

## **APPENDIX A: ANALYTICAL LABORATORY RESULTS**

CLIENT : IDEQ  
PROJECT: ROBERT HIGDEM

Sample Receipt: 8/03/04  
Report Date: 8/16/04

Page 1 of 1  
SVL JOB: 112409

SVL ID	CLIENT SAMPLE ID	Ag 6010B	As 6010B	Ba 6010B	Cd 6010B	Cr 6010B	Pb 6010B	Se 6010B	Hg 7470A
W402325	H-3 7/27/04	<0.0050mg/L	<0.010mg/L	0.0037mg/L	<0.0020mg/L	<0.0060mg/L	<0.0050mg/L	<0.010mg/L	<0.00020mg/L
W402326	H-4 7/27/04	<0.0050mg/L	0.013mg/L	0.0049mg/L	<0.0020mg/L	<0.0060mg/L	<0.0050mg/L	<0.010mg/L	<0.00020mg/L
W402327	H-5 7/27/04	<0.0050mg/L	<0.010mg/L	0.0040mg/L	<0.0020mg/L	<0.0060mg/L	<0.0050mg/L	<0.010mg/L	<0.00020mg/L
W402328	BL-DOWN 7/28/04	<0.0050mg/L	<0.010mg/L	0.0044mg/L	<0.0020mg/L	<0.0060mg/L	<0.0050mg/L	<0.010mg/L	<0.00020mg/L
W402329	BLW-2 7/28/04	<0.0050mg/L	0.011mg/L	0.0108mg/L	<0.0020mg/L	<0.0060mg/L	<0.0050mg/L	<0.010mg/L	<0.00020mg/L
W402330	BLW-3 7/28/04	<0.0050mg/L	<0.010mg/L	0.0047mg/L	<0.0020mg/L	<0.0060mg/L	<0.0050mg/L	<0.010mg/L	<0.00020mg/L
W402331	BUW-1 7/28/04	<0.0050mg/L	<0.010mg/L	0.0216mg/L	<0.0020mg/L	<0.0060mg/L	<0.0050mg/L	<0.010mg/L	<0.00020mg/L
W402332	BUW-2 7/28/04	<0.0050mg/L	<0.010mg/L	0.0020mg/L	<0.0020mg/L	<0.0060mg/L	<0.0050mg/L	<0.010mg/L	<0.00020mg/L
W402333	BUW-3 7/28/04	<0.0050mg/L	0.015mg/L	0.0409mg/L	<0.0020mg/L	<0.0060mg/L	0.0086mg/L	<0.010mg/L	<0.00020mg/L
W402334	BUW-4 7/28/04	<0.0050mg/L	<0.010mg/L	0.0033mg/L	<0.0020mg/L	<0.0060mg/L	<0.0050mg/L	<0.010mg/L	<0.00020mg/L
W402335	BUW-5 7/28/04	<0.0050mg/L	<0.010mg/L	0.0027mg/L	<0.0020mg/L	<0.0060mg/L	<0.0050mg/L	<0.010mg/L	<0.00020mg/L
W402336	BU-UP 7/28/04	<0.0050mg/L	<0.010mg/L	0.0051mg/L	<0.0020mg/L	<0.0060mg/L	<0.0050mg/L	<0.010mg/L	<0.00020mg/L

Certificate: ID ID00019  
Reviewed By: \_\_\_\_\_

*[Signature]*

Date: 8/16/04

RECEIVED  
AUG 18 2004  
DEQ-Coeur d'Alene  
Regional Office

Client : IDEQ		SVL JOB No: 112409						Analysis Date
alyte	Method	Matrix	Units	Prep Blank	True—LCS—Found	LCS %R		
Silver	6010B	WATER	mg/L	<0.0050	1.00	1.06	106.0	8/13/04
Arsenic	6010B	WATER	mg/L	<0.010	1.00	1.03	103.0	8/13/04
Barium	6010B	WATER	mg/L	<0.0020	1.00	0.994	99.4	8/13/04
Cadmium	6010B	WATER	mg/L	<0.0020	1.00	0.995	99.5	8/13/04
Chromium	6010B	WATER	mg/L	<0.0060	1.00	1.01	101.0	8/13/04
Lead	6010B	WATER	mg/L	<0.0050	1.00	1.02	102.0	8/13/04
Selenium	6010B	WATER	mg/L	<0.010	1.00	1.04	104.0	8/13/04
Mercury	7470A	WATER	mg/L	<0.00020	0.00500	0.00517	103.4	8/12/04

## LEGEND:

LCS = Laboratory Control Sample

LCS %R = LCS Percent Recovery

N/A = Not Applicable

Client : IDEQ							SVL JOB No: 112409					
Te	Method	Mtx	QC SAMPLE ID		Duplicate or Found	MSD RPD%	Matrix Spike			Analysis Date		
			Units	Result			Result	SPK ADD	%R			
Ag	6010B	W	1	mg/L	<0.0050	1.09	M	0.0	1.09	1.00	109.0	8/13/04
Ag	6010B	W	2	mg/L	<0.0050	N/A		N/A	1.08	1.00	108.0	8/13/04
As	6010B	W	1	mg/L	<0.010	1.07	M	1.9	1.05	1.00	105.0	8/13/04
As	6010B	W	2	mg/L	<0.010	N/A		N/A	1.05	1.00	105.0	8/13/04
Ba	6010B	W	1	mg/L	0.0037	1.03	M	0.0	1.03	1.00	102.6	8/13/04
Ba	6010B	W	2	mg/L	0.0027	N/A		N/A	1.02	1.00	101.7	8/13/04
Cd	6010B	W	1	mg/L	<0.0020	1.02	M	0.0	1.02	1.00	102.0	8/13/04
Cd	6010B	W	2	mg/L	<0.0020	N/A		N/A	1.01	1.00	101.0	8/13/04
Cr	6010B	W	1	mg/L	<0.0060	1.04	M	0.0	1.04	1.00	104.0	8/13/04
Cr	6010B	W	2	mg/L	<0.0060	N/A		N/A	1.03	1.00	103.0	8/13/04
Pb	6010B	W	1	mg/L	<0.0050	1.05	M	1.0	1.04	1.00	104.0	8/13/04
Pb	6010B	W	2	mg/L	<0.0050	N/A		N/A	1.03	1.00	103.0	8/13/04
Se	6010B	W	1	mg/L	<0.010	1.05	M	1.9	1.03	1.00	103.0	8/13/04
Se	6010B	W	2	mg/L	<0.010	N/A		N/A	1.02	1.00	102.0	8/13/04
Hg	7470A	W	1	mg/L	<0.00020	0.00104	M	0.0	0.00104	0.0010	104.0	8/12/04
Hg	7470A	W	2	mg/L	<0.00020	N/A		N/A	0.00102	0.0010	102.0	8/12/04

LEGEND:

RPD% =  $(|SAM - DUP| / ((SAM + DUP) / 2)) * 100$  UDL = Both SAM & DUP not detected. \*Result or \*Found: Interference required dilution.  
 RPD% =  $(|SPK - MSD| / ((SPK + MSD) / 2)) * 100$  M in Duplicate/MSD column indicates MSD.  
 SPIKE ADD column, A = Post Digest Spike; %R = Percent Recovery N/A = Not Analyzed; R > 4S = Result more than 4X the Spike Added  
 QC limits for MS recoveries apply only if the spike is at least 1/4 the concentration of the analyte in the sample.  
 Control limits for the RPD apply only if the concentration of the analyte in the sample is at least five times the reporting limit.  
 QC Sample 1: SVL SAM No.: 402325 Client Sample ID: H-3  
 QC Sample 2: SVL SAM No.: 402335 Client Sample ID: BUW-5

Contact Name: Robert Higdon  
 E-mail Address: rhigdon@deg.state.id.us  
 Address: 2110 Ironwood Parkway  
 City: CdA State: ID Zip Code: 83814



STATE OF IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY

CHAIN OF CUSTODY RECORD

Contact Phone No.: 769-1422 Fax No.: 769-1404  
 Project/Site: Lower Bullion Mine PA/SI Sampler Signature: [Signature]

SAMPLE ID. NO.	DATE	TIME	SAMPLE LOCATION	ANALYSIS REQUESTED						SPECIAL INSTRUCTIONS			
				WATER	SOIL	OTHER	Metals-Totals	Metals-TCLP	Copper		Lead	Zinc	
BL-down	7/28	1030	Bullion Cr. downstream	X			X						Verify proper preservation pH level on all liquid samples. Adjust as needed
BLW-2	7/28	1510	Tunnel #3 Adit discharge	X			X						pH < 2
BLW-3	7/28	1520	Bullion Cr. upstream	X			X						pH < 2
BLS-1	7/28	1310	South waste rock pile - N		X		X						
BLS-2	7/28	1315	South waste rock pile - S		X		X						
BLS-3	7/28	1540	North waste rock pile		X		X						
BLR-1	7/28	1100	South waste rock pile			X	X						
BLR-2	7/28	1110	South waste rock pile			X	X						
BLR-3	7/28	1120	South waste rock pile			X		X	X	X			
BLR-4	7/28	1300	South waste rock pile - S			X	X						
BLR-5	7/28	1530	North waste rock pile			X	X						

PRESERVATIVE (Ice ≤ 4° C, etc.): All liquid samples kept on ice in coolers. All liquid samples in cube-tainers preserved w/ HNO3. [Signature]

RELINQUISHED BY: [Signature] DATE: 7/30/04 TIME: 0900 RECEIVED BY: [Signature] DATE: [ ] TIME: [ ]

RELINQUISHED BY: [Signature] DATE: [ ] TIME: [ ] RECEIVED BY: [Signature] DATE: [ ] TIME: [ ]

RELINQUISHED BY: [Signature] DATE: [ ] TIME: [ ] RECEIVED BY: [Signature] DATE: [ ] TIME: [ ]

TOTAL # OF CONTAINERS: 11

SAMPLE RECEIPT: RECEIVED WITH SEALS INTACT?  YES  NO LABEL TAG, COC AGREE?  YES  NO

WHITE - ORIGINAL YELLOW - OFFICE PINK - CLIENT



STATE OF IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY  
**CHAIN OF CUSTODY RECORD**

Contact Name: **Robert Higden** E-mail Address: **rhigden@deq.state.id.us**  
 Address: **2110 Ironwood Parkway**  
 City: **CD'A** State: **ID** Zip Code: **83814**

Contact Phone No.: **769-1422** Fax No.: **769-1404**  
 Project/Site: **Upper Bullion Mine PA/SE** Sampler Signature: *[Signature]*

SAMPLE MATRIX	ANALYSIS REQUESTED										SPECIAL INSTRUCTIONS	
	WATER	SOIL	OTHER	Metals - Totals	Metals - TCLP							COMMENTS
		X		X	X							Verify proper preservation pH levels on all liquid samples. Adjust accordingly
		X		X								
			X	X								
			X	X								
			X	X								
	X			X								All liquid samples kept on ice / in coolers.
	X			X								
	X			X								
	X			X								
	X			X								
	X			X								
	X			X								
	X			X								
	X			X								
		X		X								Sediment

SAMPLE ID. NO.	DATE	TIME	SAMPLE LOCATION
BUS-1	7/28	1805	Tunnel #1 waste rock pile
BUS-2	7/28	1835	Tunnel #2 waste rock pile
BUR-1	7/28	1800	Tunnel #1 waste rock pile
BUR-2	7/28	1830	Adit #3 waste rock pile
BUR-3	7/28	1840	Tunnel #2 waste rock pile
BOW-1	7/28	1810	Tributary upstream
BOW-2	7/28	1820	Adit #3 discharge
BOW-3	7/28	1810	Tunnel #2 discharge
BOW-4	7/28	1820	Tributary downstream
BOW-5	7/28	1845	Tributary between #2 & #3
BU-up	7/28	1645	Bullion Ck. above ponds
BU-sd	7/28	1705	Beaver pond sediment

PRESERVATIVE (Ice ≤ 4° C, etc.) *BU-sd samples BUW 1,2,3,4,5 have no preservative. BU-up had HNO3 preservative.* TOTAL # OF CONTAINERS: **12**

RELINQUISHED BY: <i>[Signature]</i>	DATE: <b>7/30/04</b>	TIME: <b>0900</b>	RECEIVED BY: <i>[Signature]</i>	DATE: <b>7/30/04</b>	TIME: <b>0900</b>
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	DATE	TIME
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	DATE	TIME

SAMPLE RECEIPT: RECEIVED WITH SEALS INTACT?  YES  NO LABEL TAG, COC AGREE?  YES  NO

WHITE - ORIGINAL PINK - CLIENT YELLOW - OFFICE

**SVL ANALYTICAL, INC.**

One Government Gulch ■ P.O. Box 929 ■ Kellogg, Idaho 83827-0929 ■ Phone: (208)784-1258 ■ Fax: (208)783-0891

**REPORT OF ANALYTICAL RESULTS**

CLIENT : IDEQ  
PROJECT: ROBERT HIGDEM

Sample Receipt: 8/03/04  
Report Date: 8/17/04

Page 1 of 2  
SVL JOB: 112410

**RECEIVED**

**AUG 19 2004**

**DEQ Coeur d'Alene Regional Office**

SVL ID	CLIENT SAMPLE ID	As 6010B	Ba 6010B	Cd 6010B	Cr 6010B
S402339	<del>H-1</del> 7/27/04	1580mg/kg	57.6mg/kg	<1.0mg/kg	3.80mg/kg
S402341	<del>H-6</del> 7/27/04	<2.5mg/kg	2450mg/kg	50.9mg/kg	<1.0mg/kg
S402342	BLS-1 7/28/04	<2.5mg/kg	370mg/kg	90.7mg/kg	<1.0mg/kg
S402343	BLS-2 7/28/04	<2.5mg/kg	290mg/kg	49.7mg/kg	<1.0mg/kg
S402344	BLS-3 7/28/04	<2.5mg/kg	171mg/kg	26.9mg/kg	<1.0mg/kg
S402345	BLR-1 7/28/04	<2.5mg/kg	3110mg/kg	15.6mg/kg	<1.0mg/kg
S402346	BLR-2 7/28/04	<2.5mg/kg	1520mg/kg	25.6mg/kg	<1.0mg/kg
S402347	BLR-3 7/28/04	70.3mg/kg	59400mg/kg	9.70mg/kg	6.50mg/kg
S402348	BLR-4 7/28/04	<2.5mg/kg	245mg/kg	94.6mg/kg	<1.0mg/kg
S402349	BLR-5 7/28/04	<2.5mg/kg	186mg/kg	28.0mg/kg	<1.0mg/kg
S402350	BUS-1 7/28/04	<2.5mg/kg	283mg/kg	20.6mg/kg	<1.0mg/kg
S402351	BUS-2 7/28/04	<2.5mg/kg	141mg/kg	17.3mg/kg	<1.0mg/kg
S402352	BUR-1 7/28/04	<2.5mg/kg	1280mg/kg	18.9mg/kg	<1.0mg/kg
S402353	BUR-2 7/28/04	<0.50mg/kg	18.0mg/kg	64.1mg/kg	<0.20mg/kg
S402354	BUR-3 7/28/04	<2.5mg/kg	424mg/kg	19.4mg/kg	<1.0mg/kg
S402355	BU-SD 7/28/04	<0.50mg/kg	3.3mg/kg	12.6mg/kg	<0.20mg/kg

Soil Samples: As Received Basis

ID ID00019

Reviewed By: \_\_\_\_\_

*[Signature]*

Date: 8/17/04

CLIENT : IDEQ  
PROJECT: ROBERT HIGDEM

Sample Receipt: 8/03/04  
Report Date: 8/17/04

Page 2 of 2  
SVL JOB: 112410

SVL ID	CLIENT SAMPLE ID		Pb	Se	Hg	% So1.
			6010B	6010B	7471A	999
S402339	<del>H-1</del>	7/27/04	11.8mg/kg	<5.0mg/kg	<0.0330mg/kg	99.9%
S402341	<del>H-6</del>	7/27/04	9.50mg/kg	<5.0mg/kg	0.0520mg/kg	93.6%
S402342	BLS-1	7/28/04	17.3mg/kg	<5.0mg/kg	0.388mg/kg	99.8%
S402343	BLS-2	7/28/04	68.3mg/kg	<5.0mg/kg	0.333mg/kg	99.7%
S402344	BLS-3	7/28/04	20.3mg/kg	<5.0mg/kg	0.318mg/kg	98.6%
S402345	BLR-1	7/28/04	245mg/kg	<5.0mg/kg	0.433mg/kg	99.8%
S402346	BLR-2	7/28/04	24.7mg/kg	<5.0mg/kg	0.462mg/kg	99.7%
S402347	BLR-3	7/28/04	64.4mg/kg	23.0mg/kg	1.73mg/kg	99.7%
S402348	BLR-4	7/28/04	13.8mg/kg	<5.0mg/kg	0.508mg/kg	99.6%
S402349	BLR-5	7/28/04	20.0mg/kg	6.0mg/kg	0.475mg/kg	99.8%
S402350	BUS-1	7/28/04	41.3mg/kg	<5.0mg/kg	0.277mg/kg	99.5%
S402351	BUS-2	7/28/04	16.4mg/kg	<5.0mg/kg	0.935mg/kg	98.3%
S402352	BUR-1	7/28/04	59.1mg/kg	<5.0mg/kg	0.413mg/kg	99.7%
S402353	BUR-2	7/28/04	15.3mg/kg	<1.0mg/kg	0.0850mg/kg	99.7%
S402354	BUR-3	7/28/04	18.0mg/kg	<5.0mg/kg	1.36mg/kg	99.5%
S402355	BU-SD	7/28/04	2.67mg/kg	1.0mg/kg	<0.0330mg/kg	18.4%

Soil Samples: As Received Basis

Certificate: ID ID00019

Reviewed By: \_\_\_\_\_



Date: 8/17/04

Client : IDEQ							SVL JOB No: 112410	
alyte	Method	Matrix	Units	Prep Blank	True—LCS—Found	LCS %R	Analysis Date	
Silver	6010B	SOIL	mg/kg	<0.50	100	98.3	98.3	8/15/04
Arsenic	6010B	SOIL	mg/kg	<1.0	100	89.4	89.4	8/15/04
Barium	6010B	SOIL	mg/kg	<0.20	100	99.9	99.9	8/15/04
Cadmium	6010B	SOIL	mg/kg	<0.20	100	94.7	94.7	8/15/04
Chromium	6010B	SOIL	mg/kg	<0.60	100	101	101.0	8/15/04
Lead	6010B	SOIL	mg/kg	<0.50	100	95.2	95.2	8/15/04
Selenium	6010B	SOIL	mg/kg	<1.0	100	84.4	84.4	8/15/04
Mercury	7471A	SOIL	mg/kg	<0.0330	8.38	7.82	93.3	8/14/04

## LEGEND:

LCS = Laboratory Control Sample

LCS %R = LCS Percent Recovery

N/A = Not Applicable

Client : IDEQ		SVL JOB No: 112410									
Element	Method	Mtx	QC SAMPLE ID		Duplicate or Found	MSD RPD%	Matrix Spike			Analysis Date	
			Units	Result			Result	SPK ADD	%R		
Ag	6010B	S	1 mg/kg	<2.5	102	M	1.0	103	100	103.0	8/15/04
Ag	6010B	S	2 mg/kg	<2.5	N/A		N/A	104	100	104.0	8/15/04
As	6010B	S	1 mg/kg	1580	1320	M	25.2	1700	100	120.0	8/15/04
As	6010B	S	2 mg/kg	283	N/A		N/A	307	100	24.0	8/15/04
As	6010B	S	2 mg/kg	283	N/A		N/A	752	500	A 93.8	8/15/04
Ba	6010B	S	1 mg/kg	57.6	154	M	5.7	163	100	105.4	8/15/04
Ba	6010B	S	2 mg/kg	20.6	N/A		N/A	116	100	95.4	8/15/04
Cd	6010B	S	1 mg/kg	<1.0	95.8	M	1.3	97.1	100	97.1	8/15/04
Cd	6010B	S	2 mg/kg	<1.0	N/A		N/A	97.1	100	97.1	8/15/04
Cr	6010B	S	1 mg/kg	3.80	103	M	1.9	105	100	101.2	8/15/04
Cr	6010B	S	2 mg/kg	<3.0	N/A		N/A	104	100	104.0	8/15/04
Pb	6010B	S	1 mg/kg	11.8	108	M	2.7	111	100	99.2	8/15/04
Pb	6010B	S	2 mg/kg	41.3	N/A		N/A	135	100	93.7	8/15/04
Se	6010B	S	1 mg/kg	<5.0	89.3	M	6.2	95.0	100	95.0	8/15/04
Se	6010B	S	2 mg/kg	<5.0	N/A		N/A	86.9	100	86.9	8/15/04
Hg	7471A	S	1 mg/kg	<0.0330	0.193	M	5.3	0.183	0.167	109.6	8/14/04
Hg	7471A	S	2 mg/kg	0.277	N/A		N/A	0.420	0.167	85.6	8/14/04

LEGEND:

RPD% =  $(|SAM - DUP| / ((SAM + DUP) / 2)) * 100$  UDL = Both SAM & DUP not detected. \*Result or \*Found: Interference required dilution.

RPD% =  $(|SPK - MSD| / ((SPK + MSD) / 2)) * 100$  M in Duplicate/MSD column indicates MSD.

SPIKE ADD column, A = Post Digest Spike; %R = Percent Recovery N/A = Not Analyzed; R > 4S = Result more than 4X the Spike Added

QC limits for MS recoveries apply only if the spike is at least 1/4 the concentration of the analyte in the sample.

Control limits for the RPD apply only if the concentration of the analyte in the sample is at least five times the reporting limit.

QC Sample 1: SVL SAM No.: 402339 Client Sample ID: H-1

QC Sample 2: SVL SAM No.: 402350 Client Sample ID: BUS-1



STATE OF IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY  
**CHAIN OF CUSTODY RECORD**

Contact Name <b>Robert Gadem</b>	E-mail Address <b>rhigdem@deq.state.id.us</b>		
Address <b>2110 Ironwood Parkway</b>			
City <b>CDA</b>	State <b>ID</b>	Zip Code <b>83814</b>	

Contact Phone No. <b>769-1422</b>	Fax No. <b>769-1404</b>
Project/Site: <b>Lower Bullion Mine PA/SI</b>	Sampler Signature <i>[Signature]</i>

SAMPLE ID NO.	DATE	TIME	SAMPLE LOCATION	SAMPLE MATRIX			ANALYSIS REQUESTED							SPECIAL INSTRUCTIONS					
				WATER	SOIL	OTHER	Metals - Totals	Metals - TCLP	Copper	Lead	Zinc								
BL-down	7/28	1030	Bullion Ck. downstream	X			X												Verify proper preservation pH level on all liquid samples. Adjust as needed
<del>BLW-2</del>	<del>7/28</del>	<del>1510</del>	<del>Tunnel #3 Adit discharge</del>	<del>X</del>			<del>X</del>												<del>pH &lt; 2</del> <del>8/3/04</del>
BLW-3	7/28	1520	Bullion Ck. upstream	X			X												pH < 2
RLS-1	7/28	1310	South waste rock pile - N		X		X												
RLS-2	7/28	1315	South waste rock pile - S		X		X												
RLS-3	7/28	1540	North waste rock pile		X		X												
BLR-1	7/28	1100	South waste rock pile			X	X												
BLR-2	7/28	1110	South waste rock pile			X	X												
BLR-3	7/28	1120	South waste rock pile			X		X	X	X									
BLR-4	7/28	1300	South waste rock pile - S			X	X												
BLR-5	7/28	1530	North waste rock pile			X	X												

PRESERVATIVE (Ice or 2% Boric) *All liquid samples kept on ice* TOTAL # OF CONTAINERS: *11*

RELINQUISHED BY: (Signature) <i>[Signature]</i>	DATE <b>7/30/04</b>	TIME <b>0900</b>	RECEIVED BY: (Signature)	DATE	TIME
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	DATE	TIME
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	DATE	TIME

SAMPLE RECEIPT: RECEIVED WITH SEALS INTACT?  YES  NO LABEL TAG, COC AGREE?  YES  NO

WHITE - ORIGINAL YELLOW - OFFICE PINK - CLIENT





Client : IDEQ							SVL JOB No: 113065	
alyte	Method	Matrix	Units	Prep Blank	True—LCS—Found	LCS %R	Analysis Date	
Copper	200.7	WATER	mg/L	<0.0030	1.00	0.992	99.2	9/12/04
Zinc	200.7	WATER	mg/L	<0.0050	1.00	0.967	96.7	9/12/04
pH	150.1	WATER		5.42	7.20	7.26	100.8	9/07/04

## LEGEND:

LCS = Laboratory Control Sample

LCS %R = LCS Percent Recovery

N/A = Not Applicable

Client : IDEQ		SVL JOB No: 113065								
Tc	Method Mtx	QC SAMPLE ID		Duplicate or Found	MSD RPD%	Matrix Spike			Analysis Date	
		Units	Result			Result	SPK ADD	%R		
Cu	200.7 W	1	mg/L	<0.0030	<0.0030	UDL	1.03	1.00	103.0	9/12/04
Cu	200.7 W	2	mg/L	<0.0030	N/A	N/A	1.03	1.00	103.0	9/12/04
Zn	200.7 W	1	mg/L	<0.0050	<0.0050	UDL	1.06	1.00	106.0	9/12/04
Zn	200.7 W	2	mg/L	<0.0050	N/A	N/A	1.05	1.00	105.0	9/12/04
pH	150.1 W	1		7.85	7.84	0.1	N/A	N/A	N/A	9/07/04

LEGEND:

RPD% =  $(|SAM - DUP| / ((SAM + DUP) / 2)) * 100$  UDL = Both SAM & DUP not detected. \*Result or \*Found: Interference required dilution.

RPD% =  $(|SPK - MSD| / ((SPK + MSD) / 2)) * 100$  M in Duplicate/MSD column indicates MSD.

SPIKE ADD column, A = Post Digest Spike; %R = Percent Recovery N/A = Not Analyzed; R > .4S = Result more than 4X the Spike Added

QC limits for MS recoveries apply only if the spike is at least 1/4 the concentration of the analyte in the sample.

Control limits for the RPD apply only if the concentration of the analyte in the sample is at least five times the reporting limit.

QC Sample 1: SVL SAM No.: 409943 Client Sample ID: BL DOWN

QC Sample 2: SVL SAM No.: 409953 Client Sample ID: BL-VP



Name **Brian Cobber - Report & Invoice**  
 Address **1410 N. Hillman**  
 City **Boise** State **ID** Zip Code **83706**

Sampler(s) **Brian Cobber + Curtis Stehr**  
 Project or Site **Bullion mine ST**

# Chain of Custody Form

LAB NUMBER	DATE	TIME	SAMPLE IDENTIFICATION	TYPE OF SAMPLE	TESTS	NUMBER OF CONTAINERS
	9/1	14:35	BV-W1	Water	X	
	9-1	14:25	BV-W2	Soil		
	9-1	14:20	BV-W3	Other		
	9-1	14:15	BV-W4	BTEX (8020)		
	9-1	15:10	BCR-W1	418.1 (I.R.) TPH		
	9-1	15:00	BUR-W1	8015 (G.C.) TPH		
	9-1	15:00	BUR-W1	VOC's - 502.2/8021		
	9-1	15:00	BUR-W1	TCLP - Metals (1311)		
	9-1	15:00	BUR-W1	TCLP - Volatiles (1311)		
	9-1	15:00	BUR-W1	TCLP - Pest. (1311)		
	9-1	15:00	BUR-W1	Total Metals		
	9-1	15:00	BUR-W1	Cyanides (335.2)		
	9-1	15:00	BUR-W1	Flashpoint		
	9-1	15:00	BUR-W1	pH	X	
	9-1	15:00	BUR-W1	PAH's (8270)		
	9-1	15:00	BUR-W1	Organochlorides (8080)		
	9-1	15:00	BUR-W1	Herbicides (8150)		
	9-1	15:00	BUR-W1	Organophosphates (8140)		
	9-1	15:00	BUR-W1	Zinc	X	
	9-1	15:00	BUR-W1	Copper	X	

COMMENTS  
 SVL to preserve portion w/ HNO3 for Zn & Cu...

Lab Charge Code



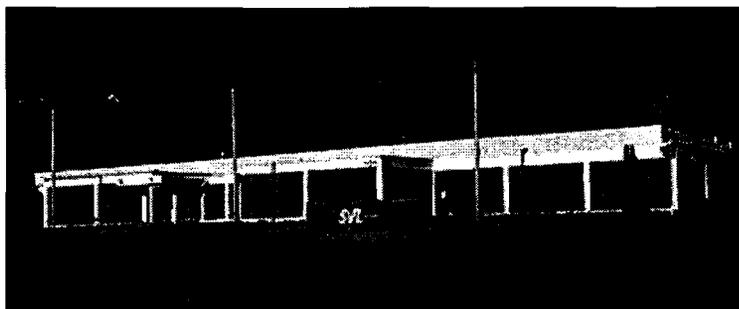
Relinquished By (Signature) *[Signature]* Date *9/20/04* Time *8:18* Received *[Signature]* Signature *[Signature]* Date *9/20/04* Time *8:18*  
 Received with Seal  Yes  No  
 Label Tsg. COC Agree?  Yes  No



<http://www.svl.net>



- About SVL
- Personnel
- Sampling
- Analyses
- Client Services
- Instrumentation/Method
- Quality Assurance Pla
- Certific
- Employ
- Link
- Photo
- Cont



<b>Shipping Address:</b>  SVL Analytical Inc. One Government Gulch Kellogg, ID 83837-0929	<b>Mailing Address:</b>  SVL Analytical Inc. P.O. Box 929 Kellogg, ID 83837-0929
<b>Phone Numbers:</b> Ask for <i>Chris Meyer</i> 1-800-597-7144 (208) 784-1258	<b>Fax Number:</b>  (208) 783-0891
<b>General E-mail Address:</b>  <a href="mailto:Information">Information</a>	<b>Web Page:</b>  <a href="http://www.svl.net">http://www.svl.net</a>

Copyright© 2001 SVL Analytical, Inc. All rights reserved.  
 Questions or Comments about this site? Write to [Webmaster](mailto:Webmaster)

## 6 TEST METHODS

### 6.1 Analytes and published methods

SVL Analytical routinely performs the following analytical methods.

<b>ANALYTE</b>	<b>METHOD</b>	<b>TECHNIQUE</b>
Aluminum	EPA 200.7, SW846 6010B	ICP
Antimony	EPA 200.7, SW846 6010B	ICP
Antimony	EPA 200.9, 204.2, SW846 7040	GFAA
Antimony	EPA 200.8, SW846 6020	ICPMS
Arsenic	EPA 200.7, SW816 6010B	ICP
Arsenic	EPA 200.9, 206.2, SW846 7060A	GFAA
Arsenic	EPA 200.8, SW846 6020	ICPMS
Barium	EPA 200.7, SW846 6010B	ICP
Barium	EPA 200.8, SW846 6020	ICPMS
Beryllium	EPA 200.7, SW846 6010B	ICP
Beryllium	EPA 200.8, SW846 6020	ICPMS
Boron	EPA 200.7, SW846 6010B	ICP
Boron	EPA 200.8, SW846 6020	ICPMS
Cadmium	EPA 200.7, SW846 6010B	ICP
Cadmium	EPA 200.9, 213.2, SW846 7131A	GFAA
Cadmium	EPA 200.8, SW846 6020	ICPMS
Calcium	EPA 200.7, SW846 6010B	ICP
Chromium	EPA 200.7, SW846 6010B	ICP
Chromium	EPA 200.9, 218.2, SW846 7191	GFAA
Chromium	EPA 200.8, SW846 6020	ICPMS
Chromium, Hexavalent	ASTM D-1687	Colorimetry
Cobalt	EPA 200.7, SW846 6010B	ICP
Cobalt	EPA 200.8, SW846 6020	ICPMS
Copper	EPA 200.7, SW846 6010B	ICP

<b>ANALYTE</b>	<b>METHOD</b>	<b>TECHNIQUE</b>
Copper	EPA 200.9, 220.2	GFAA
Copper	EPA 220.2, SW846 6020	ICPMS
Gallium	EPA 200.7, SW846 6010 B	ICP
Gold	EPA 231.2	GFAA
Hexavalent Chromium	ASTM D-1687	Colorimetry
Iron	EPA 200.7, SW846 6010B	ICP
Lanthanum	EPA 200.7, SW846 6010B	ICP
Lead	EPA 200.7, SW846 6010B	ICP
Lead	EPA 200.9, 239.2, SW846 7420	GFAA
Lead	EPA 200.8, SW846 6020	ICPMS
Lithium	EPA 200.7, SW846 6010B	ICP
Magnesium	EPA 200.7, SW846 6010B	ICP
Manganese	EPA 200.7, SW846 6010B	ICP
Manganese	EPA 200.8, SW846 6020	ICPMS
Mercury	EPA 245.1, SW846 7470A, 7471A	CVAA
Molybdenum	EPA 200.7, SW846 6010B	ICP
Molybdenum	EPA 200.8, SW846 6020	ICPMS
Nickel	EPA 200.7, SW846 6010B	ICP
Nickel	EPA 200.8, SW846 6020	ICPMS
Potassium	EPA 200.7, SW8946 6010B	ICP
Scandium	EPA 200.7, SW846 6010B	ICP
Selenium	SM 3114C	Hydride AA
Selenium	EPA 200.7, SW846 6010B	ICP
Selenium	EPA 200.9, 270.2, SW846 7740	GFAA
Selenium	EPA 200.8, SW846 6020	ICPMS
Silica	EPA 200.7	ICP
Silver	EPA 200.7, SW846 6010B	ICP
Silver	EPA 200.9, 272.2, SW846 7761	GFAA
Silver	EPA 200.8, SW846 6020	ICPMS

<b>ANALYTE</b>	<b>METHOD</b>	<b>TECHNIQUE</b>
Sodium	EPA 200.7, SW846 6010B	ICP
Strontium	EPA 200.7, SW846 6010B	ICP
Thallium	EPA 200.7, SW846 6010B	ICP
Thallium	EPA 200.9, 279.2, SW846 7840	GFAA
Thallium	EPA 200.8, SW836 6020	ICPMS
Tin	EPA 200.7, SW846 6010B	ICP
Titanium	EPA 200.7, SW846 6010B	ICP
Uranium	EPA 200.7	ICP
Uranium	EPA 200.8	ICPMS
Vanadium	EPA 200.7, SW846 6010B	ICP
Vanadium	EPA 200.8, SW846 6020	ICPMS
Zinc	EPA 200.7, SW846 6010B	ICP
Zinc	EPA 200.8, SW836 6020	ICPMS
Acidity	SM 2310B, EPA 305.1	Titration
Alkalinity	SM 2320B, EPA 310.1	Titration
Ammonia	EPA 350.1	Automated Colorimetry
Ammonia	EPA 350.3	Ion Specific Electrode
Bromide	EPA 300.0	Ion Chromatography
Chemical Oxygen Demand	EPA 410.4	Colorimetry
Chloride	EPA 300.0	Ion Chromatography
Color	EPA 110.2	Colorimetry
Conductivity	EPA 120.1	Wheatstone Bridge
Corrosivity	SM 2330 (B)	Langlier Index
Cyanide, Total	EPA 335.2, 335.4, SW846 9012A	Automated Colorimetry
Cyanide, Free	SM 4500 CN (F)	Ion Specific Electrode
Cyanide, WAD	SM 4500 CN (I)	Automated Colorimetry
Cyanide, Available	1677	Automated Colorimetry
Fluoride	EPA 300.0	Ion Chromatography

<b>ANALYTE</b>	<b>METHOD</b>	<b>TECHNIQUE</b>
Fluoride	EPA 340.2	Ion Specific Electrode
Hardness	SM 2340B	ICP Sum
Ignitability	SW846 1010	Pensky-Martens
MBAS	EPA 425.1	Colorimetry
Nitrate	EPA 300.0	Ion Chromatography
Nitrate	EPA 353.2	Automated Colorimetry
Nitrate + Nitrite	EPA 353.2	Automated Colorimetry
Nitrate + Nitrite	EPA 300.0	Automated Colorimetry
Nitrite	EPA 300.0	Ion Chromatography
Nitrite	EPA 353.2	Automated Colorimetry
Odor	EPA 140.1	Sniff Panel
ortho-Phosphate	EPA 365.2	Colorimetry
Perchlorate	EPA 314.0	Ion Chromatography
pH (aqueous)	EPA 150.1	Electrometric
pH (soil)	EPA 9045C	Electrometric
Paste pH	ASA Monograph 9	Electrometric
Phenolics, Total	EPA 420.1	Colorimetric
Phosphate, Total	EPA 365.2	Persulfate Digestion
Residue, Filterable	EPA 160.1, SM2540C	Gravimetric
Residue, Nonfilterable	EPA 160.2	Gravimetric
Settleable Solids	EPA 160.5	Volumetric
Specific Conductance	EPA 120.1	Wheatstone Bridge
Sulfate	EPA 300.0	Ion Chromatography
Sulfide	EPA 376.1	Titrimetric
Suspended Solids	EPA 160.2	Gravimetric
Total Dissolved Solids	EPA 160.1, SM2540C	Gravimetric
Total Solids	EPA 160.4	Gravimetric
Total Suspended Solids	EPA 160.2	Gravimetric
Total Kjeldahl Nitrogen	EPA 351.4	Ion Selective Electrode

<b>ANALYTE</b>	<b>METHOD</b>	<b>TECHNIQUE</b>
Total Organic Carbon	EPA 415.1	Combustion
Total Organic Halides in Waste	SW846 9076	Adsorption-Pyrolysis, Titrim
Total Volatile Solids	EPA 160.3	Gravimetric
Turbidity	EPA 180.1	Nephelometric
TCLP (Toxicity Characteristic Leaching)	SW846 1311	Extraction
SPLP (Synthetic Precipitation Leaching)	SW846 1312	Extraction
STLC (Soluble Threshold Limit Conc)		Extraction
MWMP (Meteoric Water Mobility)	ASTM E2242-02	Extraction
CEC (Cation Exchange Capacity)	SW846 9081	
Textural Analysis (Particle Size)	ASA "Methods of Soil Analysis" Number 9, Part 1	
Specific Gravity	ASTM D854-02	
TOM/TOC	USBR 5430-89	
ANP (Acid Neutralization Potential)		Titration
ABA (Acid Base Account)		LECO
Total Sulfur + Sulfur Forms		LECO
Total Carbon		LECO

## 6.2 References

Methods for Chemical Analysis of Water and Wastes, revised March 1983, EPA-600/4-79-020.

Methods for the Determination of Metals in Environmental Samples Supplement I, EPA/600/R-94/111, May 1994

Methods for the Determination of Inorganic Substances in Environmental Samples, EPA/600/R-93/100, August 1993

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW 846), Third Edition, Update III, December 1996.

Standard Methods for the Examination of Water and Wastewater, 16th Edition, 1985

Standard Methods for the Examination of Water and Wastewater, 19th Edition, 1995.

ASTM Book of Standards, part 31

Soil Testing and Plant Analysis, 3<sup>rd</sup> Edition, Soil Sciences Society of America, 1990

American Society of Agronomy, "Methods of Soil Analysis" Number 9, Parts 1 and 2

U.S. Department of Agriculture, Handbook #60

U.S. Department of the Interior, Bureau of Reclamation, Procedure for Determining Moisture, Ash, and Organic Content of Soil, USBR 5430-89

## APPENDIX B: PHOTOGRAPHIC LOG

Bullion Mine				7/27-28/2004	
Camera Type: <input checked="" type="checkbox"/> Digital <input type="checkbox"/> 35mm <input type="checkbox"/> Other _____			Camera Brand: Olympus	Camera Model: D-560	Camera ID#: 900005
Photo:	Date:	By:	Direction: (N,S,E,W, etc.)	File Name:	Description:
1	7/27/2004	RH	N	P7280038	Heavy brush covering Tunnel No. 3 (collapsed)
2	7/27/2004	RH	SE	P7280039	South waste rock dump, as viewed from north dump
3	7/27/2004	RH	N	P7280040	Close-up of ground water discharge from Tunnel No. 3
4	7/27/2004	RH	SE	P7280041	Collapsed structure on north side of Bullion Creek
5	7/27/2004	RH	NW	P7280042	South face of north dump, collapsed structure at left
6	7/27/2004	RH	SW	P7280043	North face of south dump
7	7/27/2004	RH	SW	P7280044	Close-up of north face of south dump, trestle remains?
8	7/27/2004	RH	SSW	P7280045	South dump, blowout beyond red flag at center
9	7/27/2004	RH	SSW	P7280046	Southern portion of south dump, beyond blowout (red flag)
10	7/27/2004	RH	W	P7280047	South dump, rock/soil from blowout washed through brush at right
11	7/27/2004	RH	NE	P7280048	North portion of south dump, measuring tape crosses blowout at center
12	7/27/2004	RH	SW	P7280049	Southern portion of south dump, red flag denotes sample location
13	7/27/2004	RH	NW	P7280050	View from South dump of collapsed structure (photo 4)
14	7/27/2004	RH	N	P7280051	South dump (right), north dump visible through brush (center)
15	7/27/2004	RH	W	P7280052	Collapsed structure (20' x 50') large concrete base
16	7/27/2004	RH	NW	P7280053	Close-up of collapsed structure, metal piping through concrete base
17	7/27/2004	RH	NE	P7280054	Close-up of concrete base and pipes
18	7/27/2004	RH	S	P7280055	Close-up of 1940's era truck cab at base of north dump
19	7/27/2004	RH	W	P7280056	Large collapsed lower cabin below old road
20	7/27/2004	RH	N	P7280057	Collapsed lower cabin (photo 19)
21	7/27/2004	RH	N	P7280058	Covered concrete pit (storage) in hillside just north of lower cabin
22	7/27/2004	RH	N	P7280059	Close-up of concrete pit with tin & wood roof
23	7/27/2004	RH	SW	P7280060	Meadow above beaver ponds, tributary (center), FS Road 507 at top
24	7/27/2004	RH	S	P7280061	Beaver ponds on Bullion Creek, above Lower workings
25	7/27/2004	RH	S	P7280062	Panoramic view of beaver ponds
26	7/27/2004	RH	S	P7280063	Unnamed tributary from Upper workings flows into beaver pond at right
27	7/27/2004	RH	W	P7280064	Close-up of beaver ponds 2 & 3, tributary inlet into pond 1 at far right
28	7/27/2004	RH	N	P7280065	Beaver den in pond 2, large beaver spotted entering den (not pictured)
29	7/27/2004	RH	W	P7280066	Close-up of newest beaver dam on Bullion Creek above pond 2
30	7/27/2004	RH	NW	P7280067	Waste rock dump (Tunnel No.1 & Shaft No.1) in brush (upper center)
31	7/27/2004	RH	S	P7280068	Bulldozed rock covering Tunnel No. 2 (lower right), FS Road 507 at left
32	7/27/2004	RH	SW	P7280069	Shaft No.1 opening covered with bulldozed material (clean fill)
33	7/27/2004	RH	W	P7280070	Tunnel No. 2 collapsed (right center)
34	7/27/2004	RH	E	P7280071	Thornton Tunnel collapsed, minor seepage under thick vegetation



**Photo 1. Heavy brush covering Tunnel No. 3 (collapsed).**



**Photo 3. Close-up of ground water discharge from Tunnel No. 3.**



**Photo 2. South waste rock dump, as viewed from north dump.**



**Photo 4. Collapsed structure on north side of Bullion Creek.**



**Photo 5. South face of north dump, collapsed structure at left.**



**Photo 6. North face of south dump.**



**Photo 7. Close-up of north face of south dump, trestle remains?**



**Photo 8. South dump, blowout beyond red flag at center.**



**Photo 9. Southern portion of south dump, beyond blowout (red flag).**



**Photo 10. South dump, rock/soil from blowout washed through brush at right.**



**Photo 11. North portion of south dump, measuring tape crosses blowout at center.**



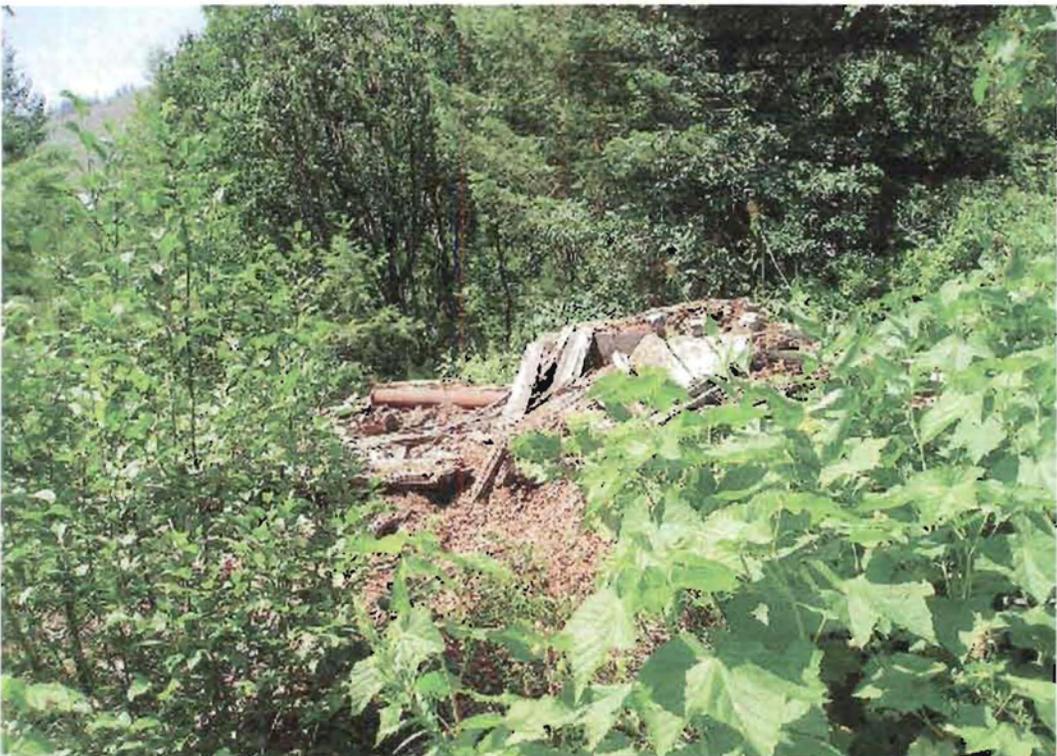
**Photo 12. Southern portion of south dump, red flag denotes sample location.**



**Photo 13. View from South dump of collapsed structure (photo 4).**



**Photo 14. South dump (right), north dump visible through brush (center).**



**Photo 15. Collapsed structure (20' x 50') large concrete base.**



**Photo 16. Close-up of collapsed structure, metal piping through concrete base.**



**Photo 17. Close-up of concrete base and pipes.**



**Photo 18. Close-up of 1940's era truck cab at base of north dump.**



**Photo 19. Large collapsed lower cabin below old road.**



**Photo 20. Collapsed lower cabin (photo 19).**



**Photo 21. Covered concrete pit (storage) in hillside just north of lower cabin.**



**Photo 22. Close-up of concrete pit with tin & wood roof.**



**Photo 23. Meadow above beaver ponds, tributary (center), FS Road 507 at top.**



**Photo 24. Beaver ponds on Bullion Creek, above Lower workings.**



**Photo 25. Panoramic view of beaver ponds.**



**Photo 26. Unnamed tributary from Upper workings flows into beaver pond at right.**



**Photo 27. Close-up of beaver ponds 2 & 3, tributary inlet into pond 1 at far right.**



**Photo 28. Beaver den in pond 2, large beaver spotted entering den (not pictured).**



**Photo 29. Close-up of newest beaver dam on Bullion Creek above pond 2.**



**Photo 30. Waste rock dumps (Tunnel No.1 & Shaft No.1) in brush (upper center).**



**Photo 31. Bulldozed rock covering Tunnel No. 2 (lower right), FS Road 507 at left.**



**Photo 32. Shaft No.1 opening covered with bulldozed material (clean fill).**



**Photo 33. Tunnel No. 2 collapsed (right center).**



**Photo 34. Thornton Tunnel collapsed, minor seepage under thick vegetation.**

## **APPENDIX C: OVERSIZED MAPS**

## **APPENDIX D: REFERENCE DOCUMENTATION**

# **IGS SITE INVESTIGATION REPORT**

### **3.16 BULLION MINE, UPPER WORKINGS (Site No. WL-489)**

These workings were identified in the field as either the Iron Spar (WL-482) or the Copper Chief (WL-486). However, this site is actually the upper workings of the Bullion Mine (Site No. WL-489). The Copper Chief claims joined the Bullion Group to the west, and most of the work on that property (except a few prospect cuts) was done through the lower tunnel of the Bullion Mine (discussed in section 3.17). In addition, the Taylor Copper Mine (WL-480) may be a synonym for either the Bullion Mine or the Copper Chief Prospect. There was a Taylor claim in the Copper Chief Group, and James H. Taylor was the manager, statutory agent, secretary, and/or major stockholder for both the Bullion Mining Company and the Copper Chief Mining Company until about 1945. However, the source document for the Taylor Mine was a U.S. Bureau of Mines property file which is not currently available.

#### **3.16.1 Site Location and Access (Figure 2.1-1b)**

The upper workings for the Bullion Mine are about 1 mile west of Bullion Pass on the north side of Forest Service Road 507 along a tributary drainage of Bullion Creek. The workings are in the SE $\frac{1}{4}$  of the NE $\frac{1}{4}$ , section 21, T. 47 N., R. 6 E., on the Lookout Pass 7.5-minute quadrangle (Figure 3.16-1). Two adits and the shaft are on the west side of the drainage, and the other adit is on the east side. All of the workings are on a block of patented claims surrounded by Forest Service land.

#### **3.16.2 Geologic Features (Figure 2.2-1b)**

These workings are in rocks of the Wallace Formation near the Placer Creek fault (Harrison and others, 1986).

#### **3.16.3 Site History**

The Bullion claims were located between 1900 and 1903 (Sims, 1998). Development started when eight men agreed to sink a 100-foot shaft in exchange for an interest in the property (Taylor, 1942a). The Bullion Mining Company, Ltd., was incorporated in 1902. (The "Ltd." was officially dropped from the company's name in 1952.) The eight men started digging the shaft, but work was soon halted because of the amount of water in the workings. The company purchased a boiler, a hoist, and a pump, but delivery of this equipment was delayed when the Northern Pacific "S" bridge was destroyed by a snow slide. From the east portal of the Borax Railway tunnel, the equipment had to be moved across the Idaho-Montana divide in an area with no roads. Using the boiler and hoist to power a sled, it took thirteen days to move the equipment the five miles from the railroad to the mine. The following summer, the company began work on a road (Taylor, 1942a). A ton of ore was shipped for testing in 1909 (Sims, 1998).

The 1910 forest fire destroyed all the equipment and buildings at the mine. Eight miners were also killed (Sims, 1998). New equipment was brought in after the road was completed. The

No. 2 tunnel was driven 350 feet to help drain the water from the workings and a new shaft was started. (Maps in the IGS's mineral property files suggest that this second shaft was internal and offset slightly from the original shaft.) Work on the No. 2 shaft was discontinued at a depth of about 50 feet, when it again became impossible to keep the water pumped out of the shaft. A carload of ore, which ran about 5.2 percent copper (Sims, 1998), was shipped from the No. 2 tunnel in 1912 (Taylor, 1942b).

