: 63.1J to 181J mg/kg	Lead: 336J to 1,430J mg/kg
Mercury: 1.06 to 16.4 mg/kg	Antimony: 115J to 224J mg/kg
Zinc: 464 to 2,030 mg/kg	
- There was no waste rock observed at this site during the investigation.
- No adit discharges, filled shafts, springs, or seeps were observed at the site during the investigation.
- The site was situated directly in the intermittent Douglas Creek drainage; surface water was flowing through and under the tailings piles at the time of this investigation. Three surface water samples were collected from Douglas Creek (upstream, center of site, and downstream). Observed releases to Douglas Creek were documented for arsenic, manganese, lead, and zinc. The MCL for arsenic was exceeded and was directly attributable to the site. The acute and chronic aquatic life criteria for copper and zinc, and the chronic aquatic life criteria for mercury and lead were exceeded in all of the samples, and therefore not directly attributable to the site. Observed releases for arsenic, manganese, and nickel were also documented in the stream sediment samples. The upstream sediment mercury concentration was significantly elevated at 22.5 mg/kg.
- One potentially hazardous adit opening was identified approximately 0.5 miles above this site. Both tailings impoundments had unstable slopes down to the stream, and both tailings dams had been breached.

Douglas Creek PA# 20-003
 AMRB HAZARDOUS MATERIALS INVENTORY
 INVESTIGATOR: PIONEER - BULLOCK
 INVESTIGATION DATE: 06/23/83

SOLID MATRIX ANALYSES

Metals in soils Results per dry weight basis

FIELD ID	Au (mg/Kg)	Pb (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)
20-003-SE-1	900	136	3.3	5.5	2.8	95.1 J	12300	22.5	3030	14 J	390 J	46 J	763	NR
20-003-SE-2	1260	128	2.3	5.1	4.1	75.1 J	13400	3.84	3390	13 J	403 J	81 J	535	NR
20-003-SE-3	2140	265	4.7	7	6.4	129 J	18500	3.78	10600	44 J	535 J	135 J	1030	NR
20-003-TP-1A	3710	491	5.7	2.4	4.5	181 J	13700	16.4	13700	56 J	1430 J	224 J	2030	NR
20-003-TP-1B	2710	274	3.8	1.4 U	2.7	75.1 J	8380	3.17	11500	44 J	556 J	186 J	985	NR
20-003-TP-2A	2140	146	2.7	3.7	3.5	118 J	14700	1.06	4270	18 J	602 J	125 J	464	NR
20-003-TP-2BA	1520	185	2.4	3.7	3.5	63.1 J	13700	1.52	4270	16 J	336 J	115 J	496	NR
20-003-TP-2BB	2950	309	4	2.4	3.8	148 J	20400	1.44	7050	27 J	974 J	156 J	817	NR
BACKGROUND	25 J	286	0.5 U	9.8	4.6	9	13900	0.161 JX	1230	11	9	4 UJ	41	NR

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENT.		SULFUR ACID BASE POTENT.		ORGANIC SULFUR		PYRITIC SULFUR		PYRITIC SULFUR ACID BASE POTENT.		CATION EXCHANGE CAPACITY	
	%	1/1000x	%	1/1000x	%	1/1000x	%	1/1000x	%	1/1000x	%	1/1000x	milliequivalents/100g	
20-003-TP1A	0.29	9.06	37.5	28.4	0.05	0.16	0.08	5	32.5	4.05				
20-003-TP1B	0.29	9.06	26.5	17.4	0.13	0.11	0.05	3.44	23.1	1.29				
20-003-TP2A	0.18	5.62	6.24	0.62	0.12	0.01	0.05	0.31	5.93	3.38				
20-003-TP2B-A	0.11	3.44	14.4	11	0.02	0.03	0.06	0.94	13.5	3.13				
20-003-TP2B-B	0.38	11.9	15.6	3.75	0.26	0.06	0.06	1.87	13.8	5.22				

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	Au	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
20-003-SW-1	24.3	28.5	2.57 U	9.7 U	6.83 U	5.43	63.7	0.11	16.1	12.7 U	1.33	30.7 U	51.9	24.3
20-003-SW-2	72.2	28.2	2.57 U	9.7 U	6.83 U	5.9	270	0.25	557	12.7 U	4.1	30.7 U	115	29.1
20-003-SW-3	87.4	25.3	2.57 U	9.7 U	6.83 U	6.37	316	0.17	807	12.7 U	5.55	30.7 U	249	33.1

Wet Chemistry Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
20-003-SW-1	81	< 5.0	10	< 0.05	NR
20-003-SW-2	95	< 5.0	15	< 0.05	NR
20-003-SW-3	98	< 5.0	20	0.06	NR

LEGEND

SE1 - Located approx. 100' upstream from the east end of tailings pond 2.
 SE2 - Approx. 70' downstream of tailings pond 2, below confluence of two stream channels.
 SE3 - Approx. 100' below tailings pond 1.
 TP1A - Composite of subsamples TP1A-A through 1A-E.
 TP1B - Composite of subsamples TP1B-A through 1B-D.
 TP2A - Composite of subsamples 2A-A through 2A-F.
 TP2B-A - Composite of subsamples TP2B-A and 2B-B.
 TP2B-B - Composite of subsamples TP2B-B-C and 2B-D.
 BACKGROUND - From the Granite Mountain Mine (20-110-SS-1)
 SW1 - Same as sample SE1
 SW2 - Same as sample SE2
 SW3 - Same as sample SE3

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

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

Mine/Site Name: <u>Algonquin</u>	County: <u>Granite</u>
Legal Description: <u>T 7N R 13W</u>	Section(s): <u>SE 1/4, SE 1/4, Sec. 30</u>
Mining District: <u>Philipsburg</u>	Mine Type: <u>Hardrock/Ag, Au, Pb, Zn, Mn</u>
Latitude: <u>N 46° 19' 40"</u>	Primary Drainage: <u>Douglas Creek</u>
Longitude: <u>W 113° 15' 57"</u>	USGS Code: <u>17010202</u>
Land Status: <u>Private</u>	Secondary Drainage: <u>Frost Creek</u>
Quad: <u>Philipsburg</u>	Date Investigated: <u>June 23, 1993</u>
Inspectors: <u>Tuesday, Belanger, Clark</u>	P.A. # <u>20-005</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 52,500 cubic yards. The following elements were elevated at least three times background:

Arsenic : 99 to 1,420 mg/kg	Cadmium: 10 to 35.4 mg/kg
Chromium: 21.9 mg/kg	Copper: 69.1 to 1,570 mg/kg
Iron: 48,800 mg/kg	Mercury: 1.02 mg/kg
Manganese: 4,590 to 9,850 mg/kg	Nickel: 51 mg/kg
Lead: 747 to 1,270 mg/kg	Antimony: 17 to 42 mg/kg
Zinc: 4,890 to 15,400 mg/kg	
- The waste rock dumps were mostly unvegetated and WR-1 had been undercut, which resulted in unstable highwalls on the dump.
- Frost Creek flowed through the site. No observed releases or exceedances of drinking water standards were documented during this investigation. Aquatic life criteria for zinc (both acute and chronic) were exceeded both up- and downstream in Frost Creek. No adit discharges, seeps or springs were observed.
- Two hazardous structures were onsite: one older mine office building and an old shed. One mine opening was onsite: a shaft fenced by Department of State Lands, but was still open and hazardous (headframe has collapsed into shaft).
- Observed probable asbestos insulation on the boiler in the mine building.

Algonquin PA# 20-005
 AMRB HAZARDOUS MATERIALS INVENTORY
 INVESTIGATOR: PIONEER - TUESDAY
 INVESTIGATION DATE: 06/23/93

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)
20-005-SE-1	14	80.4	0.5 U	10.6	6.1	6.7 J	16500	0.025	591	2 J	98 J	4 U	238	NR
20-005-SE-2	13	119	1.2	8.3	3.2	9.8 J	10300	0.044	1700	6 J	185 J	4 U	600	NR
20-005-WR-1	99	65.6	10	3.4	6.2	69.1 J	21000	1.02	1540	13 J	747 J	17 J	4890	NR
20-005-WR-2	1420	36.7	34.8	7.3	21.9	1570 J	48800	1.02	4590	28 J	585 J	35 J	15300	NR
20-005-WR-3	776	51.3	35.4	16.9	8.4	690 J	28700	0.354	9850	51 J	1270 J	42 J	15400	NR
BACKGROUND	25 J	286	0.5 U	9.8	4.6	9	13900	0.161 JX	1230	11	9	4 UJ	41	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/1000R	%	U/1000R	%	U/1000R	%	U/1000R	%	U/1000R	%	U/1000R
20-005-WR-1	1.28	40	145	105	0.4	0.24	0.64	7.5	137			
20-005-WR-2	2.17	67.8	117	48.7	1.05	0.41	0.71	12.8	104			
20-005-WR-3	1.53	47.8	408	360	<0.01	0.61	1.56	19.1	389			

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)
20-005-SW-1	3.19	23.1	2.57 U	9.7 U	6.83 U	1.55 U	104	0.038 U	37.7	12.7 U	0.38 U	30.7 U	56.4	21.3
20-005-SW-2	3.53	24.4	2.57 U	9.7 U	6.83 U	1.55 U	160	0.038 U	44.8	12.7 U	0.38 U	30.7 U	63.1	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	NO3/NO2-N	CYANIDE
20-005-SW-1	94	< 5.0	8	0.06	NR
20-005-SW-2	75	< 5.0	8	0.05	NR

LEGEND

- SE1 - Upstream of site in Frost Creek.
- SE2 - Downstream from site, 100' in Frost Creek.
- WR1 - Composite of subsamples WR1A through 1C and WR2A through 2C.
- WR2 - Composite of subsamples WR2A and 2B.
- WR3 - Composite of subsamples WR3A through 4C.
- BACKGROUND - From the Granite Mountain Mine (20-110-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>Rumsey</u>	County: <u>Granite</u>
Legal Description: <u>T 6N R 13W</u>	Section(s): <u>NE 1/4, NE 1/4, Sec. 8</u>
Mining District: <u>Philipsburg</u>	Mine Type: <u>Hardrock/Au, Ag</u>
Latitude: <u>N 46° 17' 32"</u>	Primary Drainage: <u>Flint Creek</u>
Longitude: <u>W 113° 14' 49"</u>	USGS Code: <u>17010202</u>
Land Status: <u>Private/Public</u>	Secondary Drainage: <u>Fred Burr Creek</u>
Quad: <u>Philipsburg/Fred Burr Lake</u>	Date Investigated: <u>June 24, 1993</u>
Inspectors: <u>Tuesday, Belanger, Clark</u>	P.A. # <u>20-018</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- The mill tailings associated with this site were not impounded but were in the floodplain of Fred Burr Creek and extended at least one mile downstream from the site. The volume of these tailings were estimated at 2,800 cubic yards and were 90% revegetated (naturally). The following elements were elevated at least three times background:

Arsenic : 520 mg/kg	Cadmium: 9.3 mg/kg
Copper: 63.8 mg/kg	Mercury: 4.7 mg/kg
Lead: 195 mg/kg	Zinc: 1,130 mg/kg
- The volume of waste rock associated with this site was estimated to be 22,000 cubic yards. None of the elements analyzed were elevated above three times background.
- An observed release to surface water (Fred Burr Creek) was documented in sediments for arsenic, copper, mercury, lead, and zinc. No exceedances of drinking water standards or aquatic life criteria were documented in Fred Burr Creek.
- One discharging adit had a significant flow (13 gpm). The adit water (SW-2) had a pH of 6.70, an specific conductance of 207 us/cm, and did not exceed drinking water standards; aquatic life criteria for mercury (chronic) was exceeded in the adit discharge.
- The old stone mill foundation could be hazardous. The large (10 by 12 feet) adit was a hazardous mine opening.

