

Ground-Water Information Center Water Quality Report

Site Name: BUTTE MINE FLOODING OU BERKELEY PIT LAKE

Report Date: 12/4/2017

[Compare to Water Quality Standards](#)

Location Information

Sample Id/Site Id: 225208 / 120678	Sample Date: 11/9/2017 12:55:00 PM
Location (TRS): 03N 07W 18 AABC	Agency/Sampler: MBMG / ICOPINI, GARY/MCGRATH, STEVE
Latitude/Longitude: 46° 1' 1" N 112° 30' 48" W	Field Number: BERKELEY PIT 3 FT
Datum: NAD83	Lab Date: 12/2/2017 1:11:56 PM
Altitude: 4615	Lab/Analyst: MBMG / TIMMER, JACKIE
County/State: SILVER BOW / MT	Sample Method/Handling: GRAB / ru:1 ra:0 fu:1 fa:1
Site Type: MINE	Procedure Type: DISSOLVED
Geology: 211BDBT	Total Depth (ft): NR
USGS 7.5' Quad: BUTTE NORTH	SWL-MP (ft): NR
PWS Id:	Depth Water Enters (ft): NR
Project: MINEFLO, MINEFLO_2002CDMP, MINEFLO-ACTIVE-ECBED	

Major Ion Results

	mg/L	meq/L		mg/L	meq/L
Calcium (Ca)	468.920	23.399	Bicarbonate (HCO3)	0.000	0.000
Magnesium (Mg)	623.530	51.310	Carbonate (CO3)	0.000	0.000
Sodium (Na)	76.110	3.311	Chloride (Cl)	18.060	0.509
Potassium (K)	9.590	0.245	Sulfate (SO4)	6,932.000	144.394
Iron (Fe)	1.887	0.068	Nitrate (as N)	0.270	0.019
Manganese (Mn)	263.350	9.586	Fluoride (F)	46.720	2.459
Silica (SiO2)	121.200		Orthophosphate (as P)	<0.100 U	0.000
Total Cations		142.560	Total Anions		147.382

Trace Element Results (µg/L)

Aluminum (Al): 310,925.000	Cesium (Cs): <1.000 U	Molybdenum (Mo): 4.790 J	Strontium (Sr): 1,079.860
Antimony (Sb): <1.000 U	Chromium (Cr): 10.660	Nickel (Ni): 1,211.740	Thallium (Tl): <1.000 U
Arsenic (As): 4.460	Cobalt (Co): 1,609.770	Niobium (Nb): <1.000 U	Thorium (Th): 24.440
Barium (Ba): 7.470	Copper (Cu): 56,055.650	Neodymium (Nd): 340.080	Tin (Sn): <1.000 U
Beryllium (Be): 67.390	Gallium (Ga): <1.000 U	Palladium (Pd): 23.730	Titanium (Ti): 101.980
Boron (B): 34.690	Lanthanum (La): 234.680	Praseodymium (Pr): 78.590	Tungsten (W): <1.000 U
Bromide (Br): <50.000 U	Lead (Pb): 22.640	Rubidium (Rb): 52.640	Uranium (U): 630.100
Cadmium (Cd): 1,834.290	Lithium (Li): 272.380	Silver (Ag): <1.000 U	Vanadium (V): <1.000 U
Cerium (Ce): 766.260	Mercury (Hg): NR	Selenium (Se): 18.900	Zinc (Zn): 597,500.000
			Zirconium (Zr): <1.000 U

Field Chemistry and Other Analytical Results

**Total Dissolved Solids (mg/L): 9525.93	Field Hardness as CaCO3 (mg/L): NR	Ammonia (mg/L): NR
**Sum of Diss. Constituents (mg/L): 9525.93	Hardness as CaCO3: 3737.34	T.P. Hydrocarbons (µg/L): NR
Field Conductivity (µmhos): 7300	Field Alkalinity as CaCO3 (mg/L): NR	PCP (µg/L): NR
Lab Conductivity (µmhos): 7511	Alkalinity as CaCO3 (mg/L): 0	Phosphorus, TD (mg/L): <0.300 U
Field pH: 3.93	Ryznar Stability Index: 13.688	Field Nitrate (mg/L): NR
Lab pH: 3.87	Sodium Adsorption Ratio: 0.5409	Field Dissolved O2 (mg/L): 9.220
Water Temp (°C): 3.1	Langlier Saturation Index: -4.909	Field Chloride (mg/L): NR
Air Temp (°C): NR	Nitrite (mg/L as N): <0.050 U	Field Redox (mV): 653
Nitrate + Nitrite (mg/L as N): NR	Hydroxide (mg/L as OH): 0.000	Lab, Dissolved Organic Carbon (mg/L): NR
Total Kjeldahl Nitrogen (mg/L as N): NR	Lab, Dissolved Inorganic Carbon (mg/L): NR	Lab, Total Organic Carbon (mg/L): NR
Total Nitrogen (mg/L as N): NR	Acidity to 4.5 (mg/L CaCO3): 1,192.000	Acidity to 8.3 (mg/L CaCO3): 3,532.000
As(III) (ug/L): NR	As(V) (ug/L): NR	Total Susp Solids (mg/L): NR

Sample Condition: CLEAR

Field Remarks: SAMPLES COLLECTED WITH DRONE BOAT; FE(II) = 0.02 MG/L

Lab Remarks:

Notes

Explanation: mg/L = milligrams per Liter; µg/L = micrograms per Liter; ft = feet; NR = No Reading in GWIC

Qualifiers: A = Hydride atomic absorption; E = Estimated due to interference; H = Exceeded holding time; J = Estimated quantity above detection limit but below reporting limit; K = Na+K combined; N = Spiked sample recovery not within control limits; P = Preserved sample; S = Method of standard additions; U = Undetected quantity below detection limit; * = Duplicate analysis not within control limits; ** = Sum of Dissolved Constituents is the sum of major cations (Na, Ca, K, Mg, Mn, Fe) and anions (HCO3, CO3, SO4, Cl, SiO2, NO3, F) in mg/L. Total Dissolved Solids is reported as equivalent weight of evaporation residue.

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Ground-Water Information Center Water Quality Report
Report Date: 12/4/2017

Site Name: BUTTE MINE FLOODING OU BERKELEY PIT LAKE
[Compare to Water Quality Standards](#)

Location Information

Sample Id/Site Id: 225209 / 120678	Sample Date: 11/9/2017 1:22:00 PM
Location (TRS): 03N 07W 18 AABC	Agency/Sampler: MBMG / ICOPINI, GARY/MCGRATH, STEVE
Latitude/Longitude: 46° 1' 1" N 112° 30' 48" W	Field Number: BERKELEY PIT 20 FT
Datum: NAD83	Lab Date: 12/2/2017 1:11:56 PM
Altitude: 4615	Lab/Analyst: MBMG / TIMMER, JACKIE
County/State: SILVER BOW / MT	Sample Method/Handling: GRAB / ru:1 ra:0 fu:1 fa:1
Site Type: MINE	Procedure Type: DISSOLVED
Geology: 211BDBT	Total Depth (ft): NR
USGS 7.5' Quad: BUTTE NORTH	SWL-MP (ft): NR
PWS Id:	Depth Water Enters (ft): NR
Project: MINEFLO, MINEFLO_2002CDMP, MINEFLO-ACTIVE-ECBED	

