MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

Water Quality Division

MONTANA POLLUTANT DISCHARGE ELIMINATION SYSTEM

Permit Fact Sheet

Permittee: Tintina Montana, Inc

Permit No.: MT0031909

Receiving Waters: Alluvial Ground Water, Sheep Creek, Coon Creek, Brush Creek, Little Sheep Creek, and unnamed ephemeral tributary of Little Sheep Creek.

Facility Information
Name: Black Butte Copper Project
Contact: Jerry Zieg, Vice President of Operations

County: Meagher

Fee Information
Major/Minor: Major
Type: Private Major
Number of Outfalls: 5 (for fee determination only)
001 – Mine Discharge to ground water, Sheep Creek, and Coon Creek
002, 003, 008 – Storm water to Coon Creek
004, 005, 006, 007, 009, 010, 012, 013, Storm water to Brush Creek
011 – Storm water to Little Sheep Creek
014 – Storm water to unnamed ephemeral tributary of Little Sheep Creek

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1 BACKGROUND

This fact sheet identifies the principal facts, and significant factual, legal, methodological, and policy issues considered in preparing a draft permit as required by the Administrative Rules of Montana. A fact sheet is prepared for any draft permit that establishes new or amended effluent limitations or standards, schedules of compliance, variances, nonsignificance determinations, denial or granting of mixing zones, or other significant requirements.

Tintina Montana, Inc (Permittee) is the owner and operator of the proposed Black Butte Copper Project (Facility), an underground copper mine.

Montana has adopted a number of federal regulations by reference which are used in this permit as a basis for permit limits. Reference to “director” or “state director” in these federal regulations means the Department of Environmental Quality (DEQ) when these references are to a delegated or approved NPDES state program, otherwise, it refers to the Regional Administrator.

1.1 Permit and Application Information

The application is for a new Montana Pollutant Discharge Elimination System (MPDES) and is assigned permit number MT0031909. The application is for a proposed discharge from a new source, as described below. DEQ received the initial application on December 11, 2017, and issued a notice of deficiency (NOD) on January 10, 2018. The Permittee responded to the NOD on February 15, 2018. DEQ issued a second NOD on March 16, 2018. The Permittee responded to the second NOD on April 25, 2018. DEQ determined the application was complete on May 25, 2018.

1.2 Description of Facility and Discharges

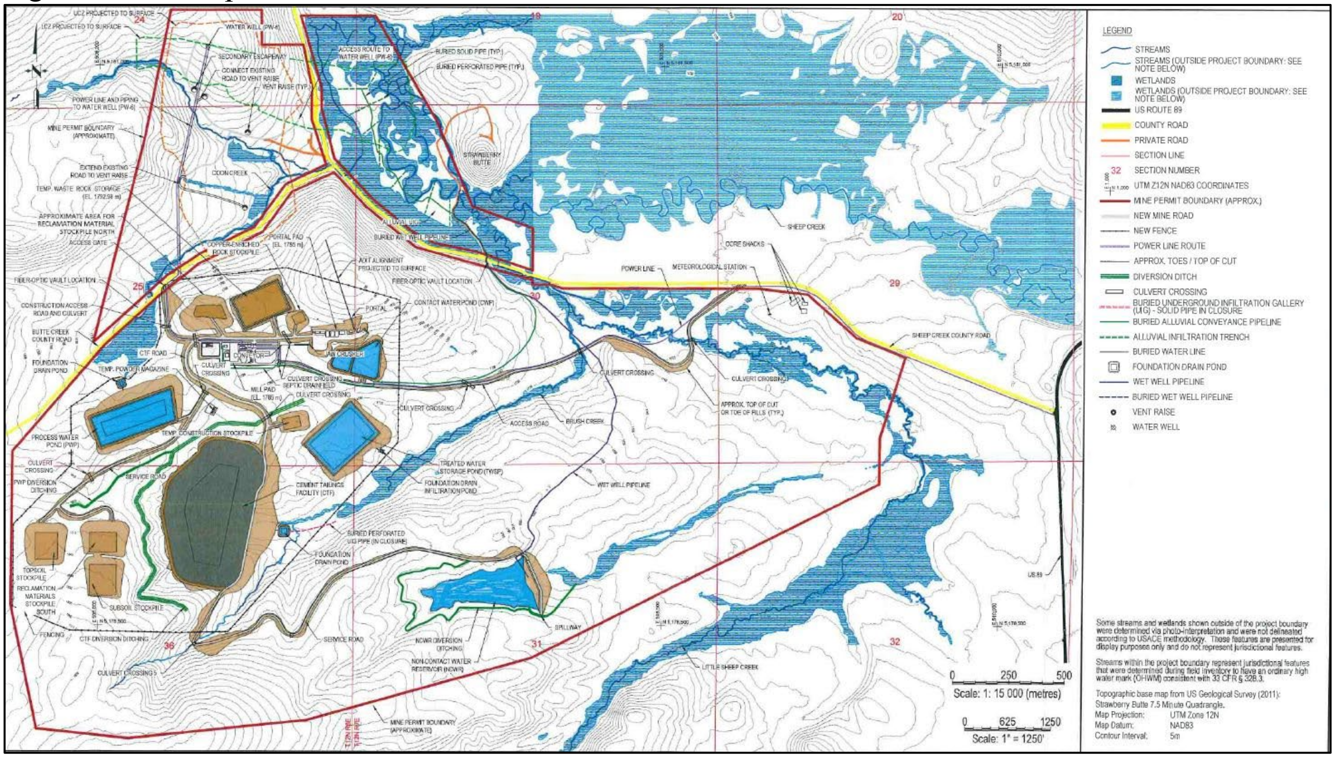
A facility, activity, or outfall is any point source, including land or appurtenances thereto, that are subject to regulation under the MPDES program. The discharge of pollutants to state waters is limited to outfalls authorized in the Facility’s discharge permit.

1.2.1 Description and Location of Facility

The Facility is not constructed. All references to the Facility operations and location in this fact sheet are to the proposed Facility and location as described in the MPDES permit application.

The Permittee proposes to develop and operate an underground copper mine with an associated froth floatation mill, lined process water pond, lined contact water pond, cemented tailings facility, treated water storage pond and water treatment plant. The Facility location is in Sections 19, 29, 30, 31, and 32 in Township 12N, Range 7E, and Sections 24, 25, and 36 in Township 12N, Range 6E, near White Sulphur Springs, Montana, in Meagher County. Facility operations will be located within a 1,888-acre operating area and also include various process and maintenance buildings, employee facilities, storage facilities, offices, and water treatment plant. Total surface disturbance required for construction and operation of the Facility and access roads comprises 286 acres. A facility site map is shown in Figure 1 below and in Appendix 6.