By 1913, three of the claims at the Bullion were patented and the company was drifting westward on the vein. Soon afterward, operations on the upper workings (described below) were discontinued, and work was started on a crosscut tunnel 440 feet below the upper workings (section 3.17). About 650 feet were driven on the lower (No. 3) tunnel by June 1915, and 1,000 feet were added in the next year. In 1918, the mine had 4,700 feet of workings, and the No. 3 tunnel reached the vein during the year. According to Taylor (1942a), the ore was 4,100 feet from the portal of the No. 3 tunnel. The company was unable to ship any of this ore because there was no road to the lower workings (Taylor, 1942a). Underground work continued until about 1922, when the three tunnels were 600 feet, 1,200 feet, and 4,400 feet long, and the shaft was 100 feet deep. An additional thirteen claims were patented in late 1922 or early 1923. The company seems to have concentrated on road work for the next few years, but from 1926 to 1929, operations included raising from the No. 3 tunnel toward the upper workings. When work was discontinued, the raise was about 66 feet from connecting with the No. 2 tunnel (Taylor, 1942b).

In 1940, after the property had been idle for several years, the company noted that most of its (portable) equipment had been stolen. Bullion Mining applied to the government for assistance in reopening the mine during World War II (Taylor, 1942b), but this effort does not seem to have met with any success. In 1949, the mine was said to have 12,080 feet of workings, including three tunnels (500 feet, 2,000 feet, and 4,800 feet long), two shafts, and one raise. Despite later changes reported in the length of the workings, the Bullion appears to have been inactive since about 1930.

### **3.16.4 Environmental Conditions**

#### **3.16.4.1 Site Features**

This property was visited by John Kauffman on July 14, 1998. A video segment describing the site, which was identified as the Iron Spar, is on the Avery and St. Maries Districts Videotape (Tape 2, index 00:00:46-00:14:12). Documenting photographs are Roll K3, frames 1-11.

The workings consist of an open adit, two caved adits, and an open shaft (Figure 3.16-2). Adit 1 (probably the Bullion No. 2 tunnel) is located in dense brush along the west side of the gully about 100 feet north of the road and is hard to see because of the vegetation (Figure 3.16-3). Inside, the adit is timbered but has some piles of rock debris on the floor (Figure 3.16-4). Water, flowing from the portal at about 10 gallons per minute, enters the drainage immediately in front of

the adit. The stream, a tributary to Bullion Creek, has eroded a channel through the waste dump, which extends down to Forest Service Road 507. Part of the dump has been modified by road construction (Figure 3.16-5). Because of this construction, the size of the dump is difficult to estimate, but it is probably 100 feet long, 60 feet wide, and 15-20 feet thick.

Adit 2 (probably the Bullion No. 1 tunnel) and the shaft are about 300 feet north of the road and are also on the west side of the gully, although about 40 feet above the drainage. The shaft dump is visible from Forest Service Road 507. Seen from the east side of the drainage (Figure 3.16-6), Adit 2 has a smaller dump than the shaft, although the two dumps overlap slightly. The shaft dump extends down the slope to the drainage. The combined dumps are about 60 feet long, 10 feet wide, and 20-40 feet down the face. Adit 2 is caved and dry. The shaft, completely hidden from view behind some brush (Figure 3.16-7), is open and probably 75 feet or more deep. It presents a very dangerous situation.

Adit 3 (identified as the Thornton tunnel on maps in the IGS mineral property files) is on the east side of the gully and about 50 feet above the drainage. This caved adit forms a shallow trough on the slope and has a minor trickle of water flowing from it (probably less than 1 gallon per minute). The small, brush-covered dump measures about 10 feet long and 8 feet wide. It extends 15 feet down on the face, but forms only a thin veneer on the slope.

The total disturbed area is less than 1.0 acre.

### 3.16.4.2 Sample Locations

#### 3.16.4.2.1 Solid Samples

Waste dump samples were collected from the waste dump for the shaft and Adit 2 (K7149801) and from the waste dump for Adit 1 (K7149805).

Sample No.	Location	Analyzed (Yes/No)
K7149801	Bullion Mine, upper workings, shaft/Adit 2 dump	Yes
K7149805	Bullion Mine, upper workings, Adit 1 dump	Yes

#### 3.16.4.2.2 Water Samples

Water samples were collected from Adit 1 (K7149804), Adit 3 (K7149803), upstream on the tributary to Bullion Creek above the dump for the shaft and Adit 2 (K7149802), and downstream about 75 feet below Forest Service Road 507 (K7149806).

Sample No.	Location	Specific Conductivity (µS)	Temp. (°C)	pH	Flow (gpm)	Analysis (Yes/No)
K7149802	Bullion Mine, upper workings, upstream	44	43	7.2	2 ft. wide, 0.5 ft. deep	Yes
K7149803	Bullion Mine, upper workings, Adit 3	41	44	7.3	1	Yes
K7149804	Bullion Mine, upper workings, Adit 1	78	42	7.7	10	Yes
K7149806	Bullion Mine, upper workings, downstream	53	44	7.2	8 ft. wide, 0.5 ft. deep	Yes

### 3.16.4.2.3 Analytical Results

#### Solid Samples (Tables 2.5-3 and 2.5-4)

The sample from the dump for Adit 1 (K7149805) exceeds background and environmental levels for arsenic, cadmium, copper, iron, manganese, nickel, and lead in the element screen. The sample from the dump for the shaft and Adit 2 (K7149801) exceeds background and environmental levels for arsenic, cadmium, copper, iron, lead, manganese, nickel, and zinc in the element screen. Neither sample shows leaching of any element of interest in the TCLP for metals screen.

#### Water Samples (Tables 2.5-1 and 2.5-2)

In the dissolved metals screen for all samples (Adit 1, K7149804; Adit 3, K7149803; upstream, K7149802; and downstream, K7149806), no water quality standards are exceeded. In the total recoverable metals screen, sample K7149803 exceeds the Secondary MCL for iron.

### 3.16.5 Structures

No structures were found at this site.

### 3.16.6 Safety

The open shaft is a serious safety hazard. The opening is completely hidden by the brush that is growing on the waste dump around the shaft. A rock tossed into the opening fell at least 1.5 seconds before an impact was heard, indicating a depth of 50-75 feet.

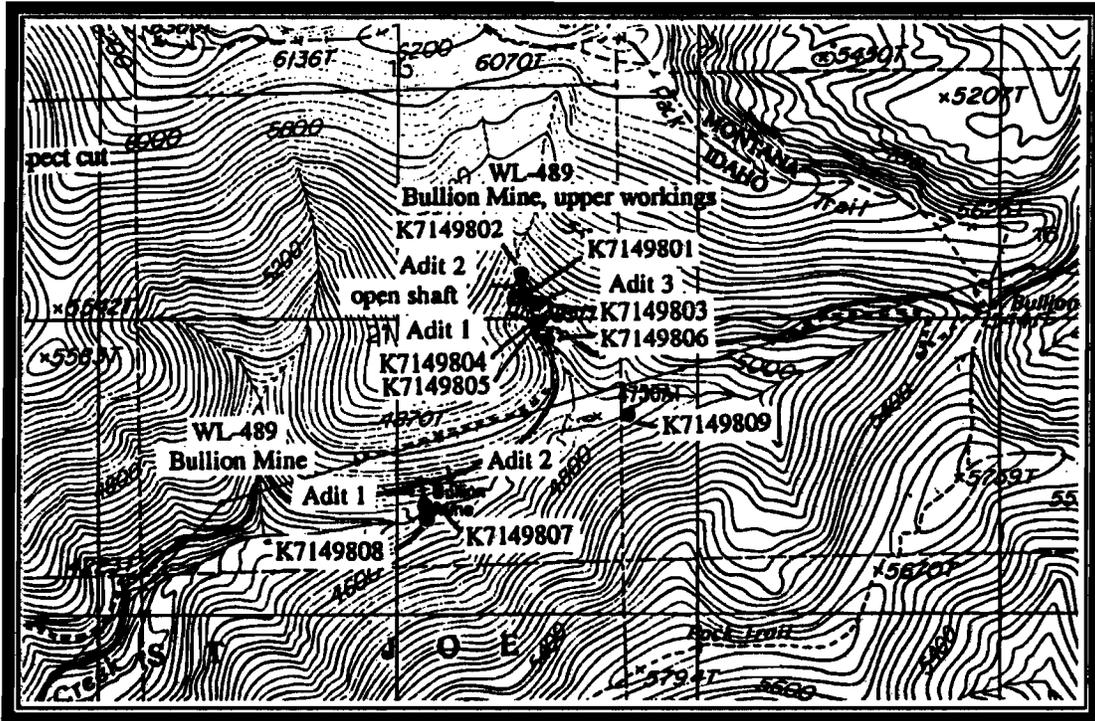


Figure 3.16-1. Location map of the upper workings of the Bullion Mine, Shoshone County, Idaho (U.S. Geological Survey Lookout Pass 7.5-minute topographic map).

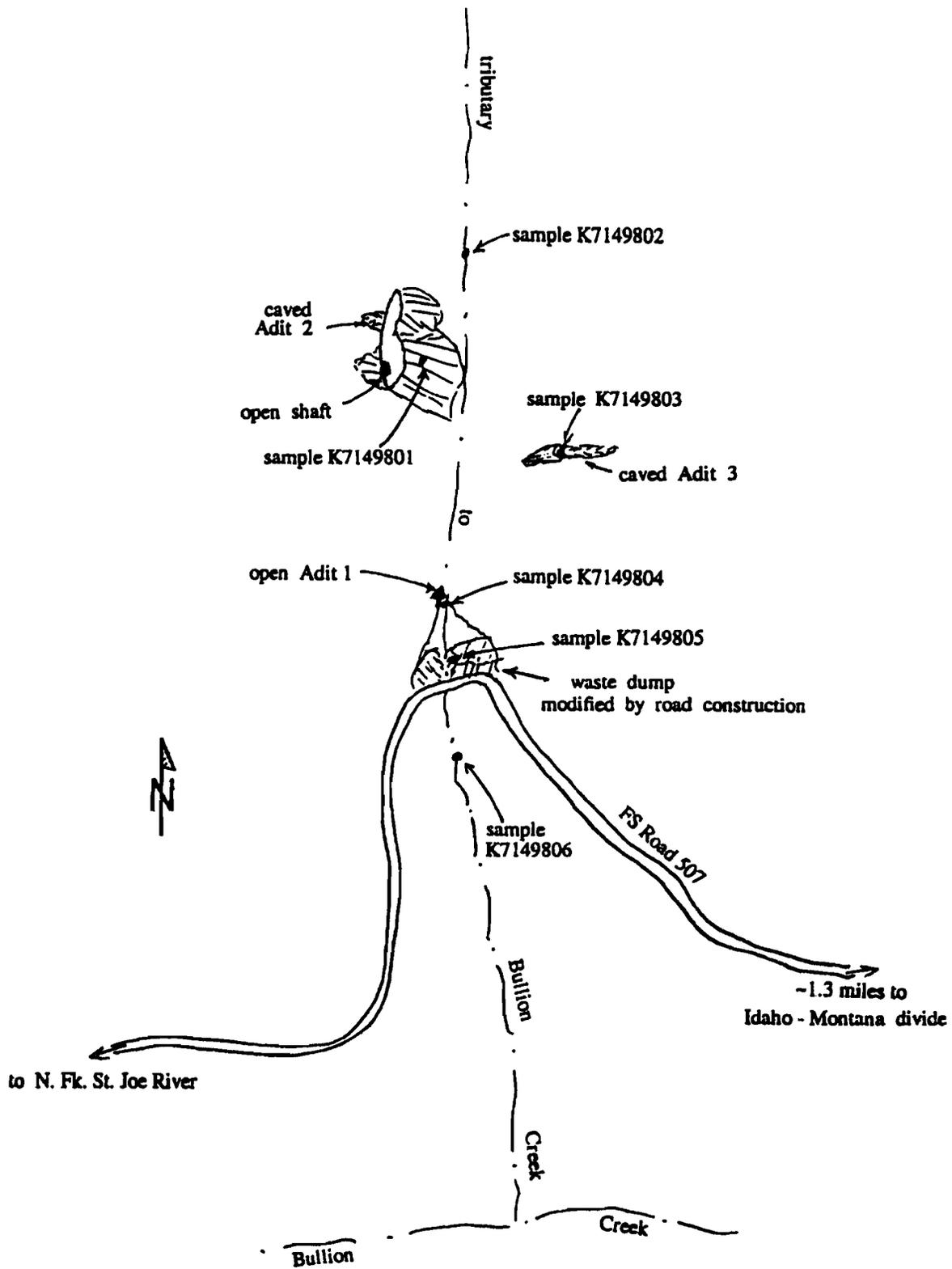


Figure 3.16-2. Sketch map of the upper workings of the Bullion Mine.



Figure 3.16-3. Open and timbered Adit 1 at the upper workings of the Bullion Mine. The view is to the west and the adit is nearly hidden in the brush (Roll K3, frame #9).



Figure 3.16-4. Inside view of the timbered entrance into Adit 1. Note the pile of rock rubble on the floor of the adit (Roll K3, frame #10).



Figure 3.16-5. Looking south along the erosion channel through the waste dump for Adit 1. The part of the dump on the east side of the creek has been modified by construction of Forest Service Road 507, seen in front of the pickup (Roll K3, frame #11).



Figure 3.16-6. Looking west across the Bullion Creek tributary at the waste dumps of the open shaft and caved Adit 2. The larger dump on the left is at the shaft (Roll K3, frame #7).



Figure 3.16-7. Close-up of the hidden open shaft at the upper workings of the Bullion Mine. The opening is in the thick brush on the left half of the photograph. The rock at the bottom left is part of the waste dump immediately in front of the opening (Roll K3, frame #4).

### **3.17 BULLION MINE, LOWER WORKINGS (Site No. WL-489)**

#### **3.17.1 Site Location and Access (Figure 2.1-1b)**

The lower workings of the Bullion Mine are on the north side of Bullion Creek and south of Forest Service Road 507 in the SW¼ of the SE¼, section 21, T. 47 N., R. 6 E., on the Lookout Pass 7.5-minute quadrangle (Figure 3.17-1). An overgrown and obscure access road about ¼ mile west of the mine leads to the site from the south side of Forest Service Road 507. The mine is on a block of patented claims surrounded by Forest Service land. The patented claims may have been acquired by the Forest Service.

#### **3.17.2 Geologic Features (Figure 2.2-1b)**

These workings are in interlaminated dolomitic argillite and siltite of the lower Wallace Formation. The main adit was started to the south of the Placer Creek fault (Harrison and others, 1986), but it may cross through the fault zone.

#### **3.17.3 Site History**

The history of the Bullion Mine is given in section 3.16.3. The main adit at this site is the Bullion No. 3 tunnel. This tunnel was also intended to explore the adjacent Copper Chief claims.

The Copper Chief Mining Company was incorporated in 1907 and held a group of claims adjacent to the Bullion on the west. Many of the officers of the Copper Chief were also involved with the Bullion Mine, and for much of its history, the Copper Chief was developed in conjunction with the Bullion. The Copper Chief Mining Company held an interest in the Bullion Mining Company's equipment and helped drive Bullion's lower (No. 3) tunnel. Copper Chief planned to develop its claims through this lower tunnel. The only workings on the Copper Chief were a few prospect cuts and, possibly, one short tunnel. Only assessment work was done after about 1920. Copper Chief forfeited its corporate charter in 1942.

#### **3.17.4 Environmental Conditions**

##### **3.17.4.1 Site Features**

The lower workings of the Bullion Mine were visited by John Kauffman on July 14, 1998. A video segment describing the property, which is identified as all the workings of the Bullion Mine, is on the Avery and St. Maries Districts Videotape (Tape 2, index 00:14:18-00:25:18). Documenting photographs are Roll K3, frames 12-18.

Two caved adits were found at this site (Figure 3.17-2). The hillside is covered with extremely dense brush which could easily conceal other workings.

Adit 1, probably the No. 3 tunnel at the Bullion Mine, is caved (Figure 3.17-3) and has water flowing from it at about 7 gallons per minute. The waste dump, which presumably originally extended continuously across Bullion Creek, is now dissected by the creek. The part of the dump on the north side of the creek is roughly 100 feet long parallel to the creek, 40 feet wide in front of the adit, and about 10-15 feet thick. The part of the dump south of the creek (Figure 3.17-4) is arcuate in shape and 250 feet long. Near the creek, the dump is 20 feet wide but it tapers to only a few feet wide at the west end. Maximum thickness is about 25 feet. The entire dump is reddish brown due to the high iron content of the rock.

Adit 2, also caved, is about 200 feet east of Adit 1 and slightly higher on the slope. The top of the waste dump is about 15 feet long and 10 feet wide. It extends down the steep slope at least 25 feet.

A 6-foot square, cement-sided pit (Figure 3.17-5) was found in some trees west of the dump for Adit 1 and about 15 feet north of the log cabin described in section 3.17.5. Collapsed lumber and metal siding suggest a covering over the opening. At first, this pit was thought to be a caved shaft (as indicated on the video), but more likely it was a storage facility of some type.

The disturbed area covers about 2-3 acres.

### 3.17.4.2 Sample Locations

#### 3.17.4.2.1 Solid Samples

A sample was collected on the south side of Bullion Creek from the dump for Adit 1 (K7149808). A stream sediment sample (K7149813) was taken from Bullion Creek about 3 miles downstream from the Bullion Mine (and also downstream from the Fourth of July Mine).

Sample No	Location	Analyzed (Yes/No)
K7149808	Bullion Mine, lower workings, Adit 1 dump	Yes
K7149813	Bullion Mine, stream sediment, 3 miles downstream from mine	Yes

#### 3.17.4.2.2 Water Samples

A sample was collected from the water flowing from Adit 1 (K7149807). An upstream sample (K7149809) was taken about ½ mile east of the mine on Bullion Creek above the beaver ponds near the head of the creek. A downstream sample (K7149810) was taken about 2 miles downstream from the mine above the bridge where Forest Service Road 507 crosses Bullion Creek.

Sample No.	Location	Specific Conductivity ( $\mu S$ )	Temperature ( $^{\circ} F$ )	pH	Flow (gpm)	Analyzed (Yes/No)
K7149807	Bullion Mine, lower workings, Adit 1	118	46	7.6	7	Yes
K7149809	Bullion Mine, upstream on Bullion Creek	41	46	7.8	5 ft. wide, 0.5 ft. deep	Yes
K7149810	Bullion Mine, downstream	55	53	8.04	10 ft. wide, 1 ft. deep	Yes

### 3.17.4.2.3 Analytical Results

#### Solid Samples (Tables 2.5-3 and 2.5-4)

The sample from the dump for Adit 1 (K7149808) exceeds background and environmental levels for arsenic, cadmium, copper, iron, manganese, nickel, and lead in the element screen. The stream sediment sample (K7149813) exceeds background and environmental levels for arsenic, cadmium, copper, and lead in the element screen. In the TCLP for metals test, neither sample shows significant leaching of any element of interest.

#### Water Samples (Tables 2.5-1 and 2.5-2)

The water sample from Adit 1 at the lower workings of the Bullion Mine (K7149807) and the sample from downstream on Bullion Creek (K7109810) do not exceed any water quality standards in either the dissolved metals or the total recoverable metals screens. Upstream sample K7149809 is at the upper limit of the Aquatic Life Chronic standard for cadmium in the total recoverable metals screen.

### 3.17.5 Structures

Two collapsed structures are present at the site. A large log cabin is just west of the Adit 1 dump. The roof has fallen in, but the wall logs are mostly intact (Figure 3.17-6). The remains of another structure (see Figure 3.17-3) were found in the notch where Bullion Creek cuts through the dump for Adit 1. This may have been an ore chute or loading platform (although it is at an unusual location for either of these), or possibly a storage shed.

### 3.17.6 Safety

No safety hazards were found at the lower workings of the Bullion Mine.

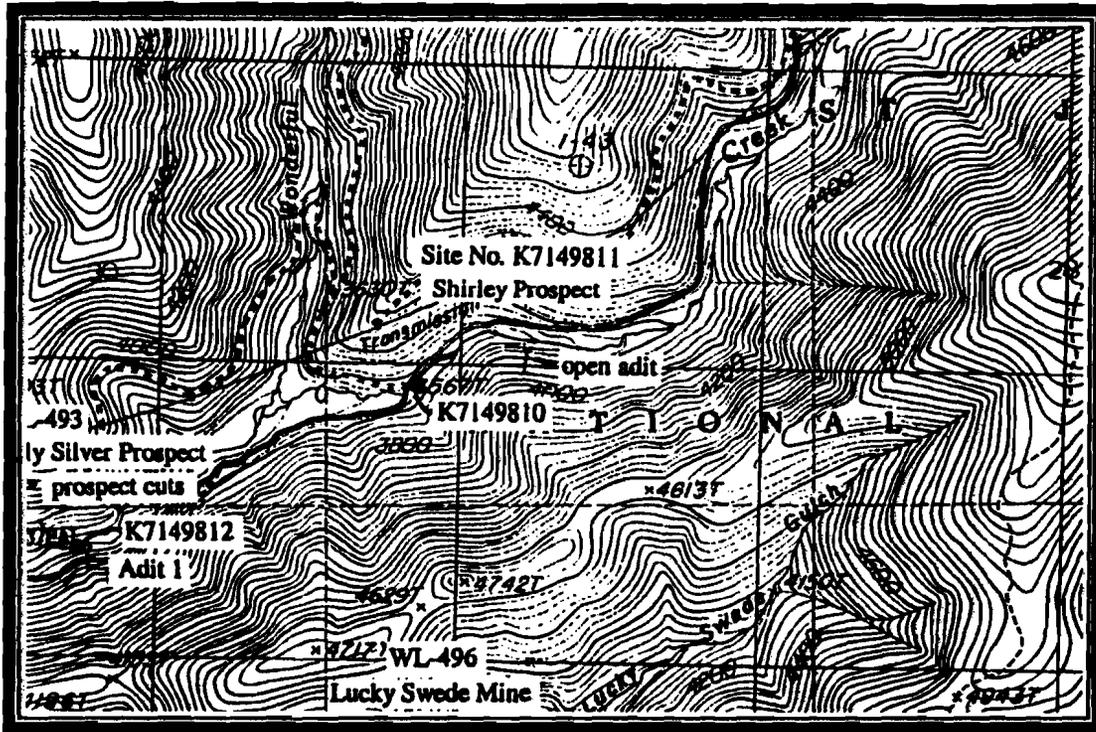


Figure 3.17-1. Location map of the lower workings of the Bullion Mine, Shoshone County, Idaho (U.S. Geological Survey Lookout Pass 7.5-minute topographic map).

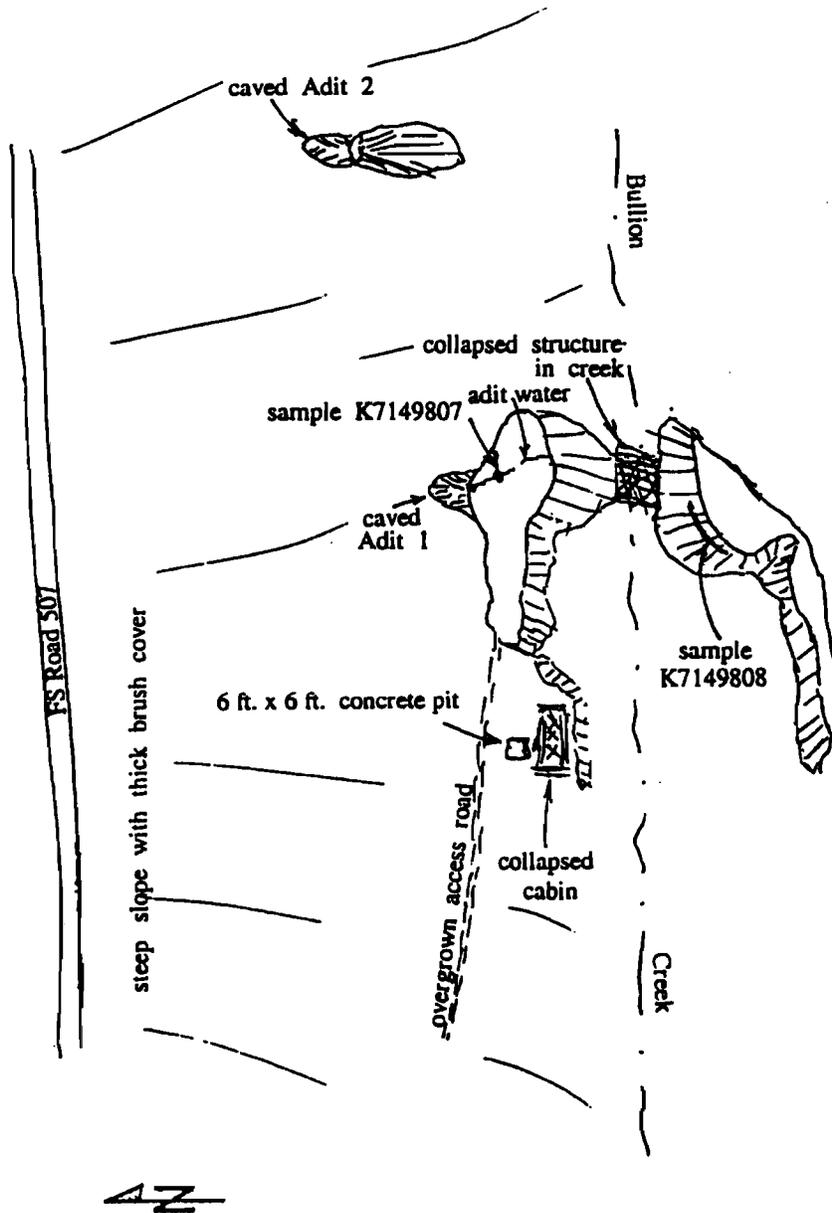


Figure 3.17-2. Sketch map of the lower workings of the Bullion Mine.



Figure 3.17-3. Looking north across Bullion Creek at caved Adit 1 of the lower workings of the Bullion Mine. The creek, visible in the lower third of the photograph, dissects the waste dump. A pile of boards near the creek is the collapsed remains of a structure (Roll K3, frame #15).



Figure 3.17-4. Looking southwest along the south side of Bullion Creek at the southern part of the waste dump for Adit 1 at the lower workings of the Bullion Mine. A gully has been eroded through the dump diagonally from the center of the photograph toward the upper left corner (Roll K3, frame #16).



Figure 3.17-5. Collapsed boards and metal siding over a concrete-lined pit. The function of the pit, located to the right of the cabin shown in Figure 3.17-6, is unknown (Roll K3, frame #18).



Figure 3.17-6. Looking west at the collapsed remains of a large log cabin located west of Adit 1 at the lower workings of the Bullion Mine. This cabin is on the north side of Bullion Creek (Roll K3, frame #17).

## **HISTORICAL ARTICLES**





## St. Joe Geographic Area

St. Joe Geographic Area (GA) lies predominantly within Benewah and Shoshone counties in Idaho, with small portions in Kootenai, Latah, and Clearwater counties. Of the 1,449,000 acres within this GA, 722,000 (50%) are administered by the Idaho Panhandle National Forests (IPNFs). National Forest System (NFS) lands in this GA comprise most of the St. Joe National Forest.

### Unique features within this GA include:

- St Joe Wild and Recreational River
- Mallard Larkins Pioneer Area
- Hiawatha Trail
- Emerald Creek Garnet Area
- Marble Creek Historic Area
- Hobo Cedar Grove Botanical Area

The St. Joe Geographic Area includes the St. Joe River Basin, which is a primary source to Coeur d'Alene Lake; and the Little North Fork of the Clearwater River, which is part of the North Fork Clearwater River. The Clearwater Mountains on the south and the St. Joe Mountains on the north form the area.

On the lands administered by the IPNFs, the dominant vegetation is mixed conifer, mostly grand fir/hemlock, Douglas-fir at low/mid elevations and subalpine fir/spruce/mountain hemlock/lodgepole pine at higher elevations. Since 1980, approximately 5% has been harvested to regenerate trees and are currently under management as plantations or naturally regenerated stands. These areas are now dominated by small to medium size trees. An additional 2% was partially cut and these areas are generally composed of medium to large size trees. Currently 11% is old growth forests, where large, old trees are a significant component of the forest.

The St. Joe has a rich fire history. Vast areas were burned in wildfires between the late 1800's and 1934. Approximately ½ the St. Joe River Basin burned in 1910, and included some of the biggest patches of that famous historic fire. Substantial parts of the 1910 fire re-burned once or more in the next three decades. As a result of the 1910 fire and prior fire history, there are very large areas of even-aged lodgepole pine forests in the upper St. Joe. As a result of the re-burns, there are still some large areas of shrub fields on the north side of the St. Joe River. With the advent of modern fire suppression, there have been few large fires in the St. Joe drainage since 1934.

A wide variety of recreational activities occur in this GA with the major attraction being the St. Joe River. This river is heavily fished and a popular one to float. The river corridor receives heavy recreational use. The Mallard Larkins Pioneer Area is popular with back-country enthusiasts and receives a fair amount of non-motorized use.

Current road and trail access for this area is portrayed on the 2002 Travel Plan Map for the St. Joe Ranger District.

Water quality is generally good and beneficial uses are well supported, especially in the Upper St. Joe and Little North Fork Clearwater River watersheds. Water Quality Limited Segments exist in all three sections of the St. Joe River.

Bull trout and other native salmonids have historically occupied most of the waters of the area; however, their numbers and range have been limited for many reasons including watershed conditions that affect water quality, loss or degradation of habitat, and competition from introduced fish species. Important bull trout habitat is currently limited to the Upper St. Joe River. The St. Joe River above Avery is a popular catch-and-release cutthroat trout fishery. The Little North Fork Clearwater River also contains some stronghold westslope cutthroat trout populations.

Two Threatened and Endangered species are known to occur in this GA; gray wolf and lynx. Mountain goats inhabit the Snow Peak area, which is managed for wildlife in cooperation with the Idaho Department of Fish and Game. Two additional species of interest known to occur in this GA are fisher and wolverine. Sensitive species which occur here, include Harlequin duck and Coeur d'Alene salamander.

This area contains all or portions of 15 Inventoried Roadless Areas totaling approximately 364,000 acres or 50% of National Forest System lands in this GA on the Idaho Panhandle National Forests. The Mallard-Larkins proposed wilderness area is located in the southeast corner of this GA.

# General Northwest News

## GRANBY DIVIDEND.

Disbursements Have Passed Ten Million Dollar Mark.

Granby Mining, Smelting & Power Co., operating mines and smelters at Grand Forks and Anyox, B. C., has declared a quarterly dividend of \$374,962, payable August 1, to stockholders of record July 19, the disbursement being at the rate of 2 1/4% for the quarter, or 10% per annum. This brings total dividends to \$10,198,895, of which \$1,124,886 has been paid out this year and \$1,449,962 in 1917.

## LUCKY JIM.

Directors Increased to Seven at Stockholders' Meeting.

At delayed annual meeting of stockholders of Lucky Jim Zinc Mines, Ltd., held at Victoria on June 15, the number of directors was increased from five to seven, J. J. Callison, of Victoria, and Dr. H. C. Lambach, of Spokane, being added. George T. Edmiston, of Spokane, formerly of Wallace, Idaho, and associated with Charles McKinnis, former secretary of Caledonia Mining Co., was made secretary-treasurer, in place of Walter J. Nicholls, of Spokane, the latter and Dr. Lambach being made managing directors.

## TARBOX MINING CO.

Main Shaft Being Put Down to Thousand-foot Level.

Tarbox Mining Co., operating three miles north of Salt Lake, Mont., is extending its double-compartment shaft from the 800 to the 1000-foot level, according to M. Rosauer, local broker, who was a recent visitor at the mine. He also says that large bodies of milling ore have been opened up on the 600 and 800-foot levels, with higher values apparent at the deeper point. The company is employing about thirty men and has everything in excellent shape for economical work. So far as known, nothing new has developed regarding milling equipment which it was said might be installed this year.

## OPENS LOCAL OFFICES.

Mining Engineer Returns to Practice in This City.

Charles O. Olsen, mining engineer, for the past twenty months connected with the valuation drafting department of the Great Northern railroad in this city, has returned to practice of his profession with offices at 701 Paulsen building. Mr. Olsen has had wide experience in the Coeur d'Alene, having been one year with Ontario Mining Co., and two years with Bunker Hill & Sullivan Mining & Concentrating Co., as miner and timberman and later for three years with Federal Mining & Smelting Co. as mining engineer. He will make a specialty of examinations, management, surveying and drafting.

## SILVERSMITH MINES.

Development Under Full Headway at Slocan Property.

A force of twenty men is now employed at the property of Silversmith Mines, Ltd., near Sandon, B. C., carrying out development plans matured by R. H. Stewart, consulting engineer, formerly manager of Consolidated Mining & Smelting Co., at Trall, B. C. Work is being confined to Nos. 8 and 10 levels, west, and it is said that several tons of clean ore have already been taken out in No. 8 and a nice

to the north. This possibility can be proved by a short piece of work that will give over 600 feet on the ore-body from the crosscut if it persists that far. This work will be undertaken as soon as the strike and extent of the ore-body have been proven at the point where it was encountered. Meanwhile ore bins and other shipping facilities are being provided and it is confidently expected that the property will be upon a producing basis within two months at the latest.

## BEAR CREEK MINES.

Revival in Long-Neglected Part of the Slocan District.

Within the past few weeks several prospective investors, including at least one from Spokane, have looked over properties in the Bear Creek district, at Sproul's, about 15 miles from Kaslo, B. C. The Caledonia, which is but 700 feet from the Canadian Pacific tracks, seems to be the center of attention, although the Monte Cristo and several others have been examined. In the early days of the district Monte Cristo was under bond to W. H. Taylor, former mayor of Spokane, and much development was done. For many years the district has been totally neglected although there are several excellent showings within comfortable distance of the railroad.

## BULLION MINING CO.

Encouraging Development at St. Joe District Mine.

According to M. Rosauer, local broker, who has recently returned from a trip of inspection, Bullion Mining Co., operating in the St. Joe district of the Coeur d'Alene, is meeting with encouragement in recent development, which is being prosecuted with a force of five men. No. 3 drift on the vein has reached a point 3400 feet from the portal and vertical depth of around 1250 feet, and it is expected that within another 100 feet a point under the winze from No. 2 will be reached. The face shows chalcopryite ore, carrying fair copper values with high iron and lime content. A raise of approximately 550 feet is to be put up to connect with winze of 50 feet already sunk from No. 2, which is already connected with No. 1 by a raise of 600 feet. Mr. Rosauer says that vein No. 1 encountered in the main level, which has not yet been prospected to any extent, shows red and black oxide of copper running up to 17.5%.

## IDAHO-CONTINENTAL.

Four New Three-ton Auto Trucks Installed Last Month.

Fosdick Auto Co., of this city, delivered four new 3-ton specially-built Pierce-Arrow trucks to Klockmann Bros., lessees of Idaho-Continental, near Porthill, Idaho, last week. The trucks were specially assembled here, the bodies, of wood and lined with sheet steel, having been made by Diamond Carriage Works and equipped with Woods hydraulic hoists. It is proposed to work two shifts, each truck making one round trip a shift and hauling 4 tons to the load. Two-wheel trailers or 2 1/2 tons capacity are to be delivered by Fosdick company at an early date, thus assuring considerably heavier production.

The property was recently visited by a fire which destroyed some of the upper terminal tramway stations and buildings. New equipment was hurriedly gathered in this city by Manager A. A. Klockmann and it is believed all damage has now been repaired.

## SPOKANE'S GREATEST TAILOR and CLOTHIER



"If It Isn't All Right

Bring It Back"

L. R. Dolby Co. Spokane

## USE FORESIGHT

The man who buys securities, when the market is in a low condition is exercising foresight, because he knows the low conditions can not last, and that eventually the situation will become readjusted. This principle applies always.

Railroad facilities are assured for properties in the Pine Creek section of the Coeur d'Alene, stocks of these companies are at a low figure.

With the completion of cheap transportation, a substantial rise in market value of these stocks may be expected.

We suggest for your consideration Constitution, Highland-Surprise, Nabob, and Douglass. Let us give you first-hand information on all or any one of these issues.

We solicit your buying or selling instructions.

## W. H. Button Company

Mining Brokers and Financial Agts.  
Members Spokane Stock Exchange  
Old National Bank Bldg.  
Phone Main 349.

## FOR SALE

### 1 Brunton Pocket Transit

In First-Class Condition.  
PRICE, \$15.00

Mining Truth Publishing Co.  
Spokane, Washington

# Coollest in Summer Heat

Surroundings make all the difference in enjoyment of meals.

You would rather have a poor

L.

Code:

Peyton

Examination  
PatJOH  
Unit

701 Moha

Examina  
dergrou

Ch

United S  
Phone MExami  
The We

k

Examina

Codes: 1

L

O

SPOKAI

(

Mine

Mir

701 Pau

C  
Consultir

Peyton t

Twenty  
Hill & S  
Coeur d  
anywher  
COB

WM.

412 Spra

Gold  
Silver Only  
Silver and L  
Gold and S

TRE

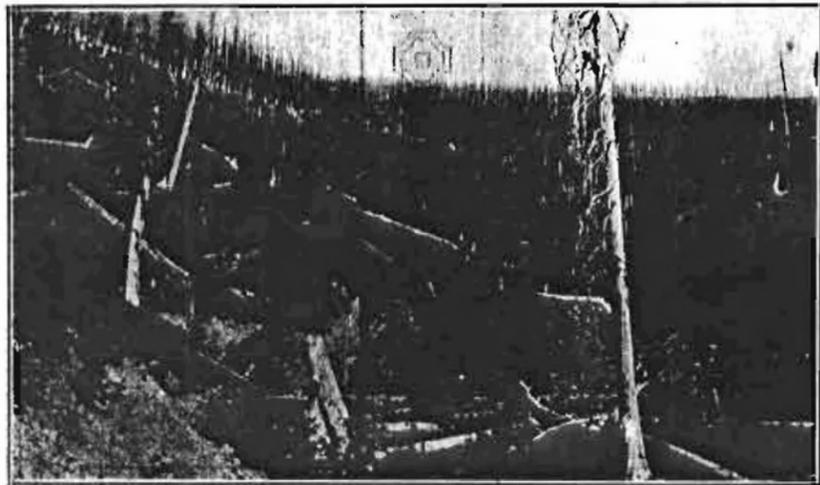
# Bullion Mining Co.

**New Strike in East Coeur d'Alene Property Deepest in District.—Exposure at Twelve Hundred Feet Vertical Depth Carries Copper, Gold, Silver and an Unidentified Mineral.**

THE recent strike in Bullion mine, East Coeur d'Alenes, is generally regarded as proving the property, and, incidentally, the district, as it demonstrates the presence at depth of commercial ore-bodies that undoubtedly will develop into important deposits. The result of months of development jointly by Bullion and Copper Chief companies, the strike has aroused considerable interest in Spokane and Coeur d'Alene mining circles. More or less conflicting reports of con-

ditions have been received since the discovery, and a report by Karl Hale Dixon, of H. T. Irvine & Co., who, accompanied by M. Rosauer, of Rosauer Brokerage Co., visited the mine last week, is the only authentic, first-hand information that has been put out.

ore that will average 6% copper, 80 cents in gold and an ounce of silver to the ton. The drift then will be about 400 feet below the shaft and in ground that has been prospected above, both east and west, with diamond drill. "The vein opened by the crosscut has all the characteristics displayed in the upper workings. It is largely spathic iron, with sufficient chalcopryrite, or sulphide copper, to make it desirable ore. Mineralization is general across its entire width.



No. 1, Dump, Bullion Mine

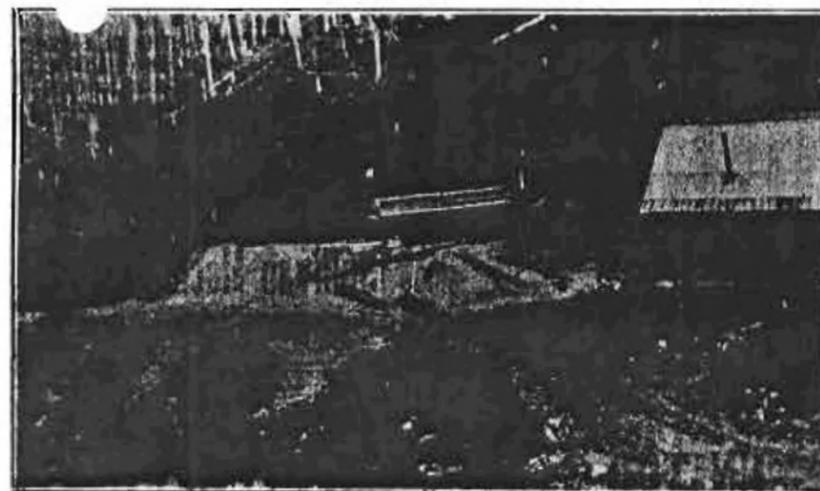
ditions have been received since the discovery, and a report by Karl Hale Dixon, of H. T. Irvine & Co., who, accompanied by M. Rosauer, of Rosauer Brokerage Co., visited the mine last week, is the only authentic, first-hand information that has been put out.

"Development at depth in the East Coeur d'Alenes is of more than passing interest," said Mr. Dixon, "because the workings of most mines of that section are comparatively shallow, although in some instances the properties have become producers,—in one case even a dividend-payer—in the last few years.

"The recent opening of commercial ore in the Bullion mine, at a depth of 1200 feet, in a strongly-defined, well-mineralized vein, 30 feet wide, has a double importance. It not only indicates the deep-seated genesis of Bullion ore bodies, but sets a precedent for that immediate vicinity that promises to stimulate activity in many erst-

"Another, and as yet unknown, substance discovered in this vein has aroused particular speculative interest. A black streak about two feet wide, first thought by the miners to be copper glance, remains unidentified, although Manager James H. Taylor ventures the opinion that it may be manganese, an ore which has become especially valuable within the last two years. Samples have been distributed for analysis among the metallurgists of the principal mining companies in the Coeur d'Alenes and the government station at Moscow, Idaho. Its appearance and weight suggests that it is some form of iron, but it is said that nothing like it was ever found in the district before.

"By an agreement made in 1914, the long No. 3 tunnel of Bullion was driven jointly by the Bullion and Copper Chief companies, the latter owning adjoining property which can be developed at depth through these workings.



No. 2, Dump, Bullion Mine

while prospects. It also lays a foundation for the expectation that ore bodies of the new producers will continue downward for considerable distance. Bullion lies in the proven copper belt of the district.

"The Bullion No. 3 crosscut entered the vein at more than 3000 feet, intersecting it through the footwall and running for 30 feet before reaching the hanging wall. Drifting to the east on the footwall side of the vein was started immediately, and, after 25 feet, the face of the drift indicated a gradual improvement in values. This was expected, as the drift is headed toward the best showing developed in the mine. According to survey, at about 350 feet it will get under the shaft sunk from the No. 2 tunnel, in the bottom of which is four feet of

The necessary finances were provided, in part, through assessments levied by both corporations. In 1916, Copper Chief gave Bullion stockholders 650,000 shares of Copper Chief treasury stock to reimburse them for two assessments of a cent each, and later 250,000 shares of Bullion treasury stock were sold to complete the fund.

"The main vein on this level was cut only a short distance from a fault which had been followed for considerable distance in driving the tunnel. At a point about 2390 feet from the portal a diabase dyke 170 feet thick was encountered. This was where the vein itself was supposed to be, and the disappointed management called on Fred W. Calloway, a Wallace min-

(Continued on Page 6)

## L. Vogelstein & Company

(INCORPORATED)

42 Broadway, New York

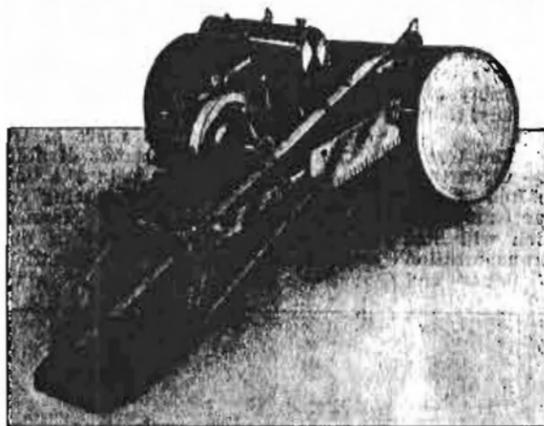
Buyers of

ORES, BULLION AND METALLURGICAL PRODUCTS

Sellers of

COPPER, LEAD, TIN, ANTIMONY AND SPELTER

### PORTABLE GASOLINE DRAG SAW



For Cutting  
Cord Wood  
Camp Fuel  
Clearing Land

Two men with  
this machine can  
cut from 15 to 25  
cords per day.

## HOFIUS STEEL & EQUIPMENT CO.

HUTTON BLDG. SPOKANE, WASH.

Send us your inquiries for new and second hand machinery

### "Cut Your Costs"

The mine manager who adheres to the old method of moving waste or ore, over long distances and by one-car man-power at \$4 or \$5 per day, is not "on to" his job.

The strenuousness of present day mining demands that every advantage be taken of improved haulage methods.

How much can you save by substituting a fool-proof gasoline locomotive, capable of hauling ten or twelve mine cars at a trip, for the one-man car that burns up the valuable time of a good man who could be employed to better advantage elsewhere?



Think it over and you will come to the conclusion that you are out of date as a mine manager if you persist in the old methods.

The Spokane gasoline mine locomotive is designed for use of mines handling heavy tonnage over long hauls. It is true economy built into fool-proof mechanism. Send for facts and figures. It will pay you well.

## Spokane Auto Manufacturing Co.

1324 N. Cedar Street, Spokane, Wash.

NW Mining Truth  
Sept 18 1917 Vol II No. 15  
p 1 of 2

was J. Roderick Robertson, of Nelson, widely known and popular pioneer British Columbia mining man, who was instantly killed about 17 years ago while sitting in his room at the Murray Hill hotel, New York, by a blast from the Lexington avenue subway, then under construction, a rock being hurled with terrific force through the window. Of recent years the mine was operated by leasers, the last being E. Shannon and Patrick McGuire, the latter formerly shift boss at the property under Robertson.

Enterprise group is credited with shipments of 10,538 tons of hand-sorted ore up to 1904. Since then, while output was considerable, no accurate

Seattle-B. C. Silver Lead Co. is capitalized for 1,000,000 dollar shares. Officers are B. F. Millard, Valdez, Alaska, president and treasurer; W. R. Millard, Valdez, vice president, and Charles Simenstad, Seattle, secretary. Judge Thomas Lyons, Seattle, is counsel for the company and Frank Higgins, Victoria, B. C., fiscal agent. Trustees until November 20, 1917, when first annual meeting will be held, are B. F. Millard, W. R. Millard and Mr. Simenstad.

In a statement accompanying his announcement of organization of new company, President Millard states that Granite Gold Co., Valdez, suspended operations last April.

## BULLION MINING CO.

(Continued from Page 4)

ing engineer, to diagnose the situation. He concluded, after examination, that the dyke cut the vein in half and that the tunnel in passing through the dyke also passed between the severed ends. On his advice the tunnel was swung to the east, taking the form of a hook; the result was the intersection of the vein east of the dyke.

"Two other veins were crosscut earlier by this tunnel. The first was about 1000 feet from the portal and 14 feet wide, and the second about 2000 feet from the portal and 4 feet wide. The latter is similar in appearance and character to the main vein and its course and dip lead to the belief that it will eventually join the main vein. Both are expected to add materially to the resources of the mine.

"Aside from the No. 3 or main tunnel, the principal development has been done by the No. 2 tunnel, driven for a distance of more than 600 feet and attaining a vertical depth of over 500 feet. A strong east-and-west vein of copper ore, exceeding 20 feet in width, was opened and some stoping was done in the east end of the tunnel; however, 175 feet west of the crosscut on this level, a series of step-faults threw the vein to the south. A shaft was sunk in the east end and the vein was further prospected by diamond drill. Two holes were driven downward and one in the breast of the drift. Of the downward holes, one driven easterly showed 3.3% copper, and one westerly 2.8%, while the breast hole disclosed 3.7%. On the No. 2 dump and blocked out in the No. 2 workings is a substantial tonnage of shipping ore that will materially increase earnings.

"The No. 1 tunnel, directly above No. 2, and connected by a raise, has explored the vein only to a limited extent. Altogether approximately 5500

feet of work has been done on the property to date.

"As soon as the east drift on the No. 3 level gets under the No. 2 shaft, it is the intention of the management to raise and begin stoping the ore. Every indication points to the fact that the ore body will be found continuous and uniform for a great distance, and, just as soon as this work is completed, the company, according to present plans, will start production on as large a scale as possible.

"The high percentage of spathic iron and lime which characterizes Bullion ore renders it especially desirable for smelters, the company being allowed 10 cents per unit of each, which covers treatment charges.

"Manager Taylor declares that the outlook for Bullion is so favorable that improved shipping facilities are being considered. At present, the mine is connected with the Northern Pacific railroad by a wagon road to Bullion station, near Borax tunnel, a distance of about four miles. However, a more convenient and economical outlet is afforded by an old logging road, a branch of the Milwaukee railway, that was formerly operated to within two and one-half miles of the main tunnel and to which an easy, down-grade wagon road can be built at small expense, the grade already having been completed.

"The property is equipped with a three-drill Ingersoll-Rand compressor, driven by water from Bullion creek under a 350-foot head and capable of generating 150 horsepower. Buildings consist of compressor building, blacksmith shop, powder house, boarding house and several employes' cabins. Operations are in charge of Dan J. Keefe, a practical mining man of many years' experience in the Coeur d'Alene district."

725 Paulsen Building

References:

Spokane & Eastern Trust Co., Spokane  
First National Bank of Wallace, Idaho.



To catch the at  
of the public r  
more than ore  
printing.

Our success is  
making paper ar  
a success as a sal

CATALOGS      PROSI  
BOOKLETS      STATI  
LOOSE LEAF SYST.  
ENGRAVING      BINDI

Telephone Riverside

The  
INLAND-AMEI  
PRINTING

Third Avenue and Browne S

p. 2 of 2

**BULLION MINING CO.**

**Satisfactory Progress in East Coeur d'Alene Property.**

Development of the Bullion mine, near Mullan, Idaho, is being watched with interest by owners of other properties, as the workings are attaining greater depth than any in the district, and it is believed that discovery of commercial ore at the lower levels would stimulate activity in the entire East Coeur d'Alene region. With the exception of Richmond, now developed to approximately 400 feet, there are no other mines in the vicinity that can be regarded as more than prospects. Successful conclusion of work now under way at the Bullion will undoubtedly be followed by extensive exploration of neighboring groups.

"There are three tunnels at the Bullion, and the ore showings are of considerably greater promise than anticipated," said M. Rosauer, local broker, who visited the property about two weeks ago. "No. 1 tunnel is merely a prospect working, but No. 2 and No. 3 are important levels, which will become the main workings of the mine if developed to the producing stage. No. 2 is in more than 600 feet, giving a vertical depth of approximately 600 feet and eight diamond drill holes have been put down 300 feet to prove the ground above No. 3.

"No. 3 tunnel, the face of which is 1200 feet below the surface, is now in 2600 feet, and is being continued to get under the drill holes from No. 2, the course having been recently changed with this in view. About 1000 feet from the portal a 16-foot ledge, carrying from 3 to 5% copper, with lead carbonates, was encountered, and at 2000 feet a 4-foot ledge, of similar character and of about the same grade, was cut. The survey indicates that a third ledge will be reached in about 25 feet at 1400 feet vertical depth. No estimate of probable ore has been made, but the management is confident that considerable tonnage can be developed by drifting on the veins already opened.

"The property is equipped with a three-drill Ingersoll-Rand compressor, driven by water from Bullion creek, under a 350-foot head, and capable of generating 150 horsepower. A good wagon road has been constructed from the portal of the lower tunnel to a siding on the Milwaukee railway, three miles distant. Operations are in charge of Dan Keefe, mine superintendent, who has six men working, but he will increase the force as soon as weather conditions permit. The snow is unusually deep for this season, and development has been retarded in consequence. Activity will be speeded soon, however, and a new record of advancement probably established this summer."