Major Ion Results

	mg/L	meq/L		mg/L	meq/L
Calcium (Ca)	472.180	23.562	Bicarbonate (HCO3)	0.000	0.000
Magnesium (Mg)	626.720	51.573	Carbonate (CO3)	0.000	0.000
Sodium (Na)	74.680	3.249	Chloride (Cl)	23.180	0.654
Potassium (K)	9.810	0.251	Sulfate (SO4)	7,025.000	146.331
Iron (Fe)	1.824	0.065	Nitrate (as N)	0.280	0.020
Manganese (Mn)	267.250	9.728	Fluoride (F)	32.800	1.727
Silica (SiO2)	122.540		Orthophosphate (as P)	<0.100 U	0.000
Total Cations		143.376	Total Anions		148.731

Trace Element Results (µg/L)

Aluminum (Al):	312,175.000	Cesium (Cs):	<1.000 U	Molybdenum (Mo):	4.670 J	Strontium (Sr):	1,140.910
Antimony (Sb):	<1.000 U	Chromium (Cr):	11.760	Nickel (Ni):	1,272.940	Thallium (Tl):	<1.000 U
Arsenic (As):	3.970 J	Cobalt (Co):	1,704.830	Niobium (Nb):	<1.000 U	Thorium (Th):	27.640
Barium (Ba):	8.110	Copper (Cu):	59,900.660	Neodymium (Nd):	357.600	Tin (Sn):	<1.000 U
Beryllium (Be):	69.410	Gallium (Ga):	<1.000 U	Palladium (Pd):	24.350	Titanium (Ti):	114.200
Boron (B):	33.080	Lanthanum (La):	217.640	Praseodymium (Pr):	100.520	Tungsten (W):	<1.000 U
Bromide (Br):	<50.000 U	Lead (Pb):	16.280	Rubidium (Rb):	55.890	Uranium (U):	716.090
Cadmium (Cd):	2,061.150	Lithium (Li):	288.250	Silver (Ag):	<1.000 U	Vanadium (V):	<1.000 U
Cerium (Ce):	965.050	Mercury (Hg):	NR	Selenium (Se):	20.680	Zinc (Zn):	599,000.000
						Zirconium (Zr):	12.820

Field Chemistry and Other Analytical Results

**Total Dissolved Solids (mg/L):	9627.98	Field Hardness as CaCO3 (mg/L):	NR	Ammonia (mg/L):	NR
**Sum of Diss. Constituents (mg/L):	9627.98	Hardness as CaCO3:	3758.61	T.P. Hydrocarbons (µg/L):	NR
Field Conductivity (µmhos):	7360	Field Alkalinity as CaCO3 (mg/L):	NR	PCP (µg/L):	NR
Lab Conductivity (µmhos):	7540	Alkalinity as CaCO3 (mg/L):	0	Phosphorus, TD (mg/L):	<0.300 U
Field pH:	3.92	Ryznar Stability Index:	13.712	Field Nitrate (mg/L):	NR
Lab pH:	3.84	Sodium Adsorption Ratio:	0.5323	Field Dissolved O2 (mg/L):	8.850
Water Temp (°C):	3.82	Langlier Saturation Index:	-4.936	Field Chloride (mg/L):	NR
Air Temp (°C):	NR	Nitrite (mg/L as N):	<0.050 U	Field Redox (mV):	657
Nitrate + Nitrite (mg/L as N)	NR	Hydroxide (mg/L as OH):	0.000	Lab, Dissolved Organic Carbon (mg/L):	NR
Total Kjeldahl Nitrogen (mg/L as N)	NR	Lab, Dissolved Inorganic Carbon (mg/L):	NR	Lab, Total Organic Carbon (mg/L):	NR
Total Nitrogen (mg/L as N)	NR	Acidity to 4.5 (mg/L CaCO3)	1,239.000	Acidity to 8.3 (mg/L CaCO3)	3,644.000
As(III) (ug/L)	NR	As(V) (ug/L)	NR	Total Susp Solids (mg/L)	NR

Sample Condition: CLEAR

Field Remarks: SAMPLES COLLECTED WITH DRONE BOAT; FE(II) = 0.06 MG/L

Lab Remarks:

Notes

Explanation: mg/L = milligrams per Liter; µg/L = micrograms per Liter; ft = feet; NR = No Reading in GWIC

Qualifiers: A = Hydride atomic absorption; E = Estimated due to interference; H = Exceeded holding time; J = Estimated quantity above detection limit but below reporting limit; K = Na+K combined; N = Spiked sample recovery not within control limits; P = Preserved sample; S = Method of standard additions; U = Undetected quantity below detection limit; * = Duplicate analysis not within control limits; ** = Sum of Dissolved Constituents is the sum of major cations (Na, Ca, K, Mg, Mn, Fe) and anions (HCO3, CO3, SO4, Cl, SiO2, NO3, F) in mg/L. Total Dissolved Solids is reported as equivalent weight of evaporation residue.

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Ground-Water Information Center Water Quality Report
Report Date: 12/4/2017

Site Name: BUTTE MINE FLOODING OU BERKELEY PIT LAKE
[Compare to Water Quality Standards](#)

Location Information

Sample Id/Site Id: 225210 / 120678	Sample Date: 11/9/2017 1:55:00 PM
Location (TRS): 03N 07W 18 AABC	Agency/Sampler: MBMG / ICOPINI, GARY/MCGRATH, STEVE
Latitude/Longitude: 46° 1' 1" N 112° 30' 48" W	Field Number: BERKELEY PIT 60 FT
Datum: NAD83	Lab Date: 12/2/2017 1:11:56 PM
Altitude: 4615	Lab/Analyst: MBMG / TIMMER, JACKIE
County/State: SILVER BOW / MT	Sample Method/Handling: GRAB / ru:1 ra:0 fu:1 fa:1
Site Type: MINE	Procedure Type: DISSOLVED
Geology: 211BDBT	Total Depth (ft): NR
USGS 7.5' Quad: BUTTE NORTH	SWL-MP (ft): NR
PWS Id:	Depth Water Enters (ft): NR
Project: MINEFLO, MINEFLO_2002CDMP, MINEFLO-ACTIVE-ECBED	

Major Ion Results

	mg/L	meq/L		mg/L	meq/L
Calcium (Ca)	467.120	23.309	Bicarbonate (HCO3)	0.000	0.000
Magnesium (Mg)	621.500	51.143	Carbonate (CO3)	0.000	0.000
Sodium (Na)	72.630	3.159	Chloride (Cl)	19.380	0.547
Potassium (K)	10.270	0.263	Sulfate (SO4)	7,010.000	146.018
Iron (Fe)	1.606	0.058	Nitrate (as N)	0.260	0.019
Manganese (Mn)	268.750	9.783	Fluoride (F)	47.510	2.501
Silica (SiO2)	123.440		Orthophosphate (as P)	<0.100 U	0.000
Total Cations		142.612	Total Anions		149.084

Trace Element Results (µg/L)

Aluminum (Al): 312,125.000	Cesium (Cs): <1.000 U	Molybdenum (Mo): 4.480 J	Strontium (Sr): 1,114.470
Antimony (Sb): <1.000 U	Chromium (Cr): 12.100	Nickel (Ni): 1,232.450	Thallium (Tl): <1.000 U
Arsenic (As): 4.590	Cobalt (Co): 1,687.510	Niobium (Nb): <1.000 U	Thorium (Th): 26.550
Barium (Ba): 8.290	Copper (Cu): 57,715.950	Neodymium (Nd): 378.690	Tin (Sn): <1.000 U
Beryllium (Be): 75.900	Gallium (Ga): <1.000 U	Palladium (Pd): 24.140	Titanium (Ti): 107.120
Boron (B): 39.790	Lanthanum (La): 252.690	Praseodymium (Pr): 97.900	Tungsten (W): <1.000 U
Bromide (Br): <50.000 U	Lead (Pb): 17.500	Rubidium (Rb): 55.000	Uranium (U): 701.280
Cadmium (Cd): 2,018.940	Lithium (Li): 290.120	Silver (Ag): <1.000 U	Vanadium (V): <1.000 U
Cerium (Ce): 943.460	Mercury (Hg): NR	Selenium (Se): 21.670	Zinc (Zn): 599,750.000
			Zirconium (Zr): <1.000 U