Rumsey PA# 20-018
 AMRB HAZARDOUS MATERIALS INVENTORY
 INVESTIGATOR: PIONEER - TUESDAY
 INVESTIGATION DATE: 06/24/93

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)
20-018-SE-1	4	25.3 J	0.5 U	3	2	2.6	8100	0.068 J	93.6 J	3 J	5 U	4 U	11	NR
20-018-SE-3	196	64 J	0.8	4.1	1.2	20.3	12100	5.56 J	758 J	4 J	67	5	277	NR
20-018-TP-1	520	233 J	9.3	10.6	8.4	63.8	31200	4.7 J	1550 J	13 J	195	6	1130	0.304
20-018-WR-1	5	201 J	0.5 U	15.7	6.8	15.8	26300	0.423 J	542 J	8 J	4 U	4 U	52	NR
BACKGROUND	25 J	286	0.5 U	9.8	4.6	9	13900	0.161 JX	1230	11	9	4 UJ	41	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 POTENT	
	%	1/1000%	%	1/1000%	%	1/1000%	%	1/1000%	%	1/1000%	%	1/1000%
20-018-TP-1	0.01	0.31	4.27	46.5	3.95	46.5	<0.01	0.01	0.01	0.01	0	4.27
20-018-WR-1	<0.01	0	46.5	46.5	46.5	46.5	<0.01	<0.01	0.02	0.02	0	46.5

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)
20-018-SW-2	0.98 U	3.63	2.57 U	9.7 U	6.83 U	1.55 U	73.9	0.11	8	12.7 U	0.38 U	30.7 U	7.57 U	80.2

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	CELODRIDE	SULFATE	NO3/NO2-N	CYANIDE
20-018-SW-2	122	< 5.0	12	0.09	NR

LEGEND

SE1 - Upstream in Fred Burr Creek - 120 feet.
 SE3 - Downstream in Fred Burr Creek - 1/2 mile.
 TP1 - Composite of subsamples TP1B-1, 1A-1, and 1C-1.
 WR1 - Composite of subsamples WR1A, 1B, 1C, 2A, and 3A.
 BACKGROUND - From the Granite Mountain Mine (20-110-SS-1).
 SW2 - Aftir discharge.

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

Mine/Site Name: <u>Scratch All</u>	County: <u>Granite</u>
Legal Description: <u>T 7N R 13W</u>	Section(s): <u>NE 1/4, SE 1/4, Sec. 30</u>
Mining District: <u>Philipsburg</u>	Mine Type: <u>Hardrock/Mn, Pb, Zn, Ag</u>
Latitude: <u>N 46° 19' 53"</u>	Primary Drainage: <u>Camp Creek</u>
Longitude: <u>W 113° 15' 59"</u>	USGS Code: <u>17010202</u>
Land Status: <u>Private</u>	Secondary Drainage: <u>None</u>
Quad: <u>Philipsburg</u>	Date Investigated: <u>June 22, 1993</u>
Inspectors: <u>Bullock, Flammang, Clark</u>	P.A. # <u>20-019</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- There were no mill tailings observed at this site during this investigation.
- The volume of waste rock associated with this site was estimated to be approximately 543,000 cubic yards. The following elements were elevated at least three times background:

Arsenic: 264 to 377 mg/kg	Nickel: 62J to 95J mg/kg
Cadmium: 9.5 to 33.3 mg/kg	Lead: 1,090J to 2,950J mg/kg
Copper: 166J to 386J mg/kg	Antimony: 28J mg/kg
Mercury: 0.654 to 1.14 mg/kg	Zinc: 4,480 to 17,700 mg/kg
Manganese: 11,700 to 18,700 mg/kg	
- No adit discharges, filled shafts, seeps, or springs were observed at the site during the investigation, and no other surface water was located on or near the site; consequently, no groundwater or surface water samples were collected.
- Four potentially hazardous mine openings were identified at the site including two fenced shafts, one partially blocked adit, and one open adit. A 15 feet tall highwall associated with the pit was also potentially hazardous. Six structures were identified that presented potential safety hazards; and several drums/tanks were located on-site that may contain hazardous materials. Potential asbestos containing materials were also identified on-site.

Scratch All PA# 20-019
 AMRB HAZARDOUS MATERIALS INVENTORY
 INVESTIGATOR: PIONEER - BULLOCK
 INVESTIGATION DATE: 06/22/93

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)
20-019-WR-1	377	80.4	33.3	4	9.3	386 J	14200	1.14	11700	62 J	2950 J	28 J	17700	NR
20-019-WR-2	264	75.5	9.5	6.5	11.1	166 J	18000	0.654	18700	95 J	1090 J	7 J	4480	NR
BACKGROUND	25 J	286	0.5 U	9.8	4.6	9	13900	0.161 JX	1230	11	9	4 UJ	41	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		ACID BASE POTENT		SULFATE		PYRITIC		ORGANIC		PYRITIC		SULFUR	
	%	1/1000x	%	1/1000x	%	1/1000x	%	1/1000x	%	1/1000x	%	1/1000x	%	1/1000x	%	1/1000x
20-019-WR-1DUP	1.76	55	550	550	<0.01	495	2.25	70.3	2.45	479	2.44	478	2.24	70	0.9	534
20-019-WR-1	1.77	55.3	548	492	<0.01	492	2.24	70	2.44	478	2.44	478	2.24	70	0.9	534
20-019-WR-2	0.15	4.69	562	558	<0.01	558	0.9	28.1	0.81	534	0.81	534	0.9	28.1	0.9	534

LEGEND

WR1 - Composite of subsamples WR1A, 1E, and 2
 WR2 - Composite of subsamples WR1B, 1C, and 1D
 BACKGROUND - From the Granite Mountain Mine (20-110-SS-1)
 WR1DUP - Duplicate of the 20-019-WR-1 sample.

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

Mine/Site Name: <u>Trout</u>	County: <u>Granite</u>
Legal Description: <u>T 7N R 13W</u>	Section(s): <u>NE 1/4, SE 1/4, Sec. 30</u>
Mining District: <u>Philipsburg</u>	Mine Type: <u>Hardrock/Au, Ag, Pb Zn</u>
Latitude: <u>N 46° 19' 48"</u>	Primary Drainage: <u>Cliff Gulch</u>
Longitude: <u>W 113° 16' 05"</u>	USGS Code: <u>17010202</u>
Land Status: <u>Private</u>	Secondary Drainage: <u>Cliff Gulch</u>
Quad: <u>Philipsburg</u>	Date Investigated: <u>June 21, 1993</u>
Inspectors: <u>Bullock, Flammang, Clark</u>	P.A. # <u>20-062</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- There were approximately 93,000 cubic yards of mostly uncovered tailings on site. The following elements were elevated at least three times background:

Arsenic: 95J to 285J mg/kg	Barium: 1,340 mg/kg
Cadmium: 6.5 to 26.7 mg/kg	Chromium: 24 mg/kg
Copper: 156 to 376 mg/kg	Mercury: 1.83JX mg/kg
Manganese: 16,900 to 19,500 mg/kg	Nickel: 79 to 110 mg/kg
Lead: 946 to 2,780 mg/kg	Antimony: 33J mg/kg
Zinc: 3,090 to 14,500 mg/kg	

- There were approximately 1,750 cubic yards of slag on site. The following elements were elevated at least three times background:

Arsenic: 663J mg/kg	Cadmium: 7.2 mg/kg
Chromium: 17.7 mg/kg	Copper: 47.2 mg/kg
Mercury: 0.882JX mg/kg	Manganese: 97,200 mg/kg
Nickel: 387 mg/kg	Zinc: 4,850 mg/kg

- There were approximately 18,140 cubic yards of mostly uncovered waste rock on site. The following elements were elevated at least three times background:

Arsenic: 218J to 615J mg/kg	Cadmium: 3.1 to 19.1 mg/kg
Chromium: 14.7 to 30.2 mg/kg	Copper: 38.9 to 323 mg/kg
Mercury: 2.51JX mg/kg	Manganese: 25,800 mg/kg
Nickel: 111 mg/kg	Lead: 3,680 mg/kg
Antimony: 28J mg/kg	Zinc: 1,480 to 11,200 mg/kg

- There were no discharging adits, shafts, seeps or springs identified at the site.

- There was no surface water on site. The nearest surface water was over 1 mile away; no surface water samples were collected. A dry drainage was identified below the site and its headwaters were in the tailings; hence, there was no upstream sample. A downstream sediment sample was collected.

Trout PAF# 20-062
 AMRB HAZARDOUS MATERIALS INVENTORY
 INVESTIGATOR: PIONEER - BULLOCK
 INVESTIGATION DATE: 06/22/93

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)
20-062-SE-1	303 J	2540	21.8	2.7	20.2	274	16900	1.23 JX	28300	131	2900	21 J	11200	NR
20-062-SL-1	663 J	507	7.2	2.6	17.7	47.2	17400	0.892 JX	97200	387	1240	10 J	4850	NR
20-062-TP-1	95 J	547	6.5	1.2 U	8.5	156	8690	0.412 JX	16900	79	946	5 J	3090	NR
20-062-TP-2	285 J	1340	26.7	7.1	24	376	21400	1.83 JX	19500	110	2780	33 J	14500	NR
20-062-WR-1	615 J	215	3.1	4.9	30.2	38.9	19300	0.335 JX	154000	723	198	7 J	1170	NR
20-062-WR-2	218 J	605	19.1	0.8 U	5.8	223	3990	2.51 JX	25800	111	3690	28 J	11200	NR
20-062-WR-3	10 J	39.5	9.8	4.7	14.7	323	15600	0.054 JX	581	12	13	4 UJ	1480	NR
BACKGROUND	25 J	286	0.5 U	9.8	4.6	9	13900	0.161 JX	1230	11	9	4 UJ	41	NR

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	TOTAL SULFUR ACID BASE v/1000x	NEUTRAL POTENT v/1000x	SULFUR ACID BASE POTENT v/1000x	SULFATE SULFUR %	PYRITIC SULFUR %	ORGANIC SULFUR %	PYRITIC SULFUR ACID BASE v/1000x	SULFUR ACID BASE POTENT v/1000x
20-062-SL-1	<0.01	0	187	187	<0.01	<0.01	0.05	0	187
20-062-SL-1DUP	<0.01	0	177	177	<0.01	0.01	0.05	0.31	177
20-062-TP-1	0.92	28.7	98	69.2	0.22	0.53	0.17	16.6	81.4
20-062-TP-2	2.17	67.8	129	61.4	<0.01	1.88	0.38	58.7	70.4
20-062-WR-1	<0.01	0	469	469	<0.01	<0.01	0.02	0	469
20-062-WR-2	<0.01	0	908	908	<0.01	<0.01	0.02	0	908
20-062-WR-3	1.8	56.2	168	112	0.02	0.77	1.01	24.1	144

Cation Exchange Capacity

FIELD ID	milliequivalents/100g
20-062-SL-1	4.19
20-062-TP-1	0.62
20-062-TP-2	3.79

LEGEND

SE1 - Downgradient sediment sample in Cliff Gulch.
 SL1 - Dark material associated with old mill Composite of subsamples SL-1, 2A, 2B, and 3
 TP1 - Composite of subsamples TP1-1A, 2, and 3
 TP2 - Composite of subsamples TP1-1B, 1C, 1D, and 2D.
 WR1 - Composite of subsamples WR1, 2, and LO#H.
 WR2 - Composite of subsamples WR4A, 4B, 5, and 6
 WR3 - Sample of the subsample WR3.
 BACKGROUND - From the Granite Mountain Mine (20-110-SS-1)
 SL1DUP - Duplicate of the sample 20-062-SL1.

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

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

Mine/Site Name: <u>Little Gem</u>	County: <u>Granite</u>
Legal Description: T <u>7N</u> R <u>13W</u>	Section(s): <u>NE 1/4, SW 1/4, Section 30</u>
Mining District: <u>Philipsburg</u>	Mine Type: <u>Hardrock/Ag. Au. Pb. Zn</u>
Latitude: <u>N 46° 19' 43"</u>	Primary Drainage: <u>Camp Creek</u>
Longitude: <u>W 113° 16' 22"</u>	USGS Code: <u>17010202</u>
Land Status: <u>Private</u>	Secondary Drainage: <u>Cliff Gulch</u>
Quad: <u>Philipsburg</u>	Date Investigated: <u>July 5, 1994</u>
Inspectors: <u>Flammang, Belanger, West</u>	P.A. # <u>20-071</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- The volume of tailings observed at the site was estimated to be 18,290 cubic yards. The following elements were elevated to at least three times the background concentrations:

Silver: 53 to 68.5 mg/kg	Manganese: 29,600 mg/kg
Cadmium: 15.1 mg/kg	Lead: 903 to 2,890 mg/kg
Copper: 145J mg/kg	Zinc: 2,590 to 9,250 mg/kg
- The volume of waste rock observed at the site was estimated to be 4,810 cubic yards. The waste rock was previously sampled during the 1993 Hazardous Materials Inventory as part of the Trout Mine (20-062) investigation. The following elements were elevated to at least three times the background concentrations:

Cadmium: 9.8 mg/kg	Zinc: 1,480 mg/kg
Copper: 323 mg/kg	
- No discharging adits, filled shafts, seeps, or springs were observed at the site during the investigation.
- Intermittent Cliff Gulch (dry during investigation) flows adjacent to the site on the north side. Sediment samples were collected from Cliff Gulch; however, no observed releases were documented due to upgradient impacts from the Trout site.
- Potential safety hazards observed at the site included one open adit, a collapsing headframe, and two collapsing wooden structures.