Bullion Mining Co. is capitalized for 1,500,000 dollar shares, of which 1,250,000 are issued. W. Squance is president, and James H. Taylor secretary-treasurer and general manager. These, with Robert Marshall, Ray C. Ireland and Frank Taylor, complete the directorate. All are residents of Wallace. In accordance with an agreement entered into in 1914, lower tunnel of Bullion is being driven jointly by Bullion and Copper Chief, the latter owning adjoining property that can be developed at depth through the workings. The community development is 2530 feet, funds being provided by assessments levied alternately by the two corporations. In September, 1916, Copper Chief gave to Bullion stockholders 650,000 shares of Copper Chief treasury stock, to reimburse them for two assessments of a cent a share each, levied to create a fund to commence the tunnel. Later, proceeds of sale of 250,000 shares of Bullion treasury stock, sold in the East, were added to the fund. It is believed that there is enough money on hand to complete development plans without further levies.

**REX CONSOLIDATED.**

**Shaft to Be Continued to Seven-Hundred Level.**

The shaft at the Rex mine, in the Nine-Mile district of the Coeur d'Alenes, under bond to Rex Consolidated Mining Co., is to be continued about 20 feet to the 700-foot level, according to Raymond Guyer, general manager.

"At the 700-foot level a station will be cut and drifting started on the Rex vein, in which an ore-shoot, six feet

wide and 120 feet long, of good milling grade, and still showing in the face, was opened on the 200-foot level," says Mr. Guyer. "We have installed a 500-gallon triplex pump, and completely unwatered the mine throughout. We now feel assured that the workings can be kept dry. Adequate equipment for sinking is already in place and the new development will begin immediately.

"In April we experienced considerable difficulty maintaining operations because of adverse weather conditions, the mill being run but 16 days. Sales of product for this brief period, however, amounted to \$24,600, which more than paid operating and development expenses, and from now on we feel certain that each month will show a substantial profit. Mine and mill are now in better shape than ever before and we do not apprehend any trouble in keeping production up to maximum capacity. Our new flotation system is working satisfactorily, while other departments of the plant have been brought up to required standard of efficiency. Arrangements have been made with Grasseil Chemical Co., Canton, Ohio, to handle the greater part of our zinc concentrates and shipments are being forwarded to that point.

"We have extended our stopes a total length of 700 feet, opening a much better grade of ore than heretofore. Much of the new stoping area was added on the 400-foot level. The lowest depth attained on the Rex vein was through the 500-foot level, but we can open this body at considerably greater depth when the drift is run from the 700-foot. The drift on the 500-foot level is being rapidly advanced to reach the shoot in the Okanogan vein, already opened on the 200 and 400-foot levels."

**CALEDONIA.**

**Cash Surplus Now Over Half Million Dollars.**

Caledonia Mining Co. earned \$305,403 net in the quarter ended March 31, 1917, according to official report of May 1. Surplus April 1 was \$512,925, of which \$385,385 was represented by cash in banks, \$91,029 by ore in transit and settlements due from smelters and \$36,511 by ore and concentrates on hand.

Extraction reached 3,953 tons, which yielded 178,224 pounds of copper, assaying 2.25%, and which was sold for 30.16 cents per pound, or \$53,760; 2,336,240 pounds lead, assaying 29.55%, sold for .084 cents per pound, or \$195,743, and 291,945 ounces of silver, sold for 75.4 cents an ounce, or \$220,342. Gross value was \$469,845; freight and treatment charges \$12, leaving net value of bullion \$344,316. During the period 11,045 tons of ore were mined at cost of \$2.92 per ton, or \$32,219, and 9,330 tons were milled at cost of 61 cents per ton, or \$5,712, while shipping costs on 4,121 tons at 24 cents per ton were \$982, making total operating costs \$38,913.

On May 5th Caledonia paid a regular dividend of three cents per share, or \$78,150, making disbursements for current year \$390,750 and increasing grand total to \$2,188,200. March net earnings were \$90,000 and it is estimated that April earnings will be better than \$100,000. It is believed that the company can continue payments at current rate for remainder of the year and for a number of months thereafter at 2 cents per share monthly, if there be no marked recession in metal prices.

**HECLA.**

**Regular Monthly Dividend Payable on May 20.**

Hecla Mining Co. will pay the regular monthly dividend of 15 cents per share, or \$150,000, on May 20, making the disbursements for current year \$750,000 and increasing grand total to \$6,055,000. Production is being maintained at maximum capacity. The company's new mill, of 650 tons capacity, is treating the lead-silver output, while the zinc ore from the south vein is being milled in the Marsh plant at Black Cloud. Marsh will begin producing in a few days, after a suspension of more than a year and arrangements have been made to divide the time of the mill, Marsh using it the first half of the month and Hecla the last half.

**Economize**

That's what you do when you buy a DOLBY TAILORED SUIT



"IF IT ISN'T ALL RIGHT, BRING IT BACK"

First Corner East of Old National Bank

**LOANS ON STOCKS**

**HENRY H. LOVE COMPANY**

Suite 201-202-203 Peyton Bldg. SPOKANE

**Try Our Service**

We make special efforts to satisfy our customers; our goods are packed by experienced clerks and shipment is promptly attended to. Our goods of the best; prices low. Wholesale prices on all such commodities. A trial order will convince you.

**Greenough-Hurley Co.**  
WHOLESALE AND RETAIL GROCERS  
521-23 Sprague Ave., Spokane

Established 1890

**Stock Certificates**

Printed and Lithographed, Designs, latest and best. Everything in Stationery and Office Supplies a Mining Firm Needs.

**Shaw & Bowen Co.**  
325-7 Riverside 326-8 Sprague  
SPOKANE, WASH.

**McDONALD Brokerage Company**

Members  
Spokane Stock Exchange  
Main 2445 614 Paulsen

**Copper King**

We believe this will prove the sensation of 1917. Write, wire or call for information.

**MINNEAPOLIS Steel & Machinery Co.**

Designers, Fabricators and Erectors of Steel Mining, Milling and Smelting Structures. Hoists, Derricks and Oil Towers. Minneapolis, Salt Lake, Denver, Helena, Spokane.

**Public Stenographers**

Multigraphing Evenings by Appointment  
**ISABEL TIMBERMAN ALICE M. BOWERS**  
511 Hyde Building, Wall and Riverside, Phone Main 4198  
Residence Phone Main 4336

**WESTERN MACHINERY EQUIPMENT**

MINING MACHINERY (New and Second Hand)  
RAILS—ALL SIZES  
F. W. BOLDRICK, Manager  
Fernwell Building

**TO THE PUBLIC**

Do you realize that recent declines in the stock market have placed many important issues on an extremely attractive level and that good profits are assured to those who will

**Purchase Now?**

Are you in a quandary on account of the international situation, as regards your surplus funds?

Do you want personal advice on your investments at this critical period?

The benefit of our knowledge and experience may help you.

Correspondence Solicited.

**W. H. Button & Co.**

Mining Brokers and Financial Agents.  
Old National Bank Bldg.  
SPOKANE

**Rosauer Brokerage Co.**

Members of Spokane and Wallace Stock Exchanges  
720 Paulsen Bldg. Phone M. 1357

We wish to announce to our clients that we have removed our offices from Wallace to Spokane.

We are now located at 720 Paulsen Building, and will appreciate your business. We will attend to your buying and selling orders as promptly as in the past. Information on Northwestern securities gladly furnished.

NW Mining Truth  
May 16, 1917 Vol. II No. 7

(6-16-98)

**Historical Overview of  
Mining in the  
St. Joe District**

**Shoshone County, Idaho**

**by  
Cort Sims**

**Idaho Panhandle National Forests**

**February, 1998**

*Draft Draft Draft Draft 1 Draft Draft Draft Draft Draft*

## Table of Contents

1. Introduction
2. Mines and Mining in Northern Idaho
3. Context and Property Types
4. World Systems and Mining in Northern Idaho
5. Mining in the St. Joe Drainage
6. Mines and Claims in the St. Joe Drainage

### Bibliography

Appendix A List of Claims in the St. Joe Drainage

Appendix B Transcript of Interview with Sam Peterson

Appendix C Timeline of Mining History in the St. Joe Drainage

### Illustrations

1. Map of Area Geology
2. Graph of Copper Prices
3. Map of the Mine and Prospect Locations in the St. Joe District

## 1. Introduction

The Idaho Panhandle National Forests contains a large number of historic sites related to mining. It is not unusual for these properties to be located in areas the Forest is considering for some action such as timber sales. It is also becoming common that the Forest targets some of these old mines for cleanup and for the elimination of safety hazards.

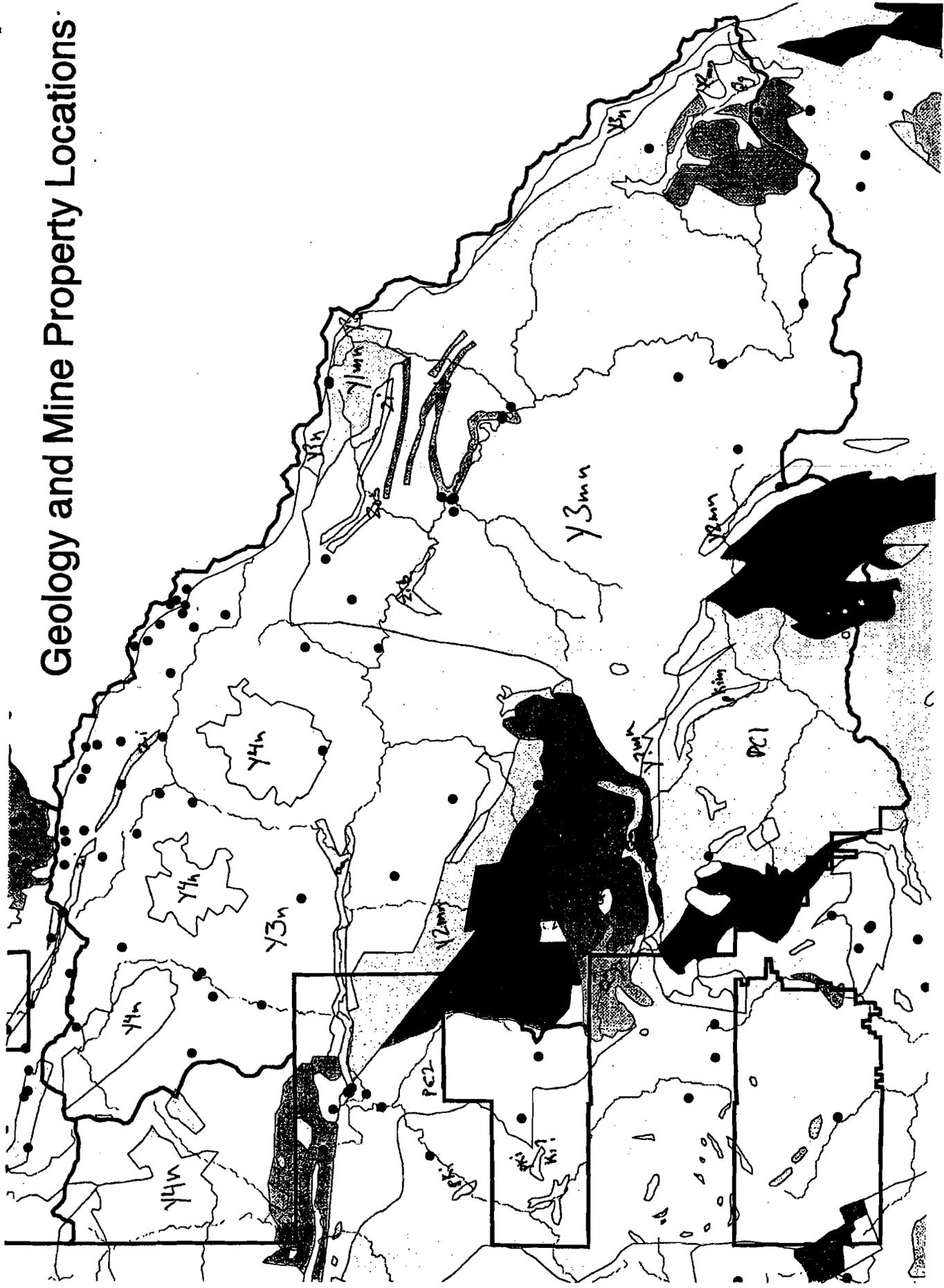
To comply with the National Historic Preservation Act, the Forest evaluates the mining properties potentially effected by any federally initiated or permitted projects. One way to do this is to define the historic contexts of mining in northern Idaho. An historic context consists of the important themes, locations and time periods identifiable within the subject of mining in northern Idaho. After defining historic contexts, the Forest can identify property types that can be expected to be related to historic mining activities. Then the Forest defines the criteria to be used for establishing the historical significance of mining sites. The final step is to review mining in northern Idaho in the context of the previous analysis.

This report contains a compilation of the historical information concerning mining in the St. Joe District. It is intended as a tool for further research rather than a definitive history or synthesis. The area covered by this report includes the St. Joe River drainage starting at the mouth of Big Creek to the top of the drainage at Illinois Peak. The elevation rises from the low point on the St. Joe River of 2250 to the high point on Illinois Peak of 7690.

The vegetation before 1910 included large stands of old growth white pine and cedar. The forest fires of 1910 burned off much of this timber and subsequent reburns reduced many areas to brush fields for many years. The Forest Service replanted many acres to white pine and other species including off site pine. In some areas natural regeneration resulted in dense stands of lodgepole pine.

The bedrock geology of the area is dominated by the Belt series, the same Precambrian sediments that occur in the Coeur d'Alene mining district to the north. Approximately 70 percent of the area is covered by the Wallace formation of shale, sandstone and quartzite. Ore deposits in the area are usually associated with what is know as the number 2 horizon of quartzite of the Wallace formation. The gangue (the rock in which valuable minerals occur) generally consists of siderite (oxidized iron) or quartz. Metallic minerals found in the area include pyrrhotite (magnetic iron sulfide), pyrite (iron sulfide), gersdorffite (sulfarsenide of nickel), arsenopyrite (sulpharsenide of iron), tetrahedrite (gray copper), chalcopyrite (copper pyrite), sphalerite (sulfide of zinc) and galena (lead sulfide). Gold and silver occurs in a small fraction in association with some of these minerals.

# Geology and Mine Property Locations



## 2. The Historic Context of Mining in Northern Idaho

The exact beginning of the mining industry in northern Idaho is debatable. For many, the Steven's Railroad Survey of 1853 and the construction of the Mullan Road (1858-1862) mark the beginning of the northern Idaho mining history. Before the survey and construction of the Mullan Road, northern Idaho was Indian country. After completion of the road the area rapidly became dominated by non-Indians led by prospectors and miners.

There is an undocumented report (Henderson et. al. 1903: 823) that a French Canadian discovered gold on Pend Oreille River in 1852. In the following year, Rickard (1932:318) states that, "as early as 1853 gold was discovered [in the Coeur d'Alene's] by Donelson of the Stevens expedition, but the hostility of the Indians prevented prospecting". Six years later, during the construction of the Mullan Road through the area between 1859 and 1862, Mullan's men noted quartz rock outcrops and some gold in the streams and Mullan met a miner with gold nuggets he found in the Coeur d'Alenes (Banksen and Harrison 1966: 37).

Following this, Charles Wilson prospected in the Coeur d'Alene Mountains in 1864 and found what he thought was a strike. However, when he attempted to led a group of Walla Walla miners back to the area, he was unable to relocate the prospect. Ironically with all of the miners passing over the road (up to 20,000 in 1865) the ore deposits in the area remained hidden. This is not as surprising as it may seem because at the time, the now largely barren valley bottom was covered by an old growth forest so dense that in many places wagons could not even be pulled off the wagon road.

According to Richard Magnuson (1968:10)

*Perhaps the earliest discovery of gold was made by a colored man whose name is not known. . . . A story printed by a Bozeman, Montana, paper in 1884 set forth that a Negro came into Missoula in the fall of 1866 with a large amount of gold dust, which he spent with abandon, claiming he knew where there was plenty more. . . . The next spring he went out again and in the fall returned with more gold than he had brought in before. The spring of 1868 saw him leaving Missoula once again, with a Flathead Indian. In July of that year, a band of travelers on the Mullan Road reported that the Negro and the Indian were living in a log cabin built in a small opening (in now Mullan, Idaho) along the road. A week later, another group traveling through there found the Negro dead, killed by a gun. Late in 1868 the Flathead was seen in possession of the Negro's horses, and it was supposed that he was responsible for the Negro's death.*

In 1873-74 a prospector named John Vollmer led a prospecting expedition into the Coeur d'Alene Mountains from Lewiston. This expedition, like the previous expeditions, was unsuccessful. In 1879, Tom Irwin from Lewiston worked a quartz vein along the Mullan Road in the Coeur d'Alene Mountains. Irwin apparently became convinced of the potential of the area and in 1881 Irwin interested A. J. Prichard enough to start prospecting the valley. Prichard eventually located placer gold claims in the upper North Fork of the Coeur d'Alene River in 1882 and started the first real gold rush into the Coeur d'Alene Valley in 1883.

The original placer mining operations boomed in 1884 and 1885, began to decline in 1886, and ended as a major enterprise by 1898. Dredging in Beaver Creek in 1902-3 and along Prichard Creek 1917-1926 (both in the Coeur d'Alene River drainage) was the last major placer operation in the Coeur d'Alenes. In other areas, placer operations existed in Boulder Creek (in the Kootenai River drainage) from the late 1800's to the 1920's and in the Upper St. Joe River intermittently from the 1880's to the 1930's.

Returning to the early 1880's, the initial influx of miners into the Prichard Creek valley fanned out over the Coeur d'Alene drainage and located many of the major silver claims in the South Fork of the Coeur d'Alene in 1884. It wasn't until Noah Kellogg located the biggest strike in Milo Gulch in 1885 near Kellogg (the future Bunker Hill Mine) that the South Fork experienced a rush of miners into the valley.

Development of the mines in the South Fork drainage proceeded rapidly following the location of the principal mines. Mineral production of Shoshone County alone in 1891 exceeded the combined production of the rest of Idaho (Cook 1961: 15). Problems with transportation, high freight rates, low metal prices and labor disturbances disrupted the development of the Coeur d'Alene Mines in the 1890's but production nevertheless steadily increased.

Prospectors continued to explore the Coeur d'Alene drainage and adjacent areas in northern Idaho. Small mining stampedes took place into the upper St. Joe River in 1887, into the Chloride area east of Lake Pend Oreille in 1888 and into the Moyie River Valley in 1893. Prospectors still continued to locate a few major mines. The Hercules property was located in 1889, the Continental Mine in northwestern Idaho was discovered in 1890 and the Lucky Friday Mine in 1899.

Lead production peaked during World War I and zinc production dramatically increased during World War II. The production of silver was something of a by-product of lead production in the Coeur d'Alenes until the Sunshine Mine developed its "Bonanza" ore body in 1930 to eventually become the world's leading silver mine.

Low prices for metals in the last 30 years has made most of the existing mines uneconomical to operate. This forced some of the more productive mines like the Star, Coeur, Galena, Crescent and Bunker Hill to close. The few that are left (Lucky Friday and Sunshine) are not making money. The total employment in the mining industry dropped from over 5000 in the 1930s to 2500 in 1980 to a little over 1000 in 1990.

### 3. Other Historic Contexts

The historic contexts of mining in northern Idaho not only included the context of exploration and development but also those of mining law, mining technology and the national economy.

#### A. Mining Law

In the context of mining law, it is important to note that the mining industry in northern Idaho developed after the passage of the principal federal law covering mining, the United States Mining Law of 1872. This act provides for opening public lands for mineral exploration and acquisition. An outline of the Act (USDA Forest Service 1995: 4-5) includes:

- 1. After discovery of a lode or vein, a mining claim may be located on a plot of land not exceeding 1,500 feet in length along the lode or vein and 300 feet on each side of the middle of such vein at the surface (fig. 1). Local mining district rules or State laws may limit the width of such claims to not less than 25 feet on each side of the middle of the vein at the surface. Surface end lines must be parallel.*
- 2. Upon completing the lode location, the locator has the exclusive right of possession and enjoyment of all (a) surface included within the lines of the location for mining purposes; and (b) all veins, lodes, or ledges throughout their entire depth if the top or apex lies inside of the surface lines extended downward vertically, even though such veins may extend outside the vertical side lines of the surface location.*
- 3. Placer claims located by a single individual and based upon a single discovery are limited to 20 acres. An association of individuals may locate up to 160 acres on each discovery.*
- 4. Both placer and lode locators are required to perform \$100 worth of development work per claim annually in order to hold their claims against subsequent locators.*
- 5. There is provision for acquiring 5-acre claims of nonlinear land for mill site purposes.*
- 6. The section commonly referred to as the Tunnel Site Act gives an individual the right to prospect a maximum of 3,000 feet into a hillside, acquiring a prior right to all theretofore unknown veins and lodes cut by the tunnel; however, no surface rights are attached.*

According to the law, there are two types of mining claims, lode and placer. The type of claim a prospector makes depends on the character of the mineral deposit covered by the claim. Rock containing gold, silver, cinnabar, lead, tin, zinc, copper or other valuable deposits are covered by lode claims. All other types of deposits such as alluvial deposits are covered by placer claims. The mining law requires that a claim be marked on the ground and that it be recorded with a description of its location and the names of locators along with the date of location

#### B. Mining and Milling Technology

The context of mining and milling technology has a bearing on the character of the mining in northern Idaho. The initial placer mining in northern Idaho relied on a technology that was well established by the time gold was discovered in the panhandle. Placering could be handled by individuals or small groups of miners with little more than picks, shovels, gold pans, rockers and sluices.

Once the easy placer deposits were worked out, methods to recover gold from more inaccessible deposits came into play. These methods required more capital to employ and were usually beyond the capability of single miners or partnerships. One method was "hydraulicking", which was used not only in the

Murray gold fields but also in adjacent Beaver Creek area of the Coeur d'Alene River Drainage, in the Upper St. Joe River area and along Boulder Creek in the Kootenai River Drainage east of Bonners Ferry.

According to Young,

*Hydraulicking was invented (or, properly speaking, reinvented) on March 7, 1853 at American Hill, north of Nevada City California by Edward E. Matteson . . . It occurred to Matteson to wash out rather than dig out the pay streak, and to this end he consulted with Anthony Chabet, a sailmaker, who constructed the pressure hose and Eli Miller, a tensmith, who built the sheet-iron nozzle. Chabet had already experimented with ground sluices cut by water wash and apparently contributed this idea as the gold-saving lash-up. . .*

*Although the per-ton cleanup in hydraulicking was not great and the investment required was considerable, the low cost of operation and the huge tonnages it could handle made the operation well worth while.*

*Hydraulicking worked effectively on steep gradients where the water pressure and material flow depended on elevation. In relatively flat areas [like the Prichard Creek valley] dredging became the preferred method.*

The final phase dealing with placer deposits involved the use of dredges, first on Beaver Creek north of Wallace in 1902 and then along Prichard Creek at Murray from 1917 to 1926.

Young (1970: 132) states that

*. . . dredging, which had first been reported in the New Zealand placers about 1882 and first employed in United States at Bannack, Montana, in 1897. A hybrid of gold-rush river mining and of ordinary sand dredging, it had been developed by the New Zealanders, who had devised a floating dredge carrying its own gold saving equipment.*

Hard rock mining technology advanced very little until the 1870's. The two major technological innovations of the 1870's involved drilling and blasting. The drilling methods prior to the 1870's involved hand drills and hammers. In the 1870's mechanical drilling developed into a practical method with the use of compressed air. Mechanical drilling improved with the development and adoption in 1897 of the Legner water-flushed drill. Young notes that

*Drill steels are roughly dated with some ease: plain chisel-bit steels predate 1897, the year of the Legner's patent; the machine chisel-bit steels with forged chuck ring and side flushing port lasted ten years; the plain star-bit steel with center flushing hole persisted to 1930's; steels with detachable bits are relatively modern.*

Another development in the 1870's was the invention of dynamite. This greatly increased the miners ability to blast out ore. Young (1970: 132) states

*The coming of air drilling and high explosives made possible the opening of medium-sized, relatively low-grade gold and silver mines of the intermediate period, particularly those of California, Arizona, the Great Basin, and the northern Rockies. Up to about 1875 small lodes were worked by one or two men who did everything from hoisting ore by windlass to their own arrastra milling. Anything bigger had to be so big and so rich as to cover a tremendous payroll of dozens to hundreds of double-jack teams working two shifts. After 1875 a mine could be opened and worked profitably with a payroll of two or three dozen men, hoisting enough ore of modest grade to net, what with the government subsidy on silver, a comfortable dividend on the operation. The economic and social consequences were instantly apparent: hundreds, if not thousands, of medium and medium-small western mines were opened in the period 1875-93. In Arizona alone thirteen thousand "mines" (more accurately, claims on which minimal location work had been done) were recorded by 1876. Within a decade the number doubled, but substantial development was confined to about seven hundred in the one territory alone. Thus all over the West there grew up a large number of small mining communities, the population of which working in the mine and the concentrator or mill or serving the community as a whole.*

Developments in milling technology helped shape the character of the mining in northern Idaho. Young (1970: 132) states that

*The initial placer mining was followed by hardrock mining. The ores in northern Idaho were mainly lead-silver, but some gold-copper-silver deposits and gold deposits were also located.*

As summarized by the Idaho Historical Society (1966)

*Free milling gold ores could be processed with stamp mills and mercury amalgamation plates. This is an old European process used in Georgia and widely in the west. . . . Arrastras often were used initially in place of stamp mills in this process, especially in remote districts.*

*Lead-silver ores present different problems of recover. These had been solved before 1880 when Idaho commenced this kind of mining. . . [with the use of a] lead-silver blast-furnace smelting. . . . Gravity concentration mills often were used prior to smelting.*

*Later process used for various Idaho ores include cyanide, developed in Australia, for some finely divided gold and silver ores where copper is absent after 1893. . . . Finally flotation, invented in 1910 and used widely after 1920, was available for gold, silver, copper, or lead ores.*

Flotation was not widely used until 1910 and in some cases was already surpassed by another process called "cyanidation". This became wide spread in the decade between 1887 and 1897. Young (1970: 285) reports that by 1891 virtually every precious-metal mill in the world" converted to cyanidation. Ideally with this process, mill operators could ". . . run gold-bearing sands or slimes into a 0.005 sodium cyanide solution, agitate well in he presence of air, and let nature take its course. Without fuss or trouble metallic gold would very quickly dissolve into the solution, which could then be decanted merely by opening a valve (Young 1970: 284).

### **C. World Economic Systems and Mining in Northern Idaho**

Mining is influenced and influences the economic systems of the world. The price of minerals depend on the interplay of a number of factors including: demand, supply, actions of cartels, prices of substitutes, speculation and production costs (Lovering 1943: 23).

*The concentrated value of gold, silver, and other minerals has stimulated exploration; their exploitation has led to commerce and power, their exhaustion to national decline and poverty. Mineral production has been instrumental in determining the course of history many times in the past and promises to be of increasing importance in the future. The aggregate area underlain by mineral deposits of economic importance is only an insignificant fraction of 1 percent of the earth's surface, and the geographic position of the individual deposits is fixed by some accident of geology (Lovering 1943: 5).*

With all of the influences on mineral prices it is small wonder that profits from mining have not been more evident. Young (1970: 288) states that

*Economically speaking, it would seem that in the long run, despite its image as a bonanza frontier, the mining West scarcely broke even. Costs insatiably devoured profits, and the number of men and institutions who came away with substantial gains was remarkably small. Most of the mineral strikes were tempting at first. They attracted millions of dollars (I decline even to speculate how many million) from Europe and the Northeast, but returned comparatively few in dividends. Nevertheless, the money was not wasted. It was expended in payrolls, transportation, costs of materials, and construction of which the general locality benefited. No matter what tenor of ore it was hoisting, a working mine was doing its share toward western development.*

Production in Shoshone County in particular and some other producing mines in other counties in northern Idaho were governed by economics. Ross (1930: 5) states that

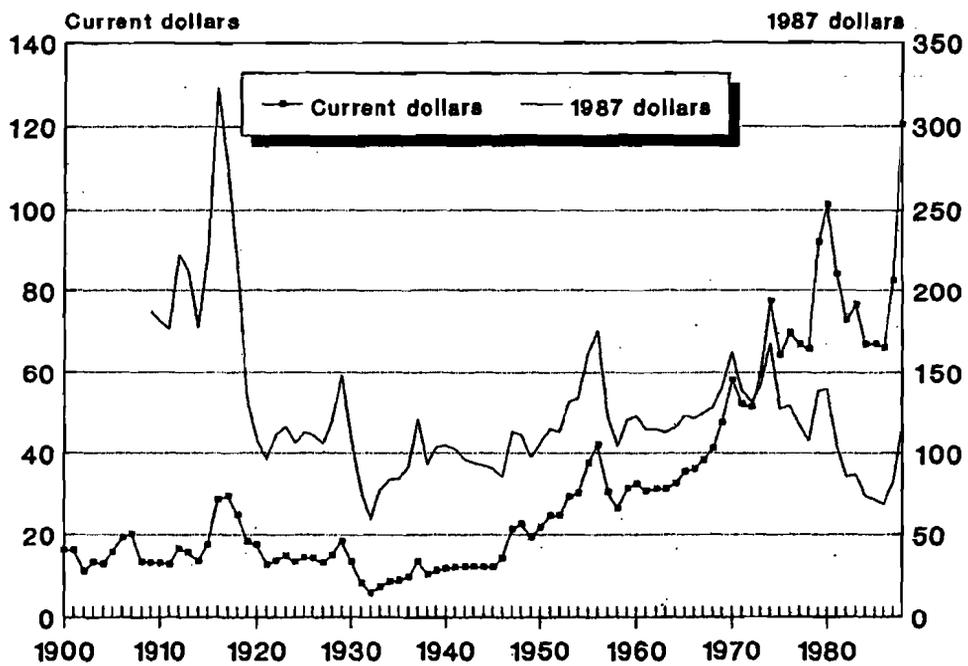
*As early as 1891 the production of [Shoshone] county exceeded in value the combined production of the rest of the state, and it has maintained its supremacy ever since. In 1926 the production of the Coeur d'Alene District was valued at nearly 94 percent of the total for the state. The variations in production in this county, unlike the others in the state, depend mainly on economic considerations rather than on the amount of available ore. The peak [speaking in 1930] of production in 1917 obviously resulted from the World War, and recovery after the post war slump has almost [come] in line with the pre-war upward trend.*

For the area under study in this report, the national price of copper is very important. As the graph illustrates the price of copper in constant dollars was highest during World War I. These prices plummeted in 1919. As Jolly (1989: 27) states

*Copper is a strategic material, the consumption of which increases several-fold during wartime. Both essential civilian and military uses depend upon a steady supply of copper. As a result, supplies become tight and prices tend to increase.*

Unlike some of the other metal prices, copper never again attained its pre-world War I price in constant dollars. In fact, faced with new ore discoveries domestically and around the world, even during wars the supply/demand/price has never reached to World War I levels.

Average annual copper prices, cents per pound



## 4. Property Types and Historical Significance

### A. Property Types

The properties associated with mining, in general, can be grouped according to the activities carried out at the locations. The National Park Service (Noble and Spude 1992) defines three basic activities: extraction of ore, beneficiation of ore and refining. Extraction activities include: (1) prospecting and mine exploration and (2) mine development and exploration.

Young (1970: 3) points out that

*Until nearly the turn of the twentieth century, American prospecting reflected no great advancement beyond that of prehistoric ages. Barring the American desert rat's acid test for mineralization, an Egyptian of the Old Kingdom would have recognized instantly what his successor was about. This prospecting, however, was not a science but an art founded upon accumulated lore, a dash of superstition disguised as lore, and a philosophy which is now forgotten beyond recall. Sheer intensity of effort was made the substitute for any sort of theoretical approach; yet, so long as men have been bitten by the Gold Bug, prospecting has never lacked for practitioners. Sooner or later the prospectors of the old schools went up every gulch and dry wash in the world. Many, for that matter, are still doing so and are still relying upon techniques and adages which were old when the Great Pyramid was yet undreamed of.*

Prospecting and mine exploration of the old school left behind an associated set of property types which include, prospecting pits, trenches, small scale placer deposits, hand-stacked rocks and rock piles, isolated shafts or adits, and mining cabins and camps.

Mine development and exploration results in mining properties with more features than results from prospecting and exploration. Property types associated with mine development and exploration include: adits, shafts, waste rock piles, large and small placer deposits, hydraulic mines, sluices, dredges, reservoirs and dams, roads, flumes, headgates and check dams, roads, trails, and railroads, tramways or haulage systems.

Beneficiation a word borrowed from the Spanish mining tradition, "Beneficar" meaning to dress ore (Young 1970: 304).

*Ore dressing is the mechanical separation of the grains of ore minerals from the worthless gangue. The resulting concentrate contains most of the ore minerals, and the waste is called tailings.*

*Usually two stages of crushing are used in ore dressing because it is more efficient than crushing to a relatively small size in a single-stage operation. Primary crushers and the coarse ore bins may be located at the mine, where the mine and mill operation are separated. Secondary crushers and the fine ore bins are usually at the mill, along with blending or custom facilities where more than one kind of ore is mined or received. The fine ore is ground in ball or rod mills to a size small enough to liberate the ore minerals, then classified in various kinds of machines to insure that the feed to the mill is uniform.*

*The various ore dressing methods are based on physical characteristics such as density, wettability, chemical reactivity toward certain reagents, and magnetic characteristics.*

*Flotation -- Flotation is the most widely used method of beneficiating complex and low-grade sulfide ores in the western United States. The word "concentrator" is virtually synonymous with froth flotation plant. The crushed ground and classified ore is pumped with water, and special reagents are used to make ore or more ore minerals water repellent and responsive to attachment with air bubbles. As the desired minerals are buoyed to the surface by the attached air bubbles, They are removed by mechanical paddles as concentrate, leaving the other minerals behind.*

Property types associated with beneficiation include: arastras, stamp mills, ball mills, cyanidation mills, and smelters.

Refining, the last process, takes the crude metal concentrate which results from beneficiation and refines it to a purity for use by industry or government mint. The Bunker Hill smelter at Smeltonville is an example of a property type resulting from refining

## **B. Historical Significance**

The historical significance of mining sites can be gaged by evaluated them using four National Register of Historic Places eligibility criteria. These criteria include:

- (1) Association with events that have made or significant contribution to the broad patterns of history.*
- (2) Association with the lives of persons that are significant in our history.*
- (3) Embody distinctive characteristics of a type, period or method of construction.*
- (4) That has yielded or may be likely to yield, information important in prehistory or history.*

For purposes of evaluation a mining site can be considered significant if, (a) it is an example of a type of site which, are rare in the Region; (b) the site has a high public educational value; or (c) the site has special potential for research and historical study.

Hardesty (1995: 7) illustrated that the only way to evaluate the research potential of a mining site (number 4 above) is to carefully develop a set of research questions and determine what data would be required to answer these questions. Hardesty (1988: 116-7) developed a "significance evaluation matrix that identifies key research questions and the context that would best answer these questions.

The contexts Hardesty suggests include world systems, mining district and feature system. This is the approach adopted in this paper. On the "world system" level Hardesty (1988: 117) research questions would deal with the change and variability on the western mining frontier as a whole. At the mining district level mining sites are compared to each other for relative information content. At the "feature systems" level, archaeologists assume that human activity produces related sets of features and objects (i.e. feature systems). As Hardesty states (1988: 11)

*... the feature system is the historical site equivalent of the activity locus, taking advantage as it does of what the documentary record tells us about site morphology and activity.*

Since mining sites may have been the location of a number of activities over time, the sites can contain a number of feature systems. Research at the feature system level focuses on the information potential of each then compared with other feature systems.

Mining districts developed as organizational units defined by groups of miners in a particular region to deal with issues of common interest. The State of Idaho, Bureau of Mines and Geology has retained this division to the present. A very appealing way to view mining districts or groups of districts is as "rural historic landscapes". McClelland and others (1992: 21-2) defines rural historic landscapes as:

*... a geographical area that historically has been used by people, or shaped or modified by human activity, occupancy, or intervention, and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, road and waterways, and natural features.*

Hardesty (1991: 4) sees mining landscapes as reflecting the "transformation of nature into culture in the American West.

With the above discussion in mind the National Register's suggested significance defining questions can be viewed from a number of perspectives. These questions (Noble and Spude 1992: 25) include

*-How do the extant vestiges of mining functions or processes relate to the broader mining or technological development of the locality, region, State, or nation?*

*-How important were the entrepreneurs, engineers, laborers, ethnic groups, and others who contributed to the development of the mining operation?*

*-How do the remaining building, structures, sites, objects, and historic districts reflect significant mining production processes?*

*-How did the mining operation(s) impact or influence other activities with a region or locale, such as exploration, settlement, and/or other commercial development-related activities?*

*-How is evidence of historic mining activity reflected in the archaeological record?*

Inevitably with all historic sites, but especially with mining sites, the question of historic integrity needs to be addressed. As indicated in a Forest Service report (USDA Forest 1995: 67)

*In many of the old mining camps of the west, every trace of former mining activity has been removed by scavengers to the point that the exact position of some small districts of historical record can no longer be found with certainty. In some areas of more recent activity, for example the gold mines of the 1930's... the mine buildings and equipment are less romantic, gradually having fallen into a state of vandalized disrepair that in every way qualifies them as the prime local eyesore. Eventually, all of the iron will be taken for scrap, the tanks appropriated by local ranchers and farmers, and the wood and galvanized sheeting hauled away.*

The National Register (Noble and Spude 1992: 19-21) recognizes seven aspects that define integrity. These include location, design, setting, materials, workmanship, feeling and association. If the property retains integrity, it will usually retain most if not all of the seven above aspects.

## 5. Mining on the St. Joe District

Prospecting in the St. Joe area started as early as the 1860's when miners from Montana stamped into the St. Joe country. Magnuson (1968: 10) states that

*Placer diggings were found, but not worked very long. This old camp was nearly south of Mullan, Idaho. Prospectors from the Murray goldfields also went in there on snowshoes in the winter of 1887-1888. They found placer diggings, but pay was too light to satisfy them, it was abandoned.*

Old placer diggings in the upper Wonderful Creek drainage suggest that this was at least one of the areas of initial exploration. In 1911, Calkins and Joes (1911: 86) noted that

*Placer mining was attempted at one time on a rather extensive scale within this region (Upper St. Joe River drainage), but evidently no work of this character has been done for many years. Old placer workings were noted on Gold and Simmons creeks. At the former locality old blazed trees evidently mark the corners of claims, and piles of boulders along the creek indicate former work. The stream has been dammed by beavers in the sluiced creek bed and a willow swamp now occupies the site of former placer mining. An old trail leads from the Bitterroot divide to the headwaters of Simmons Creek, on which old cabins, forges, and large piles of washed boulders furnish ample evidence of former work.*

Above Simmons and Gold Creeks extensive placer mining was attempted on Heller, Sherlock, the St. Joe River between Medicine and Sherlock and on California Creek. From the information on the mineral surveying it is evident that in the late 1890's prospectors began locating lode claims in the upper North Fork of the St. Joe River drainage. Development focused on a few properties. The Monitor Mine shipped 1500 tons of ore over the Bitterroot divide by wagon between 1905 to 1910.

The construction of the Chicago, Milwaukee and St. Paul Railway encouraged development of the prospects that had access to the right-of-way. The St. Maries Gazette of July 5, 1907 states that

*The construction of the Chicago, Milwaukee & St. Paul road along the St. Joe River has added much to the mining activity in this section of the country. It has always been understood that the St. Maries and St. Joe country offered some great inducements to the hard working prospectors, and the building of the road has increased their interest to such an extent that there is scarcely a day but that dozens of prospectors are entering the field. In a recent issue of one of the Wallace papers it was stated that crowds were leaving the Coeur d'Alene country for this section and that those returning reported that it would only be a question of time until the St. Joe country would rival the mining industry of the Coeur d'Alenes.*

The Bullion, Big Elk, Ward and Lucky Swede sent trial shipments to smelters in the early teens. The Richmond and St. Laurence shipped ore between 1915 and 1918. Development was spurred by World War I and the subsequent increase in the price of copper. The Lucky Swede Gold and Copper Mining Company (Later the Pearson Mining Company) intensively explored a set of claims along Lucky Swede Creek from 1909 to the 1920's. While prospecting on the south slope has continued to the present, no other major mining developments have been undertaken. Wagner stated in 1949 (1949: 45) that

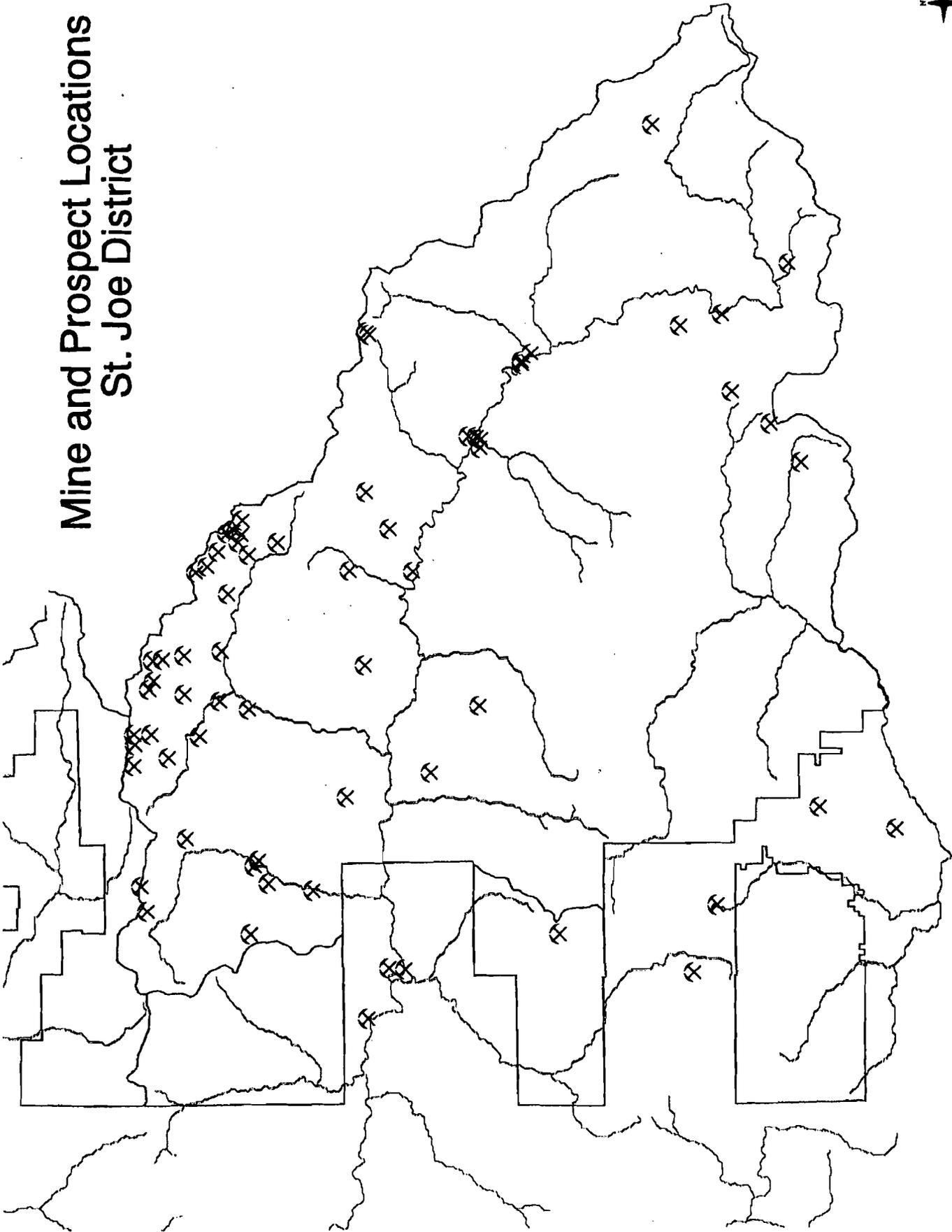
*Undoubtedly a number of claims, prior to the 1910 fire, were staked for their valuable timber. Most of the older claims are now open as the assessment work has not been kept up.*

The depressions and economic slumps of the 1920's and 1930's discouraged development but sometimes encouraged prospecting. Over 3000 claims have been located on the St. Joe Mountains. With periodic increases in metal prices new waves of prospectors put claims over older ones.

The periods of significance for this area's mining history include the period of initial exploration from 1860 to 1890 when periodic waves of prospectors flooded over the mountains. The period of discovery from 1896 to 1910 covers the time when lode claims were established in the area. The period of development from 1905 to 1925 covers the major developments at the Monitor, Richmond, St. Laurence, Lucky Swede, Bullion, Ward and Copper Prince properties.

The mine properties on the south slope are related to prospecting, mine development and exploration. The type, quality and quantity of the ores on the south slope of St. Joe Mountains never led to developments such as beneficiation. There never were any mills of any kind built in this area. What ore that was shipped, was hand picked ore right out of the mines. The Montana-Idaho Copper Company contemplated building a mill at Adair to process ore coming out of the long tunnel. Since no ore of commercial quality was encountered by the long tunnel, the mill was never built. The Bullion Mine also had plans to build a mill but never carried these plans out.

# Mine and Prospect Locations St. Joe District



## 6. Mines and Claims in the St. Joe District

*"A mine is a hole in the ground with a liar standing next to entrance"* Mark Twain

Ross and Forrester (1958: 456) state that

*The southern and western parts of Shoshone county contain deposits of lead, copper, gold and other metals, most of which have attained little production.*

This section contains descriptions of the more prominent claims taken verbatim from newspapers, mining publications and other sources.

### (1) Edna May (T. 47 N., R. 3E., Sec. 17)

The Shoshone County records lists an Edna May claim located 10/2/1908 and recorded on 10/19/1908. The claim was established by E. S. Pollard.

Today, this prospect has an adit, cabin remnant and an outhouse. It was probably worked on the theory that the ore bodies associated with the Pine Creek fault in Pine Creek, to the north, carried over the divide into the Big Creek drainage. It is now known that they do not and so it is not surprising that the prospect never developed beyond the exploration stage.

Wagner (1949: 31, 42)

*Calkins (1923, Plate 11) mapped the Pine Creek fault in the Coeur d'Alene district and his map shows it passing through the low Kellogg Saddle into the Avery district where it trends N. 45°W. with down throw to the southwest.*

*The deposits are closely associated with areas of marked structural disturbance. They occur in fractures developed during the period of deformation that produced the regional faults. These fractures are parallel to or at the small angle to the main faults. They strike from east-west to N. 70°W. and dip from 45° to 80°S. Only one of the prospect tunnels cuts a major fault. This adit, on an abandoned property, the name of which could not be learned, cuts across the Pine Creek fault in sec. 28, T. 47 N., R. 3 E. The main break is unmineralized, but small fractures in both the hanging and footwall contain stringers of quartz and siderite.*

### (2) Copper Prince (T. 45 N., R. 3 E., Sec. 10)

Interest in this prospect resulted in the longest running mine exploration on the south slope. In spite of its promise and easy access it never proved to be worth developing.

Pardee (1910: 57)

*Copper Prince. - The most promising prospect so far shown in the metamorphosed strata representing the lower part of the Newland ("Wallace") formation is the Copper Prince, near the mouth of Black Prince Creek. It is situated in sec. 10 T. 45 N., R. 3 E., 800 feet south of sec. 3, but its trend may bring it within this section, though it can not at present be traced there because of the mantle of surface debris. Toward the east it is traceable across the line into sec. 11 and there is lost under the surface soil. Altogether it can be followed for nearly a third of a mile. The Copper Prince lode trends about N. 70° W. and is nearly vertical. It is a series of parallel slopes in highly metamorphosed shales representing either the Newland ("Wallace") formation or the St. Regis formation and is in close proximity to intruded masses of granitic and monzonitic rocks, aplite, and diabase dikes. The chief minerals are pyrite and chalcopyrite, with siderite, quartz, and calcite, and these occur in small fissures and joints and in little irregular bunches replacing the country rock.*

*This scattered and bunched replacement type is characteristic of the lode so far as developed near the mouth of Black Prince Creek, but 1,000 feet north of this it seems to be better defined and to show a shear zone 4 to 5 feet wide filled with quartz, which has largely replaced the crushed material and some of the wall rock. Here, however, the evidence of mineralization is not very pronounced. About 100 feet still farther west a 10-foot tunnel shows the lode to be 3 feet wide, fairly well defined, filled with crushed, iron-stained country rock and quartz, and giving much more evidence of a possible definite ore body than it does farther to the east. The development work, in addition to the short tunnels and few small open cuts on the west end of the outcrop, consists of three tunnels - one on the west side of Black Prince Creek, 60 feet; another on the east side, 75 feet; and a third just over the line in sec. 11, driven in 40 feet deep. In some places the lode is wholly in sedimentary beds and in others it occurs as a shear zone between the sediments and the intrusive rocks. It seems to show local changes of direction, possibly due to intersecting side fissures, and such intersections might reasonably be expected to contain ore bodies.*

### **The Mines Handbook 1916**

*Copper Prince Consolidated M. & M. Co.*

*Office: Coeur d'Alene, Idaho. Mine office: Herrick, Shoshone Co., Idaho. Officers: Saml. R. Hite, v. p.; W. H. Batting, W. M. Ramsey, W. W. Parshall, John S. Craig, E. E. Dillinger and Boyd Hamilton, directors. Frank Drummond, supt. Inc. July 30, 1910, in Idaho. Cap., \$4,000,000; shares \$1 par, nonassessable; cap. reduced, Sept., 1915, to \$400,000; issued \$2,775,000. Annual meeting, first Monday in September. Property: 37 claims, unpatented, 740 acres, in 2 groups on the north bank of the St. Joe river, 6 miles and 20 miles, respectively, above the head of navigation. Property includes water rights. The Copper Prince group, formerly known as the Black Prince, has 13 claims, and the Idaho-Virginia, or Gold Ridge group, of about 24 claims, is about 6 miles east of the Copper Prince, and 3 miles from the Milwaukee railway. The Copper Prince group shows contact ore bodies, between granite and Revett quartzite, of 20 to 30' estimated average width, carrying chalcopryrite, bornite and gray copper, giving assays of 3 to 41% copper, and 8 to 13 oz. silver per ton. Development: by 500' of drift tunnels driven from the sides of 2 canyons. The ore body has been traced by trenches and crosscut tunnels, on each claim for the entire length of property, a distance of 7,800'. The Idaho-Virginia group is reported to have a 15 to 20' contact deposit, between granite and slate, carrying galena giving assays of 8 to 40% lead, and 14 to 46 oz. silver. Developed: by 2 shafts of 50' and 250' depth, and 3 crosscuts, intercepting a vein said to show galena ore of good quality. Buildings include a smithy, boarding house and a stable. Company plans utilizing water power from Prince Creek, by 6 miles of 3' ditch and 1 mile of 3' flume. Equipment: includes 4 boilers, 2 hoists, 2 six-drill air compressors, and a saw mill. Property has been under development for 6 years. Former president L. B. Holbert, brought suit in 1916 against company to recover \$27,970 for services rendered and money advanced.*

### **Northwest Mines Handbook 1918**

*Copper Prince Consolidated M. & M. Co.*

*Office: Coeur d'Alene, Idaho. Mine office: Herrick, Shoshone Co., Idaho. Officers: Samuel R. Hite, v. p.; W. H. Batting, W. M. Ramsey, W. W. Parshall, John S. Craig, E. E. Dillinger and Boyd Hamilton, directors; Frank Drummond, supt. Inc. July 30, 1910, in Idaho. Cap. reduced, Sept., 1915, to \$400,000. annual meeting, first-Monday in September. Property: 37 claims, unpatented, 740 acres, in two groups on the north bank of the St. Noe river, 6 miles and 20 miles respectively above the head of navigation. Property includes water rights. The Copper Prince group, formerly known as the Black Prince, has 13 claims, and the Idaho-Virginia, or Gold Ridge group, of about 24 claims, is about 6 miles east of the Copper Prince and 3 miles from the C. M. & St. P. railway. The Copper Prince group shows contact ore bodies between granite and Revett quartzite, of 20 to 30' estimated average width, carrying chalcopryrite, bornite and gray copper, giving assays of 3 to 41% copper, and 8 to 13 oz silver per ton. Developed: by 500' of drift tunnels, driven from the sides of 2 canyons. The ore body has been traced by trenches and crosscut tunnels, on each claim, for the entire length of property, a distance of 7,800'. The Idaho-Virginia group is reported to have a 15 to 20' contact deposit, between granite and slate, carrying galena giving assays of 8 to 40% lead, and 14 to 46 oz silver. Developed: by 2 shafts of 50' and 250' depth and 3 crosscuts, intercepting a vein said to show galena ore of good quality. Buildings include a smithy, boarding house and a stable. Company plans utilizing water power from Prince Creek, by 6 miles of 3' ditch and 1 mile of 3' flume. Equipment: includes 4 boilers, 2 hoists, 2 six-drill air compressors, and a saw mill. Property has been under development for 6 years. Former president, S. B. Holbert, brought suit in 1916 against company to recover \$27,970 for services rendered and money advanced.*

Wagner (1949: 47)

*The exploration workings on the deposit, both surface and underground, are caved and little could be learned from them; however, railroad and road cuts expose part of the structure to good advantage*

*Development work on the property has not uncovered valuable ore bodies and no ore has been shipped.*

**(3) Macedonia Mining Co. (T. 47 N., R. 4 E., Sec. 29)**

Shown on 1960 Metsker Maps otherwise unknown.