Field Chemistry and Other Analytical Results

**Total Dissolved Solids (mg/L): 9612.21	Field Hardness as CaCO3 (mg/L): NR	Ammonia (mg/L): NR
**Sum of Diss. Constituents (mg/L): 9612.21	Hardness as CaCO3: 3724.49	T.P. Hydrocarbons (µg/L): NR
Field Conductivity (µmhos): 7350	Field Alkalinity as CaCO3 (mg/L): NR	PCP (µg/L): NR
Lab Conductivity (µmhos): 7518	Alkalinity as CaCO3 (mg/L): 0	Phosphorus, TD (mg/L): <0.300 U
Field pH: 3.95	Ryznar Stability Index: 13.711	Field Nitrate (mg/L): NR
Lab pH: 3.85	Sodium Adsorption Ratio: 0.5205	Field Dissolved O2 (mg/L): 7.640
Water Temp (°C): 4.2	Langlier Saturation Index: -4.931	Field Chloride (mg/L): NR
Air Temp (°C): NR	Nitrite (mg/L as N): <0.050 U	Field Redox (mV): 663
Nitrate + Nitrite (mg/L as N): NR	Hydroxide (mg/L as OH): 0.000	Lab, Dissolved Organic Carbon (mg/L): NR
Total Kjeldahl Nitrogen (mg/L as N): NR	Lab, Dissolved Inorganic Carbon (mg/L): NR	Lab, Total Organic Carbon (mg/L): NR
Total Nitrogen (mg/L as N): NR	Acidity to 4.5 (mg/L CaCO3): 1,120.000	Acidity to 8.3 (mg/L CaCO3): 3,399.000
As(III) (ug/L): NR	As(V) (ug/L): NR	Total Susp Solids (mg/L): NR

Sample Condition: CLEAR

Field Remarks: SAMPLES COLLECTED WITH DRONE BOAT; FE(II) = 0.03 MG/L

Lab Remarks:

Notes

Explanation: mg/L = milligrams per Liter; µg/L = micrograms per Liter; ft = feet; NR = No Reading in GWIC

Qualifiers: A = Hydride atomic absorption; E = Estimated due to interference; H = Exceeded holding time; J = Estimated quantity above detection limit but below reporting limit; K = Na+K combined; N = Spiked sample recovery not within control limits; P = Preserved sample; S = Method of standard additions; U = Undetected quantity below detection limit; * = Duplicate analysis not within control limits; ** = Sum of Dissolved Constituents is the sum of major cations (Na, Ca, K, Mg, Mn, Fe) and anions (HCO3, CO3, SO4, Cl, SiO2, NO3, F) in mg/L. Total Dissolved Solids is reported as equivalent weight of evaporation residue.

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Ground-Water Information Center Water Quality Report

Site Name: BUTTE MINE FLOODING OU BERKELEY PIT LAKE

Report Date: 12/4/2017

Compare to Water Quality Standards

Location Information

Sample Id/Site Id: 225211 / 120678	Sample Date: 11/9/2017 2:28:00 PM
Location (TRS): 03N 07W 18 AABC	Agency/Sampler: MBMG / ICOPINI, GARY/MCGRATH, STEVE
Latitude/Longitude: 46° 1' 1" N 112° 30' 48" W	Field Number: BERKELEY PIT 200 FT
Datum: NAD83	Lab Date: 12/2/2017 1:11:56 PM
Altitude: 4615	Lab/Analyst: MBMG / TIMMER, JACKIE
County/State: SILVER BOW / MT	Sample Method/Handling: GRAB / ru:1 ra:0 fu:1 fa:1
Site Type: MINE	Procedure Type: DISSOLVED
Geology: 211BDBT	Total Depth (ft): NR
USGS 7.5' Quad: BUTTE NORTH	SWL-MP (ft): NR
PWS Id:	Depth Water Enters (ft): NR
Project: MINEFLO, MINEFLO_2002CDMP, MINEFLO-ACTIVE-ECBED	

Major Ion Results

	mg/L	meq/L		mg/L	meq/L
Calcium (Ca)	463.930	23.150	Bicarbonate (HCO3)	0.000	0.000
Magnesium (Mg)	617.820	50.840	Carbonate (CO3)	0.000	0.000
Sodium (Na)	74.510	3.241	Chloride (Cl)	24.180	0.682
Potassium (K)	10.430	0.267	Sulfate (SO4)	7,012.000	146.060
Iron (Fe)	1.320	0.047	Nitrate (as N)	0.260	0.019
Manganese (Mn)	272.200	9.908	Fluoride (F)	47.890	2.521
Silica (SiO2)	124.560		Orthophosphate (as P)	<0.100 U	0.000
Total Cations		142.408	Total Anions		149.282

Trace Element Results (µg/L)

Aluminum (Al):	311,650.000	Cesium (Cs):	<1.000 U	Molybdenum (Mo):	4.480 J	Strontium (Sr):	1,128.130
Antimony (Sb):	<1.000 U	Chromium (Cr):	11.190	Nickel (Ni):	1,290.790	Thallium (Tl):	<1.000 U
Arsenic (As):	4.170	Cobalt (Co):	1,718.350	Niobium (Nb):	<1.000 U	Thorium (Th):	25.760
Barium (Ba):	7.990	Copper (Cu):	59,811.790	Neodymium (Nd):	360.070	Tin (Sn):	<1.000 U
Beryllium (Be):	77.600	Gallium (Ga):	<1.000 U	Palladium (Pd):	24.370	Titanium (Ti):	114.710
Boron (B):	29.860	Lanthanum (La):	220.280	Praseodymium (Pr):	103.540	Tungsten (W):	<1.000 U
Bromide (Br):	<50.000 U	Lead (Pb):	14.720	Rubidium (Rb):	55.450	Uranium (U):	717.920
Cadmium (Cd):	2,085.290	Lithium (Li):	293.780	Silver (Ag):	<1.000 U	Vanadium (V):	<1.000 U
Cerium (Ce):	983.600	Mercury (Hg):	NR	Selenium (Se):	21.140	Zinc (Zn):	601,200.000
						Zirconium (Zr):	<1.000 U