Figure 1. Site Map



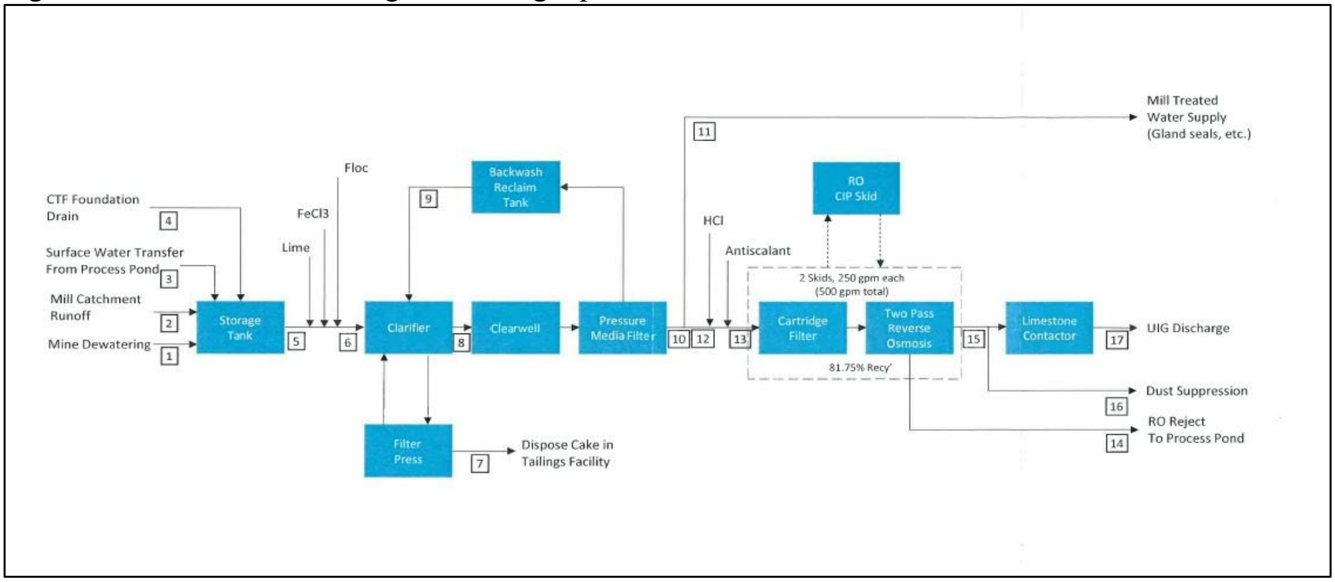
The mine will use blasting and hauling in pre-production and production mining. Pre-production mining, during which the mine portal and access declines will be constructed, will take 2 to 2.5 years to complete. Production mining will occur after most of the pre-production mining is completed. Production mining will use a "drift and fill" mining method in which copper bearing rock is removed from areas adjacent to the access decline via drifts and stopes, which are tunnels driven into the mineral deposit off of the main decline. The drifts and stopes are developed and backfilled incrementally until the entire deposit is mined and backfilled with cemented tailings.

The sources of wastewater at the Facility include adit water, which is ground water inflow into the open mine workings, storm water in the process areas collected in the contact water pond, and storm water that does not come in contact with mine or mill process areas. Process water from the mill is treated and recycled between the process water pond and the mill circuit.

Wastewater Treatment or Controls

Groundwater inflow into the mine workings is the main source of wastewater. All wastewater discharged to state waters will be treated by clarification and filtration, followed by double pass reverse osmosis. Tintina will construct separate wastewater treatment systems for the construction and operational phases of the project (pre-production and production mining). Both systems provide identical treatment but the operational phase system has more capacity. A treatment flow diagram is shown in Figure 2 below and in Appendix 6.

Figure 2. Treatment Flow Diagram During Operation



For most of the first year of pre-production mining (construction phase) no inflow or mine drainage is predicted because mining will be above the water table. During the second year, mine drainage flows will gradually increase to a maximum rate of about 250 gallons per minute (gpm), and by year 2.5 inflow is expected to be about 300 gpm. The construction phase wastewater treatment system will be capable of treating up to 250 gpm. If flows exceed this capacity during construction, the excess will be stored in either the contact or process water pond, or may be treated by the operational phase reverse osmosis (RO) system, which will be available near the end of the construction phase.

During mining operations, inflow from the mine workings will initially be diverted from the portal to the process water pond to provide enough water for mill startup. Operational water storage in the process pond will range from 103 to 162 acre-ft. The pond will have an additional 162 acre-ft of capacity to allow for storage from a probable maximum flood storm event. Once the pond reaches levels necessary for mill operation, water will be diverted from the mine portal to the operational phase water treatment plant (WTP). The operational phase WTP will be sized to treat 500 gpm. The construction phase RO system will act as a backup system and/or provide additional treatment capacity. Operating both systems will provide treatment capacity up to 750 gpm. Following RO treatment, a polishing phase will add calcium hardness and bicarbonate alkalinity to the treated effluent by passing it through a bed of calcium carbonate.

The permit application shows the following operations contributing average flow to Outfall 001:

Underground dewatering – 500 gpm
Cement tailing facility drain – 20 gpm
Mill catchment runoff – 13.1 gpm
Recycled freshwater – 14.6 gpm

The waste streams above are total flows (avg.) contributed to the water treatment plant. Only a portion of each is discharged at Outfall 001, with the balance returned to the mill as treated makeup water and RO reject or used as freshwater for dust suppression.

The application describes the average flow of wastewater leaving the treatment plant as follows:

Treated water to mill – 42.4 gpm
RO refect (to process pond and mill) – 83 gpm
Freshwater Uses – 24.6 gpm
Treated water to Underground Infiltration Gallery (UIG)(Outfall 001) – 397.7 gpm

The wastewater treatment design includes a 53 million gallon treated water storage pond. This pond may be used during the July to September period when nutrient standards apply in the receiving surface waters. If the Facility's treated effluent does not achieve the final permit limits for total nitrogen, the effluent will be stored in the storage pond. The treated effluent from the storage pond will be blended with regular treated water discharge during the October to June timeframe when nutrient standards do not apply. Under this discharge scenario the average flow to Outfall 001 is increased by 133 gpm.

Table 1 - Sources of Wastewater Contributing to Outfall 001

Outfall	Description	Average Flow (gpm)	Max Flow (gpm)	Intermittent (Y/N)
001	Continuous Discharge	397	575	N
001	Seasonal Discharge	530	708	Y

The facility water balance, both seasonal and continuous discharge, is shown in Figures 3 and 4 below. The Underground Infiltration Galleries shown are Outfall 001. The figures are also included in Appendix 6.