**(4) Royal Mining Company (T. 47 N., R. 4 E., Sec. 21)**

Shown on 1960 Metsker Maps otherwise unknown.

**(5) Slate Creek Cons (T. 47N., R. 4 E., Sec. 26)**

Shown on 1960 Metsker Maps , shown on the state list as a silver gold and lead prospect.

**(6) The Franklin Property (T. 46 N., R. 4 E., Sec. 23) (Gold Ridge Group, see Copper Prince)**

Shown on the state list as a copper prospect. Wagner (1949: 45)

*The deposit occurs in impure quartzite of the number 2 horizon of the Wallace formation and is exposed by three short tunnels with a total length of 350 feet. The surface plant consists of a cabin for living quarters and the wrecked remains of a compressor house and tool shed. No work has been done on the property for a number of years other than the opening of the tunnel portals in 1942-43 for the purpose of sampling.*

*The Franklin prospect is the most promising in the district, but the low grade of its ore combined with the tightness of the structure are not conducive to further exploration.*

**(7) The Cougar Group (T. 45N., R. 4 E., Sec. 18)**

Shown on the state list as a copper and gold prospect. Wagner (1949: 45-7)

*Development on the claims includes ore tunnel 280 feet long, driven near water level of the St. Joe River, and a number of open cuts that are now mostly filled.*

*No assay records were available on the ore of the property, but according to Mr. Theriault, the owner, the ore assays between \$7 and \$15 per ton in gold. Microscopic examination of the ore did not reveal the mode of occurrence of the gold. No shipments of ore have been made from this property.*

**(8) Silver Spray (T. 46 N., R. 4E., Sec. 11)**

Shown on the state list as a silver, gold and copper prospect. Pardee (1910: 60)

*Silver Spray. . . consists of two tunnels and several open cuts. Tunnel A bears about N. 24°W. and enters 700 feet from the mouth of Prospect Creek. It has been driven 58 feet into bluish slates representing the upper part of the Newland ("Wallace") formation, which are here interbedded with some buff-weathering to light-gray fine-grained shales and quartzite beds. The mineralization occurs in a quartzite bed 1 1/2 to 2 1/2 feet thick, which dips 10° N. and consists of siderite, pirite, crystals of chalcopyrite, galena, a little micaceous hematite, and some zinc blende. These minerals occur as small irregular replacement bunches peppered through the quartzite bed. An open cut higher up the hill shows other similar quartzite beds also more or less mineralized. Tunnel B, on Slate Creek 200 yards north of the mouth of Prospect Creek, has been driven 50 feet into the same formation and the mineralized condition here are practically identical with those above described.*

**(9) Sailor Boy (T. 46 N., R. 4 E., Sec. 13)**

Shown on the state list as a lead prospect. Pardee (1910: 60)

*The mineral conditions here are practically the same as those in the Sliver Spray. The mineralized quartzite bed is about 2 feet thick and shows the same minerals in the same sparse proportions. A tunnel 75 feet long has been driven and a 30-foot crosscut and 20-foot shaft have been added to the main working.*

**(10) Mastodon (T. 46N., R. 4 E., Sec. 8)**

Shown on the state list as a lead prospect. Pardee (1910: 60-1)

*Tunnel A of this group is driven about 75 feet into blue and light-gray slates and shales, which dip 8°N. It shows fine-grained quartzite beds containing a few small gash veins which are filled with siderite, pyrite, and some calcite, but no general vein or lode. Tunnel B, in the same formation, has been driven in 75 feet on the west side of the creek. Little irregular bunches of mineral occur here, sparingly disseminated through a vein of quartzite about 2 feet thick, which is interbedded with the slates, as in the Silver Spray and Sailor Boy prospects. The minerals observed are pyrite, galena, siderite, calcite, and zinc blende. Tunnel C, driven some 200 feet into the same formation, shows a few very small stringer veins but no mineralization except a little iron-stained quartz and some weathered siderite. Tunnel D, driven 150 feet into the same formation, opens what appears to be bedding thrust, the mineralization of which has partly replaced some of the sheared wall rock. The vein material is mostly siderite, now largely altered to iron oxide, and some pyrite. Its maximum thickness is 4 feet, but in some places it thins down to less than a foot.*

**(11) Setser (T. 45 N., R. 6 E., Sec. 5)**

Pardee (1910: 61)

*The Setser claim is located near the summit of Packsaddle (Nelson) Mountain, about 4 miles northeast of Avery. Development work consists of an adit and several open cuts. A shear zone is exposed, the planes of which bear irregular "knife-blade" seams of ore consisting of galena and sphalerite, with some chalcopryite and pyrite. Fairly large pieces of "float" galena, said to have been found in the vicinity, indicate a possible occurrence of larger ore bodies. The shear zone trends apparently east and west. The country rock is bluish and greenish shale representing the upper part of the Newland ("Wallace") formation.*

**(12) Lucky Swede/Pearson (T. 47 N., R. 6 E., Sec. 31)**

Two different companies explored these properties, all run by the same group of people. In spite of the promising deposits encountered, the mine never produced commercial grade ore in enough quantity to warrant shipping to a smelter. The Lucky Swede group of claims were located and recorded in August 1907 by Morris Pearson and others. The Pearson group of claims were established by the Lucky Swede Gold and Copper Mining Company in 1920, 1923 and 1924.

Up the Swiftwater (Crowell and Asleson 1980)

*The Lucky Swede Mine, twelve miles up the North Fork, was operated by the Pearson brothers from Minneapolis and boasted of a shaft nearly a mile in length besides its own generating plant. Despite promising signs of gold and copper, only two carloads of ore were ever transported out. After ten years of labor and a sizable investment by Minneapolis stockholders, the only salvageable commodity was the mine tailings used as fill for the Avery-Wallace road.*

Daily Idaho Press (Wallace) June 2, 1909

*Take in supplies for Lucky Swede*

*Manager Pearson will Arrange for Building New Cabins.*

*Manager Maurice Pearson of the Lucky Swede Mining company left this morning for the property which is located in the St. Joe District. He took with him C. A. Smith and Philip Shephard, miners, who will also assist in packing in about 1000 pounds of tools and provisions, which will go in by way of Sohon spur.*

*The first work to be done at the property will be making of repairs to the old buildings build some new cabins and a blacksmith shop and after this preliminary work is completed active mining operations will be begun with an increased force.*

*The company owns a group of copper claims which have been partially developed, the most work being near the surface. At the grass root level ore is found assaying 2 per cent in this metal and carrying by products of \$1 in gold and 10 ounces in silver to the ton. A lower drift has been started and is now about 70 feet. This will be continued about 600 feet, which will bring it to under the point of diabase dyke located on the surface.*

**Pardee (1910: 55)**

*A quarter mile north of the north line of sec. 6, T. 46 N., R. 6 E., the Silica Gold & Copper Mining Co. has a group of claims located on three parallel veins, which cut limy, buff-weathering sediments representing the Newland formation. The chief lode seems to consist of a fault zone which is 6 feet or more in width and is filled with crushed rock and more or less angular fragments of quartz. It trends about N. 70° W. and may be a continuation of the faulting shown on the railroad cut in the southern part of sec. 4. A few little local bunches of pyrite and chalcopyrite occur, apparently where side fissures intersect the main brecciated zone. The sulfides are said to carry gold to the value of \$4 to \$12 a ton. Siderite and calcite also occur in varying amounts. The so-called middle lode is 150 feet north of the one just described and roughly parallel to it. The development work consists of an open cut 20 feet wide, trending S. 80° E. and dipping steeply south. No pyrite or chalcopyrite was observed here.*

**The Mines Handbook (1916: 716)**

*"LUCKY SWEDE GOLD & COPPER MINING CO IDAHO Office: 625 Cedar St., Wallace, Idaho. Officers: Morris Pearson, pres.-gen. mgr.; Otto A. Olson, sec.-treas.; L. F. Macejewski, Harry Pearson and Ida Pearson, directors. Inc. May 1909. Cap., \$1,000,000; shares \$1 par; assessable; last assessment 3 mils per share, delinquent Sept., 1913; 300,000 shares issued to end of 1914. Company planned 1914 to give away stock to those agreeing to pay a 1-mill assessment per share every 60 days to provide necessary funds for development work. Property: 14 claims in the St. Joe district, S.E. of Mullan, near the C. M. & St. P. R. R., shows 3 veins with surface ores giving good assays in copper and gold. Development: by tunnel with about 600' of workings. Company's last assessment provided funds for a new 1,500' tunnel to start near the railway line and cut a copper vein expected to be reached at depth of 1,000'. Equipment: includes compressor, installed 1913, and a Pelton wheel.*

**The Mines Handbook (1922: 716)**

*Pearson Mining Co. Address: J. F. Ferguson, treas., 7 Shoshone Bldg., Wallace, Idaho. Morris Pearson, pres.-supt.; Harry Pearson, gen. mgr. Inc. 1920, in Minnesota. Cap. \$250,000; \$1 par. A reorganization of the Lucky Sweede G. & M. Co. Property: 14 claims in the St. Joe district, Shoshone county, S. E. Mullan, near the C. M. & St. P. R. R. shows 3 veins with surface ores showing good assays in copper and gold. Development: by a 1,950' crosscut tunnel, tunnel, with 200' to be driven in 1921, to reach the main vein. Equipment: includes oil engines, compressor, and a Pelton wheel.*

**Twenty-Sixth Annual Report of the Mining Industry of Idaho for the year 1924**

*Pearson Mining Co. Office: Wallace. Officers: Morris Pearson, Pres., John F. Ferguson, Sec.; Harry P. Pearson, Mgr., all of Wallace. Inc.: April 26, 1920. Capital: 250,000 shares; par value \$1; 242,150 shares issued. Property: 4 patented, 46 unpatented claims, St. Joe dist., : Falcon. Development: Principally by one tunnel 3300 ft. long. Plant: Gas driven Sullivan compressor; complete mining equipment and camp. Ore: Copper-gold. Men employed: Average, 6. Remarks: a small amount of development work was performed, and construction work on a new power plant and new mine camp was started.*

**(13) St. Joe Gold-Copper (T. 46 N., R. 7 E., Sect. 6)**

St Maries Gazette January 29, 1909

*"Discovery of Copper. The St. Joe Gold and Copper Mining company, operating on claims near Grand Forks, about a mile from the loop of the Chicago, Milwaukee & St. Paul railway, has uncovered some extra good copper ore. Work is to be pushed all winter developing the mine, of which great things are expected."*

**The Mines Handbook 1916**

*St. Joe Gold-Copper M. & M. Co.*

*Office Wallace, Idaho. Property: 9 claims, well timbered, on Kelly Creek, near Saltese, 3 miles west of the Monitor mine, and one-half mile from railroad showing 2 strong ledges. Idle some years.*

**(14) Altoona (T. 46 N., R. 7 E., Sec. 18) (Black Cat Claim)**

The Shoshone County records shows that this claim was located on 8/6/1909 and recorded on 9/24/1909. The original locators included Earl Gilmore, W. J. Ward, F. G. Hopkins and W. A. Simons.

**Up the Swiftwater (Crowell and Asleson 1980)**

*One man's dreams for a mine on Turkey Creek, also a tributary of Loop Creek, ended rather abruptly by a gunshot wound in the head. Ward, a tall, moustached man, was working for the Winton Brothers on the St. Paul Tunnel when he found prospect. After a trip East to raise money, he named his mine Altoona after a town in Michigan. It was the winter of 1911 and Ward's cook, Jack Frost, decided his paycheck was long overdue. Frost stomped to Ward's cabin under the trestle and shot him through the window. That was the end of Ward, although his name is remembered on Ward Creek.*

**(15) Miller Mine (T. 46 N., R. 7 E., Sec. 7)**

A recently active mining prospect. The claim contains an adit and cabin.

**(16) Wonderful Mine (T. 47 N., R. 6 E. Sec. 20)**

The Wonderful Mine properties were located in 1906. They were originally explored with a 1200 foot long tunnel that crosscut the claims. By 1922, there were two tunnels said to reach 2000 feet in length. The Wonderful Mining Company apparently abandoned the property and in the late 1930's, Luther T. Tallent bought the property for taxes from Shoshone County. No ore was ever shipped from this mine. The Forest Service eventually acquired the patented property through a third party land exchange.

When Mr. Tallent bought the property, it contained a cabin, a blacksmith shop near the portal, tracks and two mining cars. He added a compressor, air pipes, water pipes and the access road. Today the cabin and waste rock pile are the prominent remaining features.

**The Times (Wallace) February 2, 1907**

*Wonderful Tunnel Nearing the Vein*

*The vein in the lower tunnel on the Wonderful group of claims located south of Mullan near the Champion and park copper properties is expected to be encountered any day. A. H. Featherstone and Henry E. Howes have returned from a trip of inspection going over on snow shoes. They report the trip a hard one.*

*The lower tunnel was found to be 156 feet in and it appears as if the vein may be tapped at any shot. The tunnel is now in diorite and much water is coming from the face, a good indication of the close proximity of the vein. The contract is for 300 feet. "When the vein is reached we will crosscut it to ascertain its width and then drift on it," A. H. Featherstone.*

"In the upper tunnel the vein was found to be 25 feet wide. Good copper ore was encountered on the foot wall, but we did not continue the drift very far. We are now engaged in crosscutting to the hanging wall after which we will continue the drift."

#### Northwest Mines Handbook 1918

*Wonderful Mining Co., LTD*

*Office: Otterson Blk., Wallace, Idaho. A. H. Featherstone, sec-treas. Stock is assessable. Property: 4 claims, patented, near Mullan, Shoshone Co., Idaho., W. of the Bullion mine, on the eastern slope of Stevens peak. a 1,200' crosscut tunnel is developing a vein said to give a fair showing of galena and copper ore.....*

#### The Mines Handbook (1922: 819)

*Wonderful Mining Co., LTD.*

*Office: A. H. Featherstone, sec-treas., Otterson Blk., Wallace, Idaho. Officers: W. H. Holden, pres., with John Taylor, A. H. Featherstone, and He E. Howes, directors. Cap. \$1,500,000; \$1 par; assessable. Property: 3 patented and 6 unpatented claims, in the St. Joe district near Mullan, Shoshone county, Idaho, W. of the Bullion mine, on the eastern slope of Stevens peak. Ore carries lead and copper, the former predominating. Development: by 2 tunnels, 200' apart, and about 2,000' long.*

#### (17) Bullion Mine (T. 47 N., R. 6 E., Sec. 21)

The mine survey records show that this mine was located in 1900 to 1903 and surveyed in 1903. The Bullion Mine shipped a trial ton of ore in 1909. The following year the mine may have shipped additional ore but documentation of this has yet to come to light. In 1910, the mine buildings were destroyed by fire and eight miners were killed. By 1912 the mine was back in operation and sent a trial shipment of ore to the smelter. It does not appear that development work persisted after 1913.

#### *Spokesman-Review September 11, 1903*

*Rich Ore in Bullion Mine.*

*Values Said to Run High, Mostly in copper.*

*Wallace, Idaho, Sept. 10.-At the Bullion mine, where the strike was made last week, J. Taylor, part owner, says the ledge has been crosscut and is found to be 18 feet wide. Of this 16 feet is concentrating and two feet shipping ore. It will give an average assay of 6.1 per cent in copper. There are also good gold and silver values.*

*The shaft has been sunk in a draw and was down 83 feet when the ledge was struck. The ledge in being drifted on and is getting under the mountain. Croppings of the ledge are found on the surface, 750- feet above where the shaft is sunk. Portions of the ledge give marvelously rich returns in copper values.*

#### The Daily Times (Wallace) September 11, 1907

*Contract on Bullion*

*Taylor will take all his pay in Stock*

*This will obviate the necessity of the Bullion Levying an Assessment. Taylor Pleased with Mine.*

*A special meeting of the directors of the Bullion Mining company was held last night for the purpose of considering a proposition for driving 100 feet of tunnel at the property, taking in payment treasury stock of the company.*

*The Proposition came from James H. Taylor, one of the heavy stockholders of the company. Mr Taylor offered to drive the tunnel for \$12.50 a foot, taking in payment treasury stock at 10 cents a share. The proposition was accepted by the directors and a contract will be entered into today.*

*Mr. Taylor returned from a visit to the Bullion yesterday. He was greatly pleased with the situation at the property, and it was as a result of an exhaustive examination of the property that he concluded to make the proposition to drive the tunnel taking in payment stock at 10 cents a share.*

*It has been decided not to levy an assessment on the Bullion stock. Several days ago the officials stated the top price, 10 cents, an assessment would necessarily be levied if work at the property was to be continued. William Squance, president of the company, opposed the assessment, and Mr. Taylor's proposition was opportune.*

*"The drift at the Bullion is full of good shipping ore, and Mr Squance, president of the company last night. "Our greatest difficulty now is a method of transporting the ore to the railway. The property is situated about 4 miles from the track of the N. P. and we have no money to the road, which would cost about \$4,000. With this road constructed, I have no doubt but that the Bullion would be easily self sustaining.*

#### **The Daily Times (Wallace) October 11, 1907**

*Five Hundred Tons of Shipping Ore at Bullion*

*David Ault of Wardner Says There is 75 Feet of Stopping Ground*

*"The Bullion people are to be congratulated on the conditions which have shown up in their property," said David Ault of Wardner last evening. Mr. Ault recently paid a visit to the Bullion property, located near Saltese. "The ore is good and they have shipping mine today, but are handicapped on account of the lack of a road and outlet facilities.*

*"The Bullion has, at a conservative estimate, 500 tons of shipping ore on the dump, high grade copper ore. But they cannot ship until the Milwaukee completes its line, which will run a distance of three miles below them.*

*"The miners have opened up about 75 feet of stopping ground full of copper ore, having followed the drift. The ore is from 18 inches to three feet in width. The ore is plainly of a better grade than the Snowstorm ore. This strike was made on the east drift."*

*The Bullion property is owned principally by J. H. Taylor, William Squance and Michael Steffans of this city.*

#### **Daily Idaho Press (Wallace) Thursday, May 13, 1909**

*Mill Test Made of Bullion Ore*

*Results are entirely Satisfactory to Owners of Copper Mine*

*A mill test of the copper ore from the Bullion mine near Lookout was made at the plant of the Coeur d'Alene concentrating company, opposite the foundry Sunday which gave very satisfactory results. About a ton of the ore was run through the crushers and over the vanners and tables, resulting in its reduction to the pure concentrates. The product has not yet been assayed but previous tests showed to assay 19 per cent or a gross value of \$38 to the ton, from which must be deducted \$5 per ton for freight and treatment at the smelter at Tacoma. Giving the company a net value of \$33 per ton.*

*The ore, which is chalcopryrite was taken from the dump and had been mined from the east drift and here there is a large body of it. The west drift is also being developed and is showing up a good body of concentrating ore.*

*"The shaft in the tunnel is now down 26 feet," said James H. Taylor, one of the heavily interested parties," but the company will soon let a contract to sink this another 100 feet, when another drift will be run if the ore holds out and judging from this test we may be shipping before the summer is over"*

#### **The Mines Handbook 1916**

*Bullion Mining Co., LTD*

*Mine P.O.: Wallace, Idaho. William Squance, Pres.: R. A. Marshall, v. p.; Jas. H. Taylor, sec.-treas. and mgr., with Frank Taylor, directors. Inc. 1902 in Idaho. Cap. \$1,500,000; shares \$1 par, issued 1,248,668; in treasury, 251,332 shares; 9 assessments, one-half cent a share, levied up to Nov. 1, 1912, yielding \$39,229. Property: 10 claims, 3 patented, 220 acres, near Lookout 2 miles from the Chicago, Milwaukee & St. Paul railway, and 4 miles from Borax station, on the Northern Pacific line, on the Idaho slope of the Bitter Root divide, with a good wagon road to Borax. Property has a quartz vein of 4 to 20' width, with average of 6 to 12' and nearly vertical dip, carrying shoots of copper ore, 2-4' wide, mainly chalcopryrite. Concentrates estimated to average 19.8% copper, 3 oz. silver, \$2.40 gold, 28.5% iron and 4% silica per ton. Development: by shafts and 2 crosscut tunnels, 1,500' long, one 200' vertically above the other. The upper one has 130' crosscut and 186'*

*drift on vein. Lower tunnel cuts a 28' vein 350' from portal, with 4' of solid ore. Ore body proved for 35' upward by raise and downward by shaft. Equipment: includes steam power, a 12-h.p. hoist, Pelton wheel, and a 5-drill Ingersoll-Rand air compressor. A trial shipment of 24 tons to the East Helena smelter, Sept., 1912, showed 56% copper and 1 oz. silver per ton. Concentration tests on 5.2% ore showed a 73% recovery. No production since 1912. Diamond drill work was done in 1913 and company plans driving lower tunnel 2,533' to intercept ore at depth of 430' in 1916.*

#### Northwest Mines Handbook 1918

*Bullion Mining Co., LTD*

*Mine P. O.: Wallace, Idaho. Officers: William Squance, pres.; R. A. Marshall, v. p.; Jas. H. Taylor, sec.-treas. and mgr., with Frank Taylor and J. M. Klingman, directors. Inc. 1902, in Idaho. Cap., \$1,500,000; shares \$1 par; all issued; 9 assessments, one-half cent a share, levied up to Nov. 1, 1912, yielding \$39,229. Property: 16 claims, 2 patented, 320 acres, near Lookout, 2 miles from the Chicago, Milwaukee & St. Paul railway, and 4 miles from Borax station, on the Northern Pacific line on the Idaho slope of the Bitter Root divide, with a good wagon road to Borax. Property has a quartz vein of 4 to 20' width, with average of 6 to 12' and nearly vertical dip, carrying shoots of copper ore, 2'-4' wide, mainly chalcopyrite. Concentrates estimated to average 19.8% copper, 3 oz silver, \$2.40 gold, 28.5% iron and 4% silica per ton. Development: by shafts and 2 crosscut tunnels, one 200' vertically above the other. The upper one has 130' crosscut and 186' drift on vein. Lower tunnel cuts a 28' vein 350' from portal, with 4' of solid ore. Ore body proved from 35' upward by raise and downward by shaft. Equipment: includes steam power, a 12 h. p. hoist, Pelton wheel, and a 5-drill air compressor. A trial shipment of 24 tons to the East Helena smelter, Sept., 1912, showed 56% copper and 1 oz. silver per ton. Concentration tests on 5.2% ore showed a 73% recovery. No production since 1912. Diamond drill work was done in 1913 and company plans driving lower tunnel to intercept ore at depth of 430'.*

#### The Mines Handbook (1922: 721-22)

*Bullion Mining Co., LTD*

*Address: James H. Taylor, mgr., 7 Shoshone Bldg., Wallace, Idaho. Officers: Wm. Squance, pres.; Robt. A. Marshall, v. p.; J. H. Taylor, sec.-treas.-mgr., with Frank Taylor and J. M. Klingman, directors. Inc. 1902, in Idaho. Cap. \$1,500,000; \$1 par; all issued; assessable. Last assessment, of 1 cent a share, levied July 8, 1920, Fifteen assessments have made stock fully paid. Property: 16 claims, 2 patented, 320 acres, in Shoshone County, near Lookout, 2 miles from the C.M. & St. P. Railway, and 4 miles from Borax station, on the No. P. line, on the Idaho slope of the Bitter Root divide, with a good wagon-road to Borax. Property has a quartz vein of 4' to 20' width, with average of 6 to 12', and nearly vertical dip, carrying shoots of copper ore, 2-4' wide, mainly chalcopyrite. Development: includes 12 h. p. hoist, Pelton wheel, 5-drill air-compressor, drills and dwellings. A 100-ton mill is contemplated. Company is operating jointly with the Copper Chief M. & M Co., under same management.*

#### Up the Swiftwater (Crowell and Asleson 1980)

*The largest number of lode claims and actual mines producing or able to produce ore were located on the northeast end of the Avery district. This type of mining involved not only the search for gold but also for zinc, copper, lead, and silver--the same deposits found in the wealthy Kellogg-Wallace area. One of the earliest operations was the Bullion Mine, operated for a long time by Jim Taylor (later a Shoshone County commissioner responsible for the Avery-Wallace road). The Bullion road was the first wagon road into the area, built before the Milwaukee Railroad was constructed in 1909. Connecting with the Northern Pacific in Borax, Montana, the road was used by for large ore wagons pulled with six-horse teams. The mine had its own dam to generate power, and it also had a least two well-developed shafts. Although the lives of eight men, along with buildings, were lost in the 1910 fire, the mine was rebuilt and worked for several more years.*

#### (18) St. Paul Pass Tunnel (T. 47 N., R. 6 E., Sec. 26)

The Chicago, Milwaukee and St. Paul Railway staked 23 claims over the proposed location of the St. Paul Pass Tunnel. This action prevented disruption of the construction by prospectors and speculators. No actual mining took place. According to the Wallace Miner December 10, 1908, with the construction of the Chicago, Milwaukee and Puget Sound Railway mining activity in the area increased.

*The big Milwaukee Tunnel at Taft, Montana is developing into a copper mine. Men employed in the tunnel say it is running diagonally into the vein and for the past 700 ft., there has been trouble catching up the ground, for a time, the suspension of boring, until it could be made safer, which was necessary.*

*Ore was said to assay 4% copper at a depth of 400 ft. The discovery of ore will be of little benefit to prospectors, further than to give them the course of the vein, the ground having been taken by the railroad, to provide for just such a possibility.*

*The ground was known to be mineral bearing, and to head off any mining suits, the company located a number of claims, employing old time prospectors of this district, for the purpose, most of them from Mullan. They being more familiar with that section of the country, than those of other districts.*

*Of course the work done by the railroad is more than that required by the mining laws of the government, as annual assessment work, of \$100 on each claim, and as all claims, can be developed from the big tunnel, the ore will hold good, for the year. What the company will do, to hold them for next year, remains to be seen; under the mineral laws requiring at least \$500 worth of work to be done, for each claim before patent can be given.*

#### **St Maries Gazette January 29, 1909**

*Copper at Taft Tunnel. Four feet of copper ore averaging about 4 per cent is reported in the big bore now being driven by the Chicago, Milwaukee & St. Paul railroad. The ore was struck on the west end and has been followed up for a considerable distance. At this point the company has had much trouble on account of the softness of the ground, nevertheless an average of nine feet a day is being made. The tunnel has a total length of 8889 feet and is being driven from both ends. The engineers have it figured out that they will break the headings through about February 12, much sooner than was at first anticipated.*

#### **(19) Monitor (Montana-Idaho Copper Company) (T. 46 N., R. 7 E., Sec 9)**

The Shoshone County records shows that the claim was located on 7/31/1897 and was recorded on 9/13/1897. The original owners are listed as L. B. Hill, Otis Hill and Louis Kuhn. By 1905, it was shipping copper ore over a wagon road to Saltese, Montana. By 1910 the Monitor had shipped 1562.5 tons of ore to Tacoma Smelting Company. In 1910 the company buildings and equipment were burned in the great forest fires that swept the area and all production ceased.

In 1914 the Monitor Mining Company was reorganized into the Montana-Idaho Copper Company and started the excavation of a tunnel from Adair, Idaho (a station on the Chicago, Milwaukee and St. Paul Railway) to an area 1000 feet below the lowest workings of the original Monitor Mine. By 1924 the tunnel had reached 9400 feet in length. Apparently minable ore was not encountered and the development work ground to a halt in the 1920's.

#### **Eighth Annual Report of the Mining Industry of Idaho for the year 1906: 157**

*The Monitor Mine.—This interesting copper deposit, situated near the Idaho-Montana line, a few miles east of Mullan, was handled by some energetic Wallace operators during the past year, and made a splendid development, particularly during the closing months of the year, of high grade copper sulphide mineral of which about six hundred tons were shipped from the mine during 1906 that contained a gross value of sixty-five dollars per ton in copper, gold and silver.*

*This property carries a large fissure vein that strikes northeast and southwest and stands nearly vertical. It is developed with a shaft now down three hundred forty feet, which is being continued at the five hundred foot level. There have been four short levels opened, exposing two handsome ore bodies that carry from ten to sixteen percent copper and five or ten dollars per ton in gold and silver, through a width of from ten to fourteen feet in places. Recent reports from the mine say that it has over a half million dollars of developed ore now in sight and has a definite prospect of making a permanent and very important resource of shipping mineral.*

*Extending west from the Monitor, across the high mountain spurs that put out from the divide between the St. Joe and the South Fork of the Coeur d'Alene River, a string of claims has been located almost continuously for fifteen miles in the direction of the Bunker Hill and Sullivan lode and by some experts supposed to be on the same line of fissuring. Several of these carry remarkably handsome surface showings of copper bearing iron gossen and spatic iron ore. In fact, this belt of territory contains the most conspicuous surface showings of mineral found anywhere in the whole Coeur d'Alene district. These are accompanied at several points by a large parallel dike of igneous rock resembling diabase, to my notion a very important and significant association of the mineral veins.*

**The Times (Wallace) January 15, 1907**

*Snow is Ten Feet Deep*

*Monitor Company is Experiencing Many Difficulties at Mine*

*"We are experiencing much difficulty in keeping the road open from the Monitor copper mine to Saltese," said Dr. Harold J. Read yesterday.*

*"If another big storm, such as the last one, occurs we will be compelled to cease the shipment of ore until spring. We got the road open again Sunday and are hauling ore preparatory to making another shipment."*

*"The shaft house at the mine, as well as the other building, are almost buried in snow. In order to get into the former we had to put in steps. The snow is about ten feet on the level.*

**The Times (Wallace) February 20, 1907**

*Much Snow At Saltese*

*Miners at the Copper Age Grow Lonesome.*

*for Two Weeks Were Unable to Get Mail -- Force of Workmen at Milwaukee Tunnel Will Be Increased.*

*"Good progress is being made in the development of the copper Age and Edison," and Charles Heidenreich yesterday. "six men are at present employed. This has been the severest winter I have experienced over there near Saltese in 14 years," he added.*

*"We were quite lonesome for a while from the fact that for two weeks we were unable to get mail. The property of the company lies on the east of the Richmond.*

*"The Monitor mine is shipping steadily and the men are experiencing little if any difficulty with the snow.*

*"One of the engineers in the employ of Nelson Bennett, who has the contract for the big bore for the Chicago, Milwaukee & St. Paul in formed me that they are making preparations to put on a force of from 300 to 400 men. The mining outlook this season is better than at any time previous."*

**The Times (Wallace) March 21, 1907**

*Says Monitor is Now a Mine*

*J. L. Bailor representing Stockholders, enthusiastic.*

*Ships Ten tons Daily*

*Says Vein Has Been Proven for Five Hundred Feet -- Will Report Favorably.*

*The Monitor is a mine now, and in three months' time I believe it will be proved to be a big one," said J. L. Bailor of Oakesdale, Washington, yesterday on his return from the mine, where he had gone in company with Otis Hill, president, and Dr. Harold J. Read, of the Rossi-Reed company, the present manager of the property, as representatives of the bond holders. The control of the Monitor mine was bonded last summer to the Rossi-Reed company, and the development work on the property has since been done by them. Mr. Bailor represents those share holders who refused to option their holdings, and Mr. Hill those who gave the bond to the Rossi-Reed company.*

*"The work done on the Monitor by the Rossi-Reed company," continued Mr. Bailor, "since they took hold of the mine has demonstrated several things that were considered to be impossible are easy if you go about them the right way. Perhaps the most notable feature was keeping the wagon road open all winter. Every body said that it would be impossible to keep the road over the summit of the Bitter Root mountains open for traffic during the*

winter. They have done this, and have shipped ore continuously. The mine is now shipping at the rate of 10 tons a day, and the ore is as high grade as any that the mine has ever produced. Some of it gives net returns of \$100 per ton.

*A Steady Producer.*

"The development work they have done has transformed the property from a slightly developed prospect into a steadily producing mine. They have so improved the equipment and established the workings that the mine is now a model of what a shaft mine should be. The formation was all broken up on the surface but the main working shaft, which is now down 400 feet, is in solid formation and I was so favorably impressed with the indications there revealed that I have since largely increased my holding in the company.

"Though the bottom of the main shaft is some distance from the ledge on the foot wall side, it is going down on a stringer of good grade ore about 18 inches wide, which shots into it from the ledge. I am confident what when a crosscut is run to the vein it will open up a bigger ore body than we ever had in the upper workings.

"The manner in which everything was fixed at the mine for the winter's work was most interesting. Their timber yard alone was a sight worth seeing. In the fall the timber was stacked up as high as it could be piled and then roofed with poles to hold the snow. The timbers were stoped out from the bottom and stulls put in to hold up the roof. Now they have a big open yard with enough timber all around to last the winter and when the snow goes off there will be nothing left but the roof of poles supported by a lot of stulls.

*Vein Is Proven.*

"They have proved the Monitor vein for a total length of 800 feet on the various levels. Five Hundred feet of this distance is on the 100 foot level, where they ran right out to the surface. By means of this level, they expect to catch up most if not all of the surface water in the spring and run it out of the mine through the drift instead of having to pump it from the shaft. This is expected to facilitate their operations very materially.

"Both Mr. Hill and myself will make reports to the share holders. "Another matter which we shall advise the share holders about is the fact that the advent of the Milwaukee road, which will run within about two miles of the mine, will be of the greatest advantage to us, since by means of a tunnel and tramway, both of moderate-length, the necessity of a wagon road will be obviated and the operation of the mine in succeeding winters rendered much more easy and less expensive."

Mr. Bailor is also extensively interested in the Success and the Stewart Mines. Both he and Mr. Hill returned to Spokane yesterday.

**Daily Idaho Press (Wallace) June 28, 1909**

*Resume work at the Monitor Mine*

Further development operations at the Monitor copper mine located about four and a half miles south of Salt-ese, will be resumed tomorrow morning after a shutdown of several months. Terms arrived yesterday which will be used in the delivering of the wood with which to feed the boilers which was the primary cause of the shutdown. The shaft on the property has been sunk to the 700-foot level and from here a drift will be run, approximately 300 feet to the vein.

Good copper ore has been opened up on all levels and shipments which netted handsome returns have been made.

**Daily Idaho Press (Wallace) July 15, 1909**

*Drifting on 700 level in the Monitor Mine*

Unwatering of Mine completed, Says Samuels -- Development Well Under Way and Good Force Employed

The unwatering of the Monitor copper mine was completed some time ago and the miners are now engaged in drifting on the 700-foot level," said Manager, H. F. Samuels this morning "On this level the walls are perfect as in the upper workings and the ore showing is all that can be desired.

*"The ore runs about 30 per cent in copper as on the 400-foot level above. The machinery is in perfect working order and we have been working steadily for the past month or more as stated in the Press some time ago.*

#### *Forty on Payroll*

*"About 40 men are on the payroll, some of whom are getting in a large supply of wood with which to feed the boilers. We figured short last winter and for this reason had to shut down as it was not feasible to get out more at that season of year when there is 20 feet of snow on the ground."*

#### *Has Shipped.*

*The mine is located four and one-half miles south of Saltese on the Montana side of the Coeur d'Alenes and has shipped considerable ore from the levels above and these will soon be resumed.*

#### *Pardee (1910: 55)*

*The principal mines adjacent to and on the Idaho side of the State line are the Monitor, Richmond, and others in the midst of a large group of claims lying between the divide and the loop of the Chicago, Milwaukee & Puget Sound Railway. Considerable development work was done on the two claims mentioned, but their hoists and other improvements were completely destroyed by the forest fires of 1910, and they were completely destroyed by the forest fires of 1910, and they were for the time being inaccessible.*

#### *Spokesman-Review October 7, 1914*

##### *Start 7500-Foot Monitor Tunnel*

*Montana-Idaho Copper Company Begins Development in Adair District*

*Expects High-Grade Ore.*

*Several Properties to be Affected by Work Now Being Pushed Forward.*

*Work has been started on the 7500-foot tunnel of the Montana-Idaho Copper company from Adair station, on the Chicago, Milwaukee & St. Paul railway line, under the shaft of the Monitor Mining company, through which it is proposed to develop and operate a number of promising properties in the Adair district, according to Otis Hill, general manager of the Montana-Idaho company, who is in the city purchasing machinery and supplies.*

*Buildings have been erected and preliminary operations have been started," said Mr. Hill. "The first unit of the water power plant is now being installed and by November the work of driving the tunnel with power drills instead of hand drills will be in full force and will proceed day and night throughout the winter."*

*Recent investigations along the projected line of this tunnel have revealed evidence indicating probability of the development of valuable ore shoots along the strike of the vein long before reaching the point under the 70-foot shaft of the Monitor, which is our ultimate goal.*

*Expect High-Grade Ores.*

*The continuance of the work will be watched with great interest, as it is very generally understood among those familiar with this part of the Coeur d'Alenes that the Montana-Idaho tunnel will develop and make commercially available a large section known to carry high-grade copper ores.*

*The workings and financial details have been carefully planned and work is proceeding along strictly commercial lines. The tunnel will be double-track size, with ample drainage and plenty of head room for ventilating pipes, electric power wires, etc. Eventually it will be equipped with electric haulage and in every way made available as the working outlet for numerous adjoining properties, known to have good copper ore bodies more or less developed. These ores can be economically mined and trammed through this tunnel direct to railroad cars for transshipment to smelters.*

#### *Modern Equipment.*

*Large modern loading bins are to be erected at Adair, so constructed that ore can be trammed direct from the tunnel portal, 1100 feet distant from the railroad track, and dumped automatically into the bins. These, in turn,*

will load by gravity into railroad cars. Permitting the loading of a 50-ton car in two minutes at small cost per ton.

It is expected that a party of eastern men who are interested in the property will arrive in Spokane in October, after visiting and inspecting the property.

#### **Spokesman-Review February 13, 1915**

##### *Will Develop Monitor Mine*

##### *Spokane Men Interested in Extensive Idaho Property--Recovery From Fire Damage*

The Monitor mine, in the Coeur d'Alene district, in Idaho is to be extensively developed under the personal supervision of Otis Hill of Spokane. Director and one of the heaviest stockholders in the Montana-Idaho Copper company organized several months ago to take over the Monitor and adjacent properties, according to an announcement made yesterday by the directors, who, besides Mr. Hill, are H. F. DeBower, Chicago, Ill., and John L. Dirks and W. J. Kirby, Spokane.

##### *Swept By Fires.*

When the forest fires of 1910 swept through the Coeur d'Alenes they left the site of the Monitor mine a heap of ruins. The 700-foot shaft was filled with charred timbers and ruined machinery and, through an extensive body of high-grade copper ore had been uncovered, the damage done by the fire stopped all further improvement.

Upon the completion of the Chicago, Milwaukee & St. Paul Railway, bringing the road at Adair within a short distance of the old Monitor claims, the company was reorganized as the Montana-Idaho Copper company. A mining expert was employed and extensive surveys made. The new company took over the Monitor patented properties and located nine additional claims, bringing the property to the line of the Milwaukee road. A perpetual right was secured from Idaho to the waters of Manhattan Creek, a mile of flume was constructed and a compressor plant installed.

##### *Modern Equipment.*

A tunnel now is being driven 1000 feet below the 700-foot level of the old Monitor shaft. Modern air drills and machinery have been installed and substantial buildings erected. The portal of the tunnel is situated 1000 feet above the tracks of the Milwaukee road, permitting cars to be loaded direct from the tunnel by a gravity system. In the course of the tunnel several ore bodies are known to exist, which the management expects to reach within a few hundred feet.

#### **Spokesman-Review October 25, 1916**

The new tunnel of the Monitor company at Adair, in the Coeur d'Alene region, has attained the 2250-foot point and is within 100 to 150 feet of a vein believed to contain copper. The tunnel will pass 1800 feet below the shaft workings by estimate. Seventeen men are employed on two shifts. Otis Hill is in charge.

#### **Spokesman-Review October 30, 1917**

##### *Monitor Mine in New Hands*

*Transfer to Montana-Idaho Copper Company Formally Made by Two Boards.*

##### *Valuation of \$100,000*

*Shares Now Exchangeable--New Company Has Spent \$65,000 in Development.*

Transfer of the Monitor mine to the Montana-Idaho Copper company, negotiated two years ago, was ratified by the boards of the Monitor consolidated copper company and the Montana-Idaho company at meetings held here on Monday and Wednesday last, respectively. The valuation is \$100,000 and the payment will be made in stock of the Montana-Idaho company at the office, 907 Paulsen building.

*One Share for 1000.*

"Control has been passed and we are now ready to exchange certificates of the Montana-Idaho for those of the Monitor" said W. J. Kirby secretary-treasurer of the Montana-Idaho, who was appointed trustee for the stock of

his company. In a circular letter to Monitor stockholders Mr. Kirby urges the advisability of an immediate transfer because of pending legislation for the taxation of corporate transfers. The Monitor company will be disincorporated as soon as two-thirds of the stock has been transferred.

A share of Montana-Idaho will be given for each 1000 shares of Monitor. The Montana-Idaho is capitalized for 6000 shares, having a par value of \$100 each, and the Monitor for 1,000,000 shares, having a par value of \$1 each. One thousand shares of Montana-Idaho will be issued in absorbing all Monitor shares.

The Montana-Idaho has expended about \$65,000 in equipment and development since it began operations, said Mr. Kirby. It has driven a tunnel nearly 2900 feet to reach a vein that was developed by shaft to a depth of 700 feet by the Monitor company. This tunnel will undercut the shaft by 1000 to 1100 feet. A third of the capitalization and a substantial sum of money are in the Montana-Idaho treasury.

#### Double Working Force.

Execution of plans for the development of additional power have been delayed by the snow. Work on this project will begin soon. The plant will generate power for the operation of a larger compressor, drill sharpener and other equipment and when completed will permit the doubling of the mining force and the speeding of operations. A Leyner machine drill sharpener will be due at the mine in a few days.

The holdings of the company have been increased by the acquisition of three claims, one by purchase and two by location, since the Montana-Idaho took charge of the property. The holdings are composed of 25 claims near Adair, Idaho.

The directors of the Idaho-Montana company are H. F. De Bower of New York, president; Otis Hill, manager; George B May of Tekoa, John L. Dirks and W. J. Kirby, secretary. The directors of the Monitor company are Otis Hill, John B. Sumpter, Fred Ballor. L. B. Hill and W. J. Kirby.

### The Mines Handbook 1916

#### Montana-Idaho Copper Co.

Office: 1325 Dean Ave., Spokane, Wash. Mine office: Saltese, Missoula Co., Mont. Officer: H. F. DeBowers, Chicago, Pres.; W. J. Kirby, Spokane, v. p.; J. L. Dirks, sec.treas., directors. Otis Hill, gen. mgr. Inc. 1914 to take over holdings of Monitor Cons. C. M. Co. on basis of \$102,000, payable in shares of Mont. Idaho C. Co. at par, to be exchanged April 17, 1917. Cap., 6,000 shares; \$100 par. stock listed on Spokane Exchange. Property: 10 claims, patented, 6 miles west of Saltese, was the first copper location in the eastern Coeur d'Alenes. A fissure vein of 10 to 30' width, with N. E. strike and nearly vertical dip, has a paystreak carrying mainly massive chalcoppyrite ore, balance of vein carrying disseminated chalcoppyrite, mainly of concentrating grade. Occasional native copper is found. Shipment of selected ore returned 17 to 22% copper, 7 oz. silver and \$1.50 to \$2 gold per ton. The bottom levels of the mine, which is quite wet, show good ore. Owns 9 additional claims. Monitor mine was closed down 1910 after the entire plant had been destroyed by forest fires. New company is driving tunnel 1,000' below 700' level of old shaft.

### Northwest Mines Handbook 1918

#### Montana-Idaho Copper Co.

Office: Paulsen Bldg., Spokane, Wash. Mine office: Harbona, Ida. Officers: H. F. DeBower, Chicago, pres.; J. L. Dirks, Spokane, v.p.; W. J. Kirby, sec.-treas., directors. Otis Hill, gen mgr. Inc. 1914 to take over holdings of Monitor Cons. C. M. Co. Cap., 6,000 shares; \$100 par. Stock listed on Spokane Exchange. Property: 25 claims, 10 patented, 1/4 to 1 1/2 miles from Adair, Ida., on main line of C. M. & St. P. Ry. First copper location in the eastern Coeur d'Alene. A fissure vein of 10 to 30' width, with N. E. strike and nearly vertical dip, has a paystreak carrying mainly massive chalcoppyrite ore, balance of vein carrying disseminated chalcoppyrite, mainly of concentrating grade. Occasional native copper is found. Shipment of selected ore returned 30.5% copper, 7 oz. silver and \$1.50 to \$5 gold per ton. The bottom level of the mine, which is wet, shows good ore. Monitor mine was closed down 1910 after the entire plant had been destroyed by forest fires. Company is driving tunnel to cut vein at 1,800' depth, or 1,100' below lower level of old Monitor shaft. Company has developed its own waterpower for compressor plant.

Monitor Consolidated Copper Mining Co.

Stockholders sold property to Montana-Idaho Copper Co., 1914, for \$102,000 payable in shares of new company at par, stock to be exchanged April 17, 1917.

### 19th Annual Report of the Mining Industry of Idaho for the year 1917

Montana-Idaho Copper Co. Spokane

Capital: \$600,000. Par value \$100. Non-assessable. Directors: H. F. DeBower, pres., New York, N. Y., John L. Dirks, vice-pres.; W. J. Kirby, sec-treas.; Otis Hill, Spokane; Geo. B May, Tekoa, Wash. Annual meeting: January. Property: 10 patented claims, taken over from the Monitor Cons. Copper Mining co., and 34 unpatented claims, at Adair, on the Milwaukee railroad, Idaho. Class of Ore: Copper and gold. Working 25 men three shifts. Equipment: 100-h.p. Pelton-Double water wheels, belted direct to air compressors; water Leyner machine drills, 1 Leyner steel sharpener, 10 cars, 18-inch gauge. Not producing. Development: A 4100-ft. tunnel to open Monitor vein at 1000-ft. vertical depth, also to cut Richmond and St. Lawrence vein, at about 1800-ft vertical depth. Informant: Secy. Treas. Kirby. Note: A 10-ft vein was cut in well mineralized with copper and iron. Co. has acquired 10 additional claims, adjoining Monitor, on the east."

Montana-Idaho Copper Co.

Office: 1102 Paulsen Bldg., Spokane, Wash. Officers: H. F. DeBower, Pres., 13 Astor Place, New York City; W. J. Kirby, Sec., Spokane, Wash.; S. P. Burr, supt., Delage. Inc.: May 7, 1914. Capital: 250,000 shares; par value \$10; 120,168 shares issued. Property: Monitor group; 10 patented, 34 unpatented claims, St. Regis dist.; Delage. Development: One tunnel 8800 ft. long and a vertical shaft 700 ft. deep with 6 intermediate levels. Plant: Three 9x8 I-R compressors, driven by 3 Pelton water wheels; I-R steel sharpener; complete mining equipment and camp. Ore: Copper-gold. Men employed: Average, 12. Remarks: In 1910 the buildings, plants and all surface improvements were destroyed by the forest fires. Since that time, no operations have been carried on in the old workings. The present operations are carried on through an adit 9000 ft. in length which has been driven to a point under the old Monitor shaft. The distance between the tunnel level and the 700 or bottom of the Monitor shaft is approximately 1050 ft. Drifting to the amount of about 800 ft., crosscutting about 550 ft., and upraising 130 ft. have been done at the tunnel level.

### Twenty-Sixth Annual Report of the Mining Industry of Idaho for the year 1924

Montana-Idaho Copper Co of Idaho Office: Hutton Bldg., Spokane, Wash. Officers: H. F. DeBower, Pres., 13 Astor Place, New York City; S.P. Burr, Supt., Adair. Inc: Incorporated in Idaho as Montana-Idaho copper co on May 7, 1914; reincorporated as Montana-Idaho Coper Co of Idaho on April 23, 1924. Capital: 3,000,000 shares; par value \$1; 1,077,400 shares issued. Property: Monitor group; 10 patented, 34 unpatented claims, St. Regis dist.; Adair. Development: 1 tunnel 9400 ft. long, and a vertical shaft 700 ft. deep with 6 intermediate levels. Vertical distance between tunnel and bottom of shaft is 1050 ft. Plant: Three 9x8 I-R compressors, driven by 3 pelton water wheels; I-R steel sharpener; complete mining equipment and camp. Ore: Copper-gold. Men employed 12. Remarks: a small amount of development work was done during the early part of the year, after which the company suspended operations in Idaho.

### Report of Mineral Potential Hecla Mining Company Exchange (Minnich 1986)

Mineral production from the area has been chiefly copper with by-product gold and silver. The available literature does not differentiate which development and production came from the Montana side, however the field examination revealed an estimated +95% of the workings to be on the Idaho side. All the production had to be hoisted up shafts and transported by wagon 6 miles to the Saltese, Montana railhead. Owing to heavy snowfall the road was impassable more than half of each year. All the old workings are now caved. Although numerous claims have been patented the only mines to ship ore were the Monitor, Richmond and St. Lawrence in order of importance. Smelter settlement sheets from the Tacoma Smelting Company are available from the Monitor Mine. They show that for the years 1905-1910:

Tons shipped	1,562.5
Gross Amount	\$73,211.62
Net (-freight & smelter charges)	\$62,578.15
Average per ton gross	46.85
Average per ton net	40.05

The Monitor Mine has been developed by means of a shaft to a depth of 700 feet and by drifts on the 100, 200, 300, 400, and 700 foot levels.

