

APPENDIX A.

Table 1. PMP Well Construction Details and Monitoring Frequency

Monitoring Station Details			Current Monitoring Frequency		
Location	Media	Monitoring Zone	Program	Static Water Level Monitoring	Water-Quality Monitoring
Transect A-A' Upgradient Control					
AMW-08	Groundwater	UAU	BMFOU/BPSOU	Monthly	Quarterly
AMW-09	Groundwater	UAU	None	Monthly	Quarterly
BPS11-20	Groundwater	MAU	BPSOU	Monthly	Quarterly
GS-09-02	Groundwater	UAU	BPSOU	Monthly (1)	Quarterly (1)
GS-09-03	Groundwater	UAU	BPSOU	Monthly (1)	Quarterly (1)
GS-40	Groundwater	MAU	BPSOU	Monthly	Quarterly
Hotspot Monitoring Locations					
GS-09-01	Groundwater	UAU	BPSOU	Monthly (1)	Quarterly (1)
GS-41D	Groundwater	MAU	BMFOU/ BPSOU	Monthly (1)	Quarterly (1)
GS-41S	Groundwater	UAU	BMFOU/ BPSOU	Monthly (1)	Quarterly (1)
GS-42D	Groundwater	MAU	BPSOU	Monthly	Quarterly
GS-42S	Groundwater	UAU	BPSOU	Monthly	Quarterly
GS-45	Groundwater	UAU	BPSOU	Monthly (1)	Quarterly (1)
PT14-1	Groundwater	UAU	None	Monthly	Quarterly
Transect B-B' Parrot Plume Downgradient Area					
AMW-01A	Groundwater	UAU	BPSOU	Monthly	Quarterly
AMW-01B	Groundwater	MAU	BPSOU	Monthly	Quarterly
AMW-01C	Groundwater	LAU	BPSOU	Monthly	Quarterly
BPS07-11A	Groundwater	UAU	BPSOU	Monthly	Quarterly
BPS07-11B	Groundwater	MAU	BPSOU	Monthly	Quarterly
MH-MSD116	MSD Subdrain	MSD Subdrain	BPSOU	Monthly	Quarterly
PMP-01A	Groundwater	UAU	Parrot Performance	Continuous	Quarterly
PMP-01B	Groundwater	MAU	Parrot Performance	Continuous	Quarterly
PMP-02A	Groundwater	UAU	Parrot Performance	Continuous	Quarterly
PMP-02B	Groundwater	MAU	Parrot Performance	Continuous	Quarterly
PMP-03A	Groundwater	UAU	Parrot Performance	Continuous	Quarterly
PMP-04B	Groundwater	MAU	Parrot Performance	Continuous	Quarterly
Transect C-C' Parrot Plume Center					
BPS11-17C	Groundwater	LAU	BPSOU	Monthly	Quarterly
BPS11-18B	Groundwater	MAU	BPSOU	Monthly	Quarterly
BPS11-18C	Groundwater	LAU	BPSOU	Monthly	Quarterly
MF-07	Groundwater	UAU	BPSOU	Monthly	Quarterly
MF-07B	Groundwater	MAU	Parrot Performance	Continuous	Quarterly
MF-11	Groundwater	UAU	BPSOU	Continuous	Quarterly
MH-MSD113	MSD Subdrain	MSD Subdrain	BPSOU	Monthly	Quarterly
MSD-02A	Groundwater	UAU	BPSOU	Monthly	Quarterly
MSD-02B	Groundwater	MAU	BPSOU	Monthly	Quarterly
MSD-04	Groundwater	MAU	BPSOU	Monthly	Quarterly
PMP-05A	Groundwater	UAU	Parrot Performance	Continuous	Quarterly
PMP-05B	Groundwater	MAU	Parrot Performance	Continuous	Quarterly
PMP-06A	Groundwater	UAU	Parrot Performance	Continuous	Quarterly
PMP-06B	Groundwater	MAU	Parrot Performance	Continuous	Quarterly
PMP-07A	Groundwater	UAU	Parrot Performance	Monthly	Quarterly
PMP-07B	Groundwater	MAU	Parrot Performance	Monthly	Quarterly
Transect D-D' Parrot Plume Tail					
AMC-23	Groundwater	UAU	BPSOU/BMFOU	Monthly	NS (2)
AMC-23B	Groundwater	MAU	BPSOU	Monthly	Quarterly
AMC-24	Groundwater	UAU	BPSOU	Monthly	NS (2)
AMC-24B	Groundwater	MAU	BPSOU	Monthly	Quarterly
AMC-24C	Groundwater	LAU	BPSOU	Monthly	Quarterly
BPS11-10A	Groundwater	UAU	BPSOU	Monthly	Quarterly
BPS11-10B	Groundwater	MAU	BPSOU	Monthly	Quarterly
BPS11-10C	Groundwater	LAU	BPSOU	Monthly	Quarterly
BPS11-11A1	Groundwater	Perched Aquifer	BPSOU	Monthly	Quarterly
BPS11-11A2	Groundwater	UAU	BPSOU	Monthly	Quarterly
BPS11-11B	Groundwater	MAU	BPSOU	Monthly	Quarterly
BPS11-11C	Groundwater	LAU	BPSOU	Monthly	Quarterly
BPS11-19A2	Groundwater	UAU	BPSOU	Continuous	Quarterly
BPS11-19B	Groundwater	MAU	BPSOU	Continuous	Quarterly
MF-03	Groundwater	UAU	None	Monthly	NS
MH-MSD108	MSD Subdrain	MSD Subdrain	BPSOU	Monthly	Quarterly
MSDSG-03	Surface Water	Groundwater Seep	None	Monthly	Quarterly
PMP-08A	Groundwater	Perched Aquifer	Parrot Performance	Continuous	Quarterly
PMP-08A2	Groundwater	UAU	Parrot Performance	Continuous	Quarterly
PMP-08B	Groundwater	MAU	Parrot Performance	Continuous	Quarterly
PMP-09A	Groundwater	UAU	Parrot Performance	Monthly	Quarterly
PMP-09B	Groundwater	MAU	Parrot Performance	Monthly	Quarterly
PMP-10A	Groundwater	UAU	Parrot Performance	Continuous	Quarterly
PMP-10B	Groundwater	MAU	Parrot Performance	Continuous	Quarterly