Figure 3. Water Balance

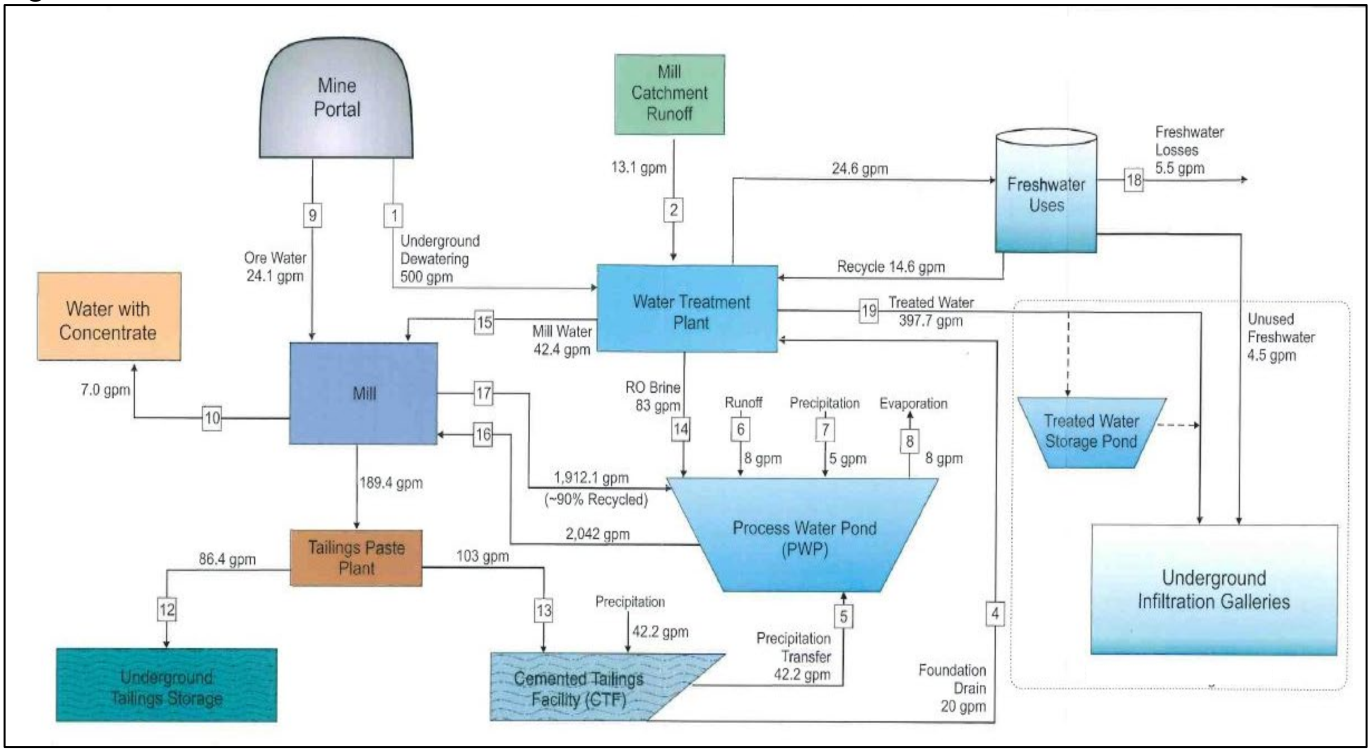
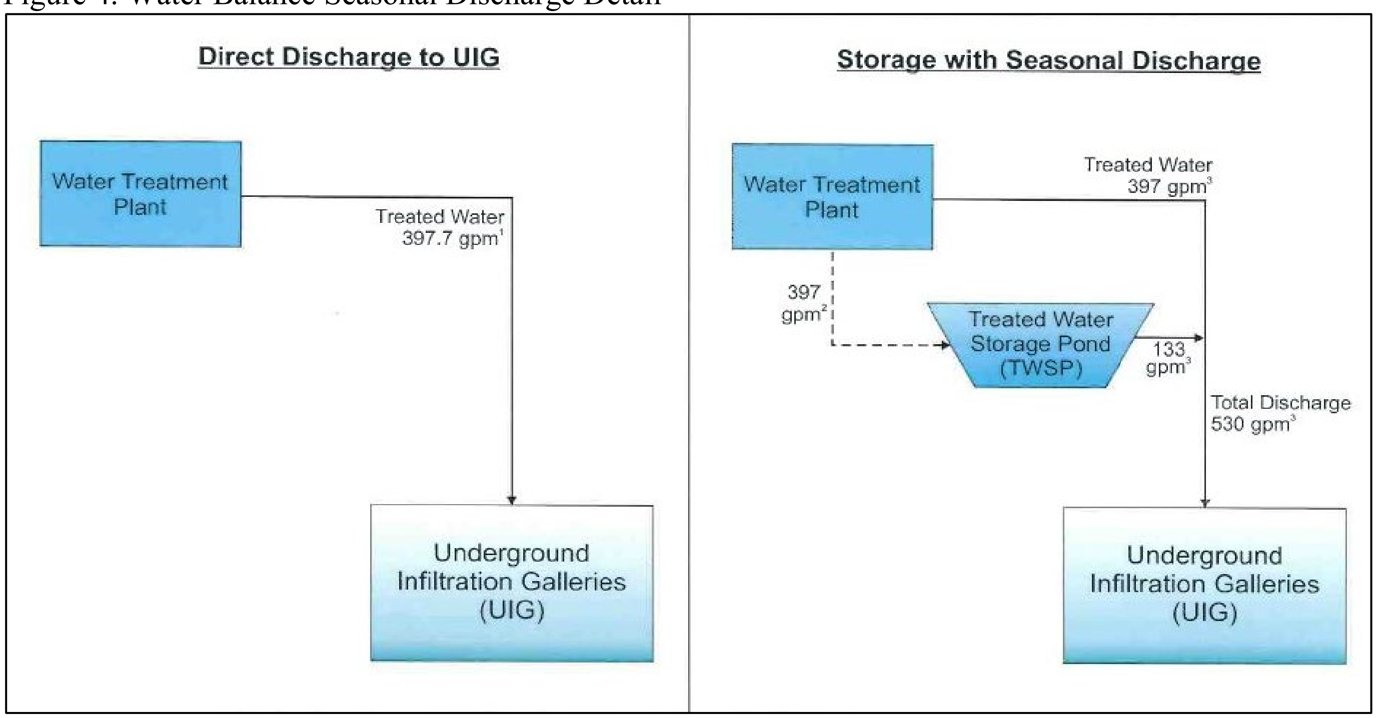


Figure 4. Water Balance Seasonal Discharge Detail



The application describes the following non-process area storm water outfalls and the surface area contributing to each. Flow rates and volumes are the estimated discharge during a 10-year 24-hour storm event.

Table 2 - Surface Area Contributing to Each Storm Water Outfall			
Outfall	Description	Drainage Area/Flow Rate/Volume (acres/cfs/acre-ft)	Intermittent (Y/N)
002	Service roads, topsoil stockpile	13.2 / 11.38 / 0.8	Y
003	Access roads, reclamation stockpile,	15.2 / 19.2 / 1.0	Y
004	Cemented tailings facility (CTF) diversion ditch, service roads, subsoil and reclamation stockpiles	65.7 / 35.5 / 2.8	Y
005	CTF embankment	13.0 / 11.99 / 0.8	Y
006	Access road, undisturbed ground	25.9 / 0.87 / 0.3	Y
007	Non-Contact water pond (NCWP) access road, undisturbed ground	27.6 / 15.4 / 1.2	Y
008	Undisturbed ground between topsoil stockpile service road and CTF diversion ditch	13.5 / 6.1 / 0.5	Y
009	Access roads, undisturbed ground	9.0 / 10.7 / 0.5	Y
010	Undisturbed ground near access road	32.3 / 12.4 / 1.1	Y
011	Main access road	1.7 / 2.94 / 0.142	Y
012	Undisturbed ground and Treated Water Storage Pond (TWSP) embankment	8.75 / 9.72 / 0.5	Y
013	TWSP embankment	2.6 / 1.76 / 0.1	Y
014	NCWR access road	5.2 / 2.0 / 0.22	Y

Storm water at the above locations will consist of runoff that has not come in direct contact with the mine or mill process areas. The primary pollutant from these areas is sediment. Best management practices are required at all storm water outfalls to limit discharges of sediment and other pollutants to receiving waters to protect water quality standards.

1.2.2 Discharge Points

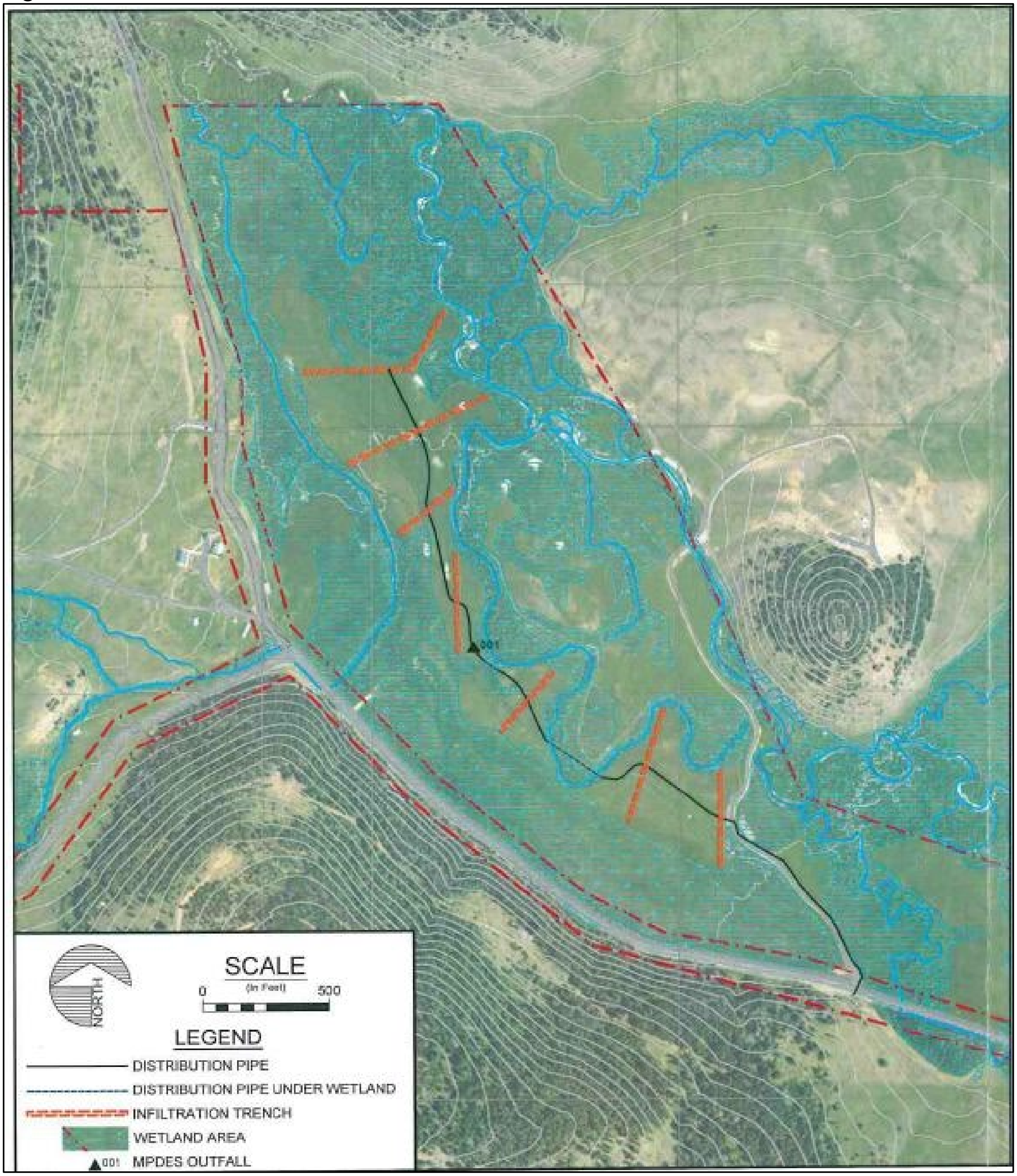
Outfalls 001 - 014 will discharge to state waters at the locations identified in the table below as identified in the permit application. For Outfall 001, the latitude and longitude is the center of the system of 14 infiltration galleries described below. For Outfalls 002-014, the latitude and longitude are at the point of discharge. State waters are any surface or underground body of water, irrigation system or drainage system. Ponds, lagoons, or other waste impoundments used solely for treating, impounding, or transporting wastes are not state waters. Discharge to state waters is prohibited unless expressly authorized in the Facility's discharge permit. The beneficial use classifications and applicable water quality standards for the receiving water are identified in Section 2.