*Richmond Mine, St. Lawrence Mine*

*No smelter sheets are available but a 1913 report by E. P. Spalding a Spokane mining engineer states net smelter returns of 30 per cent copper and \$10/ton in gold for the Richmond Mine. No dollar figures are cited for the St. Lawrence Mine but Spalding says, "Recent shipments from this property compare favorably with those noted above from the Richmond, as well as the shipments made from the Monitor." The Richmond operated during WWI and shipped 187 car loads in 1917 and some in 1918 for a net profit of \$93,000.*

*None of the available literature shows any mining costs which must have been quite high considering the remote location, elevation and climate, coupled with the fact that all the ore had to be hoisted up shafts. This ore was not milled but the grade of the smelter return indicates it was probably hand-cobbed.*

*In 1910, the entire plants of all the mines including buildings, machinery and equipment were destroyed by forest fires and all mining ceased. In 1913, after the completion of the western extension of the Milwaukee R.R. through Idaho a new company was formed and plans laid for the opening of the Monitor by driving a tunnel from near Adair station on the railroad to and under the 700 foot shaft on the Monitor property. The tunnel would be about 8,000 feet long and intersect the Monitor vein 1,000 feet below the bottom of the Monitor shaft (1,800 level). It was also proposed to drive laterals to undercut the different mining properties that would be economically served through the tunnel such as the Richmond and St Lawrence at depths of 1,900 to 1,900 feet below their outcrops. This company was called Montana-Idaho Copper Company and was headquartered in Spokane, Washington.*

*The tunnel was driven (the starting and completion date are unknown) but apparently commercial ore was never found for in 1923 the company hired Oscar H. Hershey a well known consulting geologist from San Francisco to examine the property and recommend an exploration program. He examined the Monitor, Richmond and St. Lawrence properties and made recommendations to drive a number of crosscuts from the 200 and 1,800 foot level. He had the Monitor dewatered to the 400 foot level and found; "practically no copper mineral visible anywhere on the 200, 300 and 400 foot levels..." His report is very pessimistic and the only reason he recommended any exploration is that the 8,000 foot 1,800 level tunnel had already been driven. Mr. Hershey states; "I cannot guarantee you a pound of ore and I would regard it as rank speculation if the upper workings fail to furnish more justification than is at present in sight, but if you do not want to quit until you have exhausted the possibilities in your ground on the 1,800 foot level this is the work to do."*

*No data is available on whether the company followed Mr. Hershey's recommendation or not, however, there is no record of any ore being shipped from any of the properties from this area after 1918. All workings are now abandoned and caved and I believe it is safe to assume that what little ore there was has been mined out.*

*...I would assign a low to moderate mineral potential to this land. The field examinations and all the available data indicates the properties were probably mined out by 1918. The vein system is wide and persistent to depth, at least below 1,800 feet, but the ore shoots were spotty. The upper levels contained oxide ore with secondary enrichment immediately below which probably accounted for the shipping ore. There was probably not more than 5,000 tons of ore shipped during the entire life of this district. No evidence was found for any type of mineralization except the veins present on the property.*

**Up the Swiftwater (Crowell and Asleson 1980)**

*Claims and mines virtually dotted the hills high on the Bitterroot Divide near stateline. Most importantly, they were accessible "by a carefully graded road between the Monitor Mine and Saltese," states a text published in 1914. The text described the following mines; the St. Lawrence, Richmond, Copper Age, Manhattan, and Monitor. Most of those listed had been developed with shafts of some length, but the only one to ship ore was the Monitor which put out about 500 tons before its hoist and buildings were destroyed in the 1910 Fire. On nearby Kelly Creek (tributary of Loop Creek) were the Alice, the Alpina, and Bald Mountain mines.*

**(20) Richmond (T. 46 N., R. 7 E., Sec. 9) (also St. Lawrence)**

The Richmond Mine, located in 1898 by William Sutherland and recorded in 1891, apparently shipped ore to Saltese between 1905 and 1910. Burned out by the 1910 fire, the property was reopened in 1913. The company began to ship copper ore again in 1915, again using the wagon road to Saltese. In 1916, the company installed an 8800 foot long aerial tramway between Adair and the mine. The company shipped 187 car loads in 1917 and some additional ore in 1918, before shutting down altogether.

The St. Laurence Mine was located by William Sutherland and George White in 1897. It was developed as a separate mine from the Richmond Mine. The mine is located mainly in Montana. In 1917 this company had 20 men working and was shipping 10 tons of ore a day in wagons to Saltese.

### *Spokesman-Review February 13, 1916*

#### *To Make Richmond Steady Producer*

#### *Road Being Built to Handle Shipments to Smelter in April*

#### *Will Install Tramway*

*Development Work Shows Big Ore Body—150 Tons Have Been Taken Out.*

*Operations at the Richmond mine near Adair, Idaho are being centered around getting the property in shape for large and steady production, first by means of a wagon road and as soon thereafter as possible by aerial tramway to Adair on the Milwaukee Railroad Manager Charles J Heldenreich expects that the work of completing the wagon road can be resumed by the end of March and that ore can be shipped to the smelter early in April. The tramway, which will supersede the road when installed, will be 8000 feet long and will cost in the neighborhood of \$15,000.*

#### *Pushing Development*

*Meanwhile the development of the mine is being vigorously pressed. The new lower tunnel already has reached a point nearly under the extreme west end of the drift from the main shaft on the 123-foot level at an added depth of 250 feet. It has been in pay ore for some time and recently the daily faces have been showing from one to three feet of clean ore, composed about equally of copper oxides and carbonates and averaging close to 30 per cent in copper.*

*Aside from the lower tunnel, which has been opening ground hitherto unexplored the mine is extensively developed from a double compartment shaft 210 feet deep near the east line of the claim and at about the highest point on the property. On the 60-foot level is a drift 90 feet to the east and another 30 feet to the west. On the 125 foot level is a drift 405 feet to the west with two connections through to the surface. It is the west end of this drift which the lower tunnel nearly underlies at 250 feet greater depth.*

#### *450 tons of Ore Removed*

*In doing this work there were extracted 450 tons of ore, of which six car loads shipped to the smelter had an average value of \$4.50 per ton in gold about 50 cents in silver and 3.37 per cent in copper, the owners say. In removing the west drift on the 125-foot level the vein was crosscut in several places, showing widths varying from eight to 30 feet. Though two high-grade ore shoots were encountered no stoping was done. The whole length of the level, 425 feet, is in ore and a full face of fine ore was left in the west end of the drift.*

*The pay ore was encountered in the lower level at a point 160 feet west of the west end of the upper drift. The ore shoot is consequently proved to have a length of nearly 700 feet. In the tunnel level the ore body shows more sulfides that are found above but none of the workings have gone below the zone of oxidation. No crosscutting has been done on this level, though the hanging wall has not been exposed. An upraise soon will be made to the drift above and crosscutting of the vein and further development work will be pushed at the same time. The completion of the lower tunnel will increase the ore reserves, it is estimated by the management to at least 40,000 tons.*

*The company is capitalized at \$1,000,000 in dollar shares of which 316,000 remain in the company's treasury. Cash on hand amount to more than \$7000. Martin Woldson is president and Charles J. Heldenreich manager. With W. S. Norman they constitute the principal owners of the company's stock.*

### **The Mines Handbook 1916**

*Richmond Mining, Milling & Reduction Co.*

*Office: care Martin Waldon, pres., Scandinavian-American Bank, Spokane, Wash. Chas. J. Heidenreich, v. p.-gen mgr., Saltese, Missoula Co., Mont.;*

*W. S. Norman, sec; Thos. McGowan, treas., with Dr. E. Richter, directors. Cap., \$1,000,000. Property: the Richmond mine, 6 claims, near Adair, 3 miles S. E. of Saltese, on C. M. & St. P. R. R. Mine adjoins the Monitor mine, and is developed by 3 shafts, one 375' deep, the others 125' deep and connected. Ore body reported to have width of 5-10' and to show for 160' in shaft. Equipment: includes a gasoline hoist and compressor, installed 1913. Vein, parallel to the Monitor, shows a persistent streak of copper glance in the shaft. The property was a small producer for some years and was reopened, Sept., 1913, after many years of idleness. Shipped 5 cars of ore late 1915 said to have assayed 7-10% copper, \$4-\$7 gold, 2-3 oz. silver per ton. Shipments have been made of 30% copper ore for several months. Employs 6 men. Plans installing a \$15,000 aerial tram, 800' long from mine to railway bins.*

### **19th Annual Report of the Mining Industry of Idaho for the Year 1917**

*Next to the Macky District, the principal source of copper production in Idaho during the past year was from the Richmond Mine on the St. Joe River slope in Shoshone County, near the Montana line. This property was equipped during the year with an aerial tram over a mile in length to connect it with the Milwaukee Railway. It employed a force of 40 to 50 men and was shipping a carload of crude ore a day for several months, which contained average values of about 6 per cent copper and \$3.00 per ton gold. The deposit is developed to a depth of 370 feet on a very pronounced vertical quartz filled fissure vein that cuts the Bitter Root Mountain divide from Idaho into Montana and traverse the adjoining St. Lawrence Group of claims, which is handled under an independent company management. The two properties are connected by an adit tunnel driven through the divide from Montana. The St. Lawrence ground extends about 160 feet over the line into Idaho.*

*The formation is horizontal, thin-bedded quartzite, and the vein vertical, varying from a foot to fifteen feet wide, and very persistent for more than 2,000 feet on the joint properties. The gangue is a vitreous quartz with thick bands of massive siderite and rotten spongy brown iron gossan richly sprinkled with copper corgonate and oxides, and occasional kidneys of chalcocite ore. Some scattered chalcopyrite mineral is in evidence at the deepest point penetrated, but the live ore horizon of the vein and its importance as a source of permanent copper values still remains to be proven.*

*The St. Lawrence was working 20 men at the time of my visit in November and shipping 10 tons of ore a day. This property is opened from the Montana side of the divide and its product is hauled to Saltese, a station on the Wallace branch of the Northern Pacific Railway, five and one half miles distant.*

*A long tunnel, now in nearly a mile, is being driven to tap another big fissure adjoining the Richmond and known as the Monitor vein, which will be intersected at a depth of over 1,000 feet and should demonstrate the permanent ore carrying capacity of this interesting series of fissures.*

### **Spokesman-Review October 30, 1917**

***Richmond Ships 43 Cars of Ore***

***October Production Increased by Mine Dump—copper Content Cut Thereby \$12,000 for new plant***

***New Equipment will be used in sinking and explorations on two levels.***

*The Richmond Mining, Milling and Reduction company will have shipped 13 carloads of ore in October by the end of the month." and Bert N. Sharp, managing director, yesterday. "The shipments in September were reduced to 23 tons by a wreck on the tramway. The mine shipped 30 tons in August. The average carload is 50 tons.*

*"October shipments were increased by the movement of ore from the dump. This lowered the average copper content to about 5 percent, but the expense of moving the ore was small. A good profit will be derived from the*

*dump. Shipments from this source were discontinued about October 15, when snow fell. The snow has a depth of a foot at the mine.*

#### *Tramway Lowers Car a Shift*

*"The tramway was operated on a basis of two shifts a day during the period of dump shipments. Its operation has been reduced to a shift a day since shipments have been limited to ore from the mine. The rate of delivery is 50 tons a day.*

*"From \$10,000 to \$12,000 is being spent installing additional equipment. This includes a compressor capable of driving four machine drills, an 80 horsepower gasoline engine for its operation, a new blacksmith shop and a compressor building. The new equipment will be ready for service by December 1.*

*"The compressor will speed and facilitate exploration. We purpose to sink a winze for 200 feet from the tunnel level. The place of beginning will be at a depth of 3500 feet and at a point 1500 feet from the portal.*

#### *Drift 1500 Feet.*

*"A vein on the tunnel level will be subjected to exploration. It contains 1500 feet of possibilities at this depth. The same line of exploration will be engaged in when the new depth is attained by winze.*

*The property of the Richmond company is situated on the divide between Idaho and Montana and a mile from Avery [Adair], Idaho, the shipping point. Mr. Sharp maintains headquarters at the mine.*

### *Spokesman-Review December 1, 1917*

*Cut Big Vein at Adair*

*Open Stopes in Richmond*

*Ore Under large Body That Had High Copper Content.*

*Pump and Compressor Installed - Daily Carload Shipments Maintained.*

*Two good stopes have been opened in the property of the Richmond Mining, Milling and Reduction company, Adair, Idaho, within recent weeks, according to Bert N. Sharp, managing director, who is visiting relatives here.*

*"One of them is at the 150-foot depth, which is 50 feet below a stope 6 to 20 feet wide that yielded ore valued at \$2400 to the carload," said Mr. Sharp yesterday, "The other is on the St. Lawrence tunnel level. The later ore body was never mined before so its value can be estimated only from the assay tests which show a content of five per cent copper and \$3 to \$4 in gold to the ton.*

*"The compressor and pumps have been installed. Shipments are proceeding at the rate of a carload of ore daily."*

### *Spokesman-Review January 24, 1918*

*Cut Big Vein at Adair*

*Richmond Ore is Halted*

*Frozen in Both Terminals of Tramway, Report*

*Shipments will be Resumed in the Spring--Development to Proceed.*

*The Richmond Mining, Milling and Reduction company has suspended the shipment of ore, but not of development work, according to a circular letter to stockholders issued by J. E. Codd, president. The action was taken by the board of directors. The suspension will continue until the middle of April by estimate. The services of employees on development work have been retained. The mine is on the Montana divide.*

*"Shipments were greatly retarded in December because of the inability of the railroad to furnish cars when needed," says the circular. "This resulted in the freezing of ore in the upper and lower terminals of the*

tramway, which added to the expense of handling. Development will be continued with a view of getting out a large tonnage as soon as weather conditions and transportation facilities permit."

### *Spokesman-Review March 1, 1918*

*Cut Big Vein at Adair  
Montana-Idaho Copper Drifting at 1000-foot Depth.  
Believed Vein 300 feet Ahead.*

*The Montana-Idaho copper company, operating at Adair, Idaho, in the Coeur d'Alene region, has cut a vein in its main tunnel, according to a bulletin to stockholders just issued by W. J. Kirby, secretary. The point of intersection is 3865 feet from the portal and the vertical depth 1000 feet. The body is 10 feet wide. Samples received at the Spokane office are well mineralized. They contain copper and iron but not in a quantity sufficient to be regarded as ore.*

*"We are drifting on the footwall, which is leading directly toward the Monitor shaft, 4000 feet distant," said Mr. Kirby yesterday. "It is proposed to continue the main tunnel as soon as practicable to intersect the Richmond vein 300 feet ahead, if its course in the Richmond mine is unchanged. The tunnel has been driven 2745 feet, or 400 feet beyond the vein.*

*"The company acquired additional ground recently. Some of it adjoins the Monitor group on the east. Our holdings comprise 44 claims. After drifting 50 feet on the vein the services of R. S. Merriam, a mining engineer of Wallace, were secured for an examination.*

*"A fissure 10 feet wide, having an easterly and westerly course, has been cut," says Mr. Merriam in the course of a report contained in the bulletin. "I would not care to hazard an opinion as to whether this is the vein for which you are looking, as the distance between this point and the old upper workings is so great that no one can tell what has happened, but I think there is little question that it is a vein and as it is tending in the general direction to reach a point under the old Monitor workings I would advise a continuance of drifting.*

*"Incidentally I congratulate you on the appearance of the work on your property. Your tunnel will make a fine working tunnel."*

### *Northwest Mines Handbook 1918*

*Richmond Mining, Milling & Reduction Co. Montana  
Office: 404 Sherwood Bldg., Spokane, Wash. Officers: J. E. Codd, pres.; Chas. Heidenreich and W. S. Norman, v. p's; T. W. McGowan and P. T. Sweeney, directors. B. C. Redhead, sec. B. N. Sharp, mgr. Inc. in Washington. Cap., \$1,000,000; shares \$1 par; 8000,000 issued. Cash assets on Oct. 31, 1917, totaled \$32,288; and current liabilities \$7,403. Net earnings in October were \$30,000. Property: on Idaho-Montana line, 6 miles from Saltese, Mineral Co., Mont., and 1 1/2 miles from Adair, Idaho, connected with C., M., & St., P. R. R. by 8,800 aerial tram. Company owns 6 claims, 2 patented, and millsite. Dividends: 2c per month, equal to \$16,800. Total to Oct., 1917, \$84,000. Dividend payment suspended in October. Development: 2,200' of tunnels, 500' of shafts, 2,000' of drifts, and 600' of raises. Lowest depth is 370'. Vein shows on surface for 2,200' of which 400' is being developed. Reserves are estimated as sufficient for 50 tons daily for a year. Equipment: hoist, compressor, 8800' aerial tram of 240 tons daily capacity., etc. Production: to July 1917, \$100,000 since then 50 tons of ore daily worth about \$1000, according to price of copper. Property seems to make fair profits on small output and pays regular dividends.*

### *Umpleby and Jones (1923: 111)*

*The Monitor mine, near the Montana line, on the Bitterroot divide, has shipped about 500 tons of ore but has been idle since 1910, when the hoist and buildings were destroyed by fire. . . .*

*The Richmond mine is on a vein a short distance north of that exposed in the Monitor mine. It is developed by several shafts on the Bitterroot divide and by a tunnel driven from the Idaho side which attains a depth of 350 feet. The mine was actively productive in 1916 and during the period between September 13 and October 20 shipped 17 carloads of ore which yielded \$20,000 net. One car load is said to have assayed 15 1/2 percent of copper and \$4 to 5 in gold to the ton. . . .*

*West of the Richmond the Manhattan prospect, on Manhattan Creek, and the Alice and Alpina prospects, on Kelley Creek, explore veins from 2 to 10 feet thick which strike nearly east and dip 65 degrees to 70 degrees north.*

**(21) Leroy (T. 46 N., R. 7 E., Sec. 8)**

The Daily Times (Wallace) October 19, 1907

*Work is to be Resumed on the Leroy*

*Ledge Has Been Cut and Drift will Be Run to Catch the Ore*

*Work will be started before long on the property of the Le Roy Mining company in the Saltese district after being closed down for some time. This property is located just west of the Monitor mine and is on the Monitor vein.*

*The ledge has been cut and drifted on the 500 feet. The men will continue this drift to catch the ore shoot shown by the croppings. The showings in the drift are excellent in copper so far and a large body of ore is expected to be encountered soon.*

*The Milwaukee extension will be close to this property. The principal owners are H. J. Rossi, M. E. Hart and F. E. Clark, all of this city.*

The Mines Handbook 1916

*Leroy Gold & Copper Mining Co.*

*Office: Wallace, Idaho. Mine office: Saltese, Missoula Co., Mont. Officers: Hon. Herman J. Rossi, pres.; G. F. Dann, v. p.; C. E. Clark, sec.-treas., with Wm. Fissenger and Chas. Bollinger, directors. Lands adjoin the Monitor mine, and survey for the extension of the Monitor tunnel runs through this property. Assessment of 2 mills per share called Aug., 1915, and development work resumed after several years of idleness.*

Northwest Mines Handbook 1918

*Leroy Gold & Copper Mining Co.*

*Office: Wallace, Idaho. Mine office: Saltese, Mineral Co., Mont. Officers: Hon. Herman J. Rossi, pres.; G. F. Dann, v. p.; C. E. Clark, sec.-treas., with Wm. Fissenger and Chas. Bollinger, directors. Property: adjoins the Monitor mine, and survey for the extension of the Monitor tunnel runs through this property. Assessment of 2 mills per share called Aug., 1915, and development work resumed after several years of idleness.*

**(22) Big Elk (T. 46 N., R. 6 E., Sec. 1)**

Northwest Mines Handbook 1918

*Big Elk Mining Co.*

*Office: Wallace, Idaho. Mine office: Saltese, Mineral Co., Mont. Officers: Peter Peterson, Pres., and gen. Mgr.; Carlton Fos, v. p.; A. H. Featherstone, sec.-treas.; preceding officers, Geo. K. Garrett and W. S. Brown, directors. C. F. O. Merriam, Mg. eng. Inc. April, 1909, in Idaho. Cap., \$2,000,000; shares \$1 par; assessable; fully issued. Last assessment 1 mill per share, July 22, 1914. Property: 15 claims, 300 acres, unpatented, on Bald Mountain, in the St. Joe district, showing 3 fissure veins in St. Regis quartzite, various trenches exposing veins with 4' thickness carrying streaks of chalcocopyrite and spathic iron, in spar and quartzite. A carload shipment, to Helena, from an 18' prospect shaft, returned 28.7% copper, 28.9% iron, 15% sulphur, and 2 oz. silver, per ton. A 125' upper tunnel and a 200' lower diagonal crosscut tunnel show shalcocopyrite and bornite carrying small gold values. The C., M. & St. P. R. R. crosses property. Management considered good and property promising. Four men employed continuously.*

Pardee (1910: 54, 55, 56) states that

*The Big Elk prospect, located just above the Chicago, Milwaukee & Puget Sound Railway tracks, about 2 miles northwest of Adair, was seen before the fires reached that vicinity. This is a replacement along a shear zone that can be traced for half a mile or more, . . . It is developed by a 40-foot shaft, a 15-foot winze, and some*

*short adits. . . This ore is said to assay \$10 in gold and 2 or 3 ounces of silver to the ton and 30 percent of copper.*

**Up the Swiftwater (Crowell and Asleson 1980)**

*The Big Elk Mining Company on Brushy Creek was one of the few mines to have bags of ore ready to ship out. In operation prior to the passage of the railroad, the Big Elk later listed many railroad officials as its stockholders. Unfortunately, the bags of ore sat waiting to be picked up for so many years that the bags deteriorated and the ore is part of the earth again, another lonely testament to high hopes gone awry!*

**(23) Hansey (T. 46 N. R. 7 E., Sec. 21) (see Appendix B)**

In the state list this is listed as a gold, silver and copper prospect.

**(24) Blue Bird (T. 46 N., R. 6 E., Sec. 36)**

The Shoshone County records shows that C. S. Bartlett, R. M. Debit and W. H. Rock located this claim in September 25, 1910 and recorded it in November 9, 1910. Debit was the Forest Service ranger on the Avery District and Rock also worked for the Forest Service in the area. It is interesting that this is just one month after the height of the 1910 forest fires in the area.

**Pardee (1910: 54, 55, 56)**

*On Blue Bird Creek near the southeast corner of T46N., R6E., a recent discovery known as the Blue Bird claim was being developed at the time of visit. The shallow discovery pit was about 8 feet square and located in the bottom of the canyon at the stream level. The top of a lode or pocket of quartz and calcite carrying considerable chalcopryrite and pyrite was exposed, occupying the whole pit. However, development had not proceeded far enough to show its thickness. The country rock consists of bluish and grayish sandy shales near the upper part of the strata representing the Newland ("Wallace") formation.*

**(25) Ward Peak (T. 45 N., R. 8 E., Sec. 12)**

In the state list this is shown as a gold prospect. Shoshone County records show that this claim was located on July 20, 1909 and recorded in September of 1909. The original owners included J. F. Ward, Ira Petty and George M. Bourguin. Pardee (1910: 54, 55, 56) states that

*The Ward mine is situated on the southeast spur of Wards Peak, near milepost 161 of the Idaho-Montana boundary, and lies within the two States. It is one of a group of claims lying mostly in Montana, the others of which were not visited. It is developed by an adit level and drifts aggregating 1,200 feet in length, a shaft 80 feet deep, and some minor openings. . . [The ore] is said to assay \$4 and more to the ton in gold. At the time of visit a few tons of this ore was being shipped to a smelter as a test sample.*

**(26) St. Joe Quartz (T.44N., R.8E., Sec. 5)**

**Pardee (1910: 56) states that**

*At he prospects located along St. Joe river the most development work has been done on a claim at Godards owned by the St. Joe Quartz Mining Co. A tunnel 400 feet long penetrates a mineralized shear zone in the Wishards sill. The zone trends about east and west and contains irregular seams and bunches up to 3 feet wide of quartz, calcite, and chalcopryrite. A few tons of the ore had been sacked and piled on the river banks. Half a mile above this a short adit on the Black Bear claim exposes a 4-foot vein striking N. 85° W. and consisting chiefly of scapolite with relatively small amounts of sodic plagioclase, calcite, epidote, and garnet. It contains an irregular streak of partly oxidized pyrite a few inches thick and is separated into two unequal layers by a 6-inch parting of diabase. The vein is vertical and has one slickensided gouge-lined wall upon which post-mineral faulting has occurred. The diabase is well exposed here and contains many shear zones. These are*

*more or less mineralized, usually showing veinlets of quartz and calcite and the green stain of copper carbonates*

Umpleby and Jones (1923: 114) states that

*The St. Joe quartz prospect, on St. Joe River near the mouth of Bluff Creek, is in a mineralized shear zone in the Wishards sill. The zone trends about east and contains irregular seams and bunches of quartz and calcite with a little chalcopryite, but no ore shoot has been developed.*

**(27) Eureka (T.44N., R.8E., Sec. 6)**

In the state list this is a gold prospect. Pardee (1910: 56) states that

*Half a mile to the east of Goddards a location by Isaac Hegarty is based on a persistent quartz outcrop trending N.68° W. This lode is in metamorphosed sandstones representing the lower part of the Newland ("Wallace") formation and is apparently a replacement along a crushed zone. It varies from 1 to 10 feet in width and consists of massive white quartz together with heavily ferruginous porous quartz and some undecomposed siderite and pyrite.*

**(28) Conrad's Crossing (T.44N., R.8E., Sec. 14 )**

Pardee (1910: 56) states that

*In the vicinity of Conrad's crossing on St. Joe River a few short adits and trenches have been made on small veins that are numerous in the diabase. The country rock is severely sheared and more or less mineralized in many places. The mineralization consists in the introduction of minute crystals of chalcopryite and pyrite along shear planes, and the development of seams and irregular bunches up to 3 feet or more wide of calcite, quartz, and siderite carrying chalcopryite and pyrite. The green stain of copper carbonate may be seen at many places on weathered surfaces of the diabase.*

**(29) Alice (T.45N., R.6E., Sec. 24)**

Pardee (1910: 56) states that

*Some locations about a quarter of a mile east of the mouth of Bird Creek are known as the Alice group. Here an extensive replacement deposit occurs along a shear zone in the middle part of the quartzites regarded as belonging to the Newland ("Wallace") formation. It is developed by a 70-foot adit . . .*

**(30) St. Joe Basin Placer Mining Company (T.43N., R.10E., Sec. 1, 21, 22, 25, 26, 27, 36 )**

This is a group of claims stretching along the St. Joe River from Heller Creek to Wisdom which were located in the 1880's. The claims include Solace, Mutual Idaho, Contention, Keystone, Snowstorm, Climax and Sunshine Placers. The claims were surveyed in 1908 and had at that time a number of improvements. The improvements included dams, ditches, small shafts, and cabins. The area burned during the 1910 fires and many of the improvements were probably lost.

A long time ranger in the area, Charles Scribner, was told that M. M. Chamberlain and one other person died in 1894 when one of the placer mining dams across the St. Joe broke. He also stated that another dam located just below St. Joe Lake broke in 1928. Shoshone County records show that a C. P. Chamberlin recorded a placer claim in the area on October 30 1893.

Other placer claims in the area include Frank Cooley's Bar Creek claim on Sherlock Creek dating to August 30 1934, Archie Camble's Simmons Creek claim of April 15, 1932 and Burt Clark's Yankee Bar creek claim of March 22, 1911.

- (31) Sherley Jean (T.45N.,R.7E., Sec. 16). A copper prospect.
- (32) Eagle Creek (T.45N.,R.7E., Sec. 11). A copper/silver prospect.
- (33) Setzaer Prospect (T.45N.,R.6E., Sec. 9). A lead/zinc/copper prospect.
- (34) Lintz and Stafford Prospect (T.44N.,R.8E., Sec. 5). A copper/tin prospect.
- (35) Bluff Creek Prospects (T.44N.,R.8E., Sec. 6). A gold prospect.
- (36) Revenge Lode (T.44N.,R.9E., Sec. 19). A gold prospect.
- (37) Whitetail Mine (T.44N.,R.8E., Sec. 12). A copper/silver/gold prospect.
- (38) Gold Creek Prospects (T.44N.,R.8E., Sec. 13). A copper/silver prospect.
- (39) Kismet Placer (T.43N.,R.10E., Sec. 4). A gold prospect.
- (40) Tilicum Prospect (T.43N.,R.8E., Sec. 25). A nickel/copper prospect.
- (41) Ruby Prospect (T.43N.,R.9E., Sec. 31). (10-SE-219). A garnet/gold prospect.
- (42) Trimetallic Mining Co (T.42N.,R.8E., Sec. 21). A copper/silver/gold prospect.
- (43) Granite Peat (T.42N.,R.8E., Sec. 16). A copper prospect.
- (44) Elk Prairie Prospect (T.45N.,R.7E., Sec. 3,4 and T.43N.,R.8E., Sec. 33,34). A copper prospect.
- (45) Clearwater Copper Mine (T.42N.,R.8E., Sec. 8). A copper prospect.
- (46) Kelley Creek Prospect (T.45N.,R.5E., Sec. 28). A copper prospect.
- (47) Bluff Creek Prospect (T.44N.,R.6E., Sec. 6). A copper prospect.
- (48) Fishhook Peak Prospect (T.44N.,R.4E., Sec. 30). A gold, silver prospect.
- (49) Crater Peak Prospect (T.43N.,R.3E., Sec. 25). A gold, silver and copper prospect.
- (50) Floodwood Creek Prospect (T.43N.,R.4E., Sec. 34). A lead, gold and silver prospect.
- (51) Gray Eagle Mine (T.42N.,R.4E., Sec. 36). A lead, zinc and silver prospect.
- (52) Meadows Creek Prospect (T.42N.,R.5E., Sec. 31). A gold prospect.

- (53) **Alpina Copper Prospect (T.47N.,R.7E., Sec. 31).** A copper prospect.
- (54) **Alice Prospect (T.47N.,R.7E., Sec. 31).** A copper prospect.
- (55) **Bald Mountain Prospect (T.47N.,R.7E., Sec. 32).** A copper, gold and silver prospect.
- (56) **Montana/Idaho Prospect (T.46N.,R.7E., Sec. 8).** A copper prospect.
- (57) **Wampum Prospect (T.46N.,R.7E., Sec.9).** A copper prospect.
- (58) **Copper Edge Property (T.46N.,R.7E., Sec. 16).** A copper prospect.
- (59) **Springfield Prospect (T.47N.,R.5E., Sec. 15).** A copper prospect.
- (60) **Park Copper Prospect (T.47N.,R.5E., Sec. 23).** A copper, gold and silver prospect.
- (61) **Champion Prospect (T.47N.,R.5E., Sec. 23).** A copper prospect.
- (62) **Shoshone Silver Mine (T.47N.,R.5E., Sec. 23).** A copper and silver prospect.
- (63) **Silver Shadow Group (T.47N.,R.5E., Sec. 26).** A gold, silver and copper prospect.
- (64) **Horst-Powell Prospect (T.47N.,R.5E., Sec. 36).** A copper prospect.
- (65) **Silica Gold and Copper Prospect (T.46N.,R.6E., Sec. 6).** A gold prospect.
- (66) **Silver Crest Group Prospect (T.46N.,R.6E., Sec. 7).** A silver, copper and lead prospect.
- (67) **Eagle Copper Prospect (T.47N.,R.6E., Sec. 22).** A copper prospect.
- (68) **Copper Chief Prospect (T.47N.,R.6E., Sec. 22).** A copper prospect.
- (69) **Fourth of July Silver Prospect (T.47N.,R.6E., Sec. 34).** A lead and silver prospect.
- (70) **Taylor copper Mine (T.47N.,R.6E., Sec. 34).** A silver and copper prospect.
- (71) **Old North Star Mine (T.46N.,R.6E Sec 4).** A copper and silver prospect.
- (72) **Vienna-International Prospect (T.47N.,R.6E., Sec. 21).** A lead and zinc prospect.
- (73) **Signal Silver-Gold Group (T.47N.,R.6E., Sec. 21).** A silver and gold prospect.
- (74) **Oregon-Idaho Silver-Gold Prospect (T.47N.,R.6E., Sec. 33).** A gold, silver, copper, lead and zinc prospect.

## Bibliography

Anderson, Alfred L.

- 1928 A Geological Reconnaissance in the St. Maries Region, Idaho. *Bureau of Mines and Geology Pamphlet 30*. Moscow.

Bankson, Russell and Lester S. Harrison

- 1966 *Beneath These Mountains*. Vantage Press. New York.

Calkins, F. C.

- 1909 A Geological Reconnaissance in northern Idaho and Northwestern Montana. *United States Geological Survey Bulletin 384*. Washington, D. C.

Calkins, F. C. and E. L. Jones, Jr.

- 1911 Geology of the St. Joe-Clearwater Region. *United States Geological Survey Bulletin 530*. Washington, D. C.

Campbell, Stewart

- 1906 *Eighth Annual Report of the Mining Industry of Idaho*. Idaho Bureau of Mines. Boise, Idaho.
- 1916 *Eighteenth Annual Report of the Mining Industry of Idaho*. Idaho Bureau of Mines. Boise, Idaho.
- 1917 *Nineteenth Annual Report of the Mining Industry of Idaho*. Idaho Bureau of Mines. Boise, Idaho.
- 1918 *Twentieth Annual Report of the Mining Industry of Idaho*. Idaho Bureau of Mines. Boise, Idaho.
- 1924 *Twenty-Sixth Annual Report of the Mining Industry of Idaho*. Idaho Bureau of Mines. Boise, Idaho.
- 1926 *Twenty-eight Annual Report of the Mining Industry of Idaho*. Idaho Bureau of Mines. Boise, Idaho.
- 1931 *Thirty-Third Annual Report of the Mining Industry of Idaho*. Idaho Bureau of Mines. Boise, Idaho.

Cook, E. F.

- 1961 Coeur d'Alene Highlights. In Guidebook to the Geology of The Coeur d'Alene Mining District. *Idaho Bureau of Mines and Geology Bulletin 16*. Moscow.

Crowell, Sandra A. and David O. Asleson

- 1995 *Up the Swiftwater. A Pectoral History of the Colorful Upper St. Joe River Country*. Museum of North Idaho. Coeur d'Alene.

- Hardesty, Donald L.  
 1988 *The Archaeology of Mining and Miners: A View from the Silver State*. Special Publication Series 6. Society of Historical Archaeology. Ann Arbor.
- 1995 Research Questions and Important Information. *CRM* 18:6: 4-8. National Park Service, Washington, D. C.
- Henderson, John M.; William S. Shiach and Harry B. Averill  
 1903 *An Illustrated History of North Idaho Embracing Nezperces, Idaho, Latah, Kootenai and Shoshone Counties, State of Idaho*. Western Historical Publishing Company. Spokane.
- Hustedde, Gail S., William B. Strowd, Victoria E. Mitchell and Earl H. Bennett  
 1981 *Mines and Prospects of the Pullman, Sandpoint, Spokane and Wallace Quadrangles. Idaho Bureau of Mines and Geology, Mines and Prospects Map Series*. Moscow.
- Idaho Historical Society  
 1966 Recovery Processes for Idaho Ores. *Reference Series Number 380*. Idaho Historical Society, Boise.
- Jolly, Janice L.  
 1989 Copper. In *Nonferrous Metal Prices in the United States Through 1988*. U. S. Bureau of Mines. Washington D. C.
- Livingston-Little, D. E.  
 1965 *An Economic History of North Idaho 1800-1900*. Morrison. Los Angeles.
- Lovering, T. S.  
 1943 *Minerals in World Affairs*. Prentice-Hall, Inc. New York.
- Magnuson, Richard G.  
 1968 *Coeur d'Alene Diary, The First Ten Years of Hard Rock Mining in North Idaho*. Metropolitan Press. Portland.
- Minnich, Roger  
 1986 Report of Mineral Potential, Hecla Mining Company Exchange. Unpublished Report on file at the Idaho Panhandle National Forests. Coeur d'Alene.
- McClelland, Linda Flint et. al.  
 1992 Guidelines for Evaluation and Documenting Rural Historic Landscapes. *National Register Bulletin 30*. National Park Service. Washington, D. C.
- Noble, Bruce J. and Robert Spude  
 1992 Guidelines for Identifying, Evaluating, and Registering Historic Mining Properties. *National Register Bulletin 42*. U. S. Department of the Interior. Washington D. C.
- Norman, Sidney  
 1918 *Northwest Mines Handbook. A Reference Work of the Mining Industry of Idaho*,

*Washington, British Columbia, Western Montana and Oregon.* Sidney Norman.  
Spokane.

Pardee, J. T.

1910 *Geology and Mineralization of the Upper St. Joe River Basin, Idaho.* Contributions to Economic Geology. *United States Geological Survey Bulletin 470.* Washington, D. C.

Ransome, F. L., and F. C. Calkins

1908 *The Geology and Ore Deposits of the Coeur d'Alene District, Idaho.* *United States Geological Survey Professional Paper 62.* Washington, D. C.

Rickard, Thomas A.

1932 *A History of American Mining.* McGraw-Hill Book Company. New York.

Ross, Clyde P.

1930 *A Graphic History of Metal Mining in Idaho.* *USGS Bulletin 821-A.* Washington D.C.

Scribner, Charley

n.d. Unpublished notes on the history of the St. Joe area. Manuscript on file, Idaho Panhandle National Forests. Coeur d'Alene.

Umpleby, Joseph B. E. L. Jones, Jr.

1923 *Geology and Ore Deposits of Shoshone County, Idaho.* *United States Geological Survey, Bulletin 732.* Washington D. C.

U.S.D.A. Forest Service

1995 *Anatomy of a Mine from Prospect to Production.* *General Technical Report INT-GTR-35 Revised.* Intermountain Research Station. Ogden.

Wagner, Warren R.

1949 *The Geology of Part of the South Slope of the St. Joe Mountains.* Shoshone County, Idaho. *Pamphlet No. 82.* Idaho Bureau of Mines and Geology. Moscow.

Weed, Walter Harvey

1916 *The Mines Handbook, An Enlargement of The Copper Handbook. A Manual of The Mining Industry of North America.* The Stevens Copper Handbook Co. New York.

1918 *The Mines Handbook, International Edition, An Enlargement of The Copper Handbook. A Manual of The Mining Industry of North America.* W. Weed. New York.

1922 *The Mines Handbook, International Edition, An Enlargement of The Copper Handbook. A Manual of The Mining Industry of North America.* W. Weed. New York.

Wyman, Mark

1979 *Hard Rock Epic. Western Miners and the Industrial Revolution 1860-1910.* University of California Press. Berkeley.

Young, Otis E.

1970 *Western Mining, A informal account of Precious-Metals Prospecting, Placering, Lode Mining, and Milling on the American Frontier from Spanish Times to 1893.* University of Oklahoma Press. Norman.

#### **Periodical Sources**

Daily Idaho Press (On microfilm at the Wallace, Idaho public library)

The Times (On microfilm at the Wallace, Idaho public library)

The Daily Times (On microfilm at the Wallace, Idaho public library)

Wallace Miner Newspaper (On microfilm at the Wallace, Idaho public library)

St. Maries Gazette Newspaper (On microfilm at the Hayden, Idaho public library)

Spokesman Review Newspaper (On microfilm at the Spokane, Washington public library)

**Appendix A**  
**Surveyed Mining Claims in St. Joe District**

- 1254 Independence, Richmond, Richmond Mining Milling and Reduction Company, located 1897, surveyed 1897
- 1603 West Park, East Park, Park, south Park, Park Extension, Park Copper, Park Copper and Gold Mining Co. LTD. Located 1896, 1900, surveyed 1900.
- 1618 Mayflower, Desmoines, Springfield, Cumberland, Springfield Mining Co. , Located 1897, 1898, 1899, surveyed 1900.
- 1757 Copper Kopoe, Wampum, Papoose, Molly Pitcher, Huntress, Benbolt, Medicene Man, Fool Hen, Buckeye State, Little Bristle, Electric Era, Old Glory, Flying Squadron, Volunteers, Diomond Hitch, Paul Reviere (Survey 1902) Located 1898, 99, 1900
- 1771 Black Bear, St. Lawrence, Broadwater, Gold Cross, Cold Cup, Virginia, Monte Carlo, Maggie Carson, Monitor, Gilpin, Spokane; The Monitor Mining company, Surveyed 1902, located 1896-97.
- 2030 Janice Meredith, Foxy Quiller, reliance, Defender, located 1903, surveyed 1905, Wampaum Mining Company
- 2031 Albany, located 1897, surveyed 1905
- 2045 Pan American (located 1902) (Surveyed 1905) located 1902
- 2133 Park Fraction, Park Copper and Gold Mining company, Located 1899, surveyed 1906
- 2145 Solace Group, St. Joe Basin Placer Mining Company, survey 1908.
- 2231 Wonderful, Agungldo; Wonderful Mining Company Limited Gentle Annie lode mining claim located 1906 survey 1907 "Log house, used as a boarding and lodging house for miners. 14ft long east and west 10ft north and south....value \$150"
- 2357 Kentucky Bell (Grand Forks)
- 2445 Richard Carvel located 1906, surveyed 1907
- 2446 Evelyn, Sonoma Girl
- 2449 High (Grand Forks)
- 2524 Dora (Falcon) Claim located June 10, 1907, survey 1910
- 2527 Black Cat (Turkey Creek) Altona Mining Co. LTD.
- 2652 Peter Pan, Grouse, St. Joe, located 1907-9 Surveyed 1912, Wampum Mining company
- 2705 Capstan, 2651 Nominee (located 1907) survey 1912 Wampum Mining Company
- 2772 Majic, Champion, Joseph Turner, Located 1897, Surveyed 1915.
- 2861 LeRoy, Mammoth, Ontario, Pacific, Atlantic, Arctic (Adair), Leroy Consolidated Gold and Copper Mining Co. Ltd. Located 1897, surveyed 1917.
- 2848 Adair (Adair), Richmond Mining Milling and Reduction company (Adair Load) located 1914, includes tunnel, frame house and shake barn.
- 2849 Columbus, Queen, Log Cabin, Liberty, Richmond Mining Milling and Reduction Company, located 1897, surveyed 1917
- 2953 Pearson Mining Company (survey 1921) common improvement tunnel 1671ft. long
- 2971 Copper Chief Mining Company
- 2973, 2972, 2970, 1890, 2968, 2969, Bullion Mining Company Surveyed 1921, (#1890 located 1900-1903, surveyed 1903)
- 3090 Pearson Mining Company located 1923, surveyed 1925, "A saw mill, compressor building, cook and bunkhouses are now being constructed in NW. Corner of Pearson No. 30 lode and in the NE corner of Pearosn 42 lode.
- 3151 East Fork (Frazer Creek) Claim located Jan. 1 1915
- 3338 Pretoria Lode, John Hansen, survey 1938.

**Appendix C**  
**Time Line of Mining History in the St. Joe District**  
(estimate)

1860

1861

1862

1863

1864 Claim marker on Bald Mountain; (early 60's miners from Montana stampeded into St. Joe country?)

1865

1866

1867

1868

1869 Cedar Creek, Montana placers discovered

1870 Stampede into Cedar Creek, Montana

1871

1872

1873

1874

1875

1876

1877

1878

1879

1880

1881

- 1882
- 1883
- 1884
- 1885
- 1886
- 1887 Miners from Murray goldfields stampeded into St. Joe drainage.
- 1888
- 1889
- 1890
- 1891
- 1892
- 1893 St. Joe Basin Placer claim
- 1894 C. P. Chamberlin dies when St. Joe River dam breaks below St. Joe lake.
- 1895
- 1896 Albany claim located
- 1897 LeRoy Mine located, Richmond Mine located, Monitor Mine located
- 1898 Wampum etc. located
- 1899
- 1900 Bullion Mine located
- 1901
- 1902 (Pan American located)
- 1903 Bullion Mine announces rich ore strike
- 1904
- 1905

- 1906 Wonderful Mine located
- 1907 Lucky Swede claims located
- 1908 Edna May prospect located
- 1909 Lucky Swede Gold and Copper M. C. Incorporated; St. Joe Gold and Copper Mining Co. announces strike; copper ore noted in St. Paul Pass Tunnel. Chicago Milwaukee and St. Paul begins operations through the area.
- 1910 Fire burns large part of St. Joe River drainage.
- 1911
- 1912 Trial shipment from Bullion Mine to smelter
- 1913 Richmond Mine reopened
- 1914 Adair located, Montana-Idaho Copper Company begins Monitor Tunnel from Adair.
- 1915
- 1916
- 1917 Richmond tramway constructed.
- 1918 Richmond suspends operations.
- 1919
- 1920 Pearson lode claims located
- 1921
- 1922
- 1923 Pearson lode claims located; Montana-Idaho Copper Company hires outside mining consultant to assess the long tunnel and other workings.
- 1924 Pearson lode claims located; Montana-Idaho Copper Company suspend operations after pushing the Monitor tunnel 9400 feet.
- 1925
- 1926

## **CLIMATE SUMMARY**

# AVERY RANGER STN 2, IDAHO

## Period of Record General Climate Summary - Precipitation

Station:(100528) AVERY RANGER STN 2														
From Year=1968 To Year=2004														
	Precipitation											Total Snowfall		
	Mean	High	Year	Low	Year	1 Day Max.	>= 0.01 in.	>= 0.10 in.	>= 0.50 in.	>= 1.00 in.	Mean	High	Year	
	in.	in.	-	in.	-	in.	dd/yyyy or yyyyymmdd	# Days	# Days	# Days	# Days	in.	in.	-
January	5.89	10.15	71	1.58	81	2.45	27/1984	16	14	4	1	29.5	74.5	69
February	3.86	8.00	72	0.77	73	2.30	16/1982	14	10	3	0	15.4	40.0	72
March	3.44	5.81	89	0.85	78	1.60	24/1984	14	10	2	0	4.3	13.7	70
April	2.91	6.20	96	0.41	77	1.65	24/1996	14	9	1	0	0.3	3.8	70
May	3.05	5.53	98	1.03	82	1.50	05/1979	12	8	2	0	0.0	0.3	100
June	2.18	5.36	81	0.00	85	1.35	28/1971	10	6	1	0	0.0	0.0	69
July	1.33	3.87	83	0.00	73	1.27	07/1981	7	4	1	0	0.0	0.0	69
August	1.22	4.26	76	0.00	85	1.18	26/2004	6	3	1	0	0.0	0.0	69
September	2.01	4.44	86	0.05	87	1.83	23/1976	8	6	1	0	0.0	0.0	69
October	2.32	6.05	75	0.03	87	1.27	21/1989	9	7	1	0	0.2	6.0	71
November	4.45	8.50	95	1.36	69	2.20	26/1999	15	11	3	0	7.2	26.4	75
December	5.13	10.43	77	1.83	86	2.80	02/1977	16	12	4	0	23.3	61.4	71
Annual	37.78	47.60	75	23.42	87	2.80	19771202	142	99	23	3	80.3	141.5	71
Winter	14.88	21.93	72	6.79	87	2.80	19771202	46	36	10	2	68.2	151.1	72
Spring	9.39	14.24	93	3.12	82	1.65	19960424	40	27	5	1	4.6	17.5	70
Summer	4.73	7.63	76	0.00	85	1.35	19710628	22	13	3	0	0.0	0.0	69
Fall	8.78	12.48	73	2.06	87	2.20	19991126	33	23	5	1	7.5	26.4	75

Table updated on Dec 15, 2004

For monthly and annual means, thresholds, and sums:  
 Months with 5 or more missing days are not considered  
 Years with 1 or more missing months are not considered  
 Seasons are climatological not calendar seasons

Winter = Dec., Jan., and Feb. Spring = Mar., Apr., and May

Summer = Jun., Jul., and Aug. Fall = Sep., Oct., and Nov.

