



**Prepared for:**



# Black Butte Copper Project Draft Environmental Impact Statement

March 2019

## TABLE OF CONTENTS

EXECUTIVE SUMMARY .....	ES-1
1. Purpose and Need .....	1-1
1.1. Introduction .....	1-1
1.2. Purpose and Need .....	1-1
1.2.1. Department of Environmental Quality .....	1-1
1.2.2. The Proponent .....	1-1
1.3. Project Location and History .....	1-2
1.4. Scope of the Document .....	1-4
1.5. Agency Roles and Responsibilities .....	1-5
1.5.1. State and County Agencies .....	1-5
1.5.2. Federal Agencies .....	1-7
1.6. Development of Alternatives .....	1-8
1.6.1. Public Participation .....	1-8
1.6.2. Issues of Concern .....	1-9
1.6.3. Issues Considered but Not Studied in Detail .....	1-11
2. Description of Alternatives .....	2-1
2.1. No Action Alternative .....	2-1
2.2. Proposed Action .....	2-1
2.2.1. Proposed Action Overview .....	2-2
2.2.2. Construction (Mine Years 0–2) .....	2-6
2.2.3. Operations (Mine Years 3–15) .....	2-9
2.2.4. Water Treatment Plant .....	2-12
2.2.5. Roads .....	2-12
2.2.6. Pipelines and Ditches .....	2-13
2.2.7. Power and Miscellaneous Facilities .....	2-13
2.2.8. Reclamation and Closure (Mine Years 16–19) .....	2-14
2.3. Agency Modified Alternative: Additional Backfill of Mine Workings .....	2-16
2.4. Alternatives Considered but Dismissed from Detailed Analysis .....	2-16
2.5. Preferred Alternative .....	2-23
3. Affected Environment and Environmental Consequences .....	3.1-1
3.1. Introduction .....	3.1-1
3.1.1. Location Description and Study Area .....	3.1-1
3.1.2. Impact Assessment Methodology .....	3.1-2
3.2. Air Quality .....	3.2-1
3.2.1. Regulatory Framework .....	3.2-1
3.2.2. Analysis Methods .....	3.2-9
3.2.3. Affected Environment .....	3.2-12
3.2.4. Environmental Consequences .....	3.2-17

3.3. Cultural/Tribal/Historic Resources .....	3.3-1
3.3.1. Analysis Methods .....	3.3-1
3.3.2. Affected Environment .....	3.3-3
3.3.3. Environmental Consequences .....	3.3-5
3.4. Groundwater Hydrology .....	3.4-1
3.4.1. Analysis Methods .....	3.4-1
3.4.2. Affected Environment .....	3.4-10
3.4.3. Environmental Consequences .....	3.4-37
3.5. Surface Water Hydrology.....	3.5-1
3.5.1. Analysis Methods .....	3.5-1
3.5.2. Affected Environment .....	3.5-6
3.5.3. Environmental Consequences .....	3.5-10
3.6. Geology and Geochemistry .....	3.6-1
3.6.1. Analysis Methods .....	3.6-1
3.6.2. Affected Environment .....	3.6-1
3.6.3. Environmental Consequences .....	3.6-14
3.7. Land Use and Recreation .....	3.7-1
3.7.1. Analysis Methods .....	3.7-1
3.7.2. Affected Environment .....	3.7-1
3.7.3. Environmental Consequences .....	3.7-6
3.8. Visuals and Aesthetics .....	3.8-1
3.8.1. Analysis Methods .....	3.8-1
3.8.2. Affected Environment .....	3.8-2
3.8.3. Environmental Consequences .....	3.8-5
3.9. Socioeconomics.....	3.9-1
3.9.1. Analysis Methods .....	3.9-1
3.9.2. Affected Environment .....	3.9-1
3.9.3. Environmental Consequences .....	3.9-12
3.10. Soils.....	3.10-1
3.10.1. Analysis Methods.....	3.10-1
3.10.2. Affected Environment.....	3.10-2
3.10.3. Environmental Consequences.....	3.10-9
3.11. Noise.....	3.11-1
3.11.1. Analysis Methods.....	3.11-2
3.11.2. Affected Environment.....	3.11-4
3.11.3. Environmental Consequences.....	3.11-4
3.12. Transportation .....	3.12-1
3.12.1. Analysis Methods.....	3.12-1
3.12.2. Affected Environment.....	3.12-2
3.12.3. Environmental Consequences.....	3.12-8
3.13. Vegetation .....	3.13-1
3.13.1. Analysis Methods.....	3.13-1
3.13.2. Affected Environment.....	3.13-1