Table 3 - Discharge Locations				
Outfall	**Latitude**	**Longitude**	**Receiving Water**	**Receiving Water Classification**
001	46° 46′ 47″ N	110° 54′ 20″ W	Groundwater, Sheep Creek, and Coon Creek	Class I; B-1
002	46° 45′ 58.4″ N	110° 55′ 19.5″ W	Coon Creek	B-1
003	46° 46′ 18.9″ N	110° 55′ 4.5″ W	Coon Creek	B-1
004	46° 46′ 8.7″ N	110° 54′ 35.5″ W	Brush Creek	B-1
005	46° 45′ 50.7″ N	110° 54′ 39.7″ W	Brush Creek	B-1
006	46° 45′ 33.9″ N	110° 54′ 55.2″ W	Brush Creek	B-1
007	46° 45′ 35.2″ N	110° 54′ 36.8″ W	Brush Creek	B-1
008	46° 46′ 10.2″ N	110° 54′ 55.8″ W	Coon Creek	B-1
009	46° 46′ 16.1″ N	110° 53′ 37.3″ W	Brush Creek	B-1
010	46° 46′ 10″ N	110° 53′ 57.7″ W	Brush Creek	B-1
011	46° 46′ 17.3″ N	110° 53′ 14.7″ W	Little Sheep Creek	B-1
012	46° 45′ 58.68″ N	110° 54′ 22.68″ W	Brush Creek	B-1
013	46° 46′ 2.28″ N	110° 54′ 16.92″ W	Brush Creek	B-1
014	46° 45′ 47.16″ N	110° 53′ 46.68″ W	Unnamed Ephemeral tributary to Little Sheep Creek	B-1

The discharge at Outfall 001 is to state waters via an underground infiltration gallery system (UIG) in the Sheep Creek Valley. The groundwater in the Sheep Creek Valley is hydrologically connected to Sheep Creek, so wastewater discharged to the groundwater enters surface water within a short distance. The alluvial groundwater system in the Sheep Creek Valley also discharges to Coon Creek prior to its confluence with Sheep Creek.

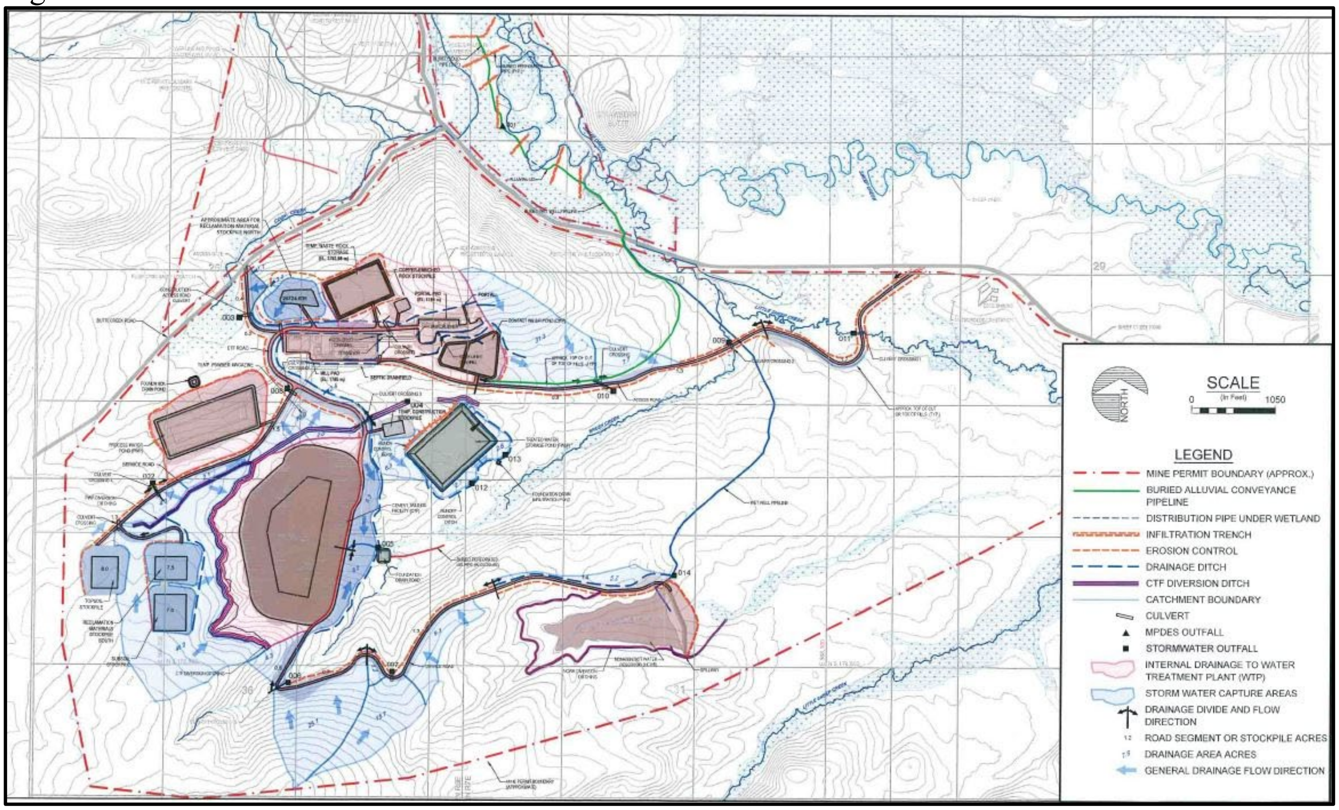
The UIG will consist of 14 individual infiltration galleries ranging from 150 to 350 feet in length. Each gallery will be 6 feet wide by 15 feet deep, and will have a valve at the main distribution pipeline for controlled application during operations. Each gallery will be backfilled with washed 2-inch plus to 6-inch minus gravels and cobbles. Water will discharge through a six-inch, perforated PVC pipe bedded 5 to 6 feet below ground surface (bgs) in the coarse backfill. Average and maximum discharge flows are expected to be 397 and 575 gpm, respectively if continuously discharging; 530 gpm (avg.) and 708 gpm (max.) if treated wastewater is held and discharged seasonally. Outfall 001 is shown in Figure 5 below and in Appendix 6.