## **PUBLIC WATER SUPPLY**

# IDEQ Chem/Rad Results History Report (s-1)

PWS	PWS Name	JURISDICTION	STAT	CLS	SRC	AOP	CONN	POP	
D1400067	LOOKOUT PASS SKI AREA	COEUR D ALENE REGIONAL OFFICE	A	NC	GU	1/1 to 12/31	3	133	
WSF #	F0005613	WSF NAME	SPRING	SMPPT:	EP1	SMPPT DESC	EP-SPRING		
COLLECT DT	11/18/2003	GRP CD:	ALLR	GRP NAME:	ALL CHEMS EXCPT RADS	LAB NAME:	SVL ANALYTICAL		
COMMENT TEXT:									
Code	<u>ANALYTE NAME</u>	<u>SMPL#</u>	<u>TYPE</u>	<u>MEAS</u>	<u>UOM</u>	<u>&lt; IND</u>	<u>DET LIM</u>	<u>LIM UOM</u>	<u>Q CD Q RSN CDQ RSN</u>
040	NITRATE (AS N)	NW365959	RT	0	MG/L	Y	0	MG/L	A
COLLECT DT	11/4/2002	GRP CD:	ALLR	GRP NAME:	ALL CHEMS EXCPT RADS	LAB NAME:	IDHW STATE LAB IN COEUR D ALEN		
COMMENT TEXT:									
Code	<u>ANALYTE NAME</u>	<u>SMPL#</u>	<u>TYPE</u>	<u>MEAS</u>	<u>UOM</u>	<u>&lt; IND</u>	<u>DET LIM</u>	<u>LIM UOM</u>	<u>Q CD Q RSN CDQ RSN</u>
040	NITRATE (AS N)	N021578	RT	0.06	MG/L	N	0	MG/L	A
041	NITRITE (AS N)	N021578	RT	0	MG/L	Y	0	MG/L	A
COLLECT DT	12/31/2001	GRP CD:	ALLR	GRP NAME:	ALL CHEMS EXCPT RADS	LAB NAME:	IDHW STATE LAB IN COEUR D ALEN		
COMMENT TEXT:									
Code	<u>ANALYTE NAME</u>	<u>SMPL#</u>	<u>TYPE</u>	<u>MEAS</u>	<u>UOM</u>	<u>&lt; IND</u>	<u>DET LIM</u>	<u>LIM UOM</u>	<u>Q CD Q RSN CDQ RSN</u>
040	NITRATE (AS N)	N112011991	RT	0.036	MG/L	N	0	MG/L	A
COLLECT DT	3/22/2000	GRP CD:	ALLR	GRP NAME:	ALL CHEMS EXCPT RADS	LAB NAME:	DWIMS LEGACY LAB DATA		
COMMENT TEXT:									
Code	<u>ANALYTE NAME</u>	<u>SMPL#</u>	<u>TYPE</u>	<u>MEAS</u>	<u>UOM</u>	<u>&lt; IND</u>	<u>DET LIM</u>	<u>LIM UOM</u>	<u>Q CD Q RSN CDQ RSN</u>
040	NITRATE (AS N)	I103000412	RT	0.042	MG/L		0		A
COLLECT DT	12/29/1999	GRP CD:	ALLR	GRP NAME:	ALL CHEMS EXCPT RADS	LAB NAME:	DWIMS LEGACY LAB DATA		
COMMENT TEXT:									
Code	<u>ANALYTE NAME</u>	<u>SMPL#</u>	<u>TYPE</u>	<u>MEAS</u>	<u>UOM</u>	<u>&lt; IND</u>	<u>DET LIM</u>	<u>LIM UOM</u>	<u>Q CD Q RSN CDQ RSN</u>
040	NITRATE (AS N)	I112992922	RT	0.029	MG/L		0		A
COLLECT DT	12/17/1998	GRP CD:	ALLR	GRP NAME:	ALL CHEMS EXCPT RADS	LAB NAME:	DWIMS LEGACY LAB DATA		
COMMENT TEXT:									
Code	<u>ANALYTE NAME</u>	<u>SMPL#</u>	<u>TYPE</u>	<u>MEAS</u>	<u>UOM</u>	<u>&lt; IND</u>	<u>DET LIM</u>	<u>LIM UOM</u>	<u>Q CD Q RSN CDQ RSN</u>
040	NITRATE (AS N)	I112982550	RT	0.059	MG/L		0		A
041	NITRITE (AS N)	I112982550	RT	0	MG/L	Y	0		A
COLLECT DT	9/25/1997	GRP CD:	ALLR	GRP NAME:	ALL CHEMS EXCPT RADS	LAB NAME:	DWIMS LEGACY LAB DATA		
COMMENT TEXT:									
Code	<u>ANALYTE NAME</u>	<u>SMPL#</u>	<u>TYPE</u>	<u>MEAS</u>	<u>UOM</u>	<u>&lt; IND</u>	<u>DET LIM</u>	<u>LIM UOM</u>	<u>Q CD Q RSN CDQ RSN</u>
040	NITRATE (AS N)	I109971912	RT	0.032	MG/L		0		A
041	NITRITE (AS N)	I109971912	RT	0	MG/L	Y	0		A
COLLECT DT	6/12/1996	GRP CD:	ALLR	GRP NAME:	ALL CHEMS EXCPT RADS	LAB NAME:	DWIMS LEGACY LAB DATA		
COMMENT TEXT:									
Code	<u>ANALYTE NAME</u>	<u>SMPL#</u>	<u>TYPE</u>	<u>MEAS</u>	<u>UOM</u>	<u>&lt; IND</u>	<u>DET LIM</u>	<u>LIM UOM</u>	<u>Q CD Q RSN CDQ RSN</u>
040	NITRATE (AS N)	I106960943	RT	0	MG/L	Y	0		A
COLLECT DT	4/2/1996	GRP CD:	ALLR	GRP NAME:	ALL CHEMS EXCPT RADS	LAB NAME:	DWIMS LEGACY LAB DATA		
COMMENT TEXT:									
Code	<u>ANALYTE NAME</u>	<u>SMPL#</u>	<u>TYPE</u>	<u>MEAS</u>	<u>UOM</u>	<u>&lt; IND</u>	<u>DET LIM</u>	<u>LIM UOM</u>	<u>Q CD Q RSN CDQ RSN</u>
040	NITRATE (AS N)	I104960457	RT	0.027	MG/L		0		A
COLLECT DT	12/29/1995	GRP CD:	ALLR	GRP NAME:	ALL CHEMS EXCPT RADS	LAB NAME:	DWIMS LEGACY LAB DATA		
COMMENT TEXT:									
Code	<u>ANALYTE NAME</u>	<u>SMPL#</u>	<u>TYPE</u>	<u>MEAS</u>	<u>UOM</u>	<u>&lt; IND</u>	<u>DET LIM</u>	<u>LIM UOM</u>	<u>Q CD Q RSN CDQ RSN</u>
040	NITRATE (AS N)	I112952850	RT	0.015	MG/L		0		A
COLLECT DT	12/9/1994	GRP CD:	ALLR	GRP NAME:	ALL CHEMS EXCPT RADS	LAB NAME:	DWIMS LEGACY LAB DATA		
COMMENT TEXT:									
Code	<u>ANALYTE NAME</u>	<u>SMPL#</u>	<u>TYPE</u>	<u>MEAS</u>	<u>UOM</u>	<u>&lt; IND</u>	<u>DET LIM</u>	<u>LIM UOM</u>	<u>Q CD Q RSN CDQ RSN</u>
040	NITRATE (AS N)	I112942459	RT	0.041	MG/L		0		A

# IDEQ Chem/Rad Results History Report (s-1)

PWS	PWS Name	JURISDICTION	STAT	CLS	SRC	AOP	CONN	POP
ID1400067	LOOKOUT PASS SKI AREA	COEUR D ALENE REGIONAL OFFICE	A	NC	GU	1/1 to 12/31	3	133

COLLECT DT: 2/15/1993    GRP CD: ALLR    GRP NAME: ALL CHEMS EXCPT RADS    LAB NAME: DWIMS LEGACY LAB DATA

CON IT\_TEXT:

Code	ANALYTE NAME	SMPL#	TYPE	MEAS	UOM	< IND	DET LIM	LIM	UOM	Q CD	Q RSN	CDQ	RSN
040	NITRATE (AS N)	I102930187	RT	0.061	MG/L		0				A		
041	NITRITE (AS N)	I102930187	RT	0	MG/L	Y	0				A		

VSF # T1400067DS1    WSF NAME DISTRIBUTION SYSTEM    SMPPT: 1    SMPPT DESC GENERIC SAMPLING PT

COLLECT DT: 11/22/2004    GRP CD: ALLR    GRP NAME: ALL CHEMS EXCPT RADS    LAB NAME: SVL ANALYTICAL

COMMENT\_TEXT:

Code	ANALYTE NAME	SMPL#	TYPE	MEAS	UOM	< IND	DET LIM	LIM	UOM	Q CD	Q RSN	CDQ	RSN
040	NITRATE (AS N)	N429114	RT	0.068	MG/L	N	0		MG/L		A		

# **DENA MORA SALTESE WEST REST STOP**

## **Source Water Delineation and Assessment Report**

**Public Water Supply: PWSID #MT0002693**

**Dena Mora Saltese West Rest Stop  
Montana Department of Transportation  
Mineral County  
5 miles west of Saltese, Montana, Mile Post 4.6  
U.S. Interstate 90  
Saltese, Montana**

**Report Date: July 2001**

**Contact: Steve Miller  
MDT Missoula Division  
P.O. Box 7039  
Missoula, Montana 59104-0437  
406-523-5816**

### **INTRODUCTION**

This delineation and assessment report is intended to meet the technical requirements of the Montana Source Water Protection Program (Montana Department of Environmental Quality [Montana DEQ], 1999) and the federal Safe Drinking Water Act (SDWA) Amendments of 1996 (P.L. 104-182). Tetra Tech EM Inc. prepared this report under contract with the Montana Department of Transportation (MDT). Information provided by MDT was used in preparing the reports. Well completion information was obtained from the Montana Ground Water Information Center (GWIC). Information on the water supply system was obtained from a sanitary survey prepared on August 25, 1995, by McNenny Environmental Engineering and Consulting (available from Montana DEQ upon request) and from Steve Miller of MDT (Miller 2001). Water quality data are derived from the U.S. Environmental Protection Agency (U.S. EPA) Envirofacts Warehouse website (U.S. EPA 2001). Land use information was obtained from the Montana State Library; Natural Resource Information Service (NRIS) database (NRIS 2000).

This source water delineation and assessment report includes a site location topographic map and a land use map showing the inventory region of the source water protection area and the land uses and potential contaminant sources within that area (Figures 1 and 2 at end of this report). The report also includes a narrative description of the public water

supply (PWS), inventory region delineation, an inventory of land uses and activities that may impact the PWS, and a susceptibility assessment. Well information for the PWS is attached.

## **PURPOSE**

The purpose of this delineation and assessment report is to assess possible threats to the water supply at the MDT Dena Mora Saltese West Rest Stop located five miles west of Saltese, Montana using information obtained from published reports. Delineation is a process in which areas that contribute water used for drinking are identified on a map. Geologic and hydrologic conditions are evaluated in order to delineate source water protection areas. The source water protection area is assessed to identify locations or regions where contaminants may be generated, stored, or transported and then to evaluate the potential for contamination of drinking water by these sources.

## **PUBLIC WATER SUPPLY INFORMATION**

The water system at this rest stop is classified as a transient, non-community PWS because it serves 25 or more persons per day but does not regularly serve the same persons for at least six months a year. Ten non-transient persons employed by the MDT are estimated to use the water supply yearly. Approximately 500 transient persons are estimated to use the rest stop per day during the summer (Miller 2001) resulting in a water supply demand of an estimated 17,500 gallons per week per season (U.S. EPA 1991).

### ***Facility Description***

The Dena Mora Saltese West Rest Stop is located in Mineral County on the north side of U.S. Interstate Highway 90 at mile post 4.6 and services traffic traveling westward ([Figure 1](#)). The wellhead of the public water supply well is located west of the comfort station. A septic system drain field is located more than 100 feet east of the public water supply well (McNenny 1995). The rest stop operates seasonally from May 1 through October 30 and is closed in the winter.

### ***Public Water Supply System***

Well log information indicates that the well was drilled September 12, 1969, is cased to 35 feet below ground surface with 8-inch casing, and screened for 5 feet from 30.0 to 35.0 feet below ground surface (GWIC 2001). Static water level was at 2 feet below ground surface in 1969. The GWIC well log is attached to this report. A concrete drainage collar surrounds the well (McNenny 1995). A three-horsepower submersible pump delivers water to a bank of 5 Jacuzzi Hydrocels located in the pipe chase of the comfort station, and to a sediment cartridge filter which contains twelve 5-micron filters (McNenny 1995).

### ***Public Water Supply Quality***

MDT is required to monitor the rest stop public water supply for coliform bacteria on a monthly basis and nitrate as nitrogen annually, or if nitrogen is present at concentrations less than 0.5 milligrams per liter (mg/L), once every three years. No health-based water quality violations have been reported to the Environmental Protection Agency within the past five years. (U.S. EPA 2001). According to the Dena Mora Saltese West Rest Stop Sanitary Survey (McNenny 1995), the well yields good quality water.

### ***Source Water Hydrogeology***

The Dena Mora Saltese West Rest Stop is located in the St. Regis River valley about 50 miles southeast from the confluence of the St. Regis and Clark Fork Rivers ([Figure 1](#)). Lithologic information from the well log indicates that the well is screened in gravely clay alluvium at an interval depth of 30 to 35 feet below ground surface. The aquifer is unconfined and the screened interval is overlain by alluvium. Based on well log information, the aquifer is likely in hydrologic connection with the St. Regis River (GWIC 2001).

### **DELINEATION**

An inventory region around the well-head and on either side of the St. Regis River for 10 miles upstream from the well-head has been delineated by the Montana DEQ Source Water Assessment Program personnel for the Dena Mora Saltese West Rest Stop ([Figure 1](#)). The inventory region encompasses the area from which water or contaminants can flow to the well over a period of years. The control zone (100-foot radius from well head) is the most critical area within which direct introduction of contaminants into the well or immediate area can occur.

### **INVENTORY**

The Montana Source Water Protection Program requires that land uses and all potential sources of nitrate and microbial contaminants be identified within the control zone and inventory region of non-community, transient public water supplies (Montana DEQ 1999).

### ***Sanitary Survey Information***

According to information in the Dena Mora Saltese West Rest Stop Sanitary Survey, the system appears to be in good working order (McNenny 1995). No potential sources of microbial contaminants were identified but samples collected from the PWS well in 1994 indicated the presence of coliform bacteria (McNenny 1995). The sanitary survey recommended installing screens over the well cap vent and to change the cartridge filters more frequently (at least one or two additional times during the operating season). The

survey also recommended replacing the hose bib faucets near the drinking fountain with smooth nose chrome plated self-closing faucets to provide a better location for collection of water samples. These recommended actions are pending (Miller 2001).

### ***Land Use***

Land use of the Dena Mora Saltese West Rest Stop inventory region is summarized in Figure 2. Land use information was obtained from the Montana Natural Resources Information System website (NRIS 2000). Other sources of information include existing databases available through Montana DEQ and information provided by MDT.

Land use in the inventory region of the Dena Mora Saltese West Rest Stop PWS well is primarily forest. The Dena Mora Eastbound Rest Stop is located on the south side of Interstate Highway 90 across the highway from the Dena Mora West Rest Stop. A transportation corridor exists along highway I-90. No animal feeding operations are located within the Dena Mora Saltese West Rest Stop inventory region. Septic system density is low throughout the inventory region. Potential sources of nitrates or microbial contaminants include the rest stop septic system and other septic systems present within the inventory region.

### **SUSCEPTIBILITY ASSESSMENT**

Susceptibility of source water to contamination is a function of source water sensitivity, the presence of significant potential sources of microbial and nitrate contamination, and the presence of barriers to contamination from the sources. Source water susceptibility is based on the following factors:

- ▶ Source water sensitivity
- ▶ Documented water contamination in the previous five years
- ▶ Presence of potential contaminant sources within the inventory region
- ▶ Density of potential contaminant sources within the inventory region
- ▶ Presence and numbers of natural and engineered barriers to contaminant migration

### ***Source Water Sensitivity***

Source water sensitivity is defined as the relative ease with which contaminants can migrate to a source aquifer or surface water body. The Dena Mora Saltese West Rest Stop

has a high source water sensitivity rating because the source water aquifer is unconfined unconsolidated alluvium.

***Documented water contamination***

Records from the U.S. EPA safe drinking water information website indicate that no health-based violations have occurred within the last five years (U.S. EPA 2001).

***Intersystem Source Water Susceptibility***

Documented water contamination in the previous five years indicates that the Dena Mora Saltese West Rest Stop PWS has a high intersystem susceptibility to microbial contaminants. Intersystem susceptibility is determined by source sensitivity and exposure as indicated by documented water contamination. Documented exposure to contaminants regulated for their acute health effects (fecal coliform and nitrate) is given greater weight when determining intersystem susceptibility than exposure to contaminants regulated for non-acute health risks. Intersystem susceptibility of the Dena Mora Saltese West Rest Stop source water is summarized in Table 1.

<b>Table 1</b>			
<b>Intersystem Source Water Susceptibility Summary</b>			
<b>Potential Contaminant</b>	<b>Documented Exposure</b>	<b>Source Water Sensitivity<sup>a</sup></b>	<b>Intersystem Susceptibility<sup>a</sup></b>
Fecal Coliform	0	High	High
Nitrate	0	High	High
Nonacute contaminants	0	High	High

Notes:

<sup>a</sup>Based on Table 4, Section 5 (Montana DEQ 2001)

***Hazard of Potential Contaminant Sources***

The hazard posed by potential contaminant sources is a function of the type of and density of contaminant sources within the inventory region. Hazard of contaminant sources within the Dena Mora Saltese West Rest Stop PWS inventory region are summarized in Table 2.

<p style="text-align: center;"><b>Table 2</b></p> <p style="text-align: center;"><b>Contaminant Source Hazard Rating Determination</b></p>		
<b>Type of Contaminant Source</b>	<b>Density within Inventory Region</b>	<b>Hazard Rating<sup>a</sup></b>
Septic Systems	Less than 50 per square mile	Low
Municipal Sanitary Sewer	Less than 20 percent of region	Low
Cropped Agricultural Land	Less than 20 percent of region	Low
Contaminant Sources within Control Zone (confined aquifer)	NA	NA
Contaminant Sources within control zone (unconfined aquifer)	None	Low

Notes:

<sup>a</sup>Based on Table 6, Section 5 of Montana Source Water Program Guidance (Montana DEQ 2001)

NA – not applicable

***Barriers to Contamination***

Barriers to contamination can be natural conditions, engineered structures, or management actions. Natural barriers to a groundwater source may include a continuous clay layer, a deep water table, contaminant attenuation capacity of vadose zone and aquifer materials, and dilution. Engineered barriers provide physical containment or early detection of potential contaminants such as double walled underground storage tanks, spill catchment basins and monitoring wells installed for leak detection. PWS wells that meet state construction standards are considered engineered barriers to contamination in control zones. Contamination barriers for the Dena Mora Saltese West Rest Stop PWS are listed below.

- ▶ Well meets state construction standards

**Source Water Intrasystem Susceptibility**

Intrasystem susceptibility is determined by the hazard associated with potential contaminant sources and the existence of barriers that may decrease the likelihood that contaminated water will flow to a PWS well or intake. A summary of all significant potential contaminant sources identified in the inventory region, their associated hazard, the presence of barriers, and relative susceptibility ratings is presented in Table 3.

The Dena Mora Saltese West Rest Stop PWS has a very moderate susceptibility to contamination from the septic systems within the control zone and a moderate susceptibility in the inventory region. Natural, engineered or management barriers include: well constructed in accordance with state construction standards. This is a barrier to contamination within the control zone.

<b>Table 3</b>				
<b>Source Water Intrasystem Susceptibility</b>				
<b>Potential Source<sup>a</sup></b>	<b>Contaminant</b>	<b>Hazard Rating<sup>b</sup></b>	<b>Barrier</b>	<b>Susceptibility<sup>c</sup></b>
On-site septic system	Nitrates, Microbial contaminants	High	Appears to be down-gradient from the well  Setback distance > 100 ft.	Moderate
Off-site septic systems	Nitrates Microbial contaminants	Low	None	Moderate

**Notes:**

<sup>a</sup>Source based on land use within inventory zone.

<sup>b</sup>Hazard rating based on Table 6, Section 5 (Montana DEQ 2001)

<sup>c</sup>Susceptibility rating based on Tables 5, Section 5 (Montana DEQ 2001)

NA = Not Applicable

## REFERENCES

GWIC. 2001. Montana School of Technology, University of Montana. Montana Groundwater Information Center website well log reports. <http://mbmaggwic.mtech.edu/>

Miller, Steve. 2001. Dena Mora Saltese West Rest Stop Maintenance Supervisor. Personal Communication with Alice Stanley May 7 These recommended actions are pending (Miller 2001).

McNenny Environmental Engineering and Consulting. 1995. Sanitary Survey of the Dena Mora Saltese West Rest Stop prepared August 25.

Montana Department of Environmental Quality (MontanaDEQ). 1999. Montana Source Water Protection Program, Approved by EPA in November 1999.

Montana DEQ. 2001. Montana Source Water Assessment Program Website Guidance Documents. <http://www.deq.state.mt.us/ppa/swp/Assessment/default.htm>

NRIS. 2000. Natural Resource Information System, National Land Cover Data, Version 05-06-2000. Information contributed by the U. S. Geological Survey, the U.S. Environmental Protection Agency, the National Oceanic and Atmospheric Administration. Information distributed by the Natural Resources Information System (NRIS), State of Montana Library.

U.S. EPA. 2001. U.S. Environmental Protection Agency Envirofacts Warehouse Safe Drinking Water Information website at [http://www.epa.gov/enviro/index\\_java.html](http://www.epa.gov/enviro/index_java.html) .

U.S. EPA. 1991. Office of Water. Manual of Small Public Water Supply Systems, EPA 570/9-91-003, 211 p.

Figure 1. Location Map

Figure 2. Dena Mora Saltese West Rest Stop Inventory Region and Land Use

ATTACH WELL LOG

# **DENA MORA SALTESE EAST REST STOP**

## **Source Water Delineation and Assessment Report**

**Public Water Supply: PWSID #MT0001943**

**Dena Mora Saltese East Rest Stop  
Montana Department of Transportation  
Mineral County  
5 miles west of Saltese, Montana, Mile Post 4.6  
U.S. Interstate 90  
Saltese, Montana**

**Report Date: July 2001**

**Contact: Steve Miller  
MDT Missoula Division  
P.O. Box 7039  
Missoula, Montana 59104-0437  
406-523-5816**

### **INTRODUCTION**

This delineation and assessment report is intended to meet the technical requirements of the Montana Source Water Protection Program (Montana Department of Environmental Quality [Montana DEQ], 1999) and the federal Safe Drinking Water Act (SDWA) Amendments of 1996 (P.L. 104-182). Tetra Tech EM Inc. prepared this report under contract with the Montana Department of Transportation (MDT). Information provided by MDT was used in preparing the reports. Well completion information was obtained from the Montana Ground Water Information Center (GWIC). Information on the water supply system was obtained from a sanitary survey prepared on August 25, 1995, by McNenny Environmental Engineering and Consulting (available from Montana DEQ upon request) and from Steve Miller of MDT (Miller 2001). Water quality data are derived from the U.S. Environmental Protection Agency (U.S. EPA) Envirofacts Warehouse website (U.S. EPA 2001). Land use information was obtained from the Montana State Library; Natural Resource Information Service (NRIS) database (NRIS 2000).

This source water delineation and assessment report includes a site location topographic map and a land use map showing the inventory region of the source water protection area and the land uses and potential contaminant sources within that area (Figures 1 and 2 at end of this report). The report also includes a narrative description of the public water

supply (PWS), inventory region delineation, an inventory of land uses and activities that may impact the PWS, and a susceptibility assessment. Well information for the PWS is attached.

## **PURPOSE**

The purpose of this delineation and assessment report is to assess possible threats to the water supply at the MDT Dena Mora Saltese East Rest Stop located five miles west of Saltese, Montana using information obtained from published reports. Delineation is a process in which areas that contribute water used for drinking are identified on a map. Geologic and hydrologic conditions are evaluated in order to delineate source water protection areas. The source water protection area is assessed to identify locations or regions where contaminants may be generated, stored, or transported and then to evaluate the potential for contamination of drinking water by these sources.

## **PUBLIC WATER SUPPLY INFORMATION**

The water system at this rest stop is classified as a transient, non-community PWS because it serves 25 or more persons per day but does not regularly serve the same persons for at least six months a year. Ten non-transient persons employed by the MDT are estimated to use the water supply yearly. Approximately 500 transient persons are estimated to use the rest stop per day during the summer (Miller 2001) resulting in a water supply demand of an estimated 17,500 gallons per week per season (U.S. EPA 1991).

### ***Facility Description***

The Dena Mora Saltese East Rest Stop is located in Mineral County on the south side of U.S. Interstate Highway 90 at milepost 4.6 and services traffic traveling eastward ([Figure 1](#)). The wellhead of the public water supply well is located west of the comfort station. The rest stop operates seasonally from May 1 through October 30 and is closed in the winter.

### ***Public Water Supply System***

Well log information indicates that the well was drilled September 20, 1969, is cased to 34 feet below ground surface with 8-inch casing, and screened for 5 feet from 29.0 to 34.0 feet below ground surface (GWIC 2001). Static water level was at 7 feet below ground surface in 1969. The GWIC well log is attached to this report. A concrete drainage collar surrounds the well (McNenny 1995). A three-horsepower submersible pump delivers water to a bank of 5 Jacuzzi Hydrocels located in the pipe chase of the comfort station, and to a sediment cartridge filter which contains twelve 5-micron filters (McNenny 1995). The wellhead is assumed to be within 100 feet of the septic drain field.

### ***Public Water Supply Quality***

MDT is required to monitor the rest stop public water supply for coliform bacteria on a monthly basis and nitrate as nitrogen annually, or if nitrogen is present at concentrations less than 0.5 milligrams per liter (mg/L), once every three years. No health-based water quality violations have been reported to the Environmental Protection Agency within the past five years (U.S. EPA 2001). According to the Dena Mora Saltese East Rest Stop Sanitary Survey (McNenny 1995), the well yields good quality water.

### ***Source Water Hydrogeology***

The Dena Mora Saltese East Rest Stop is located in the St. Regis River valley about 50 miles southeast from the confluence of the St. Regis and Clark Fork Rivers ([Figure 1](#)). Lithologic information from the well log indicates that the well is screened in silty gravel alluvium at an interval depth of 29 to 34 feet below ground surface. The aquifer is unconfined and the screened interval is overlain by alluvium. Based on well log information, the aquifer is likely in hydrologic connection with the St. Regis River (GWIC 2001).

### **DELINEATION**

An inventory region around the well-head and on either side of the St. Regis River for 10 miles upstream from the well head has been delineated by the Montana DEQ Source Water Assessment Program personnel for the Dena Mora Saltese East Rest Stop ([Figure 1](#)). The inventory region encompasses the area from which water or contaminants can flow to the well over a period of years. The control zone (100-foot radius from well head) is the most critical area within which direct introduction of contaminants into the well or immediate area can occur.

### **INVENTORY**

The Montana Source Water Protection Program requires that land uses and all potential sources of nitrate and microbial contaminants be identified within the control zone and inventory region of non-community, transient public water supplies (Montana DEQ 1999).

### ***Sanitary Survey Information***

According to information in the Dena Mora Saltese East Rest Stop Sanitary Survey, the system appears to be in good working order (McNenny 1995). No potential sources of microbial contaminants were identified but samples collected from the PWS well in 1994 indicated the presence of coliform bacteria (McNenny 1995). The sanitary survey recommended installing screens over the well cap vent and to change the cartridge filters more frequently (at least one or two additional times during the operating season). The survey also recommended replacing the hose bib faucets near the drinking fountain with

smooth nose chrome plated self-closing faucets to provide a better location for collection of water samples. These recommended actions are pending (Miller 2001).

### ***Land Use***

Land use of the Dena Mora Saltese East Rest Stop inventory region is summarized in [Figure 2](#). Land use information was obtained from the Montana Natural Resources Information System website (NRIS 2000). Other sources of information include existing databases available through Montana DEQ and information provided by MDT.

Land use in the inventory region of the Dena Mora Saltese East Rest Stop PWS well is primarily forest. The Dena Mora Saltese West Rest Stop is located on the north side of U.S. Interstate 90 across from the Eastbound Rest Stop. A transportation corridor exists along highway I-90. No animal feeding operations are located within the Dena Mora Saltese East Rest Stop inventory region. Septic system density is low throughout the inventory region. Potential sources of nitrates or microbial contaminants include the rest stop septic system and other septic systems present within the inventory region.

### **SUSCEPTIBILITY ASSESSMENT**

Susceptibility of source water to contamination is a function of source water sensitivity, the presence of significant potential sources of microbial and nitrate contamination, and the presence of barriers to contamination from the sources. Source water susceptibility is based on the following factors:

- ▶ Source water sensitivity
- ▶ Documented water contamination in the previous five years
- ▶ Presence of potential contaminant sources within the inventory region
- ▶ Density of potential contaminant sources within the inventory region
- ▶ Presence and numbers of natural and engineered barriers to contaminant migration

### ***Source Water Sensitivity***

Source water sensitivity is defined as the relative ease with which contaminants can migrate to a source aquifer or surface water body. The Dena Mora Saltese East Rest Stop has a high source water sensitivity rating because the source water aquifer is unconfined unconsolidated alluvium.

***Documented water contamination***

Records from the U.S. EPA safe drinking water information website indicate that no health-based violations have occurred within the last five years (U.S. EPA 2001).

***Intersystem Source Water Susceptibility***

Documented water contamination in the previous five years indicates that the Dena Mora Saltese East Rest Stop PWS has a high intersystem susceptibility to microbial contaminants. Intersystem susceptibility is determined by source sensitivity and exposure as indicated by documented water contamination. Documented exposure to contaminants regulated for their acute health effects (fecal coliform and nitrate) is given greater weight when determining intersystem susceptibility than exposure to contaminants regulated for non-acute health risks. Intersystem susceptibility of the Dena Mora Saltese East Rest Stop source water is summarized in Table 1.

<b>Table 1</b>			
<b>Intersystem Source Water Susceptibility Summary</b>			
<b>Potential Contaminant</b>	<b>Documented Exposure</b>	<b>Source Water Sensitivity<sup>a</sup></b>	<b>Intersystem Susceptibility<sup>a</sup></b>
Fecal Coliform	0	High	High
Nitrate	0	High	High
Nonacute contaminants	0	High	High

Notes:

<sup>a</sup>Based on Table 4, Section 5 (Montana DEQ 2001)

***Hazard of Potential Contaminant Sources***

The hazard posed by potential contaminant sources is a function of the type and density of contaminant sources within the inventory region. Hazard of contaminant sources within the Dena Mora Saltese East Rest Stop PWS inventory region are summarized in Table 2.

<p align="center"><b>Table 2</b></p> <p align="center"><b>Contaminant Source Hazard Rating Determination</b></p>		
<b>Type of Contaminant Source</b>	<b>Density within Inventory Region</b>	<b>Hazard Rating<sup>a</sup></b>
Septic Systems	Less than 50 per square mile	Low
Municipal Sanitary Sewer	Less than 20 percent of region	Low
Cropped Agricultural Land	Less than 20 percent of region	Low
Contaminant Sources within Control Zone (confined aquifer)	NA	NA
Contaminant Sources within control zone (unconfined aquifer)	None	Low

Notes:

<sup>a</sup>Based on Table 6, Section 5 of Montana Source Water Program Guidance (Montana DEQ 2001)

NA – not applicable

***Barriers to Contamination***

Barriers to contamination can be natural conditions, engineered structures, or management actions. Natural barriers to a groundwater source may include a continuous clay layer, a deep water table, contaminant attenuation capacity of vadose zone and aquifer materials, and dilution. Engineered barriers provide physical containment or early detection of potential contaminants such as double walled underground storage tanks, spill catchment basins and monitoring wells installed for leak detection. PWS wells that meet state construction standards are considered engineered barriers to contamination in control zones. Contamination barriers for the Dena Mora Saltese East Rest Stop PWS are listed below.

- ▶ Well meets state construction standards.

**Source Water Intrasystem Susceptibility**

Intrasystem susceptibility is determined by the hazard associated with potential contaminant sources and the existence of barriers that may decrease the likelihood that contaminated water will flow to a PWS well or intake. A summary of all significant potential contaminant sources identified in the inventory region, their associated hazard, the presence of barriers, and relative susceptibility ratings is presented in Table 3.

The Dena Mora Saltese East Rest Stop PWS has a very high susceptibility to contamination from the septic system within the control zone and moderate within the inventory region. Natural, engineered or management barriers include: well constructed in accordance with state construction standards. This is a barrier to contamination within the control zone.

<b>Table 3</b>				
<b>Source Water Intrasystem Susceptibility</b>				
<b>Potential Source<sup>a</sup></b>	<b>Contaminant</b>	<b>Hazard Rating<sup>b</sup></b>	<b>Barrier</b>	<b>Susceptibility<sup>c</sup></b>
On-site septic system	Nitrates, Microbial contaminants	High	None	Very High
Off-site septic systems	Nitrates Microbial contaminants	Low	None	Moderate

**Notes:**

<sup>a</sup>Source based on land use within inventory zone.

<sup>b</sup>Hazard rating based on Table 6, Section 5 (Montana DEQ 2001)

<sup>c</sup>Susceptibility rating based on Tables 5, Section 5 (Montana DEQ 2001)

NA = Not Applicable

## REFERENCES

GWIC. 2001. Montana School of Technology, University of Montana. Montana Groundwater Information Center website well log reports. <http://mbmaggwic.mtech.edu/>

Miller, Steve. 2001. Dena Mora Saltese East Rest Stop Maintenance Supervisor. Personal Communication with Alice Stanley May 7, 2001.

McNenny Environmental Engineering and Consulting. 1995. Sanitary Survey of the Dena Mora Saltese East Rest Stop prepared August 25.

Montana Department of Environmental Quality (MontanaDEQ). 1999. Montana Source Water Protection Program, Approved by EPA in November 1999.

Montana DEQ. 2001. Montana Source Water Assessment Program Website Guidance Documents. <http://www.deq.state.mt.us/ppa/swp/Assessment/default.htm>

NRIS. 2000. Natural Resource Information System, National Land Cover Data, Version 05-06-2000. Information contributed by the U. S. Geological Survey, the U.S. Environmental Protection Agency, the National Oceanic and Atmospheric Administration. Information distributed by the Natural Resources Information System (NRIS), State of Montana Library.

U.S. EPA. 2001. U.S. Environmental Protection Agency Envirofacts Warehouse Safe Drinking Water Information website at [http://www.epa.gov/enviro/index\\_java.html](http://www.epa.gov/enviro/index_java.html) .

U.S. EPA. 1991. Office of Water. Manual of Small Public Water Supply Systems, EPA 570/9-91-003, 211 p.

Figure 1. Location Map

Figure 2. Dena Mora Saltese East Rest Stop Inventory Region and Land Use

ATTACH WELL LOG

**APPENDIX E: PROJECT PLAN**

## TABLE OF CONTENTS

<b>LIST OF TABLES</b> .....	3
<b>LIST OF FIGURES</b> .....	3
<b>ACRONYMS AND ABBREVIATIONS</b> .....	4
<b>1.0 INTRODUCTION</b> .....	5
<b>2.0 WORK PLAN</b> .....	6
2.1 SITE LOCATION AND HISTORY.....	6
2.1.1 Site Location.....	6
2.1.2 Site History.....	6
2.2 PREVIOUS INVESTIGATIONS.....	10
2.3 PA/SI TASKS.....	10
2.4 SCHEDULE.....	11
<b>3.0 SAMPLE PLAN</b> .....	11
3.1 PHYSICAL SITE CHARACTERISTICS AND HAZARD ANALYSIS.....	12
3.2 SURFACE SOIL EVALUATION.....	12
3.2.1 Soil Sampling and Analysis Activities.....	12
3.2.2 Soil/Sediment Sampling Procedures.....	13
3.3 ORE ASSESSMENT.....	13
3.3.1 Ore Sampling and Analysis Activities.....	13
3.4 WATER QUALITY ASSESSMENT.....	14
3.4.1 Surface Water Sampling and Analysis Activities.....	14
3.4.2 Surface Water Sampling Procedures.....	14
3.5 GENERAL FIELD PROCEDURES.....	15
3.5.1 Documentation.....	15
3.5.2 Procedures to Prevent Cross-Contamination.....	16
3.5.3 Calibration of Water Quality Meters.....	16
3.5.4 Sample Designation.....	16
3.5.5 Sample Identification and Labeling.....	17
3.5.6 Sample Containers, Preservation and Storage.....	17
3.5.7 Sample Packaging.....	18
3.5.8 Sample Shipping.....	18
3.5.9 Sample Custody Procedures.....	18
3.5.10 Laboratory Receipt.....	18
3.6 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC).....	19
3.6.1 Quality Assurance Objectives (QAO).....	19
3.6.2 Quality Assurance Objectives for Measurements.....	19
3.6.3 Detection Limit Goals.....	20
3.6.4 Sample Containers, Preservation and Holding Time.....	20
3.6.5 Field Sampling Quality Control Samples.....	20
3.6.6 Analytical Procedures.....	20
3.6.6.1 Laboratory Analyses.....	20
3.6.6.2 Data Validation.....	20
3.6.7 Field QA/QC Sample Evaluation.....	21
3.6.8 Data Reduction and Reporting.....	21
3.6.9 Internal Quality Control (QC) Checks.....	21
3.6.10 Quality Assurance (QA) Reporting.....	21
<b>4.0 INVESTIGATION-DERIVED WASTE (IDW) MANAGEMENT PLAN</b> .....	24

**LIST OF TABLES**

Table 1 ..... Page 22  
Table 2 ..... Page 23

**LIST OF FIGURES**

Figure 1-1 Site Location Map ..... Page 8  
Figure 2-1 1-Mile Radius Map ..... Page 9  
  
Figure 3-1 4-Mile Radius Map ..... Page 25  
Figure 302 15-Mile Downstream Distance Map (TDL) ..... Page 26

## ACRONYMS AND ABBREVIATIONS

CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CLP	Contract Laboratory Procedure
CoC	Chain-of-Custody
COPCs	constituents of potential concerns
DEQ	Idaho Department of Environmental Quality
DQOs	Data Quality Objectives
EPA	U.S. Environmental Protection Agency, Region 10
HNO <sub>3</sub>	nitric acid
HSP	Health and Safety Plan
IDW	Investigation-Derived Wastes Management Plan
IGS	Idaho Geological Survey
Lower	Lower Workings of the Bullion Mine
MDL	method detection limit
OSHA	Occupational Safety and Health Administration
PA	Preliminary Assessment
PQL	practical quantitation limit
QA/QC	Quality Assurance/Quality Control
QAOs	Quality Assurance Objectives
RCRA	Resource Conservation and Recovery Act
SP	Sample Plan
SI	Site Investigation
SOW	Statement of Work
TCLP	Toxicity Characteristic Leaching Procedure
Upper	Upper Workings of the Bullion Mine
USCS	Unified Soil Classification System
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service, Panhandle Region, Avery District

## 1.0 INTRODUCTION

This Work Plan details the approach and procedures for completion of a Preliminary Assessment (PA) and Site Investigation (SI) for the Bullion Mine (Upper and Lower) site, located west of Bullion Pass in Shoshone County, Idaho (Figure 1-1). The purpose of this PA/SI is to identify conditions that may pose a risk to human health and the environment as defined by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). The PA will be based upon existing information about the site, including historical and geological information obtained from the University of Idaho, Idaho Geological Survey (IGS), the U.S. Forest Service – Coeur d’Alene District (USFS), and the Idaho Department of Environmental Quality (DEQ). Duplicate files will be maintained at DEQ State Office in Boise and the DEQ Regional Office in Coeur d’Alene. This information will be combined with current data obtained during a Site Investigation to produce a PA/SI Report. References cited within this Work Plan will be compiled in a reference section of the PA/SI Report.

This Project Plan outlines the scope of work for conducting the PA/SI, and provides details of field work required to complete the project, in accordance with 40 CFR Part 300 and all applicable U.S. Environmental Protection Agency (EPA) guidance documents for preparation of a combined Preliminary Assessment/Site Investigation (EPA Directive No. 9375.2-10FS, October 1993). This Project Plan is broken into three (3) components: A Work Plan (WP), a Sample Plan (SP) that incorporates a Quality Assurance/Quality Control (QA/QC) section, and an Investigation-Derived Wastes (IDW) Management Plan. The Health and Safety Plan (HSP) is provided as a “stand-alone” document.

A brief description of each of these components is as follows:

The Work Plan (Section 2.0) includes a description of the site location and history, a summary of previous investigations, a description of the goals and scope of this project; and a schedule for completing the project.

The Sample Plan (Section 3.0) includes a description of the sampling and data collection activities to be performed, and field sampling and data collection procedures to be followed. The Quality Assurance/Quality Control section describes data quality objectives (DQOs), laboratory testing methodology and detection limits, sample handling and custody procedures, data reduction and validation, the appropriate laboratory certifications, and qualifications of participating personnel. The QA/QC also identifies laboratories to be used for sample testing.

The Investigation-Derived Waste (IDW) Management Plan (Section 4.0) includes a description of the characterization, minimization, and disposal activities to be performed.

The Health and Safety Plan (HSP) is provided as a “stand-alone” document and prepared in accordance with 40 CFR Part 300.150(d) and all applicable Occupational Safety and Health Administration (OSHA) requirements, as described in 29 CFR 1910. The HSP will be modified, as necessary during the site visit, for on-site conditions and contingencies.

## 2.0 WORK PLAN

### 2.1 SITE LOCATION AND HISTORY

#### 2.1.1 Site Location

The Bullion Mine was a former gold and copper mine located in Section 21, Township 47N, Range 6E, Boise Meridian in Shoshone County, Idaho. The Bullion Mine consists of two (2) distinct workings – the upper portion lies on the north side of Forest Road (FR) 507 while the lower portion lies approximately 0.25 miles south below FR507. Traveling southwest on FR507 for approximately 0.5 miles, the lower workings are reached via an old haul road. The road's location is barely discernable, due to road construction and mature vegetation. The lower workings lie approximately 0.35 miles to the east.

The Bullion Mine can be best accessed on public roads from Taft, Montana. From the Taft exit on Interstate 90, turn west to the "T" intersection, then a right-hand turn onto the frontage road. The paved road continues northwest paralleling I-90 for 2.5 miles, and then curves southward becoming FR445, an unimproved road. Bullion Pass lies approximately 2.25 miles ahead, marking the Idaho-Montana border. The upper Bullion site (Upper) lies nearly 1.0 mile beyond the divide, along the north side of FR507 at the apex of a sharp left-hand curve. The waste rock dump from Tunnel # 2 mantles the slope above the road, and an unnamed tributary drainage of Bullion Creek bisects the workings. The upper workings lies between elevations of 4,850 to 5,200 feet above mean sea level.

Continuing downgrade, approximately 0.5 miles, a second, unnamed tributary of Bullion Creek is encountered, as the road again curves to the left. There is adequate space for parking on the right-hand shoulder since the old road is not suitable for vehicular traffic. From this point, walk approximately 150 feet east on FR507 to where the faint trace of the old road is visible along the right side of the road. DEQ personnel partially cleared brush and deadfall along the course of the old road to the lower Bullion site (Lower). Though the entrance to the road is barely discernable from FR507, the pathway to the Lower is easily followed. The Lower lies at an elevation of 4,560 feet amsl.

#### 2.1.2 Site History

The Bullion Mine was discovered between 1900 and 1903 (Sims, 1998). The Bullion Mining Company, Ltd. was incorporated in 1902, following initial development of a 100-foot shaft (Kauffman, et al, 2003). The shaft, developed in the Upper, was soon encumbered with water infiltration and work had to be ceased. The company purchased a boiler, hoist, and pump and built support structures. Development activity continued until 1909 when one (1) carload of ore was shipped. "The ore, which is chalcopyrite, was taken from the dump and had been mined from the east drift and here there is a large body of it. The west drift is also being developed and is showing up a good body of concentrating ore" (Idaho Daily Press, May 13, 1909).

In 1910, a devastating forest fire raged over the Northwest and swept through the Bullion Creek drainage destroying all of the structures and mine equipment. Sixty (60) firefighters, led by S. M. Taylor, were surrounded by the fire and sought safety in the Bullion Tunnel. However, eight (8) men, who were closest to the tunnel's entrance, suffocated (Cohen & Miller, 1978). In 1912, the Bullion was back in operation, sending a trial shipment of ore to a smelter. According to the *Northwest Mines Handbook* (1916): "A trial shipment of 24 tons to the East Helena smelter, Sept.,

1912, showed 56% copper and 1 oz. silver per ton. Concentration tests on 5.2% ore showed a 73% recovery. No production since 1912. Diamond drill work was done in 1913 and company plans driving lower tunnel 2,533 ' to intercept ore at depth of 420' in 1916."

According to Kauffman, et al (2003), exploration continued until the early 1930s. No other reports of production from the Bullion were recorded. "In 1949, the mine was said to have 12,080 feet of workings, including three tunnels (500 feet, 2,000 feet, and 4,800 feet long), two shafts, and one raise" (ibid, page 148).

**FIGURE 1-1 Vicinity Map of Bullion Mine**

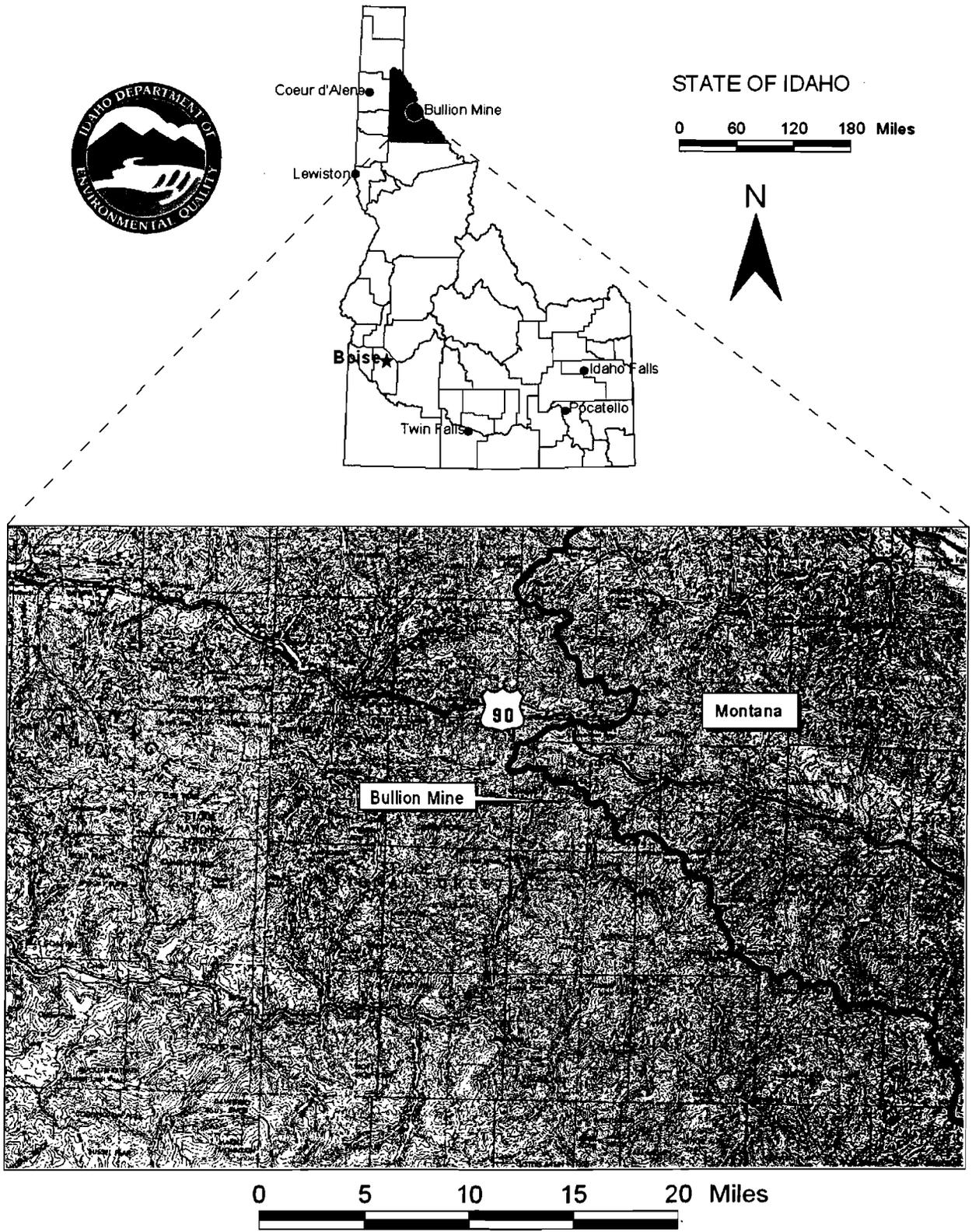
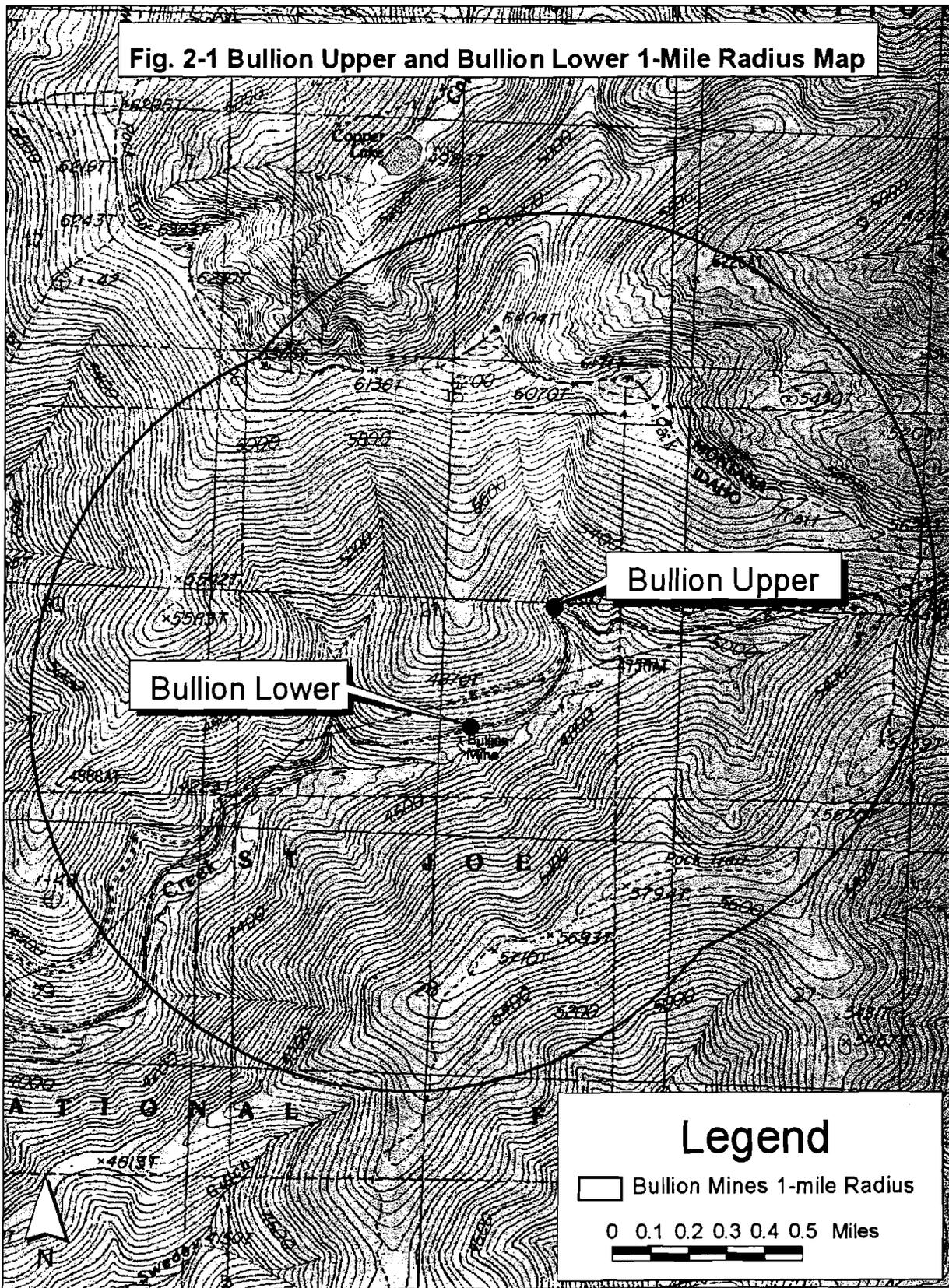


Fig. 2-1 Bullion Upper and Bullion Lower 1-Mile Radius Map



## 2.2 PREVIOUS INVESTIGATIONS

The following section summarizes the previous investigations conducted at the site. The USFS contracted the IGS to conduct Reconnaissance Site Assessments of mine and mill locations within USFS-managed lands of Idaho. The IGS conducted an assessment of the Bullion and surrounding mines on July 14, 1998. This report will be discussed in detail in the PA/SI Report. A short summary for this report is provided below.

The IGS Report includes a historic literature search of the sites as well as fieldwork where specific mine workings were located and mapped. This report summarized information relative to the historic mineral production and geology of the mine and determined safety hazards at the site and potential surface water impacts from the Bullion. Sample analysis of adit water did not indicate the exceedance of water quality standards, nor was there any significant leaching of any element of interest.

## 2.3 PA/SI TASKS

In addition to the preparation of this Work Plan, the Sample Plan, the Health and Safety Plan, and the Investigation-Derived Wastes Management Plan, this PA/SI will include the following tasks:

**Preliminary Assessment** – An initial review of “desk top” information pertaining to the Bullion Mine will be performed. The review will include researching available historical data, meteorological and geological data, human population potentially affected by site conditions, endangered species and fisheries data, and mining claim ownership available from U. S. Forest Service (USFS) records and the Shoshone County Assessor’s Office.

**Site Investigation** – An investigation of the site will be completed, and data will be collected to address the following:

- The nature and extent of hazardous material/waste releases or the threat of future releases,
- Potential threats to human health or the environment,
- The need for any emergency response actions and/or removal,
- Collection and review of existing data,
- The location and nature of sensitive environments and other environmental factors, and
- The condition and integrity of existing surface mine and mill structures and features.

Information contained in the IGS Report will be used as a guide for the field team to determine the number and location of features that will be investigated during the site visit. Field personnel will not enter any underground workings as part of this investigation.

**Emergency Response Action Assessment** – The field team will collect information during the site visit to determine whether or not an emergency response action and/or removal must be taken, in accordance with 40 CFR 300.180. This assessment will be based on the following criteria:

- Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous materials or pollutants or contaminants,
- Actual or potential contamination of drinking water supplies or sensitive ecosystems,
- Hazardous materials or pollutants or contaminants in drums, barrels, tanks, or bulk storage containers that may pose a threat of release,

- High levels of hazardous materials or pollutants or contaminants in soils, largely at or near the surface, that may migrate,
- Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released,
- Threat of fire or explosion, and
- Other circumstances or factors that may threaten human health or the environment.