3.13.3. Environmental Consequences .....	3.13-7
3.14. Wetlands .....	3.14-1
3.14.1. Analysis Methods.....	3.14-1
3.14.2. Affected Environment.....	3.14-1
3.14.3. Environmental Consequences .....	3.14-11
3.15. Wildlife.....	3.15-1
3.15.1. Analysis Methods.....	3.15-1
3.15.2. Affected Environment.....	3.15-1
3.15.3. Environmental Consequences .....	3.15-16
3.16. Aquatic Biology .....	3.16-1
3.16.1. Analysis Methods.....	3.16-1
3.16.2. Affected Environment.....	3.16-8
3.16.3. Environmental Consequences .....	3.16-27
4. Cumulative, Unavoidable, Irreversible and Irrecoverable, and Secondary Impacts and Regulatory Restrictions.....	4-1
4.1. Methodology .....	4-1
4.1.1. Identification of Geographic Extent .....	4-1
4.1.2. Identification of Timeframes .....	4-2
4.1.3. Identification of Past, Present, and Future Projects/Actions .....	4-2
4.2. Cumulative Impacts.....	4-3
4.2.1. Present Projects and Actions .....	4-3
4.2.2. Related Future Actions .....	4-7
4.3. Unavoidable Adverse Impacts.....	4-13
4.3.1. Groundwater Hydrology.....	4-13
4.3.2. Vegetation.....	4-14
4.3.3. Wetlands .....	4-14
4.3.4. Wildlife.....	4-14
4.3.5. Aquatic Biology.....	4-14
4.4. Irreversible and Irrecoverable Commitment of Resources .....	4-15
4.4.1. Vegetation.....	4-15
4.4.2. Wetlands .....	4-16
4.4.3. Wildlife.....	4-16
4.4.4. Aquatic Biology.....	4-16
4.5. Regulatory Restrictions .....	4-16
5. Comparison of Alternatives .....	5-1
5.1. Comparison of Alternatives .....	5-1
5.1.1. No Action Alternative .....	5-1
5.1.2. Proposed Action .....	5-1
5.1.3. Agency Modified Alternative: Additional Backfill of Mine Workings .....	5-2
6. Consultation and Coordination .....	6-1
7. List of Preparers .....	7-1

8. References.....	8-1
8.1. Chapter 1 .....	8-1
8.2. Chapter 2 .....	8-1
8.3. Chapter 3 .....	8-3
8.3.1. Introduction .....	8-3
8.3.2. Air Quality.....	8-3
8.3.3. Cultural and Tribal .....	8-5
8.3.4. Groundwater Hydrology.....	8-5
8.3.5. Surface Water Hydrology.....	8-7
8.3.6. Geology and Geochemistry .....	8-9
8.3.7. Land Use and Recreation.....	8-11
8.3.8. Visuals and Aesthetics.....	8-13
8.3.9. Socioeconomics .....	8-13
8.3.10. Soils.....	8-14
8.3.11. Noise .....	8-15
8.3.12. Transportation.....	8-16
8.3.13. Vegetation.....	8-16
8.3.14. Wetlands .....	8-17
8.3.15. Wildlife .....	8-18
8.3.16. Aquatic Biology .....	8-19
8.4. Chapter 4 .....	8-23

### List of Appendices

- Appendix A:** Technical Memorandum 1
- Appendix B:** Technical Memorandum 2
- Appendix C:** Technical Memorandum 3
- Appendix D:** Technical Memorandum 4
- Appendix E:** Technical Memorandum 5
- Appendix F:** Technical Memorandum 6
- Appendix J:** Technical Memorandum 7
- Appendix H:** Technical Memorandum 8
- Appendix I:** Baseline Surface Water Quality
- Appendix J:** Scoping Report
- Appendix K:** Preliminary Determination on Air Quality Permit Application

**List of Tables**

Table 1.5-1 State Agencies–Potential Requirements ..... 1-5

Table 1.5-2 Federal Agencies–Potential Requirements ..... 1-8

Table 2.2-1 Surface Disturbances in the Project Area ..... 2-4

Table 3.1-1 Impact Significance Criteria ..... 3.1-3

Table 3.2-1 National and Montana Ambient Air Quality Standards..... 3.2-3

Table 3.2-2 Climate Data for the Project Vicinity – White Sulphur Springs, Montana .... 3.2-12