Figure 5. Outfall 001



The locations for storm water outfalls 002 – 014 are shown in Figure 6 below and in Appendix 6.

Figure 6. Storm Water Outfall Locations



1.2.3 Permit Fee Determinations

Permit fees are based on the type of waste (sewage, process wastewater, storm water, noncontact cooling water, etc.) and receiving water or stream segment. An application and annual fee for multiple outfalls is not required unless the discharges are to different receiving waters or result in multiple or variable effluent limits. The table below identifies, individually or by group, the five fee groups, the type of wastewater and receiving water. Application and annual fees are required for each fee group.

Table 4 - Summary Outfall Categories for Fee Purposes

Fee Group	Effluent Description	Receiving Water	Outfalls
A	Mine Drainage	Ground Water, Sheep Creek, Coon Creek	001
B	Storm Water	Brush Creek	004 – 007, 009, 010, 012, 013
C	Storm Water	Coon Creek	002, 003 ,008
D	Storm Water	Little Sheep Creek	011
E	Storm Water	Unnamed Ephemeral Drainage	014

1.2.4 Effluent Characteristics

Effluent characteristics for Outfall 001, reported on the permit application, are summarized in Appendix 3. The reported effluent characteristics are estimates based on similar mines, similar treatment systems, and the geology of the area. In addition to the regular discharge monitoring, the Permittee must complete and submit Parts V and VI of U.S EPA Form 2C within 6 months of commencing the discharge from Outfall 001. Analytical results are required for all parameters listed in Part V-A, B, and C, including all GC/MS fractions in Table 2C-2. Part D must also be completed as required by the Form 2C instructions (See Section 3 Monitoring and Reporting Requirements).

Storm water quality was determined using analytical results from surface water site SW-14 located on Little Sheep Creek at the confluence with Brush Creek. The storm water quality was estimated by removing the ground water component from a high flow storm event as compared to a low flow sampling event. Estimated storm water quality is summarized in Appendix 3.

1.2.5 Other Information

Application Form 1 lists the following environmental permits that are applicable to the Facility: DEQ Air #497800, Draft MMRA OP #00188.

2 EFFLUENT LIMITATIONS

The control of pollutants discharged is established through effluent limitations and other requirements. There are two principal bases for effluent limitations: technology-based effluent limitations (TBELs) that specify the minimum level of treatment or control for conventional, non-conventional, and toxic pollutants and water quality-based effluent limitations (WQBELs) that attain and maintain applicable numeric and narrative water quality standards.

2.1 Technology-based Effluent Limitations

Section 402(a)(1) of the federal Clean Water Act (CWA), the federal regulations at 40 CFR 125.3(a), and Montana regulations at ARM 17.30.1207 require that permits contain TBELs that implement the technology-based treatment requirements specified in the CWA. These technology-based requirements may be national technology standards for existing sources or new sources established by EPA or, in some cases, standards established by the permit writer on a case-by-case basis using best professional judgement (BPJ). ARM 17.30.1203.

2.1.1 Scope and Authority

EPA has promulgated national TBEL and standards of performance for both existing and new sources at 40 CFR Subchapter N. These effluent limitations and standards are more commonly referred to as "effluent limitation guidelines" (ELGs). The Board of Environmental Review (Board) has adopted effluent limitations and standards, toxic effluent standards and new source performance standards in ARM 17.30.1203, 1206 and 1207, respectively, based on the applicable federal regulation. These regulations state that technology-based treatment requirements specified in the Clean Water Act represent the minimum level of control that must be imposed in MPDES permits.

In developing the ELGs for the ore mining and dressing category, EPA studied ore mining and dressing wastewaters to determine which toxic, conventional, and non-conventional pollutants required TBELs. The method for including or excluding pollutants in the ELGs is described in detail in the *Development Document for Effluent Limitations Guidelines and Standards for the Ore Mining and Dressing Point Source Category* (EPA, 1982)(development document).

For existing sources, EPA developed ELGs representing the degree of effluent treatment currently being attained (in 1982) by existing facilities (best practicable control technology currently available or BPT), the best available technology economically achievable (BAT), and the best conventional pollutant control technology (BCT) for control of conventional pollutants.

For new sources, EPA developed new source performance standards. New source performance standards (NSPS) represent the best available demonstrated control technology standards. The intent of NSPS guidelines is to set limitations that represent state-of-the-art treatment technology for new sources as defined in ARM 17.30.1304 and 1340(1).

The Facility is a new source subject to New Source Performance Standards as defined at ARM 17.30.1304(47) and 1340(1).

Where EPA has not established ELGs that are applicable to a particular class or category of industrial discharger or to a specific discharge, the permit writer establishes applicable technology-based treatment requirements on a case-by-case basis using BPJ.

2.1.2 Additional Requirements

All permit effluent limitations, standards or prohibitions for a metal must be expressed as total recoverable metal unless the applicable effluent standard or limitation has been expressed in another form, or the approved method for the metal only measures the dissolved form (e.g. hexavalent chromium).

For continuous discharges, all permit effluent limitations, standards, and prohibitions must, unless impracticable, be stated as maximum daily and average monthly discharge limitations for all dischargers other than publicly-owned treatment works (POTWs).

2.1.3 Applicable Federal Effluent Limitation Guidelines

EPA has promulgated ELGs in 40 CFR Part 440, Subpart J for facilities in the Ore Mining and Dressing Point Source Category, Copper, Lead, Zinc, Gold, Silver, and Molybdenum Ores Subcategory. The ELGs are found at 40 CFR 440.100 – 440.105 and Subpart L found at 40 CFR 440.130 – 440.132. The guidelines apply the Facility because it will discharge mine drainage and use the froth flotation process to concentrate metals from copper ores in the mill.

The applicable general definitions given in 40 CFR 440.132 are incorporated by reference into this fact sheet and will be included in the permit.

Outfall 001

The Facility is a new source and is subject to the New Source Performance Standards (NSPS) at 40 CFR 440.104, which are discussed below.

Mine Drainage

Mine drainage means any water drained, pumped, or siphoned from a mine. The concentration of pollutants discharged in mine drainage from mines that produce copper, lead, zinc, gold, silver and molybdenum bearing ores from open-pit or underground operations other than placer deposits shall not exceed:

Table 5 - Mine Drainage—40 CFR 440.104(a)

Effluent Characteristic	Units	Effluent Limitations	
		Maximum for any 1 day	Average of daily values for 30 consecutive days
Copper	mg/L	0.30	0.15
Zinc	mg/L	1.5	0.75
Lead	mg/L	0.6	0.3

Mercury	mg/L	0.002	0.001
Cadmium	mg/L	0.10	0.05
pH	s.u.	Within the range of 6.0 to 9.0	
TSS	mg/L	30	20

Process Wastewater

Process wastewater is any water which, during manufacturing or processing, comes into direct contact with, or results from the production or use of any raw material, intermediate product, finished product, by-product, or waste product. By definition, any water introduced into the mill process is considered process wastewater.

EPA considered two options when determining NSPS for process wastewater in the Ore Mining Category. Option 1 required achievement of performance standards in each subcategory based on the same technology as BAT (NSPS = BAT). Option 2 required standards based on a complete water recycle system (NSPS = zero discharge of process wastewater). Option 2 was selected for the copper, lead, zinc, gold, silver and molybdenum subcategory with mills using froth flotation.

The NSPS require that there shall be no discharge of process wastewater to navigable waters from mills that use the froth-flotation process alone, or in conjunction with other processes, for the beneficiation of copper, lead, zinc, gold, silver, and molybdenum ores or any combination of these ores. 40 CFR 440.104.

MPDES permits regulate the discharge of pollutants to state waters, defined in the Montana Water Quality Act as a body of water, irrigation system, or drainage system, either surface or underground, excluding wastewater treatment or storage ponds and irrigation or land application waters that do not return to state waters. In MPDES permits, "state waters" stands in place of "navigable waters" in the federal regulations. ARM 17.30.1301. Thus, the no discharge of process wastewater requirement is applied to state waters in this permit.