Field Chemistry and Other Analytical Results

**Total Dissolved Solids (mg/L):	9621.41	Field Hardness as CaCO3 (mg/L):	NR	Ammonia (mg/L):	NR
**Sum of Diss. Constituents (mg/L):	9621.41	Hardness as CaCO3:	3701.38	T.P. Hydrocarbons (µg/L):	NR
Field Conductivity (µmhos):	7350	Field Alkalinity as CaCO3 (mg/L):	NR	PCP (µg/L):	NR
Lab Conductivity (µmhos):	7471	Alkalinity as CaCO3 (mg/L):	0	Phosphorus, TD (mg/L):	<0.300 U
Field pH:	4	Ryznar Stability Index:	13.697	Field Nitrate (mg/L):	NR
Lab pH:	3.87	Sodium Adsorption Ratio:	0.5364	Field Dissolved O2 (mg/L):	6.230
Water Temp (°C):	4.15	Langlier Saturation Index:	-4.914	Field Chloride (mg/L):	NR
Air Temp (°C):	NR	Nitrite (mg/L as N):	<0.050 U	Field Redox (mV):	661
Nitrate + Nitrite (mg/L as N)	NR	Hydroxide (mg/L as OH):	0.000	Lab, Dissolved Organic Carbon (mg/L):	NR
Total Kjeldahl Nitrogen (mg/L as N)	NR	Lab, Dissolved Inorganic Carbon (mg/L):	NR	Lab, Total Organic Carbon (mg/L):	NR
Total Nitrogen (mg/L as N)	NR	Acidity to 4.5 (mg/L CaCO3)	1,120.000	Acidity to 8.3 (mg/L CaCO3)	3,535.000
As(III) (ug/L)	NR	As(V) (ug/L)	NR	Total Susp Solids (mg/L)	NR

Sample Condition: CLEAR

Field Remarks: SAMPLES COLLECTED WITH DRONE BOAT; FE(II) = 0.03 MG/L

Lab Remarks:

Notes

Explanation: mg/L = milligrams per Liter; µg/L = micrograms per Liter; ft = feet; NR = No Reading in GWIC

Qualifiers: A = Hydride atomic absorption; E = Estimated due to interference; H = Exceeded holding time; J = Estimated quantity above detection limit but below reporting limit; K = Na+K combined; N = Spiked sample recovery not within control limits; P = Preserved sample; S = Method of standard additions; U = Undetected quantity below detection limit; * = Duplicate analysis not within control limits; ** = Sum of Dissolved Constituents is the sum of major cations (Na, Ca, K, Mg, Mn, Fe) and anions (HCO3, CO3, SO4, Cl, SiO2, NO3, F) in mg/L. Total Dissolved Solids is reported as equivalent weight of evaporation residue.

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Ground-Water Information Center Water Quality Report
Report Date: 12/4/2017

Site Name: BUTTE MINE FLOODING OU BERKELEY PIT LAKE
[Compare to Water Quality Standards](#)

Location Information

Sample Id/Site Id: 225212 / 120678	Sample Date: 11/9/2017 2:50:00 PM
Location (TRS): 03N 07W 18 AABC	Agency/Sampler: MBMG / ICOPINI, GARY/MCGRATH, STEVE
Latitude/Longitude: 46° 1' 1" N 112° 30' 48" W	Field Number: BERKELEY PIT 450 FT
Datum: NAD83	Lab Date: 12/2/2017 1:11:56 PM
Altitude: 4615	Lab/Analyst: MBMG / TIMMER, JACKIE
County/State: SILVER BOW / MT	Sample Method/Handling: GRAB / ru:1 ra:0 fu:1 fa:1
Site Type: MINE	Procedure Type: DISSOLVED
Geology: 211BDBT	Total Depth (ft): NR
USGS 7.5' Quad: BUTTE NORTH	SWL-MP (ft): NR
PWS Id:	Depth Water Enters (ft): NR
Project: MINEFLO, MINEFLO_2002CDMP, MINEFLO-ACTIVE-ECBED	

Major Ion Results

	mg/L	meq/L		mg/L	meq/L
Calcium (Ca)	465.900	23.248	Bicarbonate (HCO3)	0.000	0.000
Magnesium (Mg)	620.170	51.034	Carbonate (CO3)	0.000	0.000
Sodium (Na)	70.340	3.060	Chloride (Cl)	24.400	0.688
Potassium (K)	10.190	0.261	Sulfate (SO4)	7,027.000	146.372
Iron (Fe)	1.150	0.041	Nitrate (as N)	0.260	0.019
Manganese (Mn)	268.400	9.770	Fluoride (F)	32.790	1.726
Silica (SiO2)	123.010		Orthophosphate (as P)	<0.100 U	0.000
Total Cations		142.176	Total Anions		148.805

Trace Element Results (µg/L)

Aluminum (Al): 311,300.000	Cesium (Cs): <1.000 U	Molybdenum (Mo): 5.170	Strontium (Sr): 1,130.590
Antimony (Sb): <1.000 U	Chromium (Cr): 11.370	Nickel (Ni): 1,247.940	Thallium (Tl): <1.000 U
Arsenic (As): 5.670	Cobalt (Co): 1,670.890	Niobium (Nb): <1.000 U	Thorium (Th): 25.940
Barium (Ba): 8.400	Copper (Cu): 57,794.470	Neodymium (Nd): 375.160	Tin (Sn): <1.000 U
Beryllium (Be): 76.680	Gallium (Ga): <1.000 U	Palladium (Pd): 25.070	Titanium (Ti): 110.860
Boron (B): 39.590	Lanthanum (La): 259.410	Praseodymium (Pr): 98.410	Tungsten (W): <1.000 U
Bromide (Br): <50.000 U	Lead (Pb): 15.020	Rubidium (Rb): 55.850	Uranium (U): 702.310
Cadmium (Cd): 2,094.120	Lithium (Li): 292.570	Silver (Ag): <1.000 U	Vanadium (V): <1.000 U
Cerium (Ce): 963.160	Mercury (Hg): NR	Selenium (Se): 21.290	Zinc (Zn): 598,250.000
			Zirconium (Zr): 3.020 J

Field Chemistry and Other Analytical Results

**Total Dissolved Solids (mg/L): 9609.41	Field Hardness as CaCO3 (mg/L): NR	Ammonia (mg/L): NR
**Sum of Diss. Constituents (mg/L): 9609.41	Hardness as CaCO3: 3715.97	T.P. Hydrocarbons (µg/L): NR
Field Conductivity (µmhos): 7370	Field Alkalinity as CaCO3 (mg/L): NR	PCP (µg/L): NR
Lab Conductivity (µmhos): 7574	Alkalinity as CaCO3 (mg/L): 0	Phosphorus, TD (mg/L): <0.300 U
Field pH: 4.02	Ryznar Stability Index: 13.693	Field Nitrate (mg/L): NR
Lab pH: 3.87	Sodium Adsorption Ratio: 0.4996	Field Dissolved O2 (mg/L): 6.250
Water Temp (°C): 4.15	Langlier Saturation Index: -4.912	Field Chloride (mg/L): NR
Air Temp (°C): NR	Nitrite (mg/L as N): <0.050 U	Field Redox (mV): 665
Nitrate + Nitrite (mg/L as N): NR	Hydroxide (mg/L as OH): 0.000	Lab, Dissolved Organic Carbon (mg/L): NR
Total Kjeldahl Nitrogen (mg/L as N): NR	Lab, Dissolved Inorganic Carbon (mg/L): NR	Lab, Total Organic Carbon (mg/L): NR
Total Nitrogen (mg/L as N): NR	Acidity to 4.5 (mg/L CaCO3): 1,203.000	Acidity to 8.3 (mg/L CaCO3): 3,496.000
As(III) (ug/L): NR	As(V) (ug/L): NR	Total Susp Solids (mg/L): NR

Sample Condition: CLEAR

Field Remarks: SAMPLES COLLECTED WITH DRONE BOAT; FE(II) = 0.07 MG/L

Lab Remarks:

Notes

Explanation: mg/L = milligrams per Liter; µg/L = micrograms per Liter; ft = feet; NR = No Reading in GWIC

Qualifiers: A = Hydride atomic absorption; E = Estimated due to interference; H = Exceeded holding time; J = Estimated quantity above detection limit but below reporting limit; K = Na+K combined; N = Spiked sample recovery not within control limits; P = Preserved sample; S = Method of standard additions; U = Undetected quantity below detection limit; * = Duplicate analysis not within control limits; ** = Sum of Dissolved Constituents is the sum of major cations (Na, Ca, K, Mg, Mn, Fe) and anions (HCO3, CO3, SO4, Cl, SiO2, NO3, F) in mg/L. Total Dissolved Solids is reported as equivalent weight of evaporation residue.