Table 3.2-3 Historical Regional Trends, Gaseous Criteria Pollutants, 2012–2016 ..... 3.2-14

Table 3.2-4 Historical Regional Trends, Particulate Criteria Pollutants, 2012–2016..... 3.2-15

Table 3.2-5 State or Local Air Monitoring Stations Operating in the  
 Region of the Project Site ..... 3.2-15

Table 3.2-6 Roster of Proposed Action Stationary Point Sources ..... 3.2-19

Table 3.2-7 Roster of Proposed Action Fugitive Dust Sources ..... 3.2-21

Table 3.2-8 Selected Monitored Background Concentrations for  
 NAAQS/MAAQS Analysis ..... 3.2-30

Table 3.2-9 Comparison of Total Criteria Pollutant Impacts and Ambient  
 Air Standards ..... 3.2-31

Table 3.2-10 Comparison of Emergency Generator Impacts to Ambient  
 PM2.5 NAAQS ..... 3.2-32

Table 3.3-1 Cultural Resources Identified within the Survey Area ..... 3.3-3

Table 3.4-1 Parameters, Methods, and Detection Limits for Baseline  
 Groundwater Monitoring ..... 3.4-5

Table 3.4-2 Hydraulic Properties of Hydrostratigraphic Units ..... 3.4-15

Table 3.4-3a Groundwater Quality Summary Statistics - MW-4A  
 (Well completed in Alluvium) ..... 3.4-27

Table 3.4-3b Groundwater Quality Summary Statistics - MW-4B  
 (Well completed in Shallow Bedrock)..... 3.4-29

Table 3.4-3c Groundwater Quality Summary Statistics - MW-3  
 (Well completed in Sulfide Ore Zone)..... 3.4-31

Table 3.4-3d Groundwater Quality Summary Statistics – PW-7  
 (Well completed in in Lower Copper Zone)..... 3.4-33

Table 3.4-4 Observed Base Flow and Calculated Groundwater Recharge ..... 3.4-36

Table 3.4-5 Groundwater Discharge (Base Flow) Estimates for  
 Selected Sheep Creek Watershed Areas ..... 3.4-37

Table 3.4-6 Groundwater Model- Simulated Annual Average Inflow to  
 Mine Workings ..... 3.4-40

Table 3.4-7 Model-Simulated Groundwater Discharge to Surface Waters..... 3.4-45

Table 3.4-8	Project Potential Consequences with regard to Groundwater Quantity and Quality.....	3.4-61
Table 3.5-1	Sampling Summary for Baseline Surface Water Quality Monitoring.....	3.5-6
Table 3.5-2	Stream Flow Ranges from 2011–2017 .....	3.5-6
Table 3.5-3	Spring Flow Ranges from 2011–2017 .....	3.5-9
Table 3.5-4	Project’s Potential Consequences Regarding Surface Water Quantity.....	3.5-15
Table 3.5-5	Model Predictions for Underground Water Quality after Closure.....	3.5-20
Table 3.5-6	Year 2 Results for Waste Rock Storage Facility .....	3.5-22
Table 3.5-7	Predicted Water Quality in the Cemented Tailing Facility Sump at Year 6, Including Sensitivity Analyses .....	3.5-25
Table 3.5-8	Predicted Water Quality in the CTF Sump at Closure, Including Sensitivity Analyses.....	3.5-27
Table 3.5-9	Predicted Water Quality in PWP at Year 6.....	3.5-29
Table 3.5-10	Results of the Proposed Action Water Quality Predictions .....	3.5-33
Table 3.5-11	Project’s Potential Consequences Regarding Surface Water Quality.....	3.5-36
Table 3.6-1	Geochemical Testing of Major Waste Rock and Near-surface Materials by Lithotype.....	3.6-9
Table 3.6-2	Black Butte Copper Project Tailings Treatments and Related Testing .....	3.6-10
Table 3.6-3	Total Organic Carbon Content of Waste Rock Composite Samples .....	3.6-12
Table 3.6-4	Tailings Characteristics, Kinetic Test Methods, and Facility Scenarios .....	3.6-13
Table 3.6-5a	Project Cut and Fill Quantities.....	3.6-17
Table 3.6-5b	Project Cut and Fill Quantities by Material Type and Source (1) .....	3.6-19
Table 3.7-1	Existing Land Use within Black Butte Copper Project Area.....	3.7-2
Table 3.7-2	Public Campgrounds within 15 miles of the Black Butte Copper Project Area .....	3.7-3
Table 3.7-3	Public Hiking Trails within 15 miles of the Black Butte Copper Project Area .....	3.7-3
Table 3.7-4	Angler Use Days for Sheep Creek and Smith River between 2001 and 2015..	3.7-4
Table 3.7-5	Montana Fish, Wildlife & Parks Hunter Days Data for Deer and Elk .....	3.7-4
Table 3.7-6	Smith River Private Float Permit Applications by Year.....	3.7-8
Table 3.9-1	2016 Selected Population and Demographic Measures.....	3.9-3
Table 3.9-2	2016 Meagher County Employment by Industry.....	3.9-4
Table 3.9-3	2016 Selected Employment and Income Measures .....	3.9-5
Table 3.9-4	2016 Top Employers in Meagher County.....	3.9-6
Table 3.9-5	2016 Selected Housing Measures .....	3.9-6
Table 3.9-6	2016-2017 School Enrollment .....	3.9-8