Preliminary Assessment/Site Investigation Report – a PA/SI Report will be prepared to summarize the results of the PA/SI. The report will contain recommendations for whether or not removal actions are warranted for mine tailings, waste rock, contaminated soil, waste containers, and waste tanks and will include the following elements:

- A description of the site, including location, legal description, area and access on and around the site,
- Site features and physical characteristics, including structures and disposal areas, local geology and soils, surface hydrology, and ecological setting,
- Ownership and operational history,
- A detailed review and summary of previous investigations, including sampling activities conducted at the site,
- Identification of sources of contamination, source containment, migration pathways, and potentially affected targets,
- A description of the PA/SI sampling program, analytical results, and their influence on potential receptors,
- Conclusions and recommendations for additional investigation or evaluation,
- Site photographs and photographic log,
- Original field notes,
- Laboratory analytical data,
- References/bibliography, and
- Figures.

#### 2.4 SCHEDULE

The schedule is largely determined by obtaining legal access to the site, the availability of DEQ personnel and resources, and by conditions at the site. The fieldwork is currently scheduled for July 26 through 29, 2004. Due to potential conflicts with other DEQ projects and personnel availability, the dates for the fieldwork may change. The PA/SI final Report will be completed on or before December 31, 2004.

#### 3.0 SAMPLE PLAN

This section describes specific activities that will be conducted during the PA/SI field data collection efforts. The general scope of work addressed in this SP includes the following tasks:

- Task 1 – Physical Site Characteristics and Hazards Evaluation
- Task 2 – Surface Soil/Tailings Evaluation
- Task 3 – Waste Rock/Ore Evaluation
- Task 4 – Surface Water Evaluation
- Task 5 – Data Evaluation

A description of each of these tasks is provided in the following sections.

### 3.1 PHYSICAL SITE CHARACTERISTICS AND HAZARD ANALYSIS

Physical site characteristics and hazards will be evaluated during the PA/SI field investigation.

Activities included under this task will focus on the following:

- Identify and document physical hazards to the field team and the general public (e.g., unsecured site);
- Document the number, location, and condition of drums/containers and tanks of hazardous materials;
- Estimate the volume of tailings piles, waste rock dump(s), waste containers, waste tanks, and surface impoundments;
- Volume estimates of waste dumps and tailings piles will be obtained by measuring (tape) the base and thickness of the unit;
- Document the contents of the drums/containers, if known, noting labels, stenciling or other markings. Otherwise, identify contents as "Unknown;"
- No drums/containers will be opened or moved by the field team;
- No categorization or volume estimates of potential hazardous materials will be conducted;
- 55-gallon drums will be considered to hold a volume of 50 gallons, unless visually observed to be empty;
- Tanks will be considered to hold a volume of 90% of capacity, unless visually observed to be empty;
- Area estimates of all surface impoundments will be obtained by measuring (tape);
- Volumes of surface impoundments can be calculated, if depth is known. Otherwise, visual observations will be conducted to obtain volume estimates;
- Document the location, condition, construction materials (presence of asbestos containing materials and lead-based paint), and estimated size of abandoned structures and equipment;
- The Site Manager will not allow entry into abandoned structures without prior owner/operator permission and a safety assessment;
- Proper PPE (hard hats, safety glasses, and boots) must be worn when entering abandoned structures;
- Document the number, location, and condition of underground mine portals, airshafts and surface workings;
- The presence or absence of water within or emanating from portals or other underground openings will be documented;
- Site conditions including accessibility, structural condition, and associated physical hazards that may affect the evaluation of chemical hazards will be documented;

### 3.2 SURFACE SOIL EVALUATION

#### 3.2.1 Soil Sampling and Analysis Activities

Up to ten (10) soil samples will be collected during the site investigation for the purpose of evaluating the presence, nature, and extent of hazardous substances. One of the samples collected will be for a background soil sample. The remaining samples will be collected from the mine workings (Upper & Lower). The specific locations of the samples will be determined based on visual or subjective evidence of impacts. Soil sample depth will be determined based upon site

conditions, though 0-6 inch depth is preferred. Shallow subsurface soil samples may be collected to evaluate the vertical distribution of observed contamination.

All soil samples will be discrete and no compositing will be performed. Non-dedicated sampling equipment will be utilized, when possible, and appropriately decontaminated prior to reuse.

The number and location of soil and sediment samples to be collected are as follows:

- 1 soil sample per waste dump, unless area of dump is extensive.
- 1 sediment sample from Bullion Creek below waste rock dump.

Up to ten (10) of the soil and sediment samples, including the two (2) background samples will be analyzed for eight Resource Conservation and Recovery Act (RCRA) listed metals by EPA Method 6000/7000 series, including the Toxic Characteristic Leaching Process (TCLP) Method for all eight (8) RCRA-listed metals. In addition to the primary soil/sediment samples, field duplicate quality control samples will be analyzed at a rate of one per ten primary samples. Matrix spike quality control samples will be analyzed by the laboratory at a rate of at least one per twenty primary samples.

### 3.2.2 Soil/Sediment Sampling Procedures

Sampling will be conducted utilizing stainless steel spoons or scoops for soil and sediment samples. A pre-cleaned shovel may be required to loosen the soil/sediment prior to collection with scoops. A pre-cleaned hand auger will be used to collect soil samples from the any tailings ponds encountered.

The following procedures will be observed:

- Record the date and time of arrival, general site conditions, and other applicable field observations related to the site.
- Fill one 8-ounce jar per sample.
- After collection, label the sample and record sample collection information and location on the sampling form (see Section 3.4.5). Sample information should include date/time sampled, soil color, grain size, and odors (if any).
- Stakes or flag markers will be placed adjacent to each collection point and noted on the site sketch map.
- Discard contaminated personal protective clothing (e.g., latex gloves), as required.
- Decontaminate any non-dedicated sampling equipment used.

## 3.3 ORE ASSESSMENT

### 3.3.1 Ore Sampling and Analysis Activities

Up to three ore samples will be collected from the waste rock dumps associated with the three (3) primary workings, Tunnel No. 3 (Lower), Tunnel No. 2, and No. 1 Shaft (Upper). The specific locations of the samples will be determined based on visual or subjective evidence of stockpiles.

All ore samples will be discrete and no compositing will be performed. Non-dedicated sampling equipment will be utilized, when possible, and appropriately decontaminated prior to reuse.

## 3.4 WATER QUALITY ASSESSMENT

### 3.4.1 Surface Water Sampling and Analysis Activities

Up to eight (8) primary surface water samples and two (2) background surface water samples will be collected during the site visit. The general locations of the samples will be as follows:

- 1 background sample from Bullion Creek, upstream of the Lower (above beaver ponds)
- 1 background sample from unnamed tributary, upstream of the Upper
- 1 sample from unnamed tributary below waste dump of No. 1 Shaft
- 1 sample from Tunnel No. 2 adit discharge
- 1 sample from Thornton Tunnel adit discharge
- 1 sample from unnamed tributary below FS Road 507 (Upper)
- 1 sample from beaver ponds below unnamed tributary below Upper
- 1 sample from Tunnel No. 3 adit discharge
- 1 sample from Bullion Creek immediately upstream of workings
- 1 sample from Bullion Creek downstream of waste dump (Lower)

The specific locations of surface water samples and stream flow data collection points will be determined in the field, based on observed conditions. Physical water parameters including pH, temperature, and conductivity will be measured with a direct reading instrument at the time of sample collection. The water samples will be analyzed for eight (8) RCRA-listed metals, both total and dissolved, in accordance with EPA Method 6000/7000 series.

In addition to the eight primary water samples, field duplicate quality control samples will be collected at a rate of one per ten primary samples. Matrix spike quality control samples will be performed by the laboratory at a rate of at least one per twenty primary samples.

### 3.4.2 Surface Water Sampling Procedures

Prior to arriving at the sample location, all monitoring equipment (including pH and conductivity meters) will be calibrated. The field team will record instrument calibration information, field observations, notes, and measurements, daily, with waterproof ink in all-weather field books. Each field book page will be signed and dated. Upon arrival at the sample site, the following procedures will be followed:

- Record the date and time of arrival, general site conditions, and other applicable field observations related to the site.
- Stream sampling will be conducted from the lowest elevation to the highest, whenever possible. Bullion Creek should be sampled from the downstream segment, first, prior to sampling on or adjacent to the site.
- Streams will be accessed for sampling by wading, if necessary.
- Measure physical water quality parameters (pH, temperature and conductivity) in situ for all water samples at the time of sampling.
- Position the mouth of the sampling container facing upstream of the person conducting the sampling. Discrete samples will be collected at several locations across the stream and composited in a clean, 1-liter plastic bottle.
- For smaller streams and/or seeps, samples will be collected as practical from pools or falls. If necessary, a depression around the shallow stream or seep location will be manually dug to allow for sample collection by submerging a pre-cleaned, 1-liter polyethylene bottle into the

pool. Once measurements of pH, conductivity, and temperature have stabilized and sediment has settled out, the water sample will be collected from the depression.

- Once field measurements and field tests are completed, collect sample aliquots in a pre-cleaned, 1-liter polyethylene bottle. Sample containers will be filled from the jug once all sample aliquots are composited. Sample containers will be filled in the following order:

#### Analysis Sample Container Type

- Total Recoverable Metals 1-liter, polyethylene bottle with nitric acid (HNO<sub>3</sub>).
- Dissolved Metals, Hardness Following field filtering, 1-liter, polyethylene bottle with nitric acid (HNO<sub>3</sub>).
- Record sample collection information and sample locations on the sampling form. Note in the field book the sample location collected.
- Stakes or flag markers will be placed adjacent to each collection point and noted on the site sketch map.
- Discard contaminated personal protective clothing (e.g., latex gloves), as required.
- Discard any dedicated and/or disposable sampling equipment, as required.
- Decontaminate any non-dedicated sampling equipment used.

### 3.5 GENERAL FIELD PROCEDURES

#### 3.5.1 Documentation

A bound field book will be maintained by each team sampler to provide a daily record of events. At the beginning of each logbook entry, the following will be recorded:

- Date
- Time
- Meteorological conditions
- Field team members present
- Level of personnel protection
- List of on-site visitors and the level of personal protection
- Signature of the person making the logbook entry

Field book entries will be as detailed as necessary so that essential information is properly documented. All documentation in field books will be in ink. If an error is made, it will be corrected by drawing a line through the error and entering the correct information. Corrections will be dated and initialed. No entries will be obliterated or rendered unreadable. If sample locations cannot be indicated on field maps, a simple drawing of the location (not to scale) will be included in the field book to provide an illustration of all sampling points. The cover of each field book used will contain:

- Person and organization to whom the book is assigned
- Book number
- Start date
- End date

Daily activities and documentation of sampling procedures will be made in the field books. Data to be included in the field books will include travel time, time at the site, a summary of activities, and

observations. Entries in the field book will include, at a minimum, the following for each date of sampling:

- Site identification
- Location and description of sampling points
- A brief sketch of sampling points
- Sample identification numbers
- Number of samples taken
- Time of sample collection
- Number and type of QA/QC samples taken
- Sampler's name
- Field observations
- Documentation of photographs taken
- All field measurements made (e.g., pH, temperature and conductivity)

### 3.5.2 Procedures to Prevent Cross-Contamination

Personnel collecting samples for chemical analyses will take the following precautions to minimize sample contamination or cross-contamination between samples:

- Disposable nitrile or latex gloves will be used while collecting all samples. New gloves will be worn for each separate sampling event.
- Sampling personnel will not touch the inside of the sampling container.
- Sampling personnel will not walk over any areas where samples are to be collected.
- Only equipment that has been properly decontaminated will be used for environmental sample collection.
- Decontamination procedures will be completed while wearing disposable gloves.
- Immediately following the collection of the sample, the container will be sealed and the sample will be labeled and entered in the field logbook and/or appropriate sampling record forms.

### 3.5.3 Calibration of Water Quality Meters

Equipment to be used during the field investigation will include a Yellow Springs Instrument Corporation (YSI) water meter that measures temperature, pH, and conductivity. This meter will be used to measure these parameters in all water samples collected during the field effort. The YSI instrument will be provided by DEQ for use on the project, and contain manufacturer-supplied calibration solution that will calibrate the meter over the full instrument range of pH and conductivity. Field calibrations will be documented in the field notebook. Entries will be made at the beginning of each sampling or measuring effort and when each instrument is calibrated.

### 3.5.4 Sample Designation

Samples collected during this PA/SI will be designated a unique sample number according to the following criteria:

Surface Soil Samples: Surface soil samples will be labeled with the prefix BL (for Bullion – Lower workings) and BU (for Bullion – Upper workings) followed by S (for surface soil) and consecutive numbers. For example, the first soil sample collected will be designated BL-S1.

Ore Samples: Waste rock samples will be labeled with the prefix BL or BU (Lower or Upper) followed by R (for ore rock), and consecutive numbers.

Surface Water Samples: Surface water samples will be labeled with the prefix BL and BU (for Lower & Upper workings) followed by W (for surface water) and consecutive numbers. All surface water samples, including stream samples, seep samples, adit effluent water samples, and spring samples will be numbered in this fashion; and the specific location of each sample will be documented in the field notebook. Background surface water samples will be labeled in the same fashion.

Sediment Samples: Sediment samples will be labeled with the prefix BL (for Bullion – Lower workings) and BU (for Bullion – Upper workings) followed by SD and consecutive numbers.

Field Quality Assurance/Quality Control (QA/QC) Samples: Field duplicates and Matrix Spikes will be the QA/QC samples collected. Field duplicate samples will be labeled in the same way as primary samples, but as the next applicable sequential number. Collection documentation of duplicate samples will be made in the field notebooks and noted on the site sketch map.

### 3.5.5 Sample Identification and Labeling

Each sample shall be identified in the field book and on the sample container label. Sample labels will be formatted as follows:

[Check with Silver Valley Labs to complete this subsection]

Site:	Bullion Mine
Sampler:	
Client:	DEQ
Date Collected:	Time:
Source:	
Analysis:	
Unpreserved, Preserved:	

The label shall be filled out as follows:

1. Site – Bullion Mine
2. Sampler's initials
3. Client – DEQ
4. Date Collected – date of sample collection
5. Time – time of sample collection (for composite samples, use the time of final aliquot collected)
6. Source - sample number and matrix (e.g. soil, water)
7. Analysis –
8. Unpreserved, Preserved –

### 3.5.6 Sample Containers, Preservation and Storage

All clean sample containers will be provided by DEQ and handled in such a way as to prevent accidental contamination prior to use. All necessary preservative(s) will be placed in appropriate sample containers by the laboratory prior to collection of samples. The types of sample containers that will be used are based on the Analytical Plan for each media to be collected. Table 1 lists the type of analysis, sample preservation (including storage conditions), and holding time requirements.

### 3.5.7 Sample Packaging

Samples collected must be handled and transported in a manner that will protect against any harmful effects to the samples or the environment due to breakage, leakage, or spoilage. Sample handling procedures will be closely supervised and recorded to minimize the potential for loss, modification, or tampering during transit to the analytical laboratory. The samples will remain under DEQ's control at all times.

### 3.5.8 Sample Shipping

Shipping dates, method of shipment (hand delivered), and shipment identification numbers will be recorded in the field logbook and on the Chain-of-Custody (CoC) forms. Samples will be stored in the field in coolers containing blue ice or gel packs to maintain appropriate temperature and sample integrity, in accordance with "Users Guide to the Contract Laboratory Program" (USEPA, 1988a). Samples will be packaged for shipping as described in the following Section. DEQ personnel will hand deliver sample coolers directly to SVL Analytical at the conclusion of sampling activities. Samples will be delivered to SVL Analytical no later than 5:00 p.m. Copies of the CoC will be retained in the project files.

### 3.5.9 Sample Custody Procedures

Sample custody and documentation procedures will include completion of CoC forms, transportation tracking, and laboratory acceptance procedures. Sample integrity will be maintained through strict adherence to these procedures. CoC forms will be completed on a daily basis and will be maintained separately from all other documentation. The CoC form will be completed by the sampler prior to releasing each cooler containing samples for transportation to the laboratory. Analytical requests will be identified on the CoC. The information for each sample on the CoC will duplicate information provided on each sample container label. The form will be taped to the inside lid of the cooler containing samples prior to transportation to the laboratory. The laboratory will receive the original CoC plus a carbon copy. A copy of the CoC will be retained in the project files.

### 3.5.10 Laboratory Receipt

When samples arrive at SVL Analytical, the laboratory personnel receiving the sample cooler will evaluate the integrity of the samples and sign the CoC form. The laboratory will assign work order numbers to the samples to be used in its internal tracking system. The status of a sample can be checked at any time by referring to the laboratory numbers on the CoC form and the laboratory work order numbers in their logbooks. Both the laboratory and sample numbers will be cited when analytical results are reported. The laboratories will send a copy of each signed CoC along with the analytical data package to the Site Manager (Brian Gaber). Damaged sample containers, cooler temperatures, and sample labeling discrepancies between samples and CoC, and analytical request discrepancies will be noted on the form. The laboratory will contact the Project Manager for problem notification and resolution.

### 3.6 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

This Section describes QA/QC procedures that will be implemented during data collection activities associated with the Preliminary Assessment/Site Investigation at the Bullion Mine. QA/QC procedures govern all aspects of data collection and analytical efforts to ensure that the data collected are representative of conditions in the field and that analytical results are valid and accurately reported.

#### 3.6.1 Quality Assurance Objectives (QAO)

The overall Quality Assurance Objectives (QAOs) for this PA/SI are to develop and implement procedures to obtain and evaluate various levels of data that can be used to satisfy the goal of identifying potential risks to human health or the environment, as defined by CERCLA.

#### 3.6.2 Quality Assurance Objectives for Measurements

Quantitative QAOs for the measurement of various analytes are based on method detection limits, precision, accuracy, and completeness. The definition of each term is provided below (USEPA, 1986, 1987b, 1988b).

Method Detection Limit (MDL): The lowest concentration for which there is at least a 95 percent (95%) chance that an analyte will be positively detected.

Practical Quantitation Limit (PQL): The lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions.

Precision: The agreement of a set of results among themselves, and a measure of the ability to reproduce a result.

Accuracy: An estimate of the difference between the true value and the determined mean value. The accuracy of a result is affected by both systematic and random errors.

Representativeness: The degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at the sampling point, or an environmental condition. Representativeness is a qualitative parameter that is most concerned with the proper design of the sampling program.

Comparability: A qualitative parameter expressing the confidence with which one data set can be compared to another. This goal is achieved through using standard techniques to collect and analyze representative samples, and by reporting analytical results in appropriate units.

Quantitative QAOs for the project analytical methods include:

- MDLs, PQLs, precision, accuracy, completeness, and QC limits for initiating corrective action for each method (if available).
- Qualitative QAOs include determining the representativeness and comparability of the data to be collected.
- Representativeness is established by selecting procedures that will produce results that accurately, precisely, and reliably depict the measured matrix and conditions. The representativeness of a result is associated with developing and following proper protocols for:

sample handling (storage, preservation, packaging, custody, and transportation); sample documentation; and laboratory sample handling and storage procedures.

- Comparability of the data will be maintained using established EPA procedures for sampling activities and analytical methods. Actual MDLs and PQLs reported by the laboratory may vary due to the nature of individual samples.

### 3.6.3 Detection Limit Goals

An objective of the analytical program is to collect high quality analytical data from each media sampled. Where technically feasible, the analytical objective is to achieve sample detection limits at or below available regulatory guidance.

### 3.6.4 Sample Containers, Preservation and Holding Time

The types of sample containers that will be used are based on the analytical plan for each media to be collected. Table 1 lists the type of analysis, sample preservation (including storage conditions), and holding time requirements that will govern sample-handling procedures.

### 3.6.5 Field Sampling Quality Control Samples

Field QA/QC samples will be collected during sampling efforts. This will include field duplicates and matrix spike. The number of field QA/QC samples to be collected during the sampling activities includes the following:

- Field duplicates will be collected at a rate of one duplicate per ten samples per media.
- Matrix spike will be collected at a frequency of one per twenty primary samples.

### 3.6.6 Analytical Procedures

#### 3.6.6.1 Laboratory Analyses

The analytical procedures that will be used for samples collected during the PA/SI investigation are provided in Table 1. The Project Manager will be responsible for scheduling analyses and will serve as the primary contact for all laboratory issues and problem resolution. SVL Analytical of Kellogg, Idaho will perform the chemical analyses of soil and water samples. The USEPA and DEQ have certified SVL Analytical. Copies of the certifications are presented in Appendix A. Quality Assurance Programs and standard operating procedures for this laboratory are available for review upon request.

#### 3.6.6.2 Data Validation

Internal laboratory data validation checks will be performed by the laboratory and reviewed by the Site Manager and Project Manager for all laboratory analyses. The following guidelines will be used for data validation reviews of all analyses performed:

- "Test Methods for Evaluating Solid Waste," SW-846 (USEPA, 1986) or latest version.
- "USEPA Contract Laboratory Program, National Functional Guidelines for Inorganic Data Review," EPA 540/R-94-013 (USEPA, 1994a), where appropriate.
- "USEPA Contract Laboratory Program, National Functional Guidelines for Organic Data Review," EPA 540/R-94-012 (USEPA, 1994b), where appropriate.
- "Methods for Chemical Analysis of Water and Wastes," EPA-600/4-79-020 (USEPA, 1983).
- "Water Quality Standards and Wastewater Treatment Requirements" (IDAPA 58.01.02).

Components of the data validation checks will include an evaluation of: holding times, initial and continuing calibrations, system performance, method blanks, matrix spike/matrix spike duplicates, field duplicates, compound identification, compound quantification, and reported detection limits. Data qualifiers will follow those used in the EPA's Contract Laboratory Procedure (CLP) program. Data validation will be performed based on QA/QC criteria specified to each method. A "summary" CLP-equivalent data review will be performed by DEQ's Technical Services Division, and reviewed by the Site Manager and Project Manager, for all data received from the laboratory. The summary review will involve evaluating the data summary and QA/QC summary sheets provided by the laboratory with each data package. The summary review does not include spot-checking the raw data packages or calculations. If the summary review indicates potential problematic areas within a data set, a "standard" review to include checking raw data and calculations will be performed.

#### 3.6.7 Field QA/QC Sample Evaluation

During the Site Investigation and following the data validation reviews of each analytical data set, field procedures and QA/QC sample results will be evaluated. This will provide information regarding the potential introduction of artificial contaminants during the sample collection process, cross-contamination, and site variability. If the introduction of contaminants is indicated by the QA/QC data, specific data will be flagged and qualified as necessary. Discussion of the QA/QC data will be included in the PA/SI Report.

#### 3.6.8 Data Reduction and Reporting

Data obtained in the field will be recorded daily in bound field logbooks and will be maintained by the Site Manager. The field data package will be reviewed by the Site Manager to determine if the field records are complete, and measurements specified in the SP have been performed. Data validation and review of laboratory and field measurement analytical data collected during the sampling efforts will be conducted as described previously. Field and laboratory measurements will be tabulated and reviewed as part of the data validation and reduction efforts.

#### 3.6.9 Internal Quality Control (QC) Checks

Internal QC checks will be performed for field sampling activities and laboratory activities. Internal QC checks of sampling procedures will be performed by submittal and evaluation of field QA/QC samples. Laboratory analytical internal QC checks will consist of QA/QC criteria and QC limits specified for each methodology and QC checks outlined in each analytical methodology. The frequency of laboratory QC sample analyses, such as laboratory method blanks, duplicate analyses, and matrix spike/matrix spike duplicate analysis will be based on specifications outlined in each specific methodology.

#### 3.6.10 Quality Assurance (QA) Reporting

QA information that will be reported to the Project Manager and submitted to the project file includes the following:

- Results of data validation reviews
- Field measurements
- Equipment calibration and preventative maintenance activities
- Results of data precision and accuracy calculations
- Evaluation of data completeness and contract compliance
- Field and/or laboratory QA problems and recommended and/or implemented corrective actions

**Table 1**

**SAMPLE CONTAINERS, PRESERVATIVES AND HOLDING TIMES**

<b>MEDIA</b>	<b>ANALYSES</b>	<b>METHOD REFERENCE</b>	<b>METHOD</b>	<b>CONTAINER</b>	<b>PRESERVATIVE</b>	<b>HOLDING TIME</b>
Soil	RCRA Metals	EPA SW-846	6000/7000 Series	4-oz glass jar	Cool to 4° C	6 months (Hg - 28 days)
	TCLP Metals	EPA SW-846	TCLP	4-oz glass jar	Cool to 4° C	6 months (Hg - 28 days)
Surface Water	Total Recoverable RCRA Metals	EPA SW-846	6000/7000 Series	1 liter poly	HNO <sub>3</sub> (pH<2), Cool to 4° C	6 months (Hg - 28 days)
	Dissolved Metals, plus Zn & Cu	EPA SW-846	6000/7000 Series	1 liter poly	HNO <sub>3</sub> (pH<2), Cool to 4° C	6 months (Hg - 28 days)
	Hardness	EPA SW-846	EPA 2340B	1 liter poly	HNO <sub>3</sub> , Cool to 4° C	6 months
Ore	Total Recoverable RCRA Metals	EPA SW-846	6000/7000 Series	2 to 5 lbs. Cloth bag	None	6 months (Hg - 28 days)

Notes:

- |                  |   |  |      |   |   |
|------------------|---|--|------|---|---|
| oz               | = | Ounce                                  | Cu   | = | Copper                                  |
| °C               | = | Degrees Celsius                        | Zn   | = | Zinc                                    |
| EPA              | = | U.S. Environmental Protection Agency   | Hg   | = | Mercury                                 |
| HNO <sub>3</sub> | = | Nitric Acid                            | TCLP | = | Toxic Characteristic Leaching Procedure |
| Poly             | = | Polyethylene bottle/container          |      |   |   |
| RCRA             | = | Resource Conservation and Recovery Act |      |   |   |

**TABLE 2**  
**DATA QUALITY OBJECTIVES SUMMARY**

<b>ACTIVITY</b>	<b>MEDIA</b>		
	<b>Soil</b>	<b>Surface Water</b>	<b>Ore</b>
<b>Objectives</b>	To assess potential metals	To assess potential contaminant transport	To assess potential metals
<b>Constituents of Concern</b>	Metals	Metals	Metals

#### 4.0 INVESTIGATION-DERIVED WASTE (IDW) MANAGEMENT PLAN

Surface water is expected to be non-hazardous under the Resources Conservation and Recovery Act (RCRA). Any quantities of soils and sediments that are not collected as samples will be spread around the sample location and covered with surficial soil. These soils are expected to be RCRA non-hazardous. Any sediment, not collected as samples, will be returned to the surface water.

In the process of collecting environmental samples at the Bullion Mine, the DEQ sampling team will generate different types of potentially contaminated investigation-derived waste (IDW) that may include the following items:

- Personnel protective equipment (PPE) – Including disposable coveralls, gloves, booties and other PPE.
- Disposable equipment – Which may include plastic sheeting and equipment covers, aluminum foil, broken or unused sample containers, sample container boxes, tape, and other related items.
- Decontamination fluids – Any spent detergent and wastewater
- Packing and shipping materials.

The U.S. EPA's National Contingency Plan requires management of IDW generated during sampling comply with all applicable or relevant and appropriate requirements to the extent practicable. The IDW will contain minor residual amount of the soil/sediment. These wastes are not considered hazardous and will be disposed of at a municipal landfill. Used PPE and disposable equipment will be double bagged and placed in municipal refuse dumpster. Non-disposable sampling equipment will be decontaminated by scrubbing with a non-phosphate detergent solution and water, with a final de-ionized water rinse. Decontamination fluids that will be generated during sampling will consist of de-ionized water, residual contaminants, and water with non-phosphate detergent. The volume and concentration of the decontamination fluid will be sufficiently low to allow disposal at the site or sampling area, or transported to the DEQ Regional Office in a 5-gallon plastic pail for disposal to the sanitary sewer system.

**FIGURE 3-1 Bullion Mine 4-Mile Radius Map**

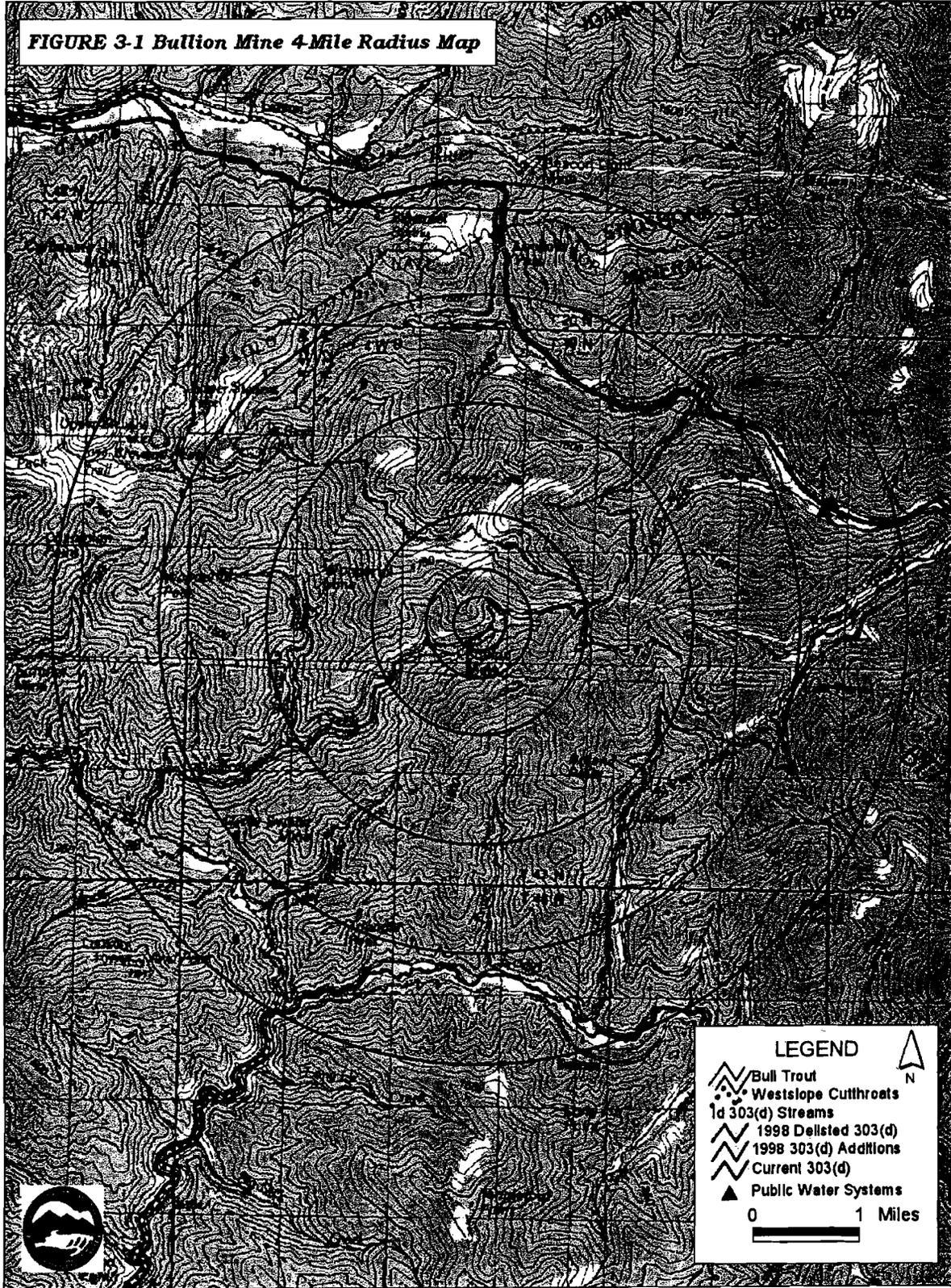
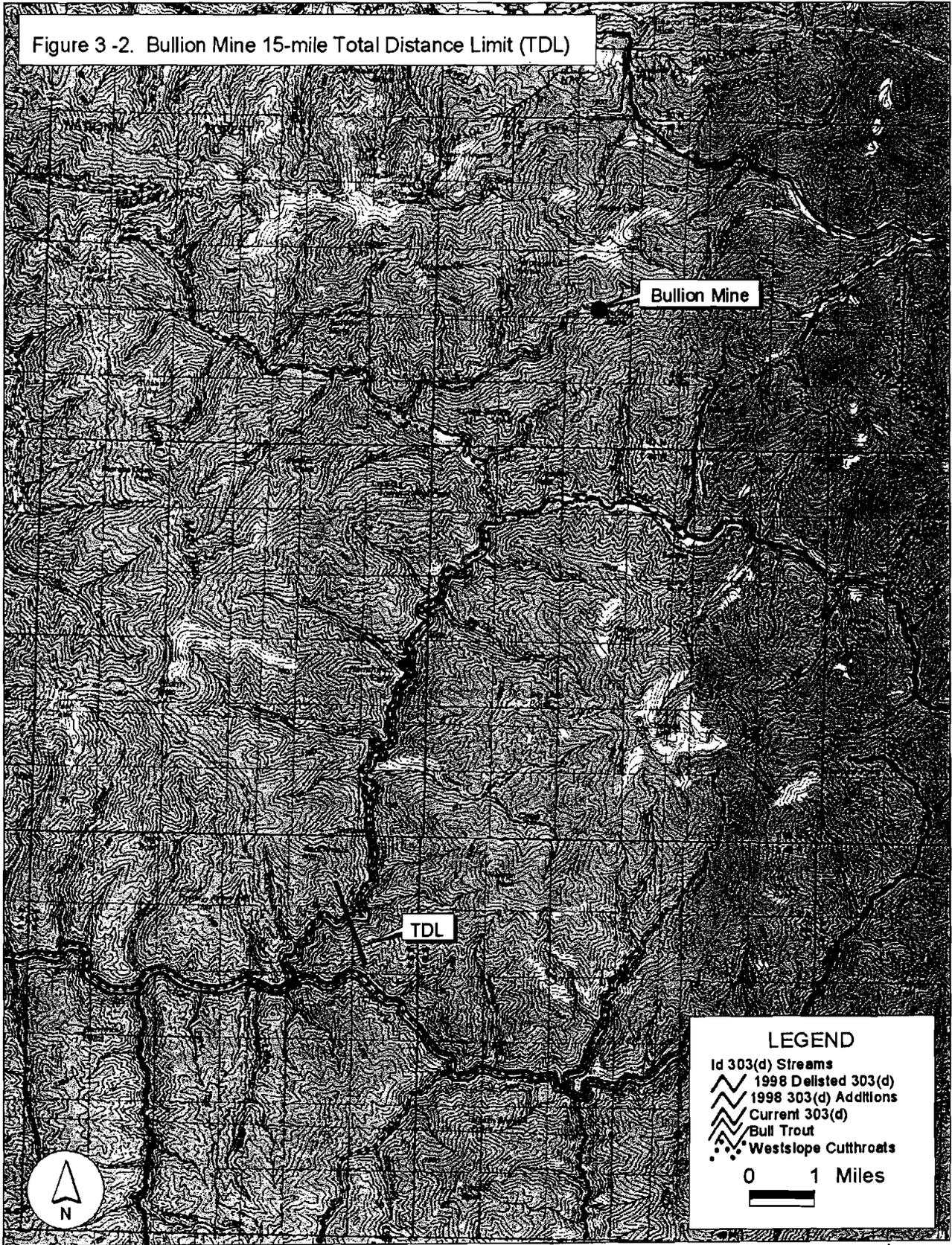


Figure 3 -2. Bullion Mine 15-mile Total Distance Limit (TDL)



**APPENDIX F: HEALTH & SAFETY PLAN DOCUMENTATION**

# HEALTH AND SAFETY PLAN

## PA/SI FOR THE BULLION MINE

		<u>TELEPHONE</u>
DEQ Project Number:	RMIN.RM28	
Project Manager & Site Safety Officer:	Robert Higdem	(208) 769-1422
Site Manager:	Brian Gaber	(208) 373-0566
Project Field Duration:	July 2004 – September 2004	
Project Completion Date:	December 2004	

## TABLE OF CONTENTS

<b>1.0</b>	<b>SUMMARY</b> .....	<b>3</b>
<b>2.0</b>	<b>SITE DESCRIPTION AND SCOPE OF WORK</b> .....	<b>6</b>
<b>2.1</b>	<b>SITE DESCRIPTIONS</b> .....	<b>6</b>
2.1.1	Site Location .....	6
2.1.2	Site History .....	6
<b>2.2</b>	<b>POTENTIAL CHEMICAL CONCERNS</b> .....	<b>7</b>
<b>2.3</b>	<b>PURPOSE AND SCOPE OF WORK</b> .....	<b>7</b>
<b>3.0</b>	<b>SAFE WORK PRACTICES</b> .....	<b>7</b>
<b>3.1</b>	<b>GENERAL</b> .....	<b>7</b>
<b>3.2</b>	<b>SAFE SAMPLE HANDLING PRACTICES</b> .....	<b>8</b>
3.2.1	Sample Collection .....	8
3.2.2	Sample Shipment/Hazardous Material Shipment .....	8
<b>3.3</b>	<b>MONITORING</b> .....	<b>8</b>
<b>4.0</b>	<b>EMERGENCY RESPONSE PLAN</b> .....	<b>8</b>
<b>4.1</b>	<b>GENERAL</b> .....	<b>8</b>
<b>4.2</b>	<b>ASSEMBLY LOCATIONS</b> .....	<b>8</b>
<b>4.3</b>	<b>FIRE</b> .....	<b>8</b>
<b>4.4</b>	<b>COMMUNICATION</b> .....	<b>9</b>
<b>4.5</b>	<b>EMERGENCY RESPONSE PROCEDURES</b> .....	<b>9</b>
<b>4.6</b>	<b>INCIDENT REPORT</b> .....	<b>9</b>
<b>5.0</b>	<b>TRAINING AND MEDICAL SURVEILLANCE</b> .....	<b>9</b>
<b>6.0</b>	<b>RECORDKEEPING</b> .....	<b>10</b>

## ATTACHMENTS

Attachment A

Hospital Route Map

## 1.0 SUMMARY

This section provides a summary of pertinent information contained in this Health and Safety Plan. The Site Manager will be issued a satellite telephone to be used for all emergencies encountered during the PA/SI project.

Ambulance:	Life Flight or Equivalent
Fire:	Avery Fire District
Police:	Shoshone County Sheriff
Hospital:	MOUNTAIN VALLEY CARE & REHAB – 601 West Cameron Kellogg, Idaho 83837 (208) 784-1283
Project Manager & Site Safety Manager:	Robert Higdem (208) 769-1422
Site Manager:	Brian Gaber (208) 373-0566

**HOSPITAL DIRECTIONS:**

Life-threatening emergency medical transport to Coeur d’Alene will be arranged through Life Flight Services.

To reach the hospital from the site for other than life-threatening emergency, travel by vehicle east on Forest Road 507 over Bullion Pass to Interstate 90, and then turn west (left) onto I-90 for 22 miles to Kellogg. Take the second<sup>2</sup><sup>nd</sup> Kellogg exit; turn north (right) for 1 block and hospital is on the right.

**CONSTITUENTS OF CONCERN:**

Based on previous sampling and analysis of site media conducted at other similar mine sites in Idaho, the following constituents may be encountered during field activities:

1. Soil and Waste Rock – Metals (arsenic, barium, cadmium, chromium, copper, lead, selenium and silver) – Low to moderate concentrations.
2. Sediments – Metals (arsenic, barium, cadmium, chromium, copper, lead, selenium, and silver) – Low to moderate concentrations.
3. Surface Water – Metals (arsenic, barium, cadmium, chromium, copper, lead, selenium, and silver) – Low concentrations.

**PROJECT HAZARD ANALYSIS**

ACTIVITY, PHASE, OR TASK	CHEM. HAZARD	HEAT / COLD STRESS	SLIP/ TRIP/ FALL	LIFTING HAZARD	MECH. HAZARD	WATER HAZARD
1. Site walk-through evaluation	Low	Low	High	Low	Low	Low
2. Soil/waste rock sampling	Low	Low	Med	Low	Low	N/A
3. Sediment sampling	Low	Low	High	Low	Low	High
4. Water sampling	Low	Low	Med	Low	Low	Med
5. Stream flow gauging	N/A	Low	High	Low	Low	High
6. Structure evaluation *	Low	Low	High	Low	Low	N/A

\* Prior owner/operator approval and Site Manager pre-survey required

High – Exposure likely more than 50% of the time      Med – Exposure likely 10-50% of the time  
 Low – Exposure likely less than 10% of the time      N/A – Exposure not anticipated

## TASK MINIMUM PERSONAL PROTECTIVE EQUIPMENT (PPE) REQUIREMENTS

1	Sturdy boots and clothing, work gloves as necessary
2	Sturdy boots (chemical resistant as necessary), safety glasses, nitrile/latex gloves
3	Rubber boots/waders, safety glasses, nitrile gloves
4	Rubber boots/waders, safety glasses, nitrile gloves
5	Rubber boots/waders, life line as necessary, personal flotation device as necessary
6	Sturdy boots and clothing, work gloves as necessary, safety glasses, hard hat

### PERSONAL EXPOSURE SAMPLING

No personal exposure sampling will be performed.

### HAZ-COM MATERIALS INVENTORY

Nitric acid (sample preservative)

#### HEALTH AND SAFETY EQUIPMENT LIST

PPE	REQUIRED	OPTIONAL/ AS NECESSARY
Satellite Telephone	Y	
Safety Glasses	Y	
Steel-toed Boots		Y
Sturdy Boots	Y	
Chemical Resistant Rubber Boots	Y	
Tyvek Coveralls	Y*	
Dust Filter Mask		Y
Air Filtering Respirator (acid-gas cartridges)		Y
Work Gloves	Y	
Nitrile and/or Latex Gloves	Y	
First Aid Kit	Y	
Drinking Water	Y	
ABC Type Fire Extinguisher	Y	
Sunscreen	Y	
Insect Repellent		Y
Hat		Y
Hard hat	Y**	

\* Required when conducting sampling activities

\*\* Required when entering structures

## 2.0 SITE DESCRIPTION AND SCOPE OF WORK

### 2.1 SITE DESCRIPTIONS

This section provides a description of the Bullion Mine to be visited as part of this combined PA/SI.

#### 2.1.1 Site Location

The Bullion Mine was a former gold and copper mine located in Section 21, Township 47N, Range 6E, Boise Meridian in Shoshone County, Idaho. The Bullion Mine consists of two (2) distinct workings – the upper portion lies on the north side of Forest Road (FR) 507 while the lower portion lies approximately 0.25 miles south below FR507. Traveling southwest on FR507 for approximately 0.5 miles, the lower workings are reached via an old haul road. The road's location is barely discernable, due to road construction and mature vegetation. The lower workings lie approximately 0.35 miles to the east.

The Bullion Mine can be best accessed on public roads from Taft, Montana. From the Taft exit on Interstate 90, turn west to the "T" intersection, then a right-hand turn onto the frontage road. The paved road continues northwest paralleling I-90 for 2.5 miles, and then curves southward becoming FR445, an unimproved road. Bullion Pass lies approximately 2.25 miles ahead, marking the Idaho-Montana border. The upper Bullion site (Upper) lies nearly 1.0 mile beyond the divide, along the north side of FR507 at the apex of a sharp left-hand curve. The waste rock dump from Tunnel # 2 mantles the slope above the road and an unnamed tributary drainage of Bullion Creek bisects the workings. The upper workings lie between elevations of 4,850 to 5,200 feet above mean sea level.

#### 2.1.2 Site History

The Bullion Mine was discovered between 1900 and 1903 (Sims, 1998). The Bullion Mining Company, Ltd. was incorporated in 1902, following initial development of a 100-foot shaft (Kauffman, et al, 2003). The shaft, developed in the Upper, was soon encumbered with water infiltration and work had to be ceased. The company purchased a boiler, hoist, and pump and built support structures. Development activity continued until 1909 when one (1) carload of ore was shipped.

In 1910, a devastating forest fire raged over the Northwest and swept through the Bullion Creek drainage destroying all of the structures and mine equipment. Sixty (60) firefighters, led by S. M. Taylor, were surrounded by the fire and sought safety in the Bullion Tunnel. However, eight (8) men whom were closest to the tunnel's entrance suffocated (Cohen & Miller, 1978). The plant and equipment were refitted in 1912, when a 24-ton trial shipment of ore was sent to the smelter. Exploration continued until the early 1930s.

The Bullion Mine is situated on private property owned by HF Magnuson & Company of Wallace, Idaho. The Bullion is comprised of two (2) distinct workings, the Upper and the Lower. The Upper consists of Tunnel No. 1 (prospect adit), Shaft No. 1, Tunnel No. 2, the Thornton Tunnel, and waste rock dumps associated with each. A perennial, though unnamed tributary of Bullion Creek, separates the Thornton Tunnel (east side) from the remaining workings. The Upper lies between elevations of 4,850 to 5,200 feet amsl. The Upper is located in the SE1/4 of the NE1/4, Section 21, T 47 N, R 6 E, on the Lookout Pass 7.5-minute quadrangle. The Lower consists of Tunnel No. 3, an

unnamed prospect adit, living quarters, shop building, and waste rock dump. The Lower is located in the SW1/4 of the SE1/4, Section 21, T 47 N, R 6 E, on the Lookout Pass 7.5-minute quadrangle.

## 2.2 POTENTIAL CHEMICAL CONCERNS

Potential chemical concerns, which may be encountered at the sites, are summarized as follows:

### **Soil:**

- Potentially elevated metal concentrations.

### **Sediment:**

- Potentially elevated metal concentrations.

### **Waste Rock and Ore:**

- Potentially elevated metal concentrations.

### **Surface Water:**

- Potentially elevated metal concentrations in adit drainage, seeps/springs, and creek water.

The exposure route for metals, while sampling soil and waste rock, is by ingesting or inhaling contaminated dust. The exposure route for metals, while sampling surface water and sediments adjacent to the surface water, is by ingesting or dermal contact from contaminated water.

## 2.3 PURPOSE AND SCOPE OF WORK

The scope of work to be performed at the Bullion site is intended to characterize the environmental conditions currently encountered at the site. The scope of work for the field activities includes the following tasks:

- Surface and subsurface soil sampling
- Mine waste rock sampling
- Surface water sampling
- Documentation of physical site characteristics and hazards
- Survey of natural resources

## 3.0 SAFE WORK PRACTICES

### 3.1 GENERAL

1. Safety briefings will be held at the mine site prior to starting the day's activities. The briefings will include a review of the potential hazards associated with the work to be done that day, and a review of associated safe work practices.
2. Avoid dermal contact with potentially contaminated soil and water. Wear gloves.
3. In the unlikely event that dusty conditions are encountered, dust filter masks will be worn to reduce potential for breathing in contaminated dusts.
4. Eating, drinking, chewing gum or tobacco, and smoking are prohibited in potentially contaminated areas or where the possibility for the transfer of contamination exists.
5. Personnel will wash their hands and face thoroughly with soap and water prior to eating, drinking, or smoking.
6. Potable water will be made available at the site.
7. Avoid contact with potentially contaminated substances. Do not walk through puddles, pools, mud, etc. Avoid, whenever possible, kneeling, leaning or sitting on contaminated surfaces.

8. Field team members should maintain frequent visual contact with one another. Any activities in or around water, pits, or other hazardous areas require a minimum of two (2) personnel.

### **3.2 SAFE SAMPLE HANDLING PRACTICES**

#### **3.2.1 Sample Collection**

For all sampling activities, the following standard safety procedures shall be employed:

1. All sampling equipment should be cleaned before proceeding to the site.
2. At the sampling site, sampling equipment should be cleaned after each use.
3. Work in "cleaner" areas should be conducted first where practical.

#### **3.2.2 Sample Shipment/Hazardous Material Shipment**

The Site Manager will be responsible for ensuring that hazardous materials, if sampled during the SI, are managed and shipped in accordance with DOT regulations [49 CFR Parts 171-177].

### **3.3 MONITORING**

Due to the low potential for encountering volatile or radioactive contaminants, real time monitoring will not be used.

Since the main contaminants of concern are metals, metal-bearing dusts should not be inhaled. Should dusty conditions be encountered, the Site Safety Officer (SSO) will determine if dust control measures (filter masks or respirators) are required. This circumstance may occur along the off-site roadway.

## **4.0 EMERGENCY RESPONSE PLAN**

### **4.1 GENERAL**

DEQ will evacuate personnel from areas involved in hazardous material emergencies and summon assistance from agencies with personnel trained to respond to the specific emergency. These procedures will be reviewed during the daily on-site safety briefings conducted by the SSO. In the event of a fire or medical emergency, the emergency numbers, identified in Section 1.0, can be called for assistance.

### **4.2 ASSEMBLY LOCATIONS**

In the event of a site emergency requiring evacuation, all personnel will evacuate to a pre-designated area located a safe distance from any health or safety hazard, and away from the area of influence. The SSO will designate a primary assembly area. The location of this area will be determined during the on-site safety briefing prior to the initiation of site activities. If adverse conditions arise (wind direction/speed), the SSO will evaluate the assembly area and redirect personnel to an alternate location.

### **4.3 FIRE**

To protect against fires, ABC type fire extinguishers will be available to contain and extinguish small fires. The appropriate fire department will be summoned in the event of any fire on the site.

#### 4.4 COMMUNICATION

Emergency telephone numbers (see Section 1.0) will be maintained with the satellite telephone. The SSO is responsible for testing the communication equipment prior to the start of work, and for explaining its operation to all site personnel.

#### 4.5 EMERGENCY RESPONSE PROCEDURES

##### Emergency Response Team

The emergency response team will consist of team members who assume the following roles:

- Emergency Care Provider – Provides first aid/CPR as needed. Current first aid/ CPR training certification is required.
- Communicator – The role of the communicator is to maintain radio contact with appropriate emergency services, to provide as much information as possible, including the number of persons injured, the type and extent of injuries, and the exact location of the accident scene.
- Site Supervisor – The Site Supervisor should survey and assess existing and potential hazards, and evacuate personnel as needed. Follow-up duties include documenting the incident, and notifying appropriate personnel/agencies described under incident reporting. It also includes reviewing and revising site safety and contingency plans, as necessary.

#### 4.6 INCIDENT REPORT

All site injuries and illnesses must be reported to the SSO immediately following first-aid treatment. The Site Manager will determine the cause of the incident and take the appropriate action to prevent a re-occurrence. Any injury or illness, regardless of severity, is to be reported to the Project Manager. The completion of an accident report form is required.

#### 5.0 TRAINING AND MEDICAL SURVEILLANCE

All DEQ site personnel will have met the requirements of 29 CFR 1910.120(e), including:

- Forty hours HAZWOPER training
- Eight hours of annual refresher training for all personnel (as required)

All DEQ site personnel are participating in medical monitoring programs that meet the requirements of 29 CFR 1910.120(f). Current copies of training certificates and statements of medical program participation for all DEQ personnel are maintained at the state office in Boise and/or the regional office in Coeur d'Alene.