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Ground-Water Information Center Water Quality Report
Report Date: 12/4/2017

Site Name: BUTTE MINE FLOODING OU BERKELEY PIT LAKE
[Compare to Water Quality Standards](#)

Location Information

Sample Id/Site Id: 225213 / 120678	Sample Date: 11/9/2017 12:55:00 PM
Location (TRS): 03N 07W 18 AABC	Agency/Sampler: MBMG / ICOPINI, GARY/MCGRATH, STEVE
Latitude/Longitude: 46° 1' 1" N 112° 30' 48" W	Field Number: BERKELEY PIT 3 FT
Datum: NAD83	Lab Date: 12/2/2017 1:11:57 PM
Altitude: 4615	Lab/Analyst: MBMG / TIMMER, JACKIE
County/State: SILVER BOW / MT	Sample Method/Handling: GRAB / ru:0 ra:1 fu:0 fa:0
Site Type: MINE	Procedure Type: TOTAL RECOVERABLE
Geology: 211BDBT	Total Depth (ft): NR
USGS 7.5' Quad: BUTTE NORTH	SWL-MP (ft): NR
PWS Id:	Depth Water Enters (ft): NR
Project: MINEFLO, MINEFLO_2002CDMP, MINEFLO-ACTIVE-ECBED	

Major Ion Results

	mg/L	meq/L		mg/L	meq/L
Calcium (Ca)	465.040	23.205	Bicarbonate (HCO3)	NR	0.000
Magnesium (Mg)	600.260	49.395	Carbonate (CO3)	NR	0.000
Sodium (Na)	73.830	3.212	Chloride (Cl)	NR	0.000
Potassium (K)	10.050	0.257	Sulfate (SO4)	NR	0.000
Iron (Fe)	2.552	0.091	Nitrate (as N)	NR	0.000
Manganese (Mn)	281.100	10.232	Fluoride (F)	NR	0.000
Silica (SiO2)	NR		Orthophosphate (as P)	NR	0.000
Total Cations		142.790	Total Anions		0.000

Trace Element Results (µg/L)

Aluminum (Al): 320,800.000	Cesium (Cs): <1.000 U	Molybdenum (Mo): 5.240	Strontium (Sr): 1,114.880
Antimony (Sb): <1.000 U	Chromium (Cr): 12.460	Nickel (Ni): 1,283.490	Thallium (Tl): <1.000 U
Arsenic (As): 6.870	Cobalt (Co): 1,681.030	Niobium (Nb): <1.000 U	Thorium (Th): 25.590
Barium (Ba): 7.960	Copper (Cu): 57,205.060	Neodymium (Nd): 371.420	Tin (Sn): <1.000 U
Beryllium (Be): 70.860	Gallium (Ga): <1.000 U	Palladium (Pd): 23.770	Titanium (Ti): 105.490
Boron (B): 51.500	Lanthanum (La): 245.460	Praseodymium (Pr): 94.510	Tungsten (W): <1.000 U
Bromide (Br): NR	Lead (Pb): 27.240	Rubidium (Rb): 55.760	Uranium (U): 679.990
Cadmium (Cd): 1,969.320	Lithium (Li): 285.570	Silver (Ag): NR	Vanadium (V): <1.000 U
Cerium (Ce): 909.680	Mercury (Hg): NR	Selenium (Se): 22.590	Zinc (Zn): 617,750.000
			Zirconium (Zr): <1.000 U

Field Chemistry and Other Analytical Results

**Total Dissolved Solids (mg/L): NR	Field Hardness as CaCO3 (mg/L): NR	Ammonia (mg/L): NR
**Sum of Diss. Constituents (mg/L): NR	Hardness as CaCO3: 3631.88	T.P. Hydrocarbons (µg/L): NR
Field Conductivity (µmhos): 7300	Field Alkalinity as CaCO3 (mg/L): NR	PCP (µg/L): NR
Lab Conductivity (µmhos): NR	Alkalinity as CaCO3 (mg/L): NR	Phosphorus, TD (mg/L): <0.300 U
Field pH: 3.93	Ryznar Stability Index: 17.565	Field Nitrate (mg/L): NR
Lab pH: NR	Sodium Adsorption Ratio: 0.5343	Field Dissolved O2 (mg/L): 9.220
Water Temp (°C): 3.1	Langlier Saturation Index: -8.783	Field Chloride (mg/L): NR
Air Temp (°C): NR	Nitrite (mg/L as N): NR	Field Redox (mV): 653
Nitrate + Nitrite (mg/L as N): NR	Hydroxide (mg/L as OH): NR	Lab, Dissolved Organic Carbon (mg/L): NR
Total Kjeldahl Nitrogen (mg/L as N): NR	Lab, Dissolved Inorganic Carbon (mg/L): NR	Lab, Total Organic Carbon (mg/L): NR
Total Nitrogen (mg/L as N): NR	Acidity to 4.5 (mg/L CaCO3): NR	Acidity to 8.3 (mg/L CaCO3): NR
As(III) (ug/L): NR	As(V) (ug/L): NR	Total Susp Solids (mg/L): NR

Sample Condition: CLEAR

Field Remarks: SAMPLES COLLECTED WITH DRONE BOAT; FE(II) = 0.02 MG/L

Lab Remarks:

Notes

Explanation: mg/L = milligrams per Liter; µg/L = micrograms per Liter; ft = feet; NR = No Reading in GWIC

Qualifiers: A = Hydride atomic absorption; E = Estimated due to interference; H = Exceeded holding time; J = Estimated quantity above detection limit but below reporting limit; K = Na+K combined; N = Spiked sample recovery not within control limits; P = Preserving sample; S = Method of standard additions; U = Undetected quantity below detection limit; * = Duplicate analysis not within control limits; ** = Sum of Dissolved Constituents is the sum of major cations (Na, Ca, K, Mg, Mn, Fe) and anions (HCO3, CO3, SO4, Cl, SiO2, NO3, F) in mg/L. Total Dissolved Solids is reported as equivalent weight of evaporation residue.