Table 3.9-7	2016 Educational Attainment .....	3.9-10
Table 3.9-8	2017 Selected Health Measures .....	3.9-11
Table 3.9-9	Project Workforce Estimates .....	3.9-13
Table 3.9-10	Projected Workforce Influx .....	3.9-14
Table 3.9-11	Projected Population Influx Relocating to Meagher County and Areas within 110 miles of the Project.....	3.9-15
Table 3.10-1	Summary of Soil Map Units in the Analysis Area .....	3.10-2
Table 3.10-2	Acres of Disturbance and Estimated Salvage Volumes for Soil Series Associated with the Project.....	3.10-10
Table 3.10-3	Salvage Recommendations for Soil Series Associated with Project Disturbance.....	3.10-15
Table 3.11-1	Construction Noise Guidelines .....	3.11-2
Table 3.11-2	Anticipated Community Noise Reaction .....	3.11-2
Table 3.11-3	Ambient Noise Levels.....	3.11-4
Table 3.11-4	Predicted Construction Phase Noise Levels (dBA) .....	3.11-5
Table 3.11-5	Predicted Noise Levels for Blasting at or near the Ground Surface.....	3.11-6
Table 3.11-6	Predicted Operations Phase Noise Levels (dBA) .....	3.11-7
Table 3.11-7	Predicted Construction and Operations Phase Traffic Noise Levels Near the Mine Site .....	3.11-8
Table 3.11-8	Predicted U.S. 89 Traffic Noise Levels .....	3.11-9
Table 3.12-1	2016 Average Annual Daily Traffic on Analysis Area Roads .....	3.12-3
Table 3.12-2	Historic Average Annual Daily Traffic on Analysis Area Roads.....	3.12-4
Table 3.12-3	Increase in AADT during Project Construction.....	3.12-9
Table 3.12-4	Increase in AADT during Project Operations (Compared to 2016 AADT) .	3.12-10
Table 3.13-1	Habitat and Sub-Community Type Noted in the Analysis Area.....	3.13-2
Table 3.13-2	Plant Species of Concern Known to Occur in Meagher County, Montana ....	3.13-6
Table 3.13-3	Noxious and Problematic Weeds within the Analysis Area .....	3.13-7
Table 3.13-4	Mine Site Vegetation Community Impacts.....	3.13-9
Table 3.13-5	Mine Site Ecological Community Impacts .....	3.13-10
Table 3.14-1	Wetland Acreage by Cowardin Classification and Watershed.....	3.14-3
Table 3.14-2	Black Butte Project Wetland Rating by Assessment Areas.....	3.14-9
Table 3.14-3	Total Projected Wetland Impacts at the Black Butte Copper Mine Site.....	3.14-12
Table 3.15-1	Habitat Types in Wildlife Analysis Area.....	3.15-3
Table 3.15-2	Potential Occurrence of Listed Terrestrial Species or Species of Concern ....	3.15-6
Table 3.15-3	Proposed Action Habitat Impacts in Wildlife Analysis Area .....	3.15-19