Transect E-E' Parrot Plume Downgradient					
AMW-13	Groundwater	UAU	BPSOU	Continuous	Quarterly
AMW-13B	Groundwater	MAU	BPSOU	Monthly	Quarterly
AMW-13B2	Groundwater	MAU/LAU	BPSOU	Monthly	Quarterly
AMW-13C	Groundwater	LAU	BPSOU	Continuous	Quarterly
BPS07-23	Groundwater	UAU	BPSOU	Monthly	Quarterly
BSP07-07	Groundwater	UAU	BPSOU	Monthly	Quarterly
BSP07-07B	Groundwater	MAU	Parrot Performance	Continuous	Quarterly
GS-28	Groundwater	UAU	BSOU	Continuous	Quarterly
GS-28B	Groundwater	MAU	Parrot Performance	Continuous	Quarterly
GS-29D	Groundwater	Bedrock	None	Monthly	Quarterly
GS-29SR	Groundwater	UAU	None	Monthly	Quarterly
MF-01	Groundwater	UAU	BMFOU/ BPSOU	Monthly	Quarterly
MSDSG-02	Surface Water	Groundwater Seep	None	Monthly	Quarterly
MSDSG-05	Surface Water	Blacktail Creek	None	Continuous	Quarterly
PMP-11A	Groundwater	UAU	Parrot Performance	Continuous	Quarterly
PMP-11B	Groundwater	MAU	Parrot Performance	Continuous	Quarterly
PMP-12	Surface Water	Upper Silver Bow Creek	Parrot Performance	Continuous	Quarterly
SS-04	Surface Water	Blacktail Creek	BPSOU	Continuous	Quarterly

(1) Wells were abandoned in June 2018 prior to Phase IIA Parrot Tailing Removal

(2) Wells were dropped from the sampling program in June 2018 due to well completion concerns,

Notes:

CERCLA	Comprehensive Environmental Response, Compensatory	UAU	Upper Alluvial Unit of the Summit Valley Alluvial Aquifer
MT	Montana	MAU	Middle Alluvial Unit of the Summit Valley Alluvial Aquifer
ST	State	LAU	Lower Alluvial Unit of the Summit Valley Alluvial Aquifer
NAVD	National American Vertical Datum of 1988	BMFOU	Butte Mine Flooding Operable Unit
SBC	Silver Bow Creek	BPSOU	Butte Priority Soils Operable Unit
BSB	Butte Silver Bow	NS	Not Sampled

Table 2. Transducer/Continuous Monitoring Parameter Inventory

Location	Transect	Transducer Type	Interval	Placement	Serial No.	Firmware Version	Model
PMP-01A	B	Solinst Edge	15 min	Suspended 6-inches from bottom	2081585	3.004	F30/M10
PMP-01B	B	Solinst Edge	15 min	Suspended 6-inches from bottom	2081499	3.004	F30/M10
PMP-02A	B	Solinst Edge	15 min	Suspended 6-inches from bottom	2081509	3.004	F30/M10
PMP-02B	B	Solinst Edge	15 min	Suspended 6-inches from bottom	2081586	3.004	F30/M10
PMP-03A	B	Solinst Edge	15 min	Suspended 6-inches from bottom	2081535	3.004	F30/M10
PMP-03A	B	In-Situ AquaTroll	1 Hour	Suspended 2' above bottom	579207	2.01	AT600
PMP-04B	B	Solinst Edge	15 min	Suspended 6-inches from bottom	2081591	3.004	F30/M10
MF-07B	C	Solinst Edge	15 min	Suspended 10' below WL	2081588	3.004	F30/M10
MF-11	C	Solinst Edge	15 min	Suspended 10' below WL	2081508	3.004	F30/M10
PMP-05A	C	Solinst SC Probe	15 min	Suspended 10' below WL	2081580	3.004	F30/M10
PMP-05A	C	Solinst Barologger	15 min	Suspended into PVC casing above groundwater	2081697	3.004	F5/M1.5
PMP-05A	C	In-Situ AquaTroll	1 Hour	Suspended 2' above bottom	579218	2.01	AT600
PMP-05B	C	Solinst SC Probe	15 min	Suspended 10' below WL	2081590	3.004	F30/M10
PMP-05B	C	In-Situ AquaTroll	1 Hour	Suspended 2' above bottom	565104	2.01	AT600
PMP-06A	C	Solinst Edge	15 min	Suspended 6-inches from bottom	121072936	3.004	F30/M10
PMP-06B	C	Solinst Edge	15 min	Suspended 6-inches from bottom	121072940	3.004	F30/M10
BPS11-19A2	D	Solinst Jr	15 min	Suspended 10' below WL	2081048	3.004	F30/M10
BPS11-19B	D	Solinst Jr	15 min	Suspended 10' below WL	2081057	3.004	F30/M10
PMP-08A	D	Solinst Jr	15 min	Suspended 10' below WL	2081062	3.004	F30/M10
PMP-08A2	D	Solinst Jr	15 min	Suspended 10' below WL	2081051	3.004	F30/M10
PMP-08B	D	Solinst Jr	15 min	Suspended 10' below WL	2081052	3.004	F30/M10
PMP-10A	D	Solinst Edge	15 min	Suspended 10' below WL	2081589	3.004	F30/M10
PMP-10B	D	Solinst Edge	15 min	Suspended 10' below WL	2081524	3.004	F30/M10
AMW-13A	E	Solinst SC Probe	15 min	Suspended 10' below WL	121072933	3.004	F30/M10
AMW-13C	E	Solinst SC Probe	15 min	Suspended 10' below WL	121072826	3.004	F30/M10
BPS07-07B	E	Solinst Jr	15 min	Suspended 10' below WL	2081063	3.004	F30/M10
GS-28	E	Solinst Jr	15 min	Suspended 10' below WL	2081066	3.004	F30/M10
GS-28B	E	Solinst Jr	15 min	Suspended 10' below WL	2081055	3.004	F30/M10
MSDSG-05	E	Solinst Jr	15 min	Surface Water Location (stilling well)	2081059	3.004	F30/M10
PMP-11A	E	Solinst Jr	15 min	Suspended 10' below WL	2081064	3.004	F30/M10
PMP-11B	E	Solinst Jr	15 min	Suspended 10' below WL	2021235	3.002	F30/M10
PMP-12	E	Solinst Jr	15 min	Surface Water Location (stilling well)	2081049	3.004	F30/M10
SS-04	E	Solinst SC Probe	15 min	Surface Water Location (stilling well)	121072934	3.004	F30/M10