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Ground-Water Information Center Water Quality Report
Report Date: 12/4/2017

Site Name: BUTTE MINE FLOODING OU BERKELEY PIT LAKE
[Compare to Water Quality Standards](#)

Location Information

Sample Id/Site Id: 225214 / 120678	Sample Date: 11/9/2017 1:22:00 PM
Location (TRS): 03N 07W 18 AABC	Agency/Sampler: MBMG / ICOPINI, GARY/MCGRATH, STEVE
Latitude/Longitude: 46° 1' 1" N 112° 30' 48" W	Field Number: BERKELEY PIT 20 FT
Datum: NAD83	Lab Date: 12/2/2017 1:11:57 PM
Altitude: 4615	Lab/Analyst: MBMG / TIMMER, JACKIE
County/State: SILVER BOW / MT	Sample Method/Handling: GRAB / ru:0 ra:1 fu:0 fa:0
Site Type: MINE	Procedure Type: TOTAL RECOVERABLE
Geology: 211BDBT	Total Depth (ft): NR
USGS 7.5' Quad: BUTTE NORTH	SWL-MP (ft): NR
PWS Id:	Depth Water Enters (ft): NR
Project: MINEFLO, MINEFLO_2002CDMP, MINEFLO- ACTIVE-ECBED	

Major Ion Results

	mg/L	meq/L		mg/L	meq/L
Calcium (Ca)	470.870	23.496	Bicarbonate (HCO3)	NR	0.000
Magnesium (Mg)	608.070	50.038	Carbonate (CO3)	NR	0.000
Sodium (Na)	73.830	3.212	Chloride (Cl)	NR	0.000
Potassium (K)	10.310	0.264	Sulfate (SO4)	NR	0.000
Iron (Fe)	2.142	0.077	Nitrate (as N)	NR	0.000
Manganese (Mn)	287.850	10.478	Fluoride (F)	NR	0.000
Silica (SiO2)	NR		Orthophosphate (as P)	NR	0.000
Total Cations		144.913	Total Anions		0.000

Trace Element Results (µg/L)

Aluminum (Al):	325,950.000	Cesium (Cs):	<1.000 U	Molybdenum (Mo):	5.320	Strontium (Sr):	1,142.820
Antimony (Sb):	<1.000 U	Chromium (Cr):	13.680	Nickel (Ni):	1,308.780	Thallium (Tl):	<1.000 U
Arsenic (As):	NR	Cobalt (Co):	1,728.980	Niobium (Nb):	<1.000 U	Thorium (Th):	29.260
Barium (Ba):	8.320	Copper (Cu):	58,654.760	Neodymium (Nd):	370.870	Tin (Sn):	<1.000 U
Beryllium (Be):	76.640	Gallium (Ga):	<1.000 U	Palladium (Pd):	26.200	Titanium (Ti):	111.510
Boron (B):	45.100	Lanthanum (La):	258.750	Praseodymium (Pr):	98.590	Tungsten (W):	<1.000 U
Bromide (Br):	NR	Lead (Pb):	20.540	Rubidium (Rb):	56.970	Uranium (U):	722.510
Cadmium (Cd):	2,074.970	Lithium (Li):	296.080	Silver (Ag):	<1.000 U	Vanadium (V):	<1.000 U
Cerium (Ce):	955.760	Mercury (Hg):	NR	Selenium (Se):	21.940	Zinc (Zn):	628,650.000
						Zirconium (Zr):	3.990 J

Field Chemistry and Other Analytical Results

**Total Dissolved Solids (mg/L):	NR	Field Hardness as CaCO3 (mg/L):	NR	Ammonia (mg/L):	NR
**Sum of Diss. Constituents (mg/L):	NR	Hardness as CaCO3:	3678.58	T.P. Hydrocarbons (µg/L):	NR
Field Conductivity (µmhos):	7360	Field Alkalinity as CaCO3 (mg/L):	NR	PCP (µg/L):	NR
Lab Conductivity (µmhos):	NR	Alkalinity as CaCO3 (mg/L):	NR	Phosphorus, TD (mg/L):	<0.300 U
Field pH:	3.92	Ryznar Stability Index:	17.554	Field Nitrate (mg/L):	NR
Lab pH:	NR	Sodium Adsorption Ratio:	0.5309	Field Dissolved O2 (mg/L):	8.850
Water Temp (°C):	3.82	Langlier Saturation Index:	-8.777	Field Chloride (mg/L):	NR
Air Temp (°C):	NR	Nitrite (mg/L as N):	NR	Field Redox (mV):	657
Nitrate + Nitrite (mg/L as N)	NR	Hydroxide (mg/L as OH):	NR	Lab, Dissolved Organic Carbon (mg/L):	NR
Total Kjeldahl Nitrogen (mg/L as N)	NR	Lab, Dissolved Inorganic Carbon (mg/L):	NR	Lab, Total Organic Carbon (mg/L):	NR
Total Nitrogen (mg/L as N)	NR	Acidity to 4.5 (mg/L CaCO3)	NR	Acidity to 8.3 (mg/L CaCO3)	NR
As(III) (ug/L)	NR	As(V) (ug/L)	NR	Total Susp Solids (mg/L)	NR

Sample Condition: CLEAR

Field Remarks: SAMPLES COLLECTED WITH DRONE BOAT; FE(II) = 0.06 MG/L

Lab Remarks:

Notes

Explanation: mg/L = milligrams per Liter; µg/L = micrograms per Liter; ft = feet; NR = No Reading in GWIC

Qualifiers: A = Hydride atomic absorption; E = Estimated due to interference; H = Exceeded holding time; J = Estimated quantity above detection limit but below reporting limit; K = Na+K combined; N = Spiked sample recovery not within control limits; P = Preserved sample; S = Method of standard additions; U = Undetected quantity below detection limit; * = Duplicate analysis not within control limits; ** = Sum of Dissolved Constituents is the sum of major cations (Na, Ca, K, Mg, Mn, Fe) and anions (HCO3, CO3, SO4, Cl, SiO2, NO3, F) in mg/L. Total Dissolved Solids is reported as equivalent weight of evaporation residue.

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Ground-Water Information Center Water Quality Report
Report Date: 12/4/2017

Site Name: BUTTE MINE FLOODING OU BERKELEY PIT LAKE
[Compare to Water Quality Standards](#)

Location Information

Sample Id/Site Id: 225215 / 120678	Sample Date: 11/9/2017 1:55:00 PM
Location (TRS): 03N 07W 18 AABC	Agency/Sampler: MBMG / ICOPINI, GARY/MCGRATH, STEVE
Latitude/Longitude: 46° 1' 1" N 112° 30' 48" W	Field Number: BERKELEY PIT 60 FT
Datum: NAD83	Lab Date: 12/2/2017 1:11:57 PM
Altitude: 4615	Lab/Analyst: MBMG / TIMMER, JACKIE
County/State: SILVER BOW / MT	Sample Method/Handling: GRAB / ru:0 ra:1 fu:0 fa:0
Site Type: MINE	Procedure Type: TOTAL RECOVERABLE
Geology: 211BDBT	Total Depth (ft): NR
USGS 7.5' Quad: BUTTE NORTH	SWL-MP (ft): NR
PWS Id:	Depth Water Enters (ft): NR
Project: MINEFLO, MINEFLO_2002CDMP, MINEFLO- ACTIVE-ECBED	

Major Ion Results

	mg/L	meq/L		mg/L	meq/L
Calcium (Ca)	475.620	23.733	Bicarbonate (HCO3)	NR	0.000
Magnesium (Mg)	626.850	51.583	Carbonate (CO3)	NR	0.000
Sodium (Na)	74.490	3.240	Chloride (Cl)	NR	0.000
Potassium (K)	10.250	0.262	Sulfate (SO4)	NR	0.000
Iron (Fe)	1.846	0.066	Nitrate (as N)	NR	0.000
Manganese (Mn)	284.950	10.372	Fluoride (F)	NR	0.000
Silica (SiO2)	NR		Orthophosphate (as P)	NR	0.000
Total Cations		147.529	Total Anions		0.000

Trace Element Results (µg/L)