Table 3.16-1	Aquatic Monitoring Station Locations at the Downstream and Upstream Ends of the Assessment Reach.....	3.16-4
Table 3.16-2	Stream Discharge Reported at Four Surface Water Quality Stations and Associated Aquatic Monitoring Reaches in the Project Area, 2014–2017.....	3.16-9
Table 3.16-3	Fish Species Documented in the Black Butte Copper Project Area, 2014–2017.....	3.16-13
Table 3.16-4	Baseline Whole Body Metal Values Downstream and Upstream of the Project Area.....	3.16-19
Table 3.16-5	Macroinvertebrate Sample Characteristics and Metrics.....	3.16-23
Table 3.16-6	Periphyton Sample Metrics.....	3.16-26
Table 4.1-1	Cumulative Impacts Assessment Areas.....	4-2
Table 5.1-1	Comparison of Project Impacts by Alternative.....	5-3
Table 6-1	Agencies Consulted.....	6-1

### **List of Figures**

Figure 1.3-1	Project Location.....	1-3
Figure 2.2-1	Project Facilities Site Plan.....	2-3
Figure 3.2-2	PM10 24-Hour Average.....	3.2-36
Figure 3.2-3	PM10 Annual Average.....	3.2-37
Figure 3.2-4	PM2.5 24-Hour Average.....	3.2-38
Figure 3.2-5	PM2.5 Annual Average.....	3.2-39
Figure 3.3-1	Cultural Resources Survey Area.....	3.3-2
Figure 3.4-1	Groundwater Hydrology Baseline Monitoring Sites/Local Study Area.....	3.4-3
Figure 3.4-2	Groundwater Hydrology Conceptual Model Area & Regional Study Area.....	3.4-4
Figure 3.4-3	Geologic Map of Conceptual Model Domain.....	3.4-12
Figure 3.4-4	Geologic Cross Sections of Conceptual Model Domain.....	3.4-13
Figure 3.4-5	Hydrostratigraphic Units.....	3.4-14
Figure 3.4-6	Groundwater Potentiometric Map for Conceptual Model Domain.....	3.4-19
Figure 3.4-7	Groundwater Potentiometric Map for Local Study Area.....	3.4-20
Figure 3.4-8	Block Groundwater Flow Diagram.....	3.4-22
Figure 3.4-9	Model-simulated Groundwater Drawdowns – Year 4.....	3.4-42
Figure 3.4-10	Model-simulated Groundwater Drawdowns – Year 15.....	3.4-43
Figure 3.4-11	Groundwater Model-Simulated Water Level Recovery – Post Mining.....	3.4-47
Figure 3.4-12a	Project Facilities Site Plan.....	3.4-49
Figure 3.4-12b	Alluvium Infiltration Testing.....	3.4-50

Figure 3.4-12c Alluvial Underground Infiltration Gallery .....	3.4-51
Figure 3.4-13 Schematic Comparison of Revised Base Case (Proposed Action) and Agency Modified Alternative .....	3.4-59
Figure 3.5-1 Project Location .....	3.5-3
Figure 3.5-2 Surface Water Resources Monitoring Sites, Major Creeks, and Tributaries ....	3.5-4
Figure 3.5-3 Baseline Spring and Seep Sites .....	3.5-5
Figure 3.5-4 Hydrograph of SW-1 Sheep Creek Monitoring Site.....	3.5-8
Figure 3.6-1 Geologic Map of the Project Area .....	3.6-4
Figure 3.6-2 Stratigraphic Section.....	3.6-5
Figure 3.6-3 Generalized Geologic Cross-Section A-A' with Ore Deposits and Ramp Access.....	3.6-6
Figure 3.6-4 Schematic Cross-Sections .....	3.6-7
Figure 3.6-5 Geotechnical Site Investigation Drill Hole and Test Pit Locations with Facilities.....	3.6-15
Figure 3.8-1 Assessment Area.....	3.8-3
Figure 3.8-2 Existing Mines and Quarries.....	3.8-4
Figure 3.8-3 Campgrounds, Parks, and Recreation Areas.....	3.8-6
Figure 3.8-4 Average Annual Daily Traffic .....	3.8-7
Figure 3.8-5 Viewpoints .....	3.8-9
Figure 3.8-6 Viewpoint 2 Existing .....	3.8-10
Figure 3.8-7 Viewpoint 2 Proposed.....	3.8-11
Figure 3.8-8 Viewpoint 6 Existing .....	3.8-12
Figure 3.8-9 Viewpoint 6 Proposed.....	3.8-13
Figure 3.8-10 Viewpoint 7 Existing .....	3.8-14
Figure 3.8-11 Viewpoint 7 Proposed.....	3.8-15
Figure 3.8-12 Oblique Aerial.....	3.8-16
Figure 3.9-1 Socioeconomic Analysis Area .....	3.9-2
Figure 3.10-1 Baseline Soil Survey Map.....	3.10-3
Figure 3.11-1 Project Facilities and Noise Measurement Locations .....	3.11-3
Figure 3.12-1 AADT Count Locations .....	3.12-5
Figure 3.12-2 Smith River Float Route and Major Roads.....	3.12-13
Figure 3.13-1 Vegetative Communities.....	3.13-4
Figure 3.13-2 Vegetative and Soil Ecological Communities .....	3.13-5
Figure 3.14-1 Surveyed Wetlands .....	3.14-2
Figure 3.14-2 Surveyed Wetland Classifications .....	3.14-4