Little Gem PA# 20-071
 AMRB HAZARDOUS MATERIALS INVENTORY
 INVESTIGATOR: PIONEER - FLAMMANG
 INVESTIGATION DATE: 07/05/94

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)
20-062-WR3	NR	10 J	39.5	9.8	4.7	14.7	323	15600	0.054 JX	581	12	13	4 UJ	1480	NR
20-071-SE1	60.4	225 J	1690	16.4 J	1.8	7.9 J	168 J	13500	0.75 J	20900	2.3 JX	2240	18.2 JX	9560	NR
20-073-SE2	55.4	252 J	2120	15.9 J	2.0	9.6 J	191 J	14700	0.74 J	22500	5.0 JX	1990	16.1 JX	8940	NR
20-071-TP1	53.0	309 J	808	3.8 J	1.9 U	7.8 J	111 J	24500	1.18 J	6510	3.4 JX	903	6.4 UJX	2590	2.28
20-071-TP2	68.5	189 J	846	15.1 J	2.5	8.7 J	145 J	12200	1.03 J	29600	1.6 UJX	2890	18.8 JX	9250	1.23
BACKGROUND	8.6	169 J	484	1.6 J	6.6	12.6 J	44.4 J	15600	0.63 J	3830	7.3 JX	192	6.7 UJX	440	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		ORGANIC SULFUR		PYRITIC SULFUR		SULFATE SULFUR		NEUTRAL POTENTIAL		SULFUR ACID/BASE POTENTIAL	
	%	g/1000g	%	g/1000g	%	g/1000g	%	g/1000g	%	g/1000g	%	g/1000g	%	g/1000g
20-071-TP1	2.06	64.4	-39	104	0.78	25.6	1.03	32.2	0.25	8.2	-39	104	-6.54	116
20-071-TP2	1.33	41.5	146	104	0.19	146	0.96	30.0	0.18	30.0	146	104	116	

LEGEND

- SE1 - Dependent of Little Gem; composition of Trace; approx. 1% from low of waste rock (through in valley)
- SE2 - Dependent of Wigger #2; composition of Little Gem and White River Mines.
- TP1 - Composite of sub-samples TP1A-1 and 2A-1.
- TP2 - Composite of sub-samples TP2A-1 through 2A-4.
- SE3-WR3 - One sample of the WR3 sub-sample; from the Trace Mine.
- BACKGROUND - From the Little Gem Mine (20-071-SE1).

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

Mine/Site Name: <u>Wenger No. 2</u>	County: <u>Granite</u>
Legal Description: <u>T 7N R 13W</u>	Section(s): <u>SW 1/4, SW 1/4, Section 30</u>
Mining District: <u>Philipsburg</u>	Mine Type: <u>Hardrock/Ag. Au. Pb. Zn</u>
Latitude: <u>N 46° 19' 10"</u>	Primary Drainage: <u>Camp Creek</u>
Longitude: <u>W 113° 16' 47"</u>	USGS Code: <u>17010202</u>
Land Status: <u>Private</u>	Secondary Drainage: <u>Cliff Gulch</u>
Quad: <u>Philipsburg</u>	Date Investigated: <u>July 5, 1994</u>
Inspectors: <u>Flammang, Belanger, West</u>	P.A. # <u>20-073</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- The volume of tailings observed at the site was estimated to be 86,635 cubic yards. The following elements were elevated to at least three times the background concentrations:

Silver: 52.4 to 70.6 mg/kg	Arsenic: 520J mg/kg
Barium: 3,880 to 7,050 mg/kg	Cadmium: 10J to 12.4J mg/kg
Copper: 187J to 644J mg/kg	Manganese: 16,000 mg/kg
Lead: 1,920 to 2,340 mg/kg	Zinc: 6,820 to 7,860 mg/kg
- The volume of waste rock observed at the site was estimated to be 8,350 cubic yards. The following elements were elevated to at least three times the background concentrations:

Barium: 1,940 mg/kg	Copper: 330J mg/kg
Manganese: 36,900 mg/kg	Zinc: 2,500 mg/kg
- No discharging adits, filled shafts, seeps, or springs were observed at the site during the investigation.
- Intermittent Cliff Gulch (dry during investigation) flows adjacent to the site on the northeast side. Sediment samples were collected from the Cliff Gulch drainage; however, no observed releases were documented.
- Potential safety hazards observed at the site included two open adits, a collapsing loadout structure, and a collapsing cabin.

Wenger No. 2 PA# 20-073
 AMRB HAZARDOUS MATERIALS INVENTORY
 INVESTIGATOR: PIONEER - FLAMMANG
 INVESTIGATION DATE: 07/05/94

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)
20-073-SE1	28.9	1590	8.6 J	1.6 U	6.4 J	123 J	9140	0.70 J	15400	1.4 UJX	1430	7.1 JX	5310	NR
20-073-SE2	55.4	2120	15.9 J	2.0	9.6 J	191 J	14700	0.74 J	22500	5.0 JX	1990	16.1 JX	8940	NR
20-073-TP1	70.6	7050	10.0 J	1.9 U	7.3 J	644 J	9080	0.78 J	6440	7.5 JX	2340	23.4 JX	7860	2.28
20-073-TP2	52.4	3880	12.4 J	2.2	13.2 J	187 J	14300	1.22 J	16000	4.6 JX	1920	24.5 JX	6920	1.23
20-073-WR1	23.5	1940	3.8 J	2.2	4.5 J	330 J	7190	0.43 J	36900	1.3 UJX	272	4.8 UJX	2500	NR
BACKGROUND	8.6	484	1.6 J	6.6	12.6 J	44.4 J	15600	0.63 J	3830	7.3 JX	192	6.7 UJX	440	NR