The NSPS allow some limited exceptions to the no discharge requirement for process wastewater. The NSPS exceptions are broken into two categories: "Relief from No Discharge Requirement" and "Relief from Effluent Limitations for Those Facilities Permitted to Discharge." Facilities permitted to discharge refers specifically to mills permitted to discharge. The development document states "…the ore mining and milling industry was divided into 7 major subcategories based upon metal ore and 21 subdivisions based upon whether the facility was a mine or a mill" (emphasis added). Thus, process wastewater may be discharged from some mills under NSPS, and not at others. Mine drainage may be discharged in all subcategories under the NSPS.

Under NSPS, the Permittee's mill is subject to the no discharge of process wastewater requirement under "normal" conditions. Facilities subject to the no discharge requirement may obtain relief, on a case by case basis as a result of:

1. An overflow or increase in volume from rainfall or snowmelt if the facility is designed, constructed and maintained to contain a 10-year 24-hour rainfall provision over and above normal pond levels.

2. Location in a "net precipitation" area; such facilities can discharge the difference between the precipitation falling on the facility and evaporation from this area.

3. Groundwater infiltration.

4. A buildup of contaminants in the recycle water that interferes with ore recovery process.

The applicability and implementation of these exceptions in this permit are explained below.

Storm Provision

Language from 40 CFR 440.131(c) will be included in the permit. The mill may discharge treated water from the process water pond that exceeds the amount held in the pond during normal operations plus the volume of water resulting from precipitation and runoff from a 10-year 24-hour precipitation event.

The permit will require that this water be treated and the discharge comply with the final effluent limitations applicable to Outfall 001.

Net Precipitation

The availability of the net precipitation exception can be determined through the use of the Climatic Atlas of the United States or local climate stations to determine annual precipitation and evaporation. The mill operator may also develop precipitation and evaporation data specific to the site. The net precipitation relief is only available if annual precipitation exceeds annual evaporation (net precipitation). If annual precipitation does not exceed evaporation, then the relief is not available.

DEQ used the evaporation and precipitation maps in the *Climatic Atlas of the United States* (NOAA 1968) and *Evaporation Pond Design for Agricultural Wastewater Disposal* by the U.S. Department of Agriculture Soil Conservation Service in Bozeman (1974), to estimate the annual precipitation and evaporation at the Facility site. DEQ also considered the site-specific precipitation and evaporation estimates developed by the Permittee and reported in the mine operating permit application. All three sources indicate that annual evaporation exceeds annual precipitation at the Facility site.

The relief from the no discharge requirement for net precipitation in 40 CFR 440.104(b)(2)(i) is not available to the Facility.

Ground Water Infiltration

The process water pond, cemented tailings facility, and the contact water pond will be lined and not subject to ground water infiltration. This relief is not available to the Facility.

Interference

Language from 40 CFR 440.104(b)(2)(ii) will be included in the permit. A limited volume of discharge may occur to eliminate an interference in the ore recovery process due to a buildup of contaminants. Any discharge due to interference shall be subject to the numeric limitations for mine drainage at Outfall 001. The applicant shall have the burden of demonstrating the discharge is necessary due to interference that could not be eliminated through appropriate treatment of the recycle water and shall submit information supporting the justification for the exception. DEQ shall review any request for this exception and discharge may not commence until approved in writing by DEQ.

Storm Water Outfalls 002 – 014

Outfalls 002 - 014 are storm water outfalls for runoff from access roads, haul roads, topsoil stockpiles, berms constructed of non-waste rock materials, and runoff from undisturbed ground on slopes above the facility and associated structures that is captured and directed around these areas. Discharges from these outfalls will not contain process wastewater or mine drainage; ELGs are not promulgated for these storm water discharges.

The discharge of any process wastewater or any water resulting from mine dewatering activities or mine drainage is prohibited at Outfalls 002 - 014.

Given that these are storm water discharges from outside the mine and mill process areas and should contain uncontaminated sediment easily controlled by BMPs, DEQ is establishing the use of best management practices (BMPs) for the control of pollutants discharged at Outfalls 002 - 014 (ARM 17.30.1345); (see Special Conditions Section 4.0). BMPs are defined as a permit condition and serve as TBELs representing the minimum level of control that must be implemented in MPDES permits to prevent or control the discharge of pollutants to state waters. The Permittee must comply with all BMP requirements (see Special Conditions Section 4.0) and must develop, implement, and maintain a Storm Water Pollution Prevention Plan (SWPPP) (see Special Conditions Section 4.0) identifying all BMPs selected for storm water control and submit the SWPPP for DEQ review. The Permittee must receive written DEQ approval of the SWPPP prior to construction of Outfalls 002 - 014.

2.1.4 Other General Provisions Applicable to Outfall 001

Combined Waste Streams

The general provision of 40 CFR 440.131(a) allows the discharge of waste streams from various subparts or segments of subparts of Part 440 when they are combined for treatment and discharge (referred to as the commingling provision). This provision does not apply to the Facility because the Permittee has not proposed to commingle mine drainage with the mill process water and discharge it.

The general provision for commingled waste streams is also not applicable to the Facility because the mill is subject to the specific no discharge of process wastewater requirement at 40 CFR 440.104(b)(1). The commingling provision under NSPS is intended to apply only to combined waste streams when all waste streams are allowed to be discharged under the NSPS. Froth flotation mills in this subcategory subject to the no discharge requirement cannot produce a "waste stream" for treatment and discharge. This interpretation of the commingling provision is supported in the development document.

pH Adjustment

The general provision of 40 CFR 440.131(d) allows the permitting authority to alter pH limitations where necessary for the discharge to achieve the metals limits in the ELGs or to allow for a natural pH in the receiving water less than 6.0. This provision does not apply because the Permittee is proposing a treatment technology that is not addressed by the provision and the natural pH of the receiving water is not less than 6.0.

2.1.5 Variance Request

The Permittee has not requested a variance for any of the applicable provisions and DEQ has determined that the discharge does not qualify for a variance.

2.1.6 Final TBELs

Table 6 and the narrative conditions below summarize the TBELs at Outfall 001.

Outfall 001

The concentration of pollutants discharged at Outfall 001 -shall not exceed:

Table 6 – Technology Based Effluent Limitations

Parameter	Units	Average Monthly Limitation	Maximum Daily Limitation
Copper	mg/L	0.15	0.30
Zinc	mg/L	0.75	1.5
Lead	mg/L	0.3	0.6
Mercury	mg/L	0.001	0.002
Cadmium	mg/L	0.05	0.10
pH	s.u.	Within the range of 6.0 to 9.0	
TSS	mg/L	20	30

There shall be no discharge of process wastewater from the mill, except that a discharge may occur under the following conditions:

1. If, as a result of precipitation (rainfall or snowmelt), the facility has an overflow or discharge from the process water pond, a discharge may occur that is equal to the volume of water in excess of the pond capacity under normal operation plus the volume of water and runoff generated from a 10-year 24-hour storm event. The facility (PWP) must be designed, constructed, and maintained to contain the maximum volume of water in the pond during normal operations plus the 10-year 24-hour precipitation event. The design volume must include the facility and all areas contributing runoff to the process water pond. Any discharge

resulting from this exception must comply with the final effluent limitations and monitoring requirements applicable to Outfall 001.

2. In the event there is a buildup of contaminants in the recycle water which significantly interferes with the ore recovery process and this interference cannot be eliminated through appropriate treatment of the recycle water, a discharge in an amount necessary to correct the interference may occur after installation of appropriate treatment. The facility shall have the burden of demonstrating to DEQ that the discharge is necessary to eliminate the interference in the ore recovery process and that the interference could not be eliminated through appropriate treatment of the recycle water. The permittee must request the discharge and provide the required justification in writing. The discharge may not occur until DEQ has provided written authorization. Any discharge resulting from this exception must comply with the final effluent limitations and monitoring requirements applicable to Outfall 001.

Outfalls 002 – 014

The Permittee for Outfalls 002 – 014 must develop, implement, and maintain a facility-wide storm water pollution prevention plan and associated BMPs to control pollutants associated with storm water. See Special Conditions Part 4.2 *Best Management Practices and Pollution Prevention*.