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Figure 3.14-3	Surveyed Wetland Classifications .....	3.14-5
Figure 3.14-4	Surveyed Wetland Classifications .....	3.14-6
Figure 3.14-5	Surveyed Wetland Classifications .....	3.14-7
Figure 3.14-6	Impacted Wetlands.....	3.14-10
Figure 3.14-7	Wetlands Functional Assessment .....	3.14-13
Figure 3.14-8	Wetlands Functional Assessment .....	3.14-14
Figure 3.14-9	Wetlands Functional Assessment .....	3.14-15
Figure 3.14-10	Wetlands Functional Assessment .....	3.14-16
Figure 3.15-1	Wildlife Analysis Area .....	3.15-2
Figure 3.16-1	Aquatic Monitoring Stations.....	3.16-3
Figure 3.16-2	Seasonal Average Fish Abundance per Mile with Standard Deviation Error Bars for Project Aquatic Sampling Locations on Sheep Creek SH17.5 (top), SH22.7 (middle), and SH19.2 (bottom).....	3.16-14
Figure 3.16-3	Seasonal Average Fish Abundance per Mile with Standard Deviation Error Bars for Project Aquatic Sampling Locations on Sheep Creek SH18.3 (top), Tenderfoot Creek TN9.3 (middle), and Sheep Creek SH15.5US (bottom) .....	3.16-15
Figure 3.16-4	Seasonal Average Fish Abundance per Mile with Standard Deviation Error Bars for Project Aquatic Sampling Locations on Sheep Creek SH18.3 (top), Tenderfoot Creek TN9.3 (middle), and Sheep Creek SH15.5US (bottom) .....	3.16-16
Figure 3.16-5	Overall Average Salmonid Abundance per Mile with Standard Deviation Error Bars for Sheep, Little Sheep, and Tenderfoot Creek Sampling Locations.....	3.16-17
Figure 3.16-6	2016 Stream Redd Counts .....	3.16-20
Figure 3.16-7	Average Number of Redds per 100 meters within the Project Area.....	3.16-21
Figure 3.16-8	Macroinvertebrate Metrics in the Project Area Arranged Upstream to Downstream .....	3.16-24

## GLOSSARY AND ACRONYMS

Terms are defined within the context of this Environmental Impact Statement.

**algal bloom:** A sudden eruption of algae or cyanobacteria growth in water, which usually results from an excess of certain nutrients (e.g., nitrogen, phosphorous).

**background:** Refers to views beyond 1,500 feet and to the horizon

**chert:** A fine-grained sedimentary rock that was often used as a raw material for prehistoric stone tools

**deciview:** the unit of visibility deterioration is the deciview (dV), with one dV being equivalent to a 10-fold change in atmospheric clarity

**foreground:** Refers to views from zero to approximately 500 feet

**gossan:** Intensely oxidized, weathered, or decomposed rock, usually the upper and exposed part of an ore deposit or mineral vein

**Isopleth:** Model simulations using the AERMOD system produce diagrams that show the distribution of dispersed pollutants at ground level. These diagrams, termed “isopleth maps,” depict the distributions as a series of overlaid irregular contours onto a regional map. Isopleth maps somewhat resemble the effect of a topographic contour map, with outlines of the specific concentration levels serving the similar purpose as outlines of specific ground elevation on a topographic map.

**mesic shrubs:** Require a moderate amount of water to grow.

**midden:** A collection of branches, twigs, grasses, or leaves surrounding a nest.

**middle-ground:** Refers to views from approximately 500 to 1,500 feet.

**mucking:** Removing broken material from blast rounds.

**Net Precipitation Transfer:** This is made up of the net precipitation and runoff water, which together would be routed from the Process Water Pond to the mill. The net precipitation transfer would be treated at the Water Treatment Plan.