D - Not Detected, J - Estimated Quantity, X - Differ for Accuracy or Precision, NR - Not Reported

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENT		SULFUR ACID BASE POTENT		SULFATE SULFUR		PYRITIC SULFUR		ORGANIC SULFUR		PYRITIC SULFUR ACID BASE POTENT		SULFUR ACID BASE POTENT	
	%	v/1000r	%	v/1000r	%	v/1000r	%	v/1000r	%	v/1000r	%	v/1000r	%	v/1000r	%	v/1000r
20-073-TP1	0.89	27.8	89.6	61.8	0.23	0.59	0.07	0.23	0.59	0.07	18.4	0.07	18.4	71.2	42.6	599
20-073-TP2	1.09	34.1	64.8	30.7	0.18	0.71	0.20	0.18	0.71	0.20	22.2	0.20	22.2	42.6	599	599
20-073-WR1	0.01	0.31	599	599	<0.01	<0.01	0.08	<0.01	<0.01	0.08	0.00	0.08	0.00	599	599	599

LEGEND

- SE1 - Determination of cadmium soil on west side of canal.
- SE2 - Upgrade of Wenger #2, Determination of Little Oats and White Horse Mine west of road in drainage.
- TP1 - Each sample of the TP1-A sub-sample.
- WR1 - Composite of sub-samples WR1A through 1C, 2A, 2B, and 3.

BACKGROUND - From the Little Oats Mine (20-071-081).

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

Mine/Site Name: <u>Granite Mountain</u>	County: <u>Granite</u>
Legal Description: T <u>7 N</u> R <u>13 W</u>	Section(s): <u>NE 1/4, SE 1/4, Sec. 32</u>
Mining District: <u>Philipsburg</u>	Mine Type: <u>Hardrock/Ag, Au, Pb</u>
Latitude: <u>N 46° 18' 55" to 19' 05"</u>	Primary Drainage: <u>Flint Creek</u>
Longitude: <u>W 113° 14' 20" to 14' 50"</u>	USGS Code: <u>17010202</u>
Land Status: <u>Private/Public</u>	Secondary Drainage: <u>Douglas Creek</u>
Quad: <u>Fred Burr/Philipsburg</u>	Date Investigated: <u>June 22, 1993</u>
Inspectors: <u>Tuesday, Belanger, Lasher</u>	P.A. # <u>20-110</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- The volume of tailings associated with this site was estimated to be approximately 8,280 cubic yards. Tailings were also observed in a dry stream bed extending approximately 1 mile downstream to Douglas Creek. The following elements were elevated at least three times background:

Arsenic: 55,000J mg/kg	Mercury: 4.58JX mg/kg
Cadmium: 38.3 mg/kg	Lead: 1,240 mg/kg
Copper: 1,560 mg/kg	Antimony: 224J mg/kg
Iron: 298,000 mg/kg	Zinc: 7,920 mg/kg
Cyanide: 0.737 mg/kg	
- The volume of waste rock associated with this site was estimated to be approximately 53,000 cubic yards. The following elements were elevated at least three times background:

Arsenic: 3,420 mg/kg	Lead: 315 mg/kg
Copper: 52.9 mg/kg	Antimony: 28 mg/kg
Mercury: 1.67 JX mg/kg	Zinc: 289 mg/kg
- No flowing adits or filled shafts, were observed on or adjacent to the site during the investigation; no groundwater or surface water samples were collected.
- The fenced shaft was open and potentially hazardous. A highwall located near the top of the hill was unstable and potentially hazardous.

**Granite Mountain PA# 20-110
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - TUESDAY
INVESTIGATION DATE: 08/22/93**

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)
20-110-TP-2	55000 J	98.4	38.3	4.9	10.4	1560	298000	4.58 JX	1990	11	1240	224 J	7920	0.737
20-110-WR-1	3420 J	232	1.3	4.3	1.8	52.9	21200	1.67 JX	1090	6	315	28 J	289	NR
BACKGROUND	25 J	286	0.5 U	9.8	4.6	9	13900	0.161 JX	1230	11	9	4 UJ	41	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		SULFATE		PYRITIC		ORGANIC		PYRITIC		SULFUR	
	%	μ/1000g	%	μ/1000g	%	μ/1000g	%	μ/1000g	%	μ/1000g	%	μ/1000g	%	μ/1000g	%	μ/1000g
20-110-TP-2	0.72	22.5	-2.3	-2.3	0.1	-25	0.1	0.47	14.7	0.15	0.15	0.15	14.7	-17	-17	-17
20-110-WR-1DUP	0.43	13.4	2.02	2.02	0.34	-11	0.34	<0.01	0	0.09	0.09	0.09	0	2.02	2.02	2.02
20-110-WR-1	0.41	12.8	2.37	2.37	0.31	-10	0.31	0.01	0.31	0.09	0.09	0.09	0.31	20.6	20.6	20.6

LEGEND

TP2 - Sample of the TP2 subsample
WR1 - Composite of WR1A, 1B, 1C, 1D, and 1E.
BACKGROUND - From Granite Mountain Mine (20-110-SS-1).
WR1DUP - Duplicate of sample 20-110-WR-1

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

Mine/Site Name: <u>True Fissure</u>	County: <u>Granite</u>
Legal Description: <u>T 7N R 13W</u>	Section(s): <u>NE 1/4, SE 1/4, Sec. 30</u>
Mining District: <u>Philipsburg</u>	Mine Type: <u>Hardrock/Ag. Mn, Pb, Zn</u>
Latitude: <u>N 46° 19' 32"</u>	Primary Drainage: <u>Douglas Creek</u>
Longitude: <u>W 113° 16' 00"</u>	USGS Code: <u>17010202</u>
Land Status: <u>Private</u>	Secondary Drainage: <u>Camp Creek</u>
Quad: <u>Philipsburg</u>	Date Investigated: <u>June 23, 1993</u>
Inspectors: <u>Tuesday, Belanger, Clark</u>	P.A. # <u>20-111</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 137,360 cubic yards. The following elements were elevated at least three times background:

Arsenic : 502 mg/kg	Cadmium: 2.3 to 3.6 mg/kg
Copper: 43.4J to 43.7J mg/kg	Manganese: 34,900 mg/kg
Nickel: 142J mg/kg	Lead: 347J to 1,140J mg/kg
Zinc: 1,730 to 2,420 mg/kg	
- The waste rock dumps were undercut for use as fill material, and resulted in unstable highwalls on WR-4. A residence was located at the base of WR-1.
- No observed releases or exceedances of drinking water standards or aquatic life criteria were documented during this investigation. No adit discharges, seeps or springs were observed.
- Two hazardous structures were on site: one older building and an old covered tramway. Two mine openings were on site: an adit closed by Department of State Lands (DSL), and a shaft fenced by DSL but still open.