2.2 Water Quality-based Effluent Limitations

Permits must include limitations more stringent than applicable federal technology-based requirements where necessary to achieve applicable water quality standards.

2.2.1 Scope and Authority

The Montana Water Quality Act at 75-5-401(2), MCA states that a permit may only be issued if DEQ finds that the issuance or continuance of the permit will not result in pollution of any state waters. Montana water quality standards require that no wastes may be discharged such that the waste either alone or in combination with other wastes will violate or can reasonably be expected to violate any standard.

2.2.2 Applicable Water Quality Standards

The water quality standards include both numeric and narrative standards that protect the beneficial uses set forth in the water use classifications. The specific standards are given in ARM 17.30.621 through 629 and incorporate by reference Circular DEQ-7 which contains numeric water quality standards for protection of aquatic life and human health, and Circular DEQ-12A.

ARM 17.30.637(1) requires that state waters must be free from substances which will: (a) settle to form objectionable sludge deposits or emulsions beneath the surface of the water or upon adjoining shorelines; (b) create floating debris, scum, a visible oil film (or be present in concentrations at or in excess of 10 milligrams per liter) or globules of grease or other floating materials; (c) produce odors, colors or other conditions as to which create a nuisance or render undesirable tastes to fish flesh or make fish inedible; (d) create concentrations or combinations of materials which are toxic or harmful to human, animal, plant or aquatic life; and (e) create conditions which produce undesirable aquatic life.

Effluent limitations based on the narrative prohibition of substances that will cause toxicity in state surface water are developed with whole effluent toxicity (WET) tests. WET tests results are expressed as pass or fail. There is no numeric standard for WET. WET methods may also be used to develop a no observed effects levels for pollutants regulated by narrative standards. WET requirements are discussed in Section 2.2.8 and 2.2.10.

For new sources, effluent limitations for numeric and narrative standards are modified by the criteria in ARM 17.30.715 which are based on the protection of existing water quality. Appendix 1 provides a summary of water quality standards and any applicable nondegradation criteria for the affected receiving waters.

Water Use Classification and Standards

Outfall 001 will discharge to alluvial ground water and is projected to reach Sheep Creek and Coon Creek. The nearest Outfall 001 underground infiltration gallery (UIG) to Sheep Creek will be immediately adjacent to the stream and the farthest will be approximately 600 feet away. UIG distances to Coon Creek will range from 1,200 to 3,500 feet. The receiving waters are located in the Smith River watershed, USGS Hydrological Unit Code (HUC) 10030103. Sheep Creek is identified as Montana Assessment Unit ID MT41J002_030. The designated water-use classification for Sheep Creek and Coon Creek is B-1 and ground water is Class I.

Storm water Outfalls 002 - 014 discharge storm water runoff to Coon Creek, Brush Creek, Little Sheep Creek, and an unnamed ephemeral drainage. All are classified B-1.

Water use classifications and beneficial uses are summarized below.

Table 7 - Water Use Classification and Beneficial Uses— Surface Waters Sheep Creek, Coon Creek, Brush Creek, Little Sheep Creek, and Ground Water

Classification	Beneficial Uses
Surface Waters B-1	Drinking, culinary and food processing purposes after conventional treatment; Bathing, swimming, and recreation; Growth and propagation of salmonid fishes and associated aquatic life, waterfowl, and furbearers; and Agricultural and industrial water supply
Ground Water Class I	The quality of Class I ground water must be maintained so that these waters are suitable for the following uses with little or no treatment: public and private water supplies; culinary and food processing; irrigation; livestock and wildlife; and commercial and industrial purposes.

2.2.3 Design Conditions

Montana water quality standards state that no wastes may be discharged, either alone or in combination with other wastes, or activities, that will violate or can reasonably be expected to violate any of the standards. In order to establish discharge limitations in permits it is necessary to determine certain characteristics of the receiving water that are critical for the protection of designated uses and existing water quality (new sources).

Critical Stream Flow (Q_s)

Where dilution with the receiving water is requested and appropriate, critical stream flow is based on the specific standards of ARM 17.30.620-629 which require that discharge permits not cause receiving water concentrations to exceed applicable standards when stream flows equal or exceed the design flows specified in ARM 17.30.635(2). The receiving water design flow for point source discharges is the minimum consecutive seven-day average flow which may be expected to occur on the average once in 10 years (7Q10). If there are insufficient data to establish a 7Q10, DEQ must establish an acceptable stream flow. DEQ established a 7Q10 flow for Sheep Creek, which is discussed in Appendix 7. The Permittee did not request a mixing zone for any parameter except total nitrogen, so the 7Q10 is not used for development of effluent limits or reasonable potential in this fact sheet.

Effluent limitations for controlling nitrogen and phosphorus must be based on the seasonal 14Q5, which is the lowest average 14 consecutive day low flow, occurring from July through September, with an average recurrence frequency of once in five years.

The permit application proposes a 14Q5 of 20.5 cubic feet per second (cfs), based on USGS gage 06077000 (Sheep Creek nr White Sulphur Springs MT). The seasonal 14Q5 at this gage is 11.7 cfs and the Permittee adjusted this value by applying a multiplier (1.75) based on a watershed analysis to adjust for the larger watershed at the outfall location.

DEQ has developed its own methodology for determining receiving water low flow statistics. Using this methodology, DEQ modeling staff determined the use of the multiplier proposed in the application is inappropriate and determined the seasonal 14Q5 is instead 11.8 cfs. Appendix 7 describes the method and rationale used to develop this value and the 7Q10.

Critical Background Receiving Water Pollutant Concentration (C_s)

The critical pollutant concentration is the average or mean concentration expected in the receiving water during the flow period corresponding to the critical stream flow (7Q10 or 14Q5) (See *Handbook: Stream Sampling for Waste Load Allocation Applications*, EPA/625/6-86/013, September 1986; *Technical Guidance Manual for Performing Waste Load Allocations, Book VII: Permit Averaging Period*, EPA, September 1984). Since the critical stream flow is an infrequent event, the critical pollutant concentration must be estimated based on existing water quality data that are collected at non-critical conditions.

DEQ uses the interquartile range of the available data for estimating background receiving water pollutant concentrations. The upper bound of the interquartile range (75th percentile) is used when determining assimilative capacity. The lower bound (25th percentile) is used to establish nonsignificance criteria for nondegradation purposes. Background concentrations' sources of information and methodology are presented in Appendix 2.

The magnitude of some numeric standards is dependent on characteristics of the receiving water, such as hardness, pH, and temperature. The hardness used to calculate metal standards in this permit is 124 mg/L based on the 25th percentile of the receiving water data. Temperature and pH are based on the 75th percentile.

Table 8 - Basis for Certain Numeric Water Quality Standards			
Dependent Parameter	**Measured Parameter**	**Statistic**	**Value**
Metals (Cadmium, Copper, Chromium(III), Lead, Nickel, Silver, and Zinc)	Hardness (as $CaCO_3$)	25th percentile	124
Total ammonia	pH (s.u.)	75th percentile	8.3
	Temperature (degrees C)		8.8

The numeric water quality standards applicable to Sheep Creek, Coon Creek and ground water are shown in Appendix 1.

2.2.4 Impaired Waters

The Montana Water Quality Act requires DEQ to monitor state waters and to identify surface water bodies or segments of water bodies whose designated uses are threatened or impaired. DEQ must complete a TMDL for those water bodies that are identified as threatened or impaired.

Upon approval of the TMDL, the wasteload allocation (WLA) developed for a point source must be incorporated into the Facility's discharge permit. A WLA is defined as the portion of the receiving water's loading capacity that is allocated to one of its existing or future point sources.

2018 303(d) List
Sheep Creek is listed as impaired on the 2018 303(d) list as not fully supporting aquatic life or primary contact recreation uses. Listed causes of impairment are aluminum from natural sources and *E. coli*. from riparian area grazing.