**plugs:** Massive concrete blocks confined by bulkheads at both ends used to completely fill a short segment of an open mine working. Grouting may accompany plug installation to minimize fracture flow around the plug and at the plug/bedrock interface.

**Species of Concern:** Species that are either known to be rare or declining, or declining due to the lack of basic biological information.

**sub-wave base:** Refers to below the wave base (i.e., the maximum depth at which a water wave’s passage causes significant water motion. For water depths deeper than the wave base, bottom sediments and the seafloor are no longer stirred by the wave motion above).

**tailings:** A fine-grained waste product from the mill.

**void:** The space from which the ore was removed.

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°F	degree Fahrenheit
°C	degree Celsius
µg/m <sup>3</sup>	microgram(s) per cubic meter
a.m.	ante meridian (morning and before noon)
AADT	annual average daily traffic
ABA	acid-based accounting
AES	Aquatic Ecological System
Al	aluminum
AMA	Agency Modified Alternative
amsl	above mean sea level
ANFO	ammonium nitrate/fuel oil (explosive)
AP	acid potential
ARD	acid rock drainage
ARM	Administrative Rules of Montana
As	arsenic
ASTM	ASTM International
Ba	barium
Ba <sub>3</sub> (AsO <sub>4</sub> ) <sub>2</sub>	barium arsenate
BACI	Before, After, Control (upstream and offsite reference) and Impact (within and downstream)
BACT	Best Available Control Technology
BBF	Black Butte Fault
Be	beryllium
bgs	below ground surface
BHP	Broken Hill Proprietary Company Limited
Big Sky Acoustics	Big Sky Acoustics, LLC
BLM	U.S. Bureau of Land Management
BMP	best management practice
C	Coon Creek code in sampling site
Ca	calcium
CaCO <sub>3</sub>	calcium carbonate

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CAA	Clean Air Act
CAI	Cominco American Inc.
CAPS	Crucial Areas Planning System
Cd	cadmium
CFR	Code of Federal Regulations
cfs	cubic feet per second
CH <sub>4</sub>	methane
Cl	chlorine
Co	cobalt
CO	carbon monoxide
CO <sub>2</sub>	carbon dioxide
CO <sub>2e</sub>	carbon dioxide equivalents
COC	contaminants of concern
Cr	chromium
Cr <sub>2</sub> O <sub>3</sub>	chromium(III) oxide
CTF	Cemented Tailings Facility
Cu	copper
Cu <sub>3</sub> (As,Sb)S <sub>8</sub>	chalcopyrite and tennantite
CuFeS <sub>2</sub>	chalcopyrite
CWA	Clean Water Act
CWP	Contact Water Pond
dB	decibel(s)
dba	A-weighted decibel(s)
dBC	C-weighted decibel(s)
DEQ	Montana Department of Environmental Quality
DNRC	Montana Department of Natural Resources and Conservation
DO	dissolved oxygen
DS, D/S	downstream
<i>E. Coli</i>	<i>Escherichia coli</i>
EBT	juvenile brook trout
EIS	Environmental Impact Statement

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EPT	Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies)
F	fluorine
Fe	iron
FeS <sub>2</sub>	Pyrite and/or marcasite
FLM	federal land manager
FR	Forest Road
FWP	Fish, Wildlife & Parks
G	gossan
gal	gallon
GHG	greenhouse gas
gpm	gallons per minute
H <sub>2</sub> SO <sub>4</sub>	sulfuric acid
HAP	hazardous air pollutants
HBI	Hilsenhoff Biotic Index
HDPE	High Density Polyethylene
HELP	Hydrologic Evaluation of Landfill Performance
Hg	mercury
hhs	human health standard
HNO <sub>3</sub>	nitric acid
hp	horsepower
HRMIB	Hard Rock Mining Impact Board
HSU	hydrostratigraphic unit
I-90	Interstate 90
ICP	inductively coupled plasma
IG	Igneous Dykes
ILF	In-Lieu Fee Program
IPaC	Information for Planning and Consultation
JD	Jurisdictional Determination
K	hydraulic conductivity
K	potassium