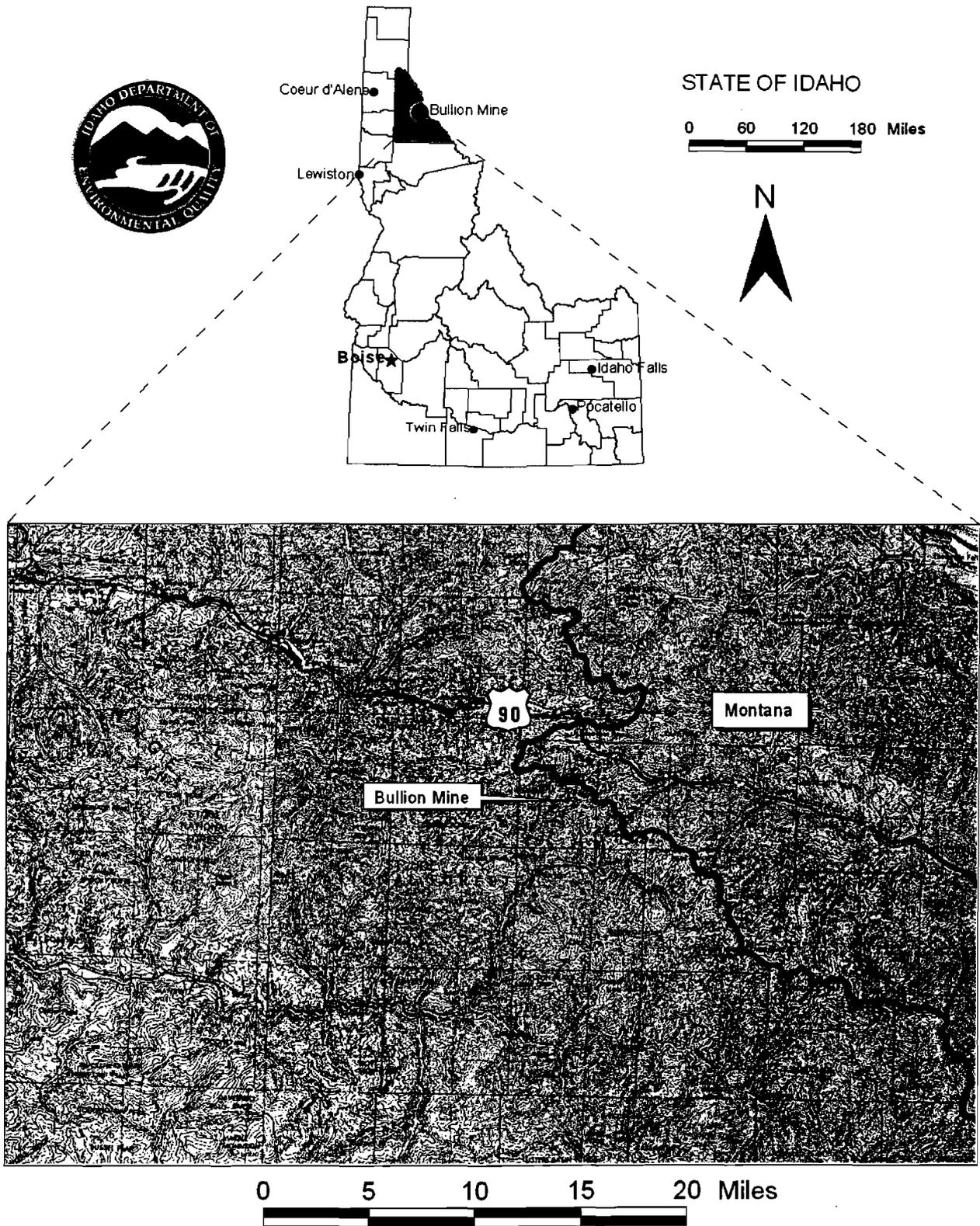
Prior to initiation of PA/SI activities, the SSO will conduct a site safety briefing, which will include all team members involved in site activities. At this meeting, the SSO will discuss:

- Contents of this Safety Plan
- Types of hazards at the site and means for minimizing exposure to them
- Personal protective equipment that will be required
- Safe work practices and communication
- Location and use of emergency equipment
- Emergency procedures, including location of assembly area, evacuation signals, and procedures

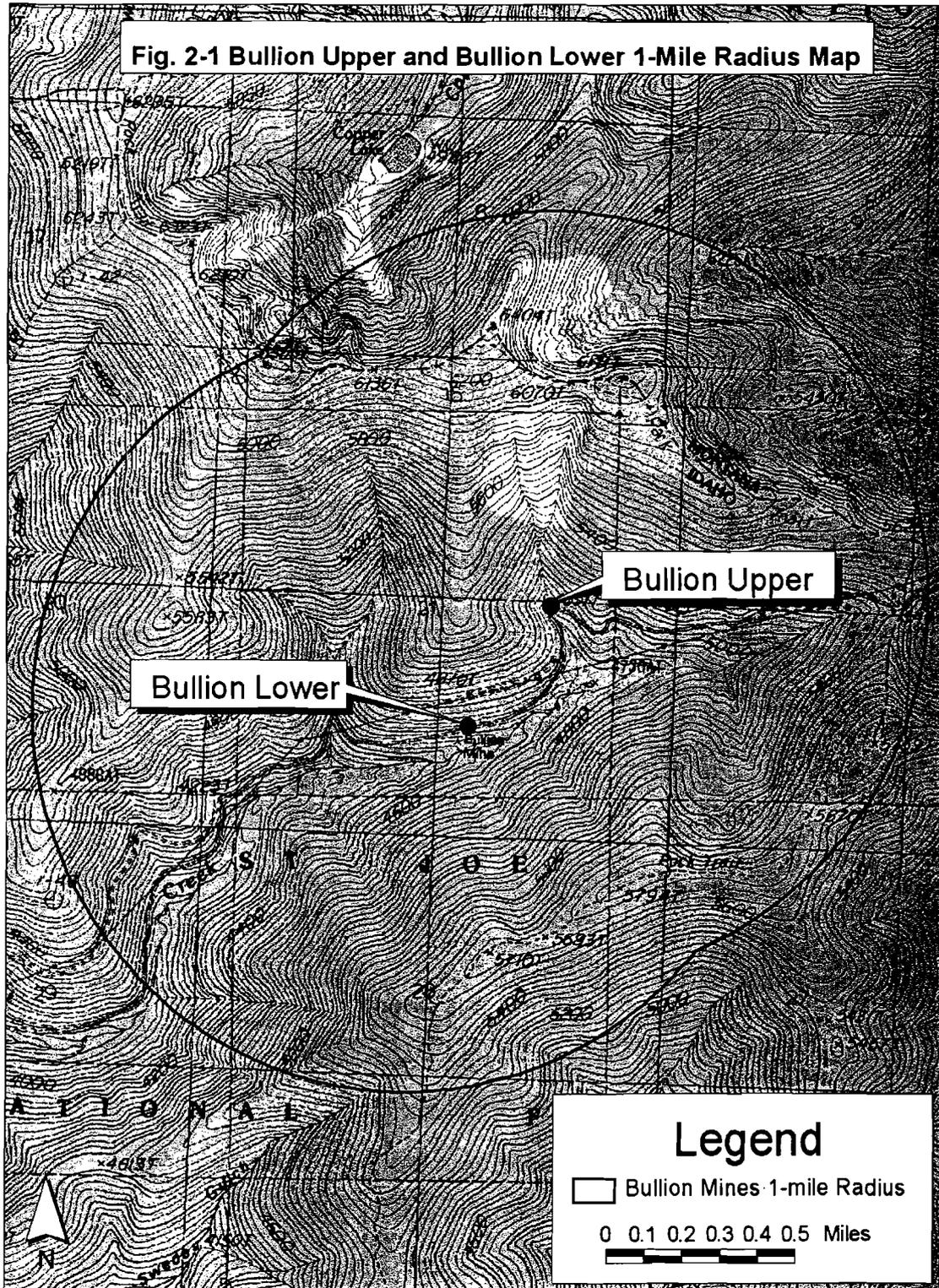
## **6.0 RECORDKEEPING**

The Site Manager and the Site Safety Officer are responsible for site recordkeeping. The Site Safety Officer will conduct a safety briefing in accordance with Section 5.0 prior to each day's field activities. Any accident or exposure incident will be investigated and the form will be completed and forwarded to the Project Manager.

**FIGURE 1-1 Vicinity Map of Bullion Mine**



**Fig. 2-1 Bullion Upper and Bullion Lower 1-Mile Radius Map**



**FIGURE 3-1 Bullion Mine 4-Mile Radius Map**

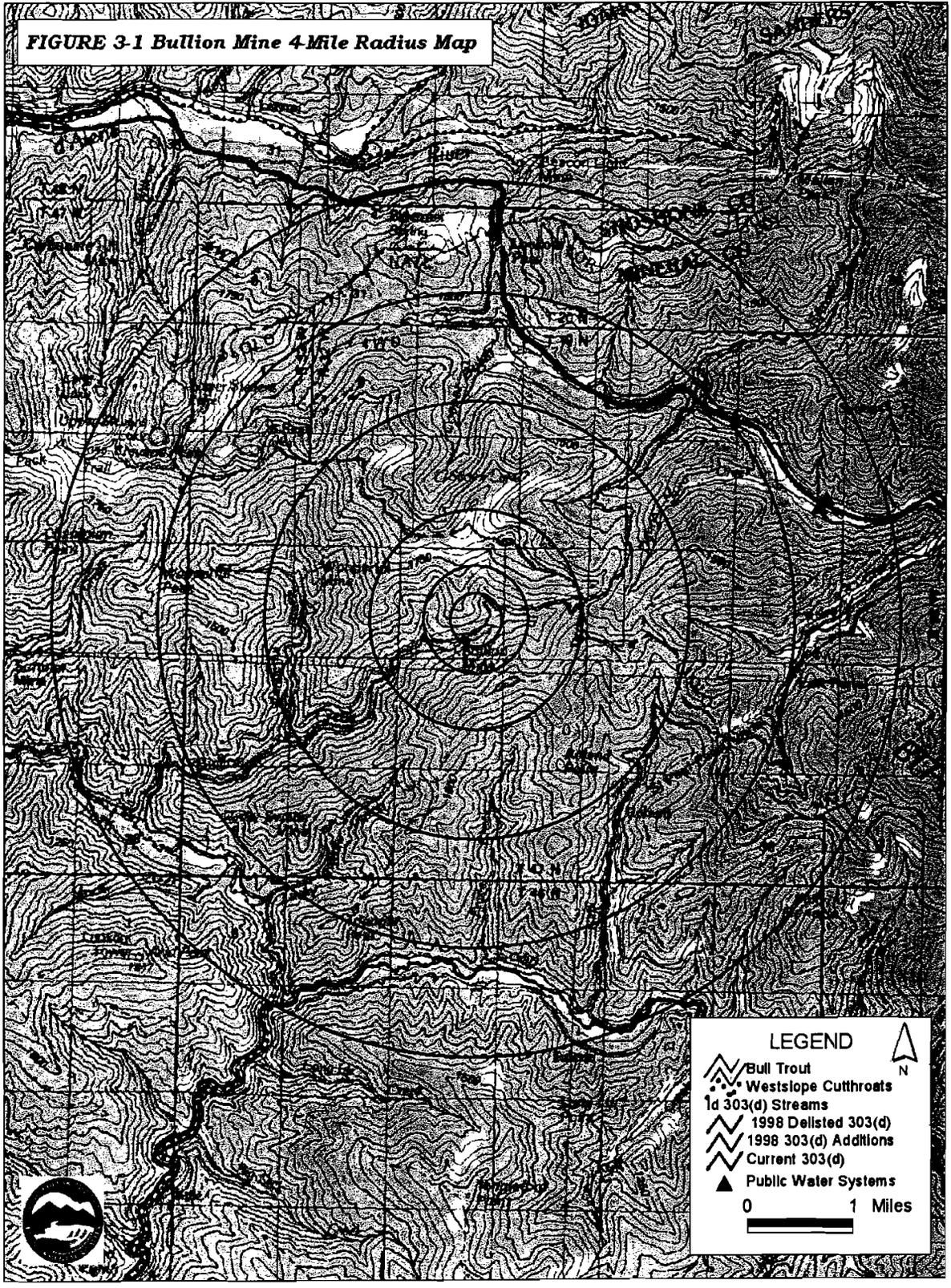
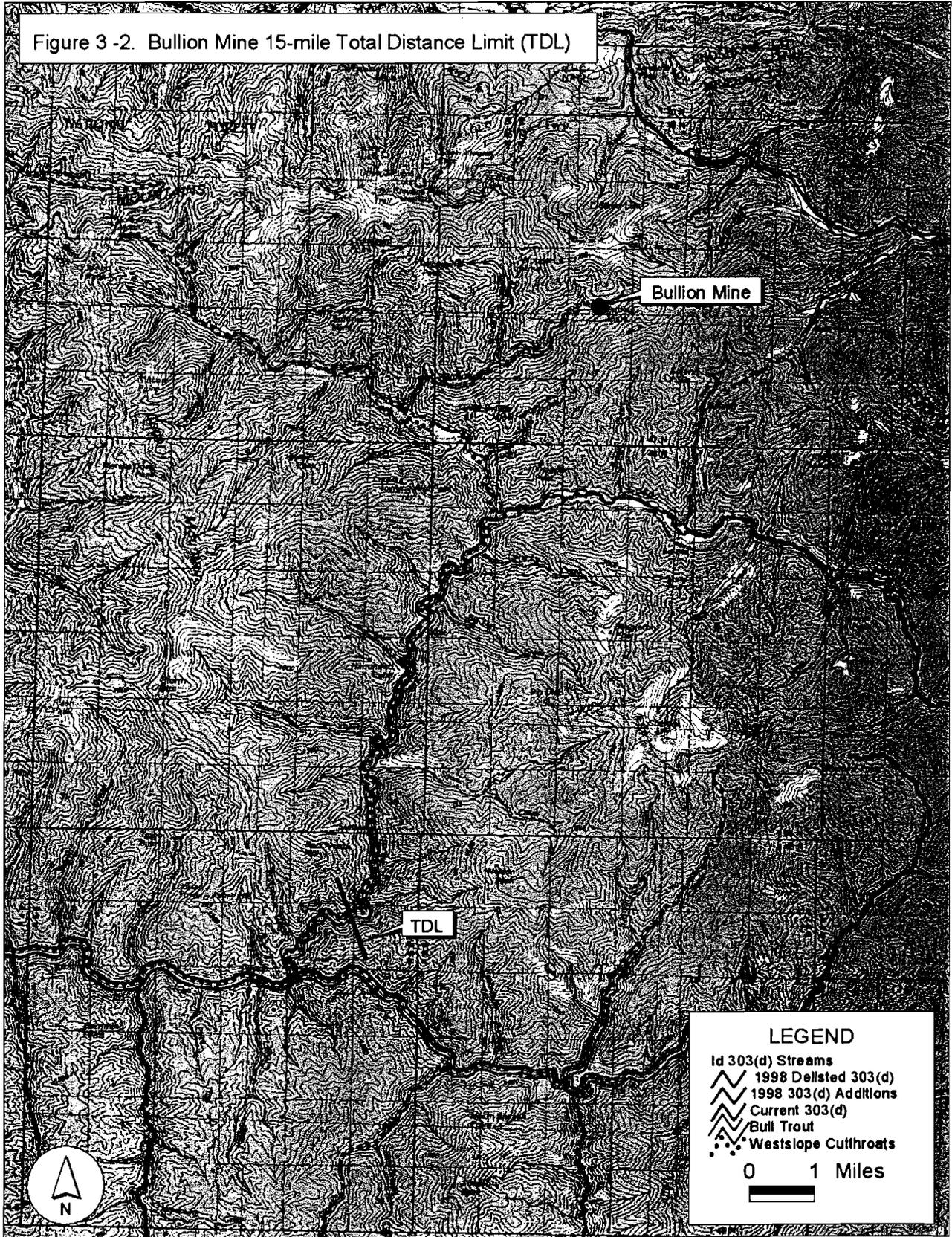
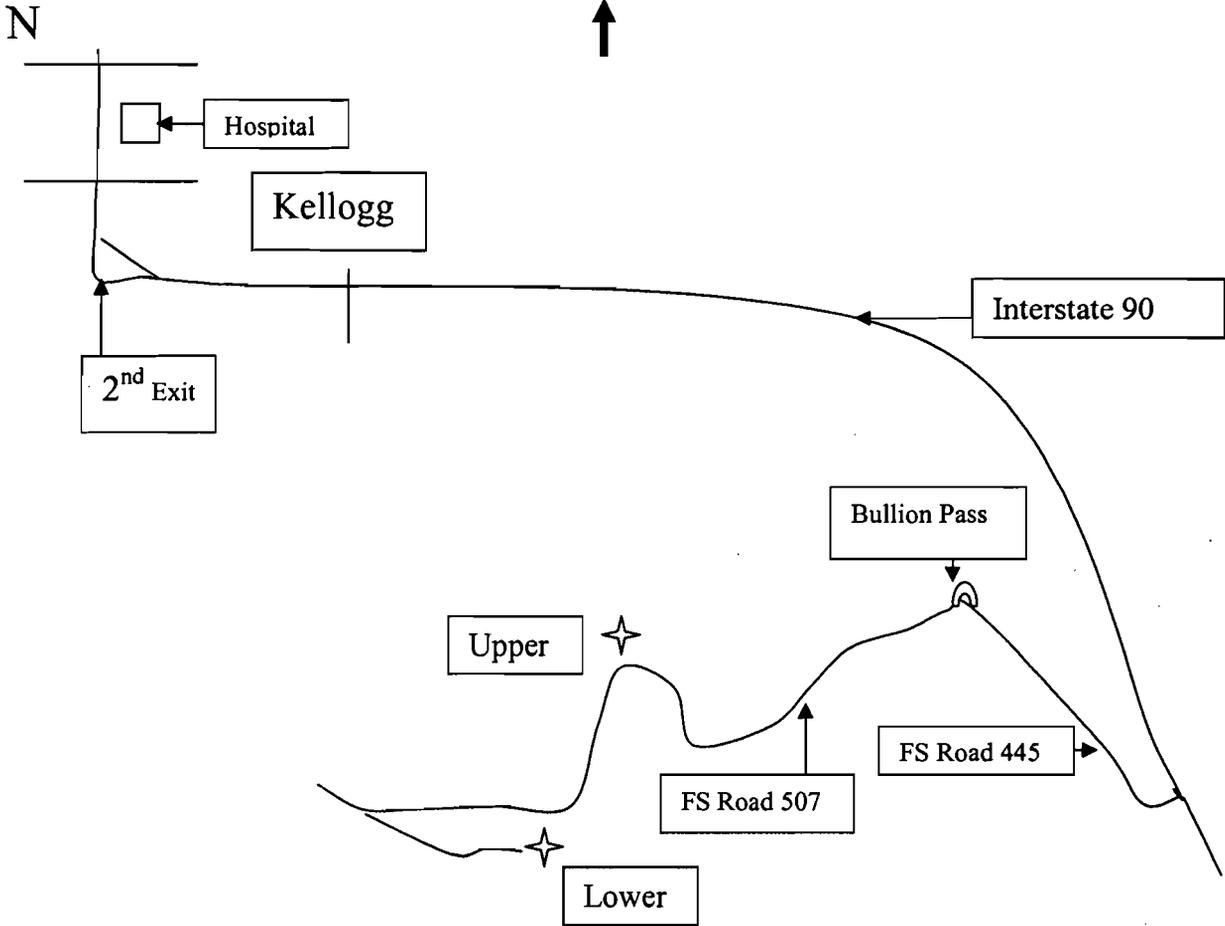


Figure 3 -2. Bullion Mine 15-mile Total Distance Limit (TDL)



**ATTACHMENT A**

# HOSPITAL ROUTE MAP



## **APPENDIX G: FIELD NOTES**

"Rite in the Rain"  
ALL-WEATHER WRITING PAPER



Name Brian Gaber

IDEQ

Address 1410 N Hilton

Boise ID 83706

Phone 208-373-0566

Project St. Joe watershed

Bullion Mine - PAISE

Upper + lower workings

### CONTENTS

PAGE	REFERENCE	DATE
2	Project team info + Directions	7-27-04
3	Site location Bullion Mine	7-27-04
5	Site Investigation - Lower Bullion	7-28
7	Narrative	"
9	"	"
10	Sketch south waste Rock Dump	"
11	Narrative continued	7-28
13	"	"
14-15	Sketch Lower Bullion	7-28
17	Upper Bullion Mine	7-28
19	Narrative	"
21	"	"
23	"	"
24	Sketch upper Bullion	7-28

page 1

Bullion Mine - Lower workings

PA/BI	7-28-04	Sunny warm	5:10 mph SW
Robert Higden + Brian Gabler			
Arrived at entrance to old mine road at 9:00 hours			
Road is extremely brushy as noted yesterday spent approx 1 hour trimming branches + brush to ease access of supplies to mine site			
Removed some brush + dead fuel, but road is not accessible with truck; length of road to adit #1 approx. = 25 miles			
Began site recon at 10:00 hours			
Observed large log cabin (collapsed) below the old road on a fairly level ground. The cabin is located SW from Adit #1.			
Followed a game trail or narrow road through brush to Bullion Creek. Here a rock/sail embankment appears to have been constructed (purpose unknown) observed several feet of water (kind piping, similar to			

Stone piping or vent tubing  
The path extended across the creek.

Sample B-1-Dump collected at 10:30  
by B.G. sample container removed with tiner  
preservative 3 ml nitric acid  
This sample is representative of the  
wader of Bullion Creek downstream from  
all workings.

- the creek water appears to clear,  
mud rocks in the creek are covered with  
green - yellow/green moss and thick  
brush lines both sides of the creek.

Followed path to S. side of creek to  
base of red-colored waste rock dump  
observed small elongated 'lenses' of  
fine grained red sand and minor waste  
rock between the creek and the  
large waste rock dump. Two of these  
'lenses' supported trees (P-pine is 5 yrs  
old (estimate)).

The waste rock dump appears to be

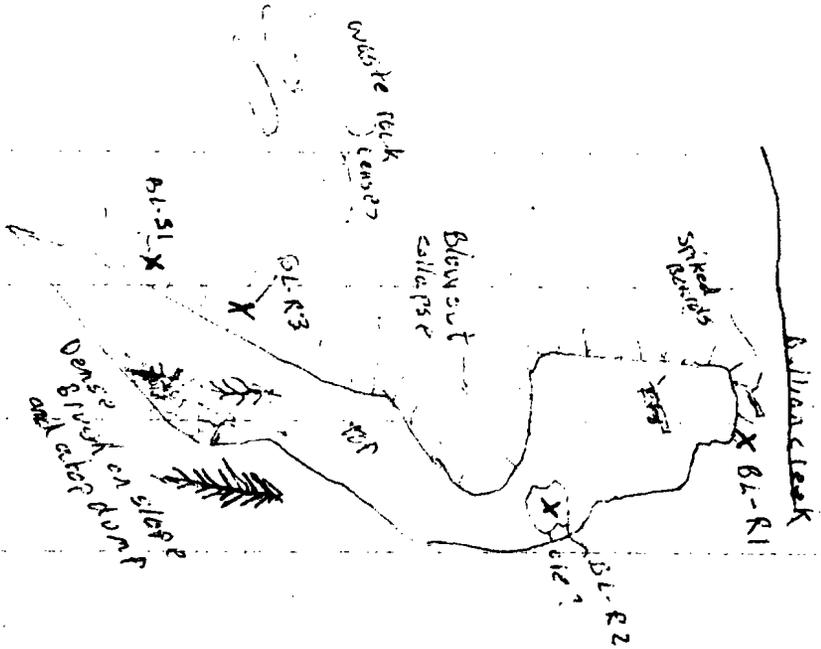
are shep'd with the upper end terminating at the creek. An elbow appears midway and this bend is accentuated by a 'blowout' erosional feature, extending down the entire NW slope of the dump. The dump appears to lie NW from the downstream, thinned portion to the upstream section.

Closer examination of the upstream portion of the dump reveals wood beams, broken boards with 4" nail spites - which points to the remains of a trestle. No rails are located here, but the presence of other construction artifacts concerns us.

Measured dump with Abing was tape, as follows:

West Face -	ht.	48 ft	45' 5" ATR
NW Face -	"	37 ft	45' 5" ATR
North Face -		26 ft	
E Face -		12 ft.	
Long W			
N Face to S Face at Blowout -		55 ft	X
S Face -	SE 32' X	SE point -	N Face 71 ft

South waste dump sketch



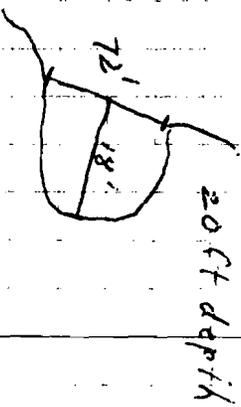
page 2

Middle Pile

This triangular shaped area lies NW of the blowout. The remaining portion of the waste rock dump. The remaining 'surface' is measured as follows:

length  
NW point to blowout to SE terminal (top) 95 ft  
midway width 10 ft (across top)  
SE end width 5 ft  
height 20 ft

The blowout measures as follows



Sample collected BL-R1 Rock/soil location N face of South waste rock dump (observed rough heavy boards with R spikes, waste remains).

pages

- Sample collected B4-R2  
High Grade? one rocks from middle top  
of South waste dump, more trash remains  
observed, though no nails

- Sample collected B2-R3  
rock/soil sample from W edge of South  
waste dump, midway down slope beyond  
Blowout

- Sample collected B2-R4 ~~SE~~  
Rock/soil sample, midway down slope  
of W end of North waste dump

- Sample collected B2-~~R~~S2  
Soil sample from same location as  
B2-R4

Measurement of North waste dump and  
adit #1 (AKA #3 Tunnel)  
Length 92 ft  
width from portal 59 ft  
thickness at S face opposite first ruins  
29 ft

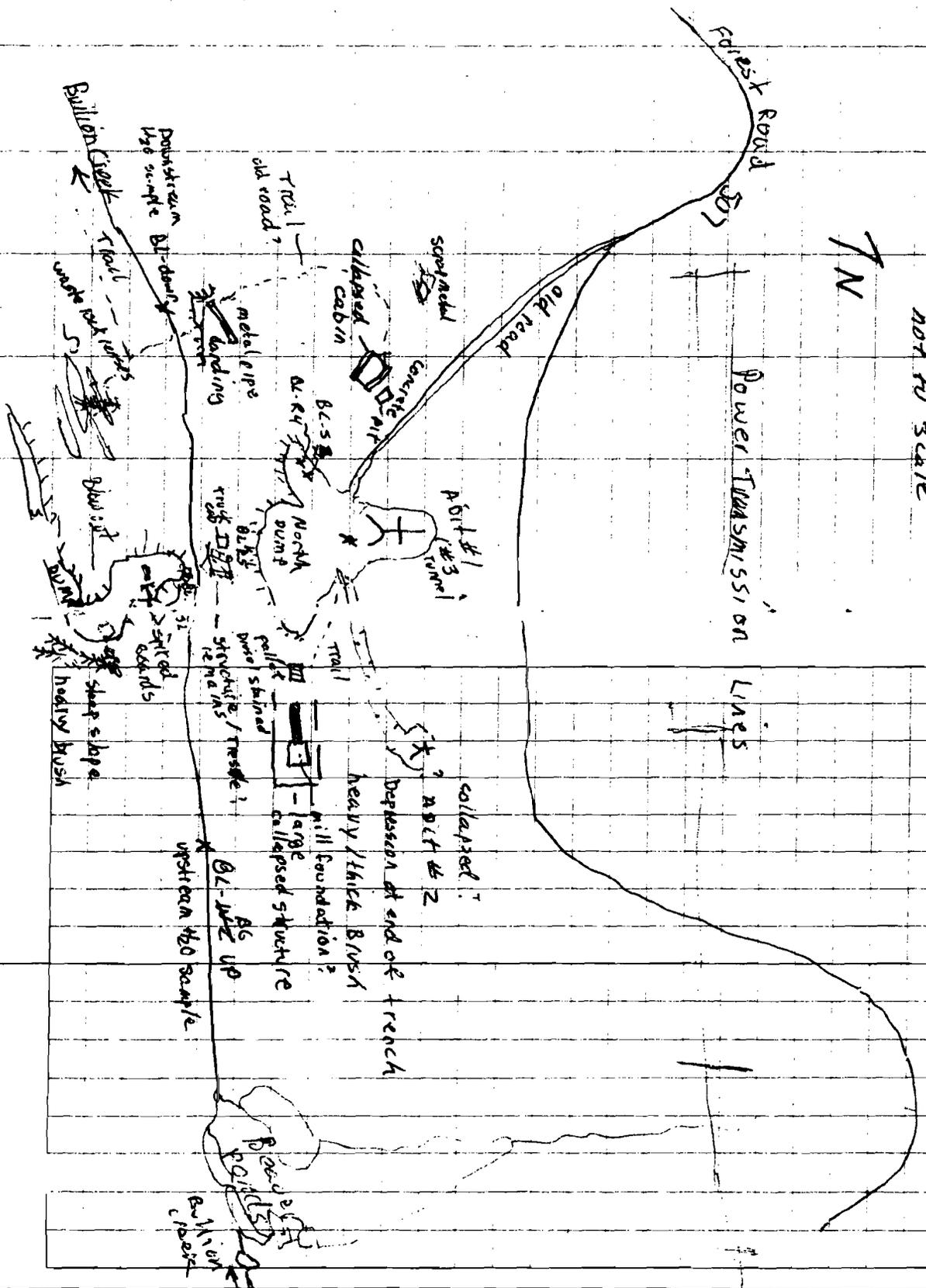
off-site 16:09 hours

Lower Bullion Pine  
not to scale

TN

sketch 7-29-04

Upper Bullion workings



Upper Bullion Mine 16:30 hours

Beaver Ponds located upstream from the Lower Bullion + downstream of Upper Bullion (tributary) were mapped and samples collected. Robert Higdon's tag notes include a sketch of the beaver ponds and sample locations.

Traveled E on ES 507 to the upper workings of the Bullion mine  
on site at 17:30 hours

- sample collected

BV. W4 at 17:40. From culvert below ES 507. water from tributary appeared clear

- sample collected

BV. W3 at 17:55. From base of "closed" soil/rock covering over old portal adit - Tunnel #2

Adit #1 (aka #2 Tunnel) is located on the W side of tributary. The adit appears to have been driven NW into argillite (siltite) west of wallace Formation (see 3 pages prev)

## page 2 Upper Bullhorn

Apparently, the upper workings were reworked with a bulldozer, perhaps to address safety concerns (identified by T&S - Kautzman/2027).

The lower waste rock dump - attributed to Adit #1, had been accessed by the bulldozers whose tracks were observed entering the dumps E face, crossing the top of the dump, across the tributary to the portal of Adit #1.

- The bulldozer carved a cut across the face of the slope to the adit  
 \* W-S measures 68 ft length + E-W measures 18 ft to tributary

- The rock/soil breached from the cut was used to cover the adit portal timbers  
 \* are visible at E end (lower)

- The 'rod' of the cover emanates a cloud of water estimated at 2 gallons/minute  
 Sample of BUVS was collected from the base of the fire, which then flows E into the tributary

- A deep is visible emanating on the uphill slope above the bulldozed cut

page 3

21

The seep lies approx. 20 ft S of the closed adit, and drips into the exposed rock/soil, rather than flowing across it.

Adit #1, waste rock dump measures 68 ft SE-NW, 81 ft E-W and the thickness is estimated at 24 ft. The dump has been modified by earlier road construction and subsequent bulldozer activity. Exact thickness, therefore, can not be determined.

A minor flow of water from the NE enters the uppermost portion of the dump and flows approximately 30 ft over the dump before subsiding into the dump face. Estimated flow of 1.5 gallons per minute. Green vegetation at the SW base of the dump suggests terraces of this water.

Sample collected BU-S2 soil sample from the dump face, collected at a depth of 6 inches at 18:25 hours

Sample collected BU-R3 rock/soil from dump face at 18:30

## Page 4

Another 'spring' flow appears to emanate from the SSE of the dump, flowing SW along the base of the dump along the curb of HS Road 707 and into the tributary N of the road. The flow is estimated at 2 gallons/minute  
 - apparently both sides of this upper tributary drainage is dotted with springs and seeps.

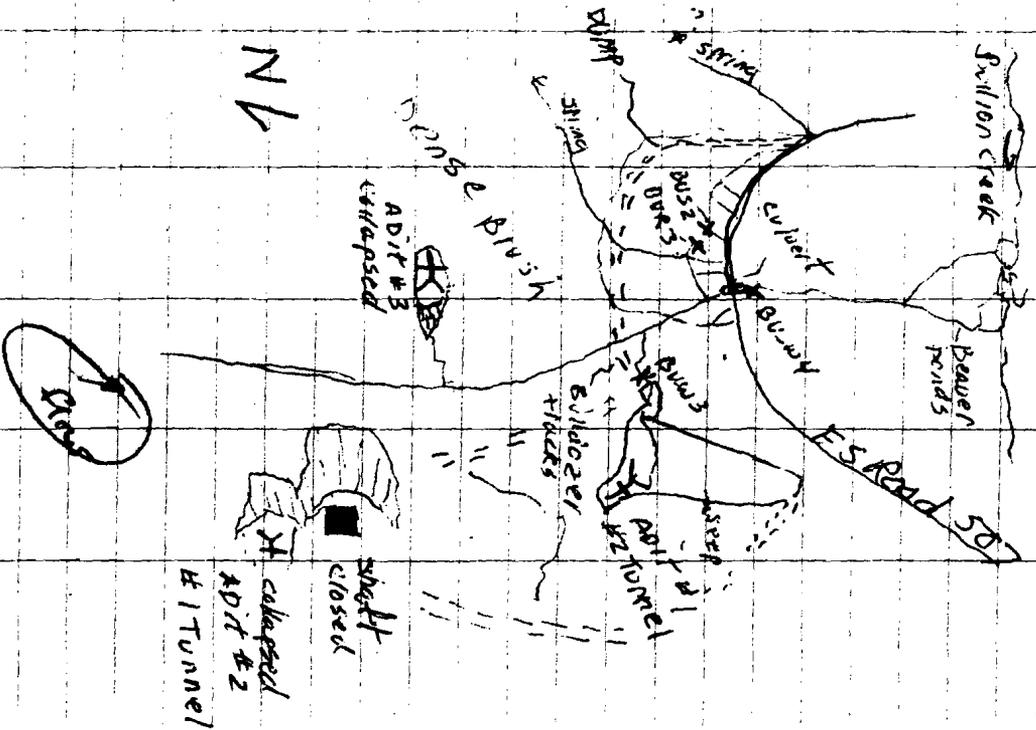
Tributary flow at the downstream end of the culvert where B.V. way was collected is estimated at 150 gallons/min.

Robert Higden collected additional water, soil and rock samples from well nos. 243, shaft #1 and the associated dumps. See Higden's log notes

off site at 1900 hours

\* appear that bulldozer traveled uphill from SW end of cut to shaft #2 + placed covered shaft with rock/soil. see Higden's log notes

## Upper Bullion Sketch



onsite 14:00 hours

September 1, 2004 Upper Bullion workings

25

additional water samples required in order to run analyses for copper, zinc + PH  
 onsite 14:00 hours cloudy w 15-30 mph NW  
 Curtis Staehr + Brian Gader  
 Brian collected BU-W4 below road (ES 507)  
 at culvert and BU-W3 at toe of closed  
 portal of Adit #1 (Tunnel 2)  
 Curtis collected BU-W2 below waste rock  
 pile of shaft + Adit #2 (Tunnel 1) in tributary  
 and BU-W1 above all the workings from the  
 unnamed tributary, as the background sample  
 (upgradient) for the Upper Bullion.

Curtis collected BVR-W1 from the  
 beaver pond and BCR-VI from Bullion Creek  
 above the beaver ponds and the confluence of  
 the unnamed tributary (Upper Bullion mine)

Robert Hydem

10:42 a.m.

7/28/04

Bu 1100a

Level A-1 #1 (Tunnel #3) Waste

Rock Pie CAP: 47' 24" 03' 70" KU  
115' 42" 09' 68" LD

PDR 3

Waste pile Tunnel #3 Road Cle KO 72517BA

(Virus)

Level B-1 looking west Tunnel's entrance  
- covered in oak/leaves vegetation

(B) down - under rope collected below  
all mushrooms + piles (DWB B. G. Baker)

Tunnel #3 N 47' 24" 04' 17"

11:00 W 115' 42" 08' 97"

Base Site # RO 72917 B

Phyll B-2 W/S (P) Tunnel #3 east end call speed

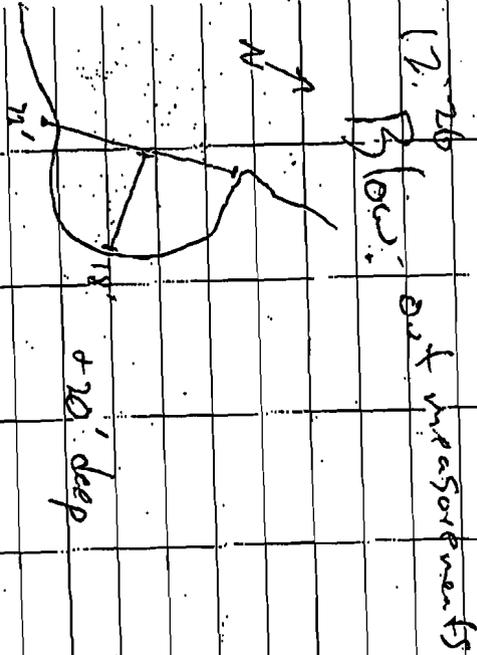
11:05 add Red rock pile is

on S side of CR.

Phyll B-3 W/S (P) Tunnel #3 about S of Sling 3

Red collapsed ashtr

Phyll B-4 W/S (P) Base collapsed structure



Pile BL5 1/2 MIS ladderock (x15?) deep  
 pile on N side of CR  
 tunnel #3 is OGC problem  
 just to the right

Pile BL6 W/S waste rock (x15?) deep  
 on S side of CR

Pile BL7 Rod Clear R072918A  
 position N 47° 24' 02" 20"  
 W 115° 42' 09" 91"  
 see them waste rock pile

Pile BL8 W/S 1/4 mi down north of bridge  
 track use w/ square 5/8" x 5/8"  
 on top of waste rock pile on  
 S side of CR

Pile BL9 W/S 1/4 mi down  
 on top of waste rock pile on  
 S side of CR

Pile BL10 W/S 1/4 mi down  
 on top of waste rock pile on  
 S side of CR

Pile BL11 W/S 1/4 mi down  
 on top of waste rock pile on  
 S side of CR

11/15/04  
 11/15/04

B- Bullman  
 Lt. Roak  
 5-5011  
 w-water

South pile 49' high (Northern face)

PBL 12V5 South pile showing  
 in concrete and sample

PBL 4  
 PLS 1

PBL 13 6V5 South pile showing sample  
 locations:

46 ft  
 taken  
 were  
 all

BLS 5  
 BLS 2

South pile 95' across top (height)  
 Southern tip: 5' across top (width)  
 middle of pile: 10' " "  
 Northern tip: " " "

PBL 14 V/ NW for South pile  
 looking @ collapsed structure  
 on N. side of CR

PBL 15 V/ N for South pile

PBL 16 V/ NW collapsed structure  
 approx. 30' x 50'  
 made large concrete base  
 2 piles (BLS 11 & 12)

PBL 17 V/- close up of concrete base

PBL 18

concrete base/collapsed structure CPS:

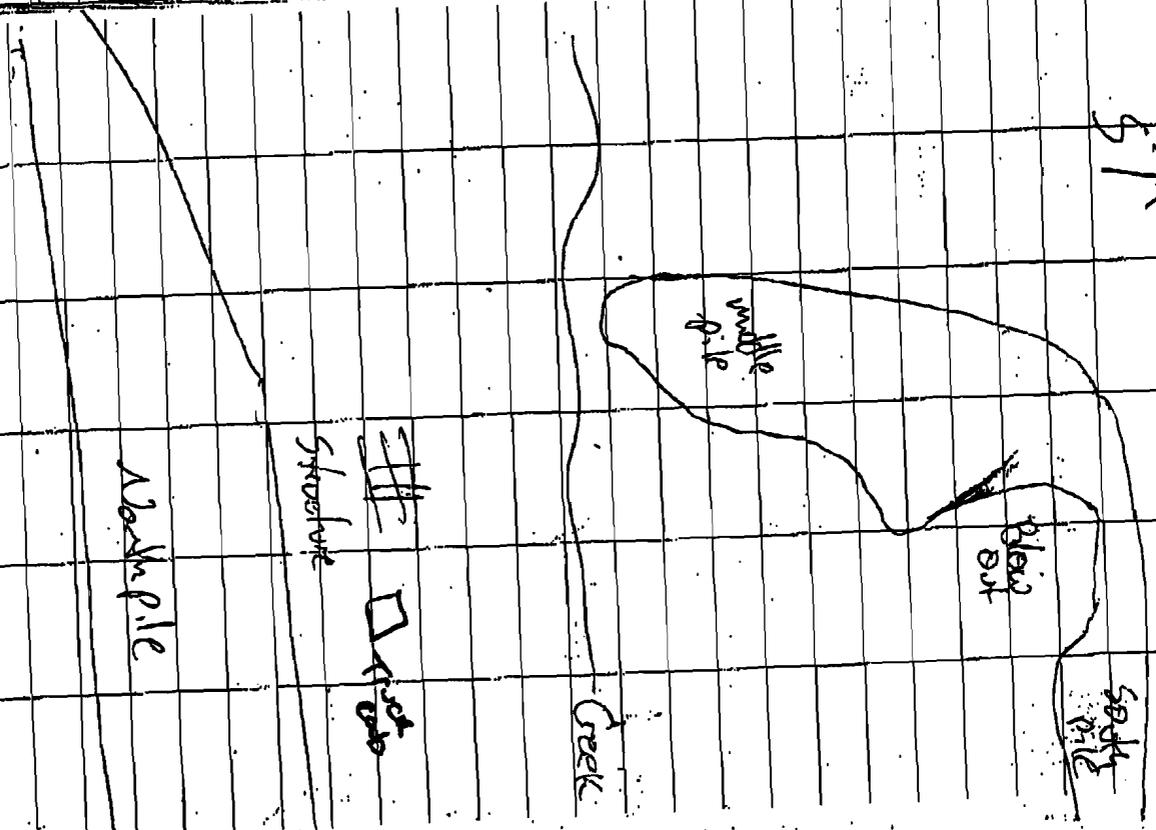
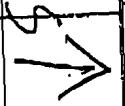
4V5 10 47 24 DS 21  
 15 42 07 95

200 1 inch

3.0 sample PBL 10.2 (see map)  
 taken @ tunnel #15 also large  
 (see above BLS 3)

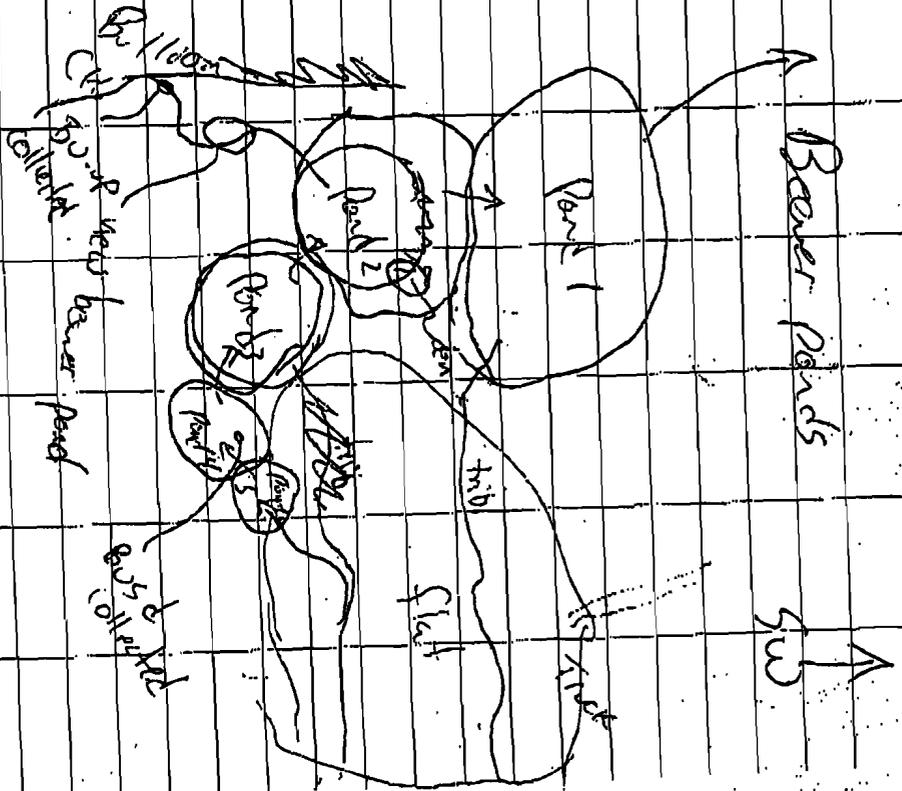
3.0 5-pile BLS 3 taken from  
 middle of CR  
 40 yds upstream from  
 middle of CR pile

Tunnel #2



PBL-19	W/W	Close up of
		1940's (hand-drawn)
		Windows P.D. calls
PBL-20	W/W	Center - cabin - roll-up
PBL-21	W/W	Planks in front - ground or
		Do 9 feet across
		and 1 1/2 feet across
PBL-22	W/W	Structure (hand-drawn) show
		rest of structure into
		hillside
PBL-23	W/W	Close up of
		Concrete structure NW of
		canal. Appears to be storage
		(possibly for seed). Concrete
		walls (hand-drawn) were
		built to hold a high wall
		rest of wall a fence

1650: I situated large beaver entrance in pond #2



Upper Bullion 7:28 to 4:06 pm

PBU 1 - Remains of 3 piles of

the beaver and below upper

building - Tib. from old

but flow is in right hand pic

2 streams - flow in the

Bullion CK. 2nd stream is

near stream in photo

W/SW

PBU 2 -> clumps of beaver pond  
W/S

PBU 3 - up sample collector No

4:45 Bullion CK. approx 10 yds  
above upper beaver pond #2

PBU 4 - WW beaver dam on center

off pr. note either off

upper Bullion No. @ night

or picture (light colored rocks)

PBU 5 - The beginning of a new

beaver pond/dam above  
upper pond #2

1705

Sample BU 501 Section Core - part #4  
 This appears to be a blue shale in the core  
 upper or discolored from upper a.d.s

1710 GPS Base reads  
 W 49° 24' 15.10"  
 W 115° 41' 38.31"

1720 GPS Tunnel #2 upper rock pile  
 N 47° 24' 24.73"  
 W 115° 41' 45.51"

PBU C Urea of upper a.d.s. Co-  
 tunnel #2 rock pile  
 W/NUU

PBU Z Urea of Tunnel #2 W/S  
 appears to have been recently  
 collapsed and the use of a bulldozer

PBU 8 upper part W/S  
 80% removed by other geology

BURP - W/S D  
 - based on low N and S in sp. This  
 would have been the old #2  
 (upper). No water or large  
 this time. However, evidence  
 exists of ~~sp~~ a sharp or minimal  
 N increase maybe during spring  
 rain.

Upper soil beside rock pile as approx  
 90' ~~from~~ 100' down to toe  
 at 30' wide across top

BURP - sample collected 1/8" upper  
 6:00 soil on top 1/8" of N/S Area

BUS - sample collected 6" soil  
 6:05 same loc then as  
 BURP

6:10 BUW - collected @ upper  
 20' ~~to~~ 20' ~~yes~~ ups from lower upper  
 and H.

6:10 PBUID V111 (Kau Sam #2) Caved in old #23  
 6:20 Collected one for sample BUBUD  
 From Adit #23 chert layer (E1301/any  
 6:30 Collected BUBR2 rock for sample  
 From face off old #23 rock  
 dump  
 6:45 Collected BUBUD5 from creek  
 above Adit #11 (Kau Sam #2)  
 and BUBUD Adit #2 (Kau Sam #2)

Note: Both sides hill sides (South &  
 north of the creek/tributary  
 have mud as signs a seep.  
 The southern slope (N1 Adits (B2)  
 has no soil.

Hole open about @ Adit #2  
 has been recently obliterated a dozen  
 and large amount of chert. It (hole) was the  
 rock. It appears to have been obliterated

same time as Adit #2.

7/29/04

A. The Office (DEQ) - prepared  
all samples for delivery to SWL

7/29/04  
Note: B. Carter's Field book will

address a sample known as  
BLR-4. This sample

has been changed to BLR-5.

Note: There is no BLR-1. This  
is the sample known as BL-down.

Note: Sample # BL 5-2 (B. Carter)  
has been changed to BLIS-3.

Notes on the lab submittal / COC,  
the "three of sample collected" has  
been eliminated for BLR 1, 2, 3, 5.

These were collected by B. Carter.  
Actual collection times are recorded  
in B. Carter's Fieldbook

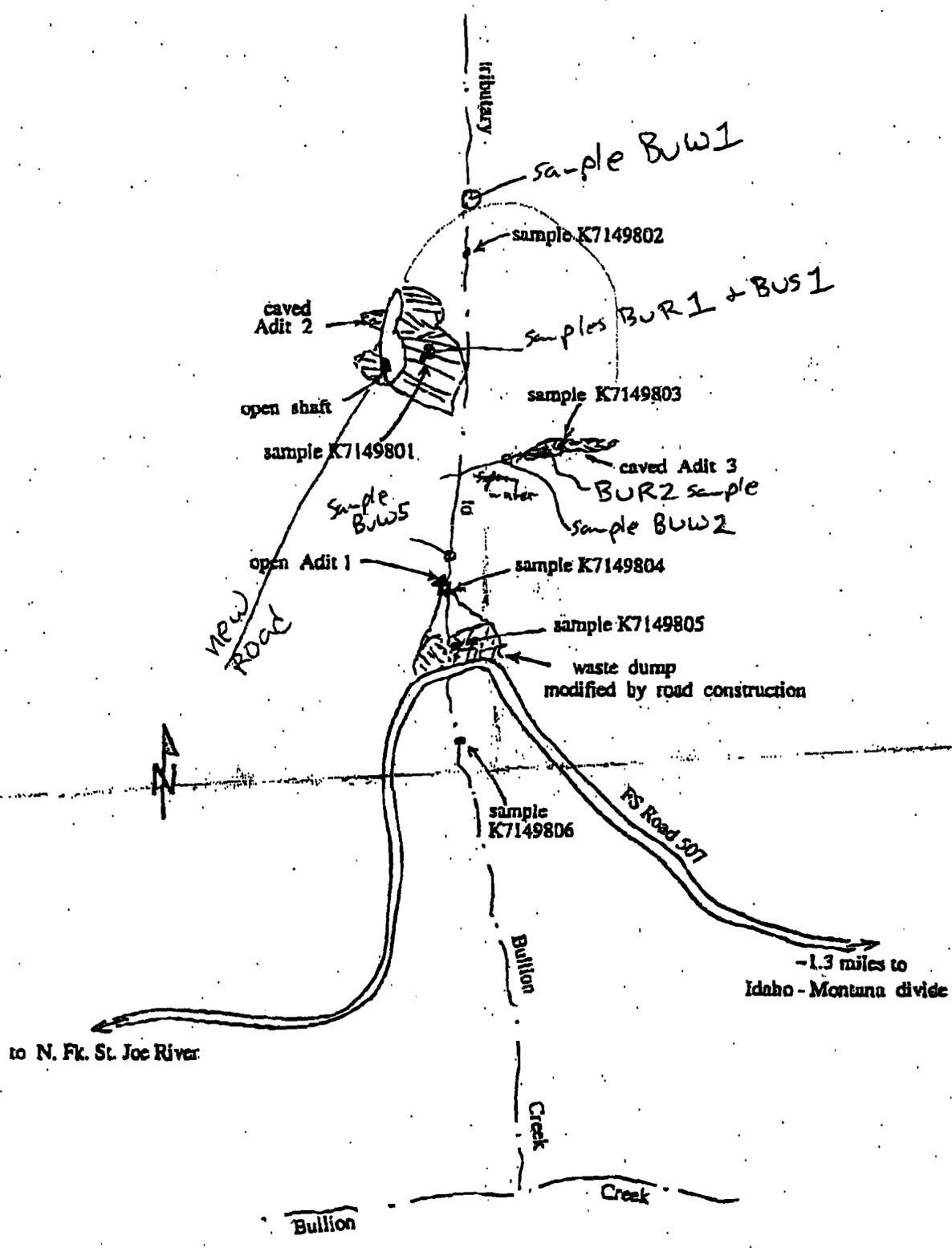


Figure 3.16-2. Sketch map of the upper workings of the Bullion Mine.