True Fissure PA# 20-111
 AMRB HAZARDOUS MATERIALS INVENTORY
 INVESTIGATOR: PIONEER - TUESDAY
 INVESTIGATION DATE: 06/23/93

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)
20-111-WR-1	74	88.3	3.6	3	6.1	43.4 J	6960	0.244	34900	142 J	347 J	8 J	2420	NR
20-111-WR-2	502	227	2.3	6.2	4.4	43.7 J	37800	1.88	342	2 U	1140 J	5 J	1730	NR
BACKGROUND	25 J	286	0.5 U	9.8	4.6	9	13900	0.161 JX	1230	11	9	4 UJ	41	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		SULFATE		PYRITIC		ORGANIC		PYRITIC		SULFUR ACID BASE POTENT	
	%	1/1000K	%	1/1000K	%	1/1000K	%	1/1000K	%	1/1000K	%	1/1000K	%	1/1000K	%	1/1000K
20-111-WR-1	0.34	10.6	595	1.44	<0.01	584	0.44	0.34	13.7	0.34	581	0.19	13.7	0.34	581	0.19
20-111-WR-2	0.75	23.4	1.44	1.44	0.57	-22	0.04	0.14	1.25	0.14	0.19	0.19	1.25	0.14	0.19	0.19

LEGEND

WR1 - Composite of subsamples WR1A through 1C, 4A, and 4B
 WR2 - Composite of subsamples WR2A and 3A.
 BACKGROUND - From the Granite Mountain Mine (20-110-SS-1)

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

Mine/Site Name: <u>Nonpareil</u>	County: <u>Granite</u>
Legal Description: <u>T 8 N R 12 W</u>	Section(s): <u>SW 1/4, SW 1/4, Sec. 32</u>
Mining District: <u>South Boulder</u>	Mine Type: <u>Hardrock/Pb, Ag, Zn, Cu</u>
Latitude: <u>N 46° 23' 53"</u>	Primary Drainage: <u>Flint Creek</u>
Longitude: <u>W 113° 08' 20"</u>	USGS Code: <u>17010202</u>
Land Status: <u>Private/Public</u>	Secondary Drainage: <u>Boulder Creek</u>
Quad: <u>Maxville</u>	Date Investigated: <u>September 8, 1993</u>
Inspectors: <u>M. Babits, S. Babits/Pierson</u>	P.A. # <u>20-012</u>
Organization: <u>Pioneer Technical Services, Inc./Thomas, Dean and Hoskins, Inc.</u>	

- There were approximately 18,475 cubic yards of tailings on site. The following were elevated at least three times background:

Arsenic: 360 to 697 mg/kg	Barium 433 mg/kg
Cadmium: 23.1 to 45.8 mg/kg	Copper: 159 to 316 mg/kg
Mercury: 1.22 mg/kg	Lead: 2,640 to 3,110 mg/kg
Antimony: 243J to 282J mg/kg	Zinc: 3,260 to 12,100 mg/kg
Cyanide: 0.395 to 0.541 mg/kg	
- There were approximately 3,200 cubic yards of uncovered waste rock. The following were elevated at least three times background:

Arsenic: 2,330 mg/kg	Copper: 863J mg/kg
Iron: 176,000 mg/kg	Lead: 5,720 mg/kg
Antimony: 116J mg/kg	Zinc: 3,310 mg/kg
- There were no discharging adits, filled shafts, seeps, or springs identified at the site.
- Boulder Creek was flowing approximately 200 feet west of the site. Water which flowed directly through the tailings discharged into Boulder Creek. An observed release to Boulder Creek was documented for copper; however, no MCLs or acute or chronic aquatic life criteria were exceeded that were attributable to the site.

Nonpareil PA# 20-012
 AMRB HAZARDOUS MATERIALS INVENTORY
 INVESTIGATOR: PIONEER - BABITS
 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)
20-012-SE-1	54.1	28.9 J	4.6	3.37 J	3.23	42.7 J	7660	0.751	195 J	6.97	97.2	6.1 UJ	1020	NR
20-012-SE-2	177	139 J	7.9	5.76 J	5.57	69.8 J	18400	0.719	702 J	11.7	754	42.5 J	1380	NR
20-012-TP-1	360	433 J	23.1	1.64 U	2.16	159 J	14900	1.22	9.66 J	2.13 U	3110	282 J	3260	0.395
20-012-TP-2	697	319 J	45.8	8.89 J	4.09	316 J	29700	0.169	198 J	42.4	2640	243 J	12100	0.541
20-012-WR-1	2330	111 J	0.5 U	2.02 J	12.8	863 J	176000	1.78	119 J	5.85	5720	116 J	3310	NR
BACKGROUND	17 JX	122	0.8 J	10.4 J	34.2 J	34.6	23500 J	0.06	1040 J	36 J	38 J	5 U	106 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 ACID BASE POTENT.	
	%	1/1000x	1/1000x	1/1000x	%	1/1000x	%	1/1000x	%	1/1000x	%	1/1000x
20-012-TP-1	0.84	26.2	1.51	-25	0.63	0.15	1.87	-0.36				
20-012-TP-2	2.65	82.8	11.7	-71	0.6	0.29	55	-43.3				
20-012-WR-1	0.53	16.6	-0.3	-17	0.51	0.02	0	-0.28				

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)
20-012-SW-1	1.79	15.1	4.27 J	9.7 U	6.83 U	2.9 J	48.2	0.12 UJX	4.08 U	15.1 JX	3.73	30.7 U	16.9 J	76.3
20-012-SW-2	2.96	21	2.57 U	9.7 U	6.83 U	8.87 J	75.3	0.13 JX	4.13	12.7 UX	7	30.7 U	37.1 J	80.6
20-012-SW-3	5.13	32.6	2.57 U	9.7 U	6.83 U	9.4 J	99.4	0.12 UJX	4.13	12.7 UX	6.69	30.7 U	67.2 J	93.8