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Km	kilometer
kW	kilowatt
lb	pound(s)
LCZ	Lower Copper Zone
L <sub>d</sub>	daytime sound level
L <sub>dn</sub>	day-night average sound level
LECO	Laboratory Equipment Corporation
L <sub>eq</sub>	equivalent noise levels
L <sub>eq</sub> (h)	existing peak hour sound level
L <sub>n</sub>	nighttime sound level
LOS	Level of Service
L <sub>peak</sub>	unweighted instantaneous peak noise level
LS	Little Sheep Creek Code
LSA	Local Study Area
LST	Little Sheep Creek Tributary Code
LSZ	Lower Sulfide Zone
LZ FW	lower sulfide zone footwall
MAAQs	Montana Ambient Air Quality Standards
MAQP	Montana Air Quality Permit
MARS	Montana Aquatic Resources Services
MBAC	Montana Business Assistance Connection
MCA	Montana Code Annotated
MDT	Montana Department of Transportation
MEPA	Montana Environmental Policy Act
Mg	magnesium
mg/kg	milligrams per kilogram
mg/L	milligram per liter
mg/m <sup>2</sup>	milligram per square meter
mm	millimeter
MMI	multi-metric indices
MMRA	Metal Mine Reclamation Act



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Mn	manganese
MO	Moose Creek code
MOP	Mine Operating Permit
MPDES	Montana Pollutant Discharge Elimination System
mph	miles per hour
MRL	Montana Rail Link
MT	metric tonne
MTNHP	Montana Natural Heritage Program
MVE	million vehicles entering
N	nitrogen
N/D	non-detect
Na	sodium
NA	not applicable
NAAQS	National Ambient Air Quality Standards
NAG	net acid generation
NCWR	Non-Contact Water Reservoir
NESHAP	National Emission Standards for Hazardous Air Pollutants
Ni	nickel
[Ni,Co] <sub>3</sub> S <sub>4</sub>	siegenite
NO	nitric oxide
NO <sub>2</sub>	nitrogen dioxide
NO <sub>3</sub>	nitrate, nitric acid
NO <sub>x</sub>	nitrogen oxides
NP	neutralization potential
NR	not reported
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
NSR	New Source Review
P	phosphorus
p.m.	post meridian (afternoon and evening)

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PAH	polycyclic aromatic hydrocarbons
Pb	lead
PFC	Proper Functioning Condition
pH	potential hydrogen
PHREEQC	pH-Redox-Equilibrium
PIT	passive integrated transponders
PM	particulate matter
PM <sub>10</sub>	particulate matter up to 10 micrometers in diameter
PM <sub>2.5</sub>	particulate matter up to 2.5 micrometers in diameter
ppb	parts per billion
ppm	parts per million
Project	Black Butte Copper Project
Proponent	Sandfire Resources America Inc.
PSD	Prevention of Significant Deterioration
PWP	Process Water Pond
RICE	reciprocating internal combustion engine
RM	river miles
RO	reverse osmosis
RSA	Regional Study Area
RV	recreational vehicle
RW	riparian and wetland
s.u.	standard unit (pH)
Sandfire	Sandfire Resources America Inc. (formally Tintina Resources Inc.)
Sb	antimony
SC	Sheep Creek code
Se	selenium
SH	Sheep Creek code
SHPO	State Historic Preservation Office
Si	silicon
SIL	significant impact level
SM	Smith River code

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SM	stream mile
SO <sub>2</sub>	sulfur dioxide
SO <sub>4</sub>	sulfate
SOC	Species of Concern
SP	undeveloped spring
SPLP	synthetic precipitation leachability procedure
Sr	strontium
SrCO <sub>3</sub>	strontianite
SrSO <sub>4</sub>	celestine
SW	surface water
T&E	threatened and endangered
Tgd	tertiary sill-form granodiorite intrusive rocks
Tl	thallium
TMDL	total maximum daily load
TN	Tenderfoot Creek code
TOC	total organic compound
tph	tons per hour
tpy	tons per year
TWSP	Treated Water Storage Pond
U	uranium
U.S.	United States
UCZ	Upper Copper Zone
UG	underground workings
UIG	Underground Infiltration Gallery
UMOWA	Upper Missouri Watershed Alliance
US, U/S	upstream
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USZ	Upper Sulfide Zone

VOC	volatile organic compound
VVF	Volcano Valley Fault
WEG	wind erodibility group
WESTECH	WESTECH Environmental Services, Inc.
WRS	Waste Rock Storage
WTP	Water Treatment Plant
WW	wetted width
Ynl	Lower Newland Formation subunit
Ynl A	Upper Newland Formation subunit above the USZ
Ynl B	Lower Newland Formation subunit below the USZ
Ynl Ex	bedrock zones of the Lower Newland Formation
Ynu	Upper Newland Formation subunit
yr	year
Zn	zinc