Aluminum (Al):	331,175.000	Cesium (Cs):	<1.000 U	Molybdenum (Mo):	5.140	Strontium (Sr):	1,221.970
Antimony (Sb):	<1.000 U	Chromium (Cr):	12.900	Nickel (Ni):	1,375.150	Thallium (Tl):	<1.000 U
Arsenic (As):	5.020	Cobalt (Co):	1,790.410	Niobium (Nb):	<1.000 U	Thorium (Th):	28.630
Barium (Ba):	8.310	Copper (Cu):	60,238.380	Neodymium (Nd):	377.050	Tin (Sn):	<1.000 U
Beryllium (Be):	78.550	Gallium (Ga):	<1.000 U	Palladium (Pd):	24.310	Titanium (Ti):	110.620
Boron (B):	37.280	Lanthanum (La):	261.910	Praseodymium (Pr):	100.870	Tungsten (W):	<1.000 U
Bromide (Br):	NR	Lead (Pb):	18.550	Rubidium (Rb):	57.060	Uranium (U):	724.840
Cadmium (Cd):	2,096.750	Lithium (Li):	296.630	Silver (Ag):	NR	Vanadium (V):	<1.000 U
Cerium (Ce):	967.320	Mercury (Hg):	NR	Selenium (Se):	22.510	Zinc (Zn):	638,150.000
						Zirconium (Zr):	<1.000 U

Field Chemistry and Other Analytical Results

**Total Dissolved Solids (mg/L):	NR	Field Hardness as CaCO3 (mg/L):	NR	Ammonia (mg/L):	NR
**Sum of Diss. Constituents (mg/L):	NR	Hardness as CaCO3:	3767.74	T.P. Hydrocarbons (µg/L):	NR
Field Conductivity (µmhos):	7350	Field Alkalinity as CaCO3 (mg/L):	NR	PCP (µg/L):	NR
Lab Conductivity (µmhos):	NR	Alkalinity as CaCO3 (mg/L):	NR	Phosphorus, TD (mg/L):	<0.300 U
Field pH:	3.95	Ryznar Stability Index:	17.545	Field Nitrate (mg/L):	NR
Lab pH:	NR	Sodium Adsorption Ratio:	0.5246	Field Dissolved O2 (mg/L):	7.640
Water Temp (°C):	4.2	Langlier Saturation Index:	-8.773	Field Chloride (mg/L):	NR
Air Temp (°C):	NR	Nitrite (mg/L as N):	NR	Field Redox (mV):	663
Nitrate + Nitrite (mg/L as N)	NR	Hydroxide (mg/L as OH):	NR	Lab, Dissolved Organic Carbon (mg/L):	NR
Total Kjeldahl Nitrogen (mg/L as N)	NR	Lab, Dissolved Inorganic Carbon (mg/L):	NR	Lab, Total Organic Carbon (mg/L):	NR
Total Nitrogen (mg/L as N)	NR	Acidity to 4.5 (mg/L CaCO3)	NR	Acidity to 8.3 (mg/L CaCO3)	NR
As(III) (ug/L)	NR	As(V) (ug/L)	NR	Total Susp Solids (mg/L)	NR

Sample Condition: CLEAR

Field Remarks: SAMPLES COLLECTED WITH DRONE BOAT; FE(II) = 0.03 MG/L

Lab Remarks:

Notes

Explanation: mg/L = milligrams per Liter; µg/L = micrograms per Liter; ft = feet; NR = No Reading in GWIC

Qualifiers: A = Hydride atomic absorption; E = Estimated due to interference; H = Exceeded holding time; J = Estimated quantity above detection limit but below reporting limit; K = Na+K combined; N = Spiked sample recovery not within control limits; P = Preserved sample; S = Method of standard additions; U = Undetected quantity below detection limit; * = Duplicate analysis not within control limits; ** = Sum of Dissolved Constituents is the sum of major cations (Na, Ca, K, Mg, Mn, Fe) and anions (HCO3, CO3, SO4, Cl, SiO2, NO3, F) in mg/L. Total Dissolved Solids is reported as equivalent weight of evaporation residue.

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Ground-Water Information Center Water Quality Report
Report Date: 12/4/2017

Site Name: BUTTE MINE FLOODING OU BERKELEY PIT LAKE
[Compare to Water Quality Standards](#)

Location Information

Sample Id/Site Id: 225216 / 120678	Sample Date: 11/9/2017 2:28:00 PM
Location (TRS): 03N 07W 18 AABC	Agency/Sampler: MBMG / ICOPINI, GARY/MCGRATH, STEVE
Latitude/Longitude: 46° 1' 1" N 112° 30' 48" W	Field Number: BERKELEY PIT 200 FT
Datum: NAD83	Lab Date: 12/2/2017 1:11:57 PM
Altitude: 4615	Lab/Analyst: MBMG / TIMMER, JACKIE
County/State: SILVER BOW / MT	Sample Method/Handling: GRAB / ru:0 ra:1 fu:0 fa:0
Site Type: MINE	Procedure Type: TOTAL RECOVERABLE
Geology: 211BDBT	Total Depth (ft): NR
USGS 7.5' Quad: BUTTE NORTH	SWL-MP (ft): NR
PWS Id:	Depth Water Enters (ft): NR
Project: MINEFLO, MINEFLO_2002CDMP, MINEFLO- ACTIVE-ECBED	

Major Ion Results

	mg/L	meq/L		mg/L	meq/L
Calcium (Ca)	474.230	23.664	Bicarbonate (HCO3)	NR	0.000
Magnesium (Mg)	635.900	52.328	Carbonate (CO3)	NR	0.000
Sodium (Na)	72.510	3.154	Chloride (Cl)	NR	0.000
Potassium (K)	10.580	0.271	Sulfate (SO4)	NR	0.000
Iron (Fe)	1.649	0.059	Nitrate (as N)	NR	0.000
Manganese (Mn)	283.400	10.316	Fluoride (F)	NR	0.000
Silica (SiO2)	NR		Orthophosphate (as P)	NR	0.000
Total Cations		147.939	Total Anions		0.000

Trace Element Results (µg/L)

Aluminum (Al):	330,700.000	Cesium (Cs):	<1.000 U	Molybdenum (Mo):	4.620 J	Strontium (Sr):	1,240.710
Antimony (Sb):	<1.000 U	Chromium (Cr):	13.030	Nickel (Ni):	1,367.660	Thallium (Tl):	<1.000 U
Arsenic (As):	5.540	Cobalt (Co):	1,788.970	Niobium (Nb):	<1.000 U	Thorium (Th):	26.060
Barium (Ba):	8.250	Copper (Cu):	61,158.250	Neodymium (Nd):	375.840	Tin (Sn):	<1.000 U
Beryllium (Be):	74.880	Gallium (Ga):	<1.000 U	Palladium (Pd):	24.120	Titanium (Ti):	111.740
Boron (B):	42.200	Lanthanum (La):	265.540	Praseodymium (Pr):	103.790	Tungsten (W):	<1.000 U
Bromide (Br):	NR	Lead (Pb):	19.120	Rubidium (Rb):	57.250	Uranium (U):	728.420
Cadmium (Cd):	2,146.160	Lithium (Li):	314.680	Silver (Ag):	NR	Vanadium (V):	<1.000 U
Cerium (Ce):	997.800	Mercury (Hg):	NR	Selenium (Se):	23.620	Zinc (Zn):	634,850.000
						Zirconium (Zr):	<1.000 U