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	
	<	<	<	<	<	<	<	<	<	<
20-012-SW-1	130	< 5.0	< 5.0	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	NR
20-012-SW-2	144	< 5.0	< 5.0	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	NR
20-012-SW-3	155	< 5.0	< 5.0	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	NR

LEGEND

- SE1 - Upgradient (100' from mill building in Boulder Creek just upgradient of pump house)
- SE2 - At PPE of pond discharge to Boulder Creek.
- TP1 - Composite of subsamples TP1, TP2, TP3, TP4A, and 4B
- TP2 - Composite of subsamples TP5A and TP5B.
- WR1 - Composite of subsamples WR1A and WR1B
- BACKGROUND - From Jackson Park (20-027-SS-1)
- SW1 - Same as SE1.
- SW2 - Same as SE2.
- SW3 - Pond below Tailings Pond 5. (discharges into Boulder Creek)

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

Mine/Site Name: <u>Brooklyn</u>	County: <u>Granite</u>
Legal Description: T <u>7N</u> R <u>12W</u>	Section(s): <u>SE 1/4, NW 1/4, Sec. 5</u>
Mining District: <u>South Boulder</u>	Mine Type: <u>Hardrock/Ag, Cu, Pb, Zn, Bismuth</u>
Latitude: <u>N 46° 23' 23"</u>	Primary Drainage: <u>Flint Creek</u>
Longitude: <u>W 112° 07' 30"</u>	USGS Code: <u>17010202</u>
Land Status: <u>Public</u>	Secondary Drainage: <u>Boulder Creek</u>
Quad: <u>Maxville/Pikes Peak</u>	Date Investigated: <u>June 24, 1993</u>
Inspectors: <u>Bullock, Flammang, Lasher</u>	P.A. # <u>20-025</u>
Organization: <u>Pioneer Technical Services, Inc.</u>	

- Two small impoundments were constructed between the upper mine workings and Boulder Creek. The waste material in these impoundments was either mill tailings or eroded waste rock from the waste rock dumps above. There was no evidence of a mill structure on site, and no historical accounts of milling on-site were found. There were approximately 4800 cubic yards of waste material in the impoundment area. The following elements were elevated at least three times background:

Arsenic: 668 mg/kg	Barium: 861J mg/kg
Cadmium: 99.3 mg/kg	Copper: 2290 mg/kg
Mercury: 10.4J mg/kg	Lead: 5650 mg/kg
Antimony: 747 mg/kg	Zinc: 13,500 mg/kg
- The volume of waste rock associated with this site was estimated to be approximately 38,000 cubic yards. The following elements were elevated at least three times background:

Arsenic: 388 to 797 mg/kg	Barium: 435J mg/kg
Cadmium: 38.7 to 41.4 mg/kg	Copper: 121 to 566 mg/kg
Mercury: 2.2J to 20.8J mg/kg	Lead: 2030 to 5510 mg/kg
Antimony: 64 to 644 mg/kg	Zinc: 648 to 9140 mg/kg
- There were no discharging adits or shafts associated with this site.
- Boulder Creek flowed along the base of the lower workings (WR-5 and WR-6). Observed releases were documented for mercury and lead. MCLs and MCLGs were not exceeded in the samples collected. The chronic aquatic life criteria for lead was exceeded and was be directly attributed to this site.

Brooklyn PA# 20-025
 AMRB HAZARDOUS MATERIALS INVENTORY
 INVESTIGATOR: PIONEER - BULLOCK
 INVESTIGATION DATE: 06/24/93

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)
20-025-SE-1	126	318 J	12.6	1.5	1.4	56.5	8610	1.52 J	42.4 J	8 J	537	63	1560	NR
20-025-SE-2	17	40 J	1.2	3.5	2.6	8	9410	0.099 J	278 J	3 J	32	4 U	179	NR
20-025-TP-1	668	861 J	99.3	3.8	5.7	2290	15900	10.4 J	18.2 J	16 J	5650	747	13500	NR
20-025-WR-2	466	294 J	38.7	3.9	3.5	566	17700	12.6 J	43.9 J	15 J	5510	644	9140	NR
20-025-WR-3	797	227 J	3	6.3	3	121	54300	2.2 J	43.4 J	15 J	2030	64	648	NR
20-025-WR-5	388	435 J	41.4	4.4	2.5	213	17600	20.8 J	45.1 J	80 J	3310	184	3180	NR
BACKGROUND	17 JX	122	0.8 J	10.4 J	34.2 J	34.6	23500 J	0.06	1040 J	36 J	38 J	5 U	106 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/1000X	%	U/1000X	%	U/1000X	%	U/1000X	%	U/1000X	%	U/1000X
20-025-TP-1	3.29	103	-1.6	-104	0.96	1.25	1.08	39	-40.6			
20-025-WR-2	1.81	56.5	5.7	-51	0.49	0.29	1.03	9.06	-3.36			
20-025-WR-3	5.07	158	42.1	-116	0.88	2.62	1.57	81.8	-39.7			
20-025-WR-5	1.65	51.5	165	114	0.1	0.46	1.09	14.4	151			

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)
20-025-SW-1	2.88	13.4	257 U	9.7 U	6.83 U	2.33	110	0.067	6.2	12.7 U	9.39	30.7 U	7.57 U	51.5
20-025-SW-2	1.24	10.5	257 U	9.7 U	6.83 U	1.55 U	25.5	0.038 U	4.43	12.7 U	0.38 U	30.7 U	7.57 U	51.8

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
20-025-SW-1	95	< 5.0	5	< 0.05	NR
20-025-SW-2	96	< 5.0	5	< 0.05	NR

LEGEND

SE1 - Downgradient of waste rock dump 5 and 6.
 SE2 - Upgradient of mine.
 TP1 - Composite of subsamples TP1A-A, 1A-B, 1B-A, 1B-B, and 1B-C.
 WR2 - Composite of subsamples WR1, 2A, 2B, and 2C.
 WR3 - Composite of subsamples WR3A, 3B, 3C, and 3D.
 WR5 - Composite of subsamples WR5A, 5B, 6A, 6B, and 6C.
 BACKGROUND - From the Jackson Park Mine (20-027-SS-1).

SW1 - Same as sample SE1.

SW2 - Same as sample SE2.