Table 3. Sampling Parameters for Groundwater and Surface Water

Sampling Matrix for Groundwater			
Analysis	Method	Matrix	Sample Preparation
Dissolved Metals	EPA 200.7 & 200.8	Water	1-500mL filtered (0.45 micron) + Acidified (2% HNO ₃)
Anions by Chromatography (Br, Cl, SO ₄)	E 300.0	Water	1-250 mL filtered (0.45 micron) + untreated
Fluoride	A4500-FC	Water	1-250 mL filtered (0.45 micron) + untreated
Total Alkalinity	A2320 B	Water	1-500 mL, unfiltered + untreated
Total Nitrogen	E353.2	Water	1-250mL, Filtered (0.45 micron) + acidified (0.5% H ₂ SO ₄)
Rare Earth Elements (REEs)	E 200.7/ 200.8	Water	1-250 mL filtered (0.45 micron) + Acidified (2% HNO ₃)
Physical parameters (ph and SC)	A4500-HB; A2510B	Water	1-500 mL, unfiltered + untreated
Hardness	A2340 B	Water	1-250 mL filtered (0.45 micron) + untreated
Solids, Total Dissolved	A2540 C	Water	1-250 mL filtered (0.45 micron) + untreated
Total Organic Carbon	A5310 C	Water	1-60mL unfiltered + acidified (2% HCL)
Dissolved Organic Carbon	A5310 C	Water	1-60mL Filtered (0.45 micron) + acidified (2% HCL)
Anion/ Cation Balance	A 1030 E	Water	
Sampling Matrix for Surface Water			
Analysis	Method	Matrix	Sample Preparation
Total Recoverable Metals	EPA 200.7 & 200.8	Water	1-500mL, unfiltered + acidified (2% HNO ₃)
Dissolved Metals	EPA 200.7 & 200.8	Water	1-500mL filtered (0.45 micron) + Acidified (2% HNO ₃)
Anions by Chromatography (Br, Cl, SO ₄)	E 300.0	Water	1-250 mL filtered (0.45 micron) + untreated
Fluoride	A4500-FC	Water	1-250 mL filtered (0.45 micron) + untreated
Total Alkalinity	A2320 B	Water	1-500 mL, unfiltered + untreated
Total Nitrogen	E353.2	Water	1-250mL, Filtered (0.45 micron) + acidified (0.5% H ₂ SO ₄)
Rare Earth Elements (REEs)	E 200.7/ 200.8	Water	1-250 mL filtered (0.45 micron) + Acidified (2% HNO ₃)
Physical Parameters (ph and SC)	A4500-HB; A2510B	Water	1-500 mL, unfiltered + untreated
Hardness	A2340 B	Water	1-250 mL filtered (0.45 micron) + untreated
Solids, Total Dissolved	A2540 C	Water	1-250 mL filtered (0.45 micron) + untreated
Total Organic Carbon	A5310 C	Water	1-60mL unfiltered + acidified (2% HCL)
Dissolved Organic Carbon	A5310 C	Water	1-60mL Filtered (0.45 micron) + acidified (2% HCL)
Anion/ Cation Balance	A 1030 E	Water	

NOTES:

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| EPA | Environmental Protection Agency |
| mL | Milliliter |
| % | Percent |
| HNO ₃ | Nitric Acid |
| SM | Standard Method |
| H ₂ SO ₄ | Sulfuric Acid |
| HCL | Hydrochloric Acid |
| Br | Bromide |
| Cl | Chloride |
| SO ₄ | Sulfate |
| SC | Specific conductivity |