Field Chemistry and Other Analytical Results

**Total Dissolved Solids (mg/L):	NR	Field Hardness as CaCO3 (mg/L):	NR	Ammonia (mg/L):	NR
**Sum of Diss. Constituents (mg/L):	NR	Hardness as CaCO3:	3801.52	T.P. Hydrocarbons (µg/L):	NR
Field Conductivity (µmhos):	7350	Field Alkalinity as CaCO3 (mg/L):	NR	PCP (µg/L):	NR
Lab Conductivity (µmhos):	NR	Alkalinity as CaCO3 (mg/L):	NR	Phosphorus, TD (mg/L):	<0.300 U
Field pH:	4	Ryznar Stability Index:	17.548	Field Nitrate (mg/L):	NR
Lab pH:	NR	Sodium Adsorption Ratio:	0.5152	Field Dissolved O2 (mg/L):	6.230
Water Temp (°C):	4.15	Langlier Saturation Index:	-8.774	Field Chloride (mg/L):	NR
Air Temp (°C):	NR	Nitrite (mg/L as N):	NR	Field Redox (mV):	661
Nitrate + Nitrite (mg/L as N)	NR	Hydroxide (mg/L as OH):	NR	Lab, Dissolved Organic Carbon (mg/L):	NR
Total Kjeldahl Nitrogen (mg/L as N)	NR	Lab, Dissolved Inorganic Carbon (mg/L):	NR	Lab, Total Organic Carbon (mg/L):	NR
Total Nitrogen (mg/L as N)	NR	Acidity to 4.5 (mg/L CaCO3)	NR	Acidity to 8.3 (mg/L CaCO3)	NR
As(III) (ug/L)	NR	As(V) (ug/L)	NR	Total Susp Solids (mg/L)	NR

Sample Condition: CLEAR

Field Remarks: SAMPLES COLLECTED WITH DRONE BOAT; FE(II) = 0.05 MG/L

Lab Remarks:

Notes

Explanation: mg/L = milligrams per Liter; µg/L = micrograms per Liter; ft = feet; NR = No Reading in GWIC

Qualifiers: A = Hydride atomic absorption; E = Estimated due to interference; H = Exceeded holding time; J = Estimated quantity above detection limit but below reporting limit; K = Na+K combined; N = Spiked sample recovery not within control limits; P = Preserved sample; S = Method of standard additions; U = Undetected quantity below detection limit; * = Duplicate analysis not within control limits; ** = Sum of Dissolved Constituents is the sum of major cations (Na, Ca, K, Mg, Mn, Fe) and anions (HCO3, CO3, SO4, Cl, SiO2, NO3, F) in mg/L. Total Dissolved Solids is reported as equivalent weight of evaporation residue.

Disclaimer

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Ground-Water Information Center Water Quality Report
Report Date: 12/4/2017

Site Name: BUTTE MINE FLOODING OU BERKELEY PIT LAKE
[Compare to Water Quality Standards](#)

Location Information

Sample Id/Site Id: 225217 / 120678	Sample Date: 11/9/2017 2:50:00 PM
Location (TRS): 03N 07W 18 AABC	Agency/Sampler: MBMG / ICOPINI, GARY/MCGRATH, STEVE
Latitude/Longitude: 46° 1' 1" N 112° 30' 48" W	Field Number: BERKELEY PIT 450 FT
Datum: NAD83	Lab Date: 12/2/2017 1:11:57 PM
Altitude: 4615	Lab/Analyst: MBMG / TIMMER, JACKIE
County/State: SILVER BOW / MT	Sample Method/Handling: GRAB / ru:0 ra:1 fu:0 fa:0
Site Type: MINE	Procedure Type: TOTAL RECOVERABLE
Geology: 211BDBT	Total Depth (ft): NR
USGS 7.5' Quad: BUTTE NORTH	SWL-MP (ft): NR
PWS Id:	Depth Water Enters (ft): NR
Project: MINEFLO, MINEFLO_2002CDMP, MINEFLO-ACTIVE-ECBED	

Major Ion Results

	mg/L	meq/L		mg/L	meq/L
Calcium (Ca)	469.360	23.421	Bicarbonate (HCO3)	NR	0.000
Magnesium (Mg)	627.520	51.639	Carbonate (CO3)	NR	0.000
Sodium (Na)	73.890	3.214	Chloride (Cl)	NR	0.000
Potassium (K)	10.840	0.277	Sulfate (SO4)	NR	0.000
Iron (Fe)	2.250	0.081	Nitrate (as N)	NR	0.000
Manganese (Mn)	280.050	10.194	Fluoride (F)	NR	0.000
Silica (SiO2)	NR		Orthophosphate (as P)	NR	0.000
Total Cations		146.241	Total Anions		0.000

Trace Element Results (µg/L)

Aluminum (Al): 326,225.000	Cesium (Cs): <1.000 U	Molybdenum (Mo): 5.110	Strontium (Sr): 1,216.170
Antimony (Sb): <1.000 U	Chromium (Cr): 13.050	Nickel (Ni): 1,381.140	Thallium (Tl): <1.000 U
Arsenic (As): 7.760	Cobalt (Co): 1,750.640	Niobium (Nb): <1.000 U	Thorium (Th): 27.480
Barium (Ba): 8.500	Copper (Cu): 59,653.430	Neodymium (Nd): 373.220	Tin (Sn): <1.000 U
Beryllium (Be): 76.740	Gallium (Ga): <1.000 U	Palladium (Pd): 26.590	Titanium (Ti): 111.280
Boron (B): 40.240	Lanthanum (La): 259.900	Praseodymium (Pr): 99.120	Tungsten (W): <1.000 U
Bromide (Br): NR	Lead (Pb): 17.330	Rubidium (Rb): 56.480	Uranium (U): 703.850
Cadmium (Cd): 2,082.500	Lithium (Li): 303.880	Silver (Ag): NR	Vanadium (V): <1.000 U
Cerium (Ce): 955.250	Mercury (Hg): NR	Seelenium (Se): 21.010	Zinc (Zn): 628,750.000
			Zirconium (Zr): 4.060 J

Field Chemistry and Other Analytical Results

**Total Dissolved Solids (mg/L): NR	Field Hardness as CaCO3 (mg/L): NR	Ammonia (mg/L): NR
**Sum of Diss. Constituents (mg/L): NR	Hardness as CaCO3: 3754.86	T.P. Hydrocarbons (µg/L): NR
Field Conductivity (µmhos): 7370	Field Alkalinity as CaCO3 (mg/L): NR	PCP (µg/L): NR
Lab Conductivity (µmhos): NR	Alkalinity as CaCO3 (mg/L): NR	Phosphorus, TD (mg/L): <0.300 U
Field pH: 4.02	Ryznar Stability Index: 17.557	Field Nitrate (mg/L): NR
Lab pH: NR	Sodium Adsorption Ratio: 0.5255	Field Dissolved O2 (mg/L): 6.250
Water Temp (°C): 4.15	Langlier Saturation Index: -8.778	Field Chloride (mg/L): NR
Air Temp (°C): NR	Nitrite (mg/L as N): NR	Field Redox (mV): 665
Nitrate + Nitrite (mg/L as N) NR	Hydroxide (mg/L as OH): NR	Lab, Dissolved Organic Carbon (mg/L): NR
Total Kjeldahl Nitrogen (mg/L as N) NR	Lab, Dissolved Inorganic Carbon (mg/L): NR	Lab, Total Organic Carbon (mg/L): NR
Total Nitrogen (mg/L as N) NR	Acidity to 4.5 (mg/L CaCO3) NR	Acidity to 8.3 (mg/L CaCO3) NR
As(III) (ug/L) NR	As(V) (ug/L) NR	Total Susp Solids (mg/L) NR

Sample Condition: CLEAR

Field Remarks: SAMPLES COLLECTED WITH DRONE BOAT; FE(II) = 0.07 MG/L

Lab Remarks:

Notes

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