Approved TMDL
The Sheep Creek *E. coli* TMDL and Water Quality Improvement Plan was approved by EPA in 2017. This TMDL did not include a wasteload allocation for the Facility. *E. coli* is not a pollutant of concern in the discharge from Outfall 001. The TMDL for aluminum is pending and is expected to include a WLA for aluminum applicable to the Facility discharge from Outfall 001 to Sheep Creek.

Outfall 001 effluent limitations for aluminum in this permit are based on the nonsignificance criteria in Coon Creek.

2.2.5 Pollutants of Concern

WQBELs are assessed for pollutants of concern (POC) based on effluent characteristics and the water quality objectives for the affected receiving water(s). DEQ has identified the POCs listed below for purposes of assessing WQBELs. Included in this list is any pollutant that has an assigned wasteload allocation as part of a TMDL, exceeds a water quality standard or nondegradation criterion in the effluent, or is subject to a federal ELG.

Table 9 - Pollutants of Concern	
Parameter	**Basis for Identifying as a Pollutant of Concern**
Outfall 001	
Copper Zinc Lead Mercury Cadmium TSS pH	Applicable ELGs/TBELs
Flow Total Nitrogen Total Phosphorus Ammonia Temperature Aluminum Antimony Arsenic Barium Beryllium Chromium Iron Nickel Selenium Silver Strontium Thallium Uranium Cyanide	Permit Application Review

2.2.6 Nondegradation Analysis

The MWQA includes a nondegradation policy that applies to any new or increased activity which results in a change in existing water quality. The level of protection provided to the receiving water(s) is specified in ARM 17.30.705(2) and conforms to three “tiers” of the federal antidegradation policy at 40 CFR 131.12. These three levels of protection are as follows:

Protection of Existing Uses (Tier 1): Existing and anticipated (designated) uses of state waters and the level of water quality necessary to protect those uses must be maintained and protected (ARM 17.30.705(2)(a)). Tier I protection applies to all state waters including waters not designated as high quality. The effluent limitations applied to outfalls subject to this level of protection are derived from and comply with the state’s numeric and narrative water quality standards and, therefore, ensure the level of water quality necessary to attain and maintain existing and anticipated uses are fully protected.

Protection of High Quality Waters (Tier 2): Unless authorized by DEQ (authorization to degrade) or exempted from review under 75-5-317 MCA, the quality of high-quality waters must be maintained. This rule applies to any activity that may cause degradation of high quality waters, for any parameter, unless the changes in existing water quality are determined to be nonsignificant under ARM 17.30.670, 17.30.715, or 17.30.716. High quality waters includes all state surface waters except those not capable of supporting any one of the designated uses for their classification or that have zero flow or surface expression for more than 270 days during most years. Any water body for which the receiving water pollutant concentration is less than the applicable water quality standard is considered high quality. This determination is made on a parameter by parameter basis and may include waters listed on the state's 303(d) list.

Protection of Outstanding Resource Waters (Tier 3): ARM 17.30.705(2)(c) requires that, for outstanding resource waters, no degradation is allowed and no permanent change in the quality of outstanding resources waters resulting from a new or increased point source discharge is allowed.

A discharge that meets the nondegradation criteria is in compliance with Montana's nondegradation policy. New discharges (or sources) that are able to meet WQBELs based on application of nonsignificance criteria are not required to submit an authorization to degrade state waters.

DETERMINATION – NEW OR INCREASED SOURCES

The Facility is a new source subject to review under the non-degradation rules. DEQ has made the following determinations with respect to the proposed discharges:

Table 10 - New or Increased Source Determination

Outfall(s)	Receiving Water	Source Determination	Nondegradation - Level of Protection Required
001	Alluvial Ground Water	New	Tier 2 All Parameters
	Coon Creek	New	Tier 2 All Parameters
	Sheep Creek	New	Tier 1 for Aluminum and *E. coli* Tier 2 for all other parameters
002 - 014	Brush Creek, Coon Creek, Little Sheep Creek	New	Tier 2 All Parameters

The permit effluent limitations at Outfall 001 are based on the most stringent nonsignificance criterion of the three receiving waters. For example, the nondegradation protection for aluminum is Tier 2 in Coon Creek and Tier 1 in Sheep Creek because the aquatic life use in Sheep Creek is impaired due to aluminum. Effluent limitations for aluminum are therefore based on achieving the more stringent nonsignificance criterion applicable to Coon Creek. Nonsignificance-based limits must be achieved at the point of discharge before mixing with ground water or surface water.

Effluent limitations (See Section 2.3 Final Effluent Limitations and Conditions) at Outfalls 002- 014 are based on ensuring BMPs are protective of the nonsignificance criteria.

2.2.7 Mixing Zones

A mixing zone is an area where the effluent mixes with the receiving water and certain numeric water quality standards may be exceeded.

Where a mixing zone is requested by a discharger, DEQ will determine whether the requested mixing zone may or may not be granted for a particular parameter and, if a mixing zone is granted, the type of mixing zone. Unless specifically requested, granted, and identified in the permit or permit fact sheet, a mixing zone is not assumed for any parameter.

The discharge must also comply with the general prohibitions of ARM 17.30.637(1), which require that state waters, including mixing zones, be free from certain substances.

When requested and approved, DEQ may provide mixing zones for chronic aquatic life criteria, human health criteria and the nutrients total nitrogen and total phosphorus. In limited circumstances a mixing zone may also be granted for acute aquatic life standards.

The stream flows used for mixing zone analyses are discussed in Section 2.2.3. Generally, dilution is based on the 7Q10 for aquatic life and human health criteria. For nutrients, mixing zones are based on dilution with the 14Q5.

In addition to sufficient flow, the receiving water must also have assimilative capacity for the parameter(s) under consideration for a mixing zone, i.e. the receiving water quality upstream of the discharge must be less than the water quality standard or nonsignificance criterion. DEQ uses the 75th percentile of the receiving water data for the purpose of determining assimilative capacity and to develop any necessary water quality-based effluent limitations.

Because the proposed discharge is a new source, the mixing zone analysis must be based on achieving the nonsignificance criteria or the Permittee must receive an authorization to degrade water quality under ARM 17.30.707 - 708.

Discharges from new sources containing harmful parameters, and the parameters in DEQ-12A, are considered nonsignificant when the changes outside of a mixing zone are less than ten percent of the applicable standard and the existing water quality level is less than 40 percent of the standard.

When determining a water quality standard or nonsignificance criterion that is expressed as an incremental change relative to the background receiving water quality, DEQ uses the 25th percentile of the receiving water data as the background receiving water quality.

<u>Mixing Zone Determination</u>

Outfall 001

The Permittee did not request a mixing zone for aquatic life or human health water quality standards. Final effluent limitations based on the nonsignificance criteria must be achieved at the point of discharge.

The Permittee requested a source specific mixing zone for total nitrogen in Sheep Creek and Coon Creek. A source specific mixing zone is requested because the discharge from Outfall 001 is likely to exceed the nonsignificance criterion for total nitrogen after receiving treatment in the reverse osmosis treatment system. The discharge will be from a series of underground infiltration galleries and will enter Sheep and Coon Creeks after first passing through the ground and mixing with ground water. The discharge will enter Sheep Creek and Coon Creek in a diffuse manner over a distance in excess of ten stream widths and is therefore not eligible for a standard mixing zone.

When assessing a mixing zone request, DEQ must first determine if a mixing zone is feasible depending on the parameter(s) for which the mixing zone is requested, the water quality standards and/or nonsignificance criteria, and the characteristics of the receiving water. DEQ reviewed the background seasonal total nitrogen data for the alluvial groundwater, Sheep Creek and Coon Creek and compared them with the nonsignificance criteria; summarized in the following table.

Table 11 – Background Total Nitrogen Concentrations, Standards, and Nonsignificance Criteria

Receiving Water	Seasonal Total Nitrogen Concentration (mg/L)		Total Nitrogen Water Quality Standard (mg/L)	Total Nitrogen Nonsignificance Criterion (mg/L) [1]
	25th Percentile	75th Percentile		
Ground Water [2]	0.06	0.09	--	--
Sheep Creek	0.06	0.09	0.300	0.090
Coon Creek	0.06	0.12	0.300	0.090

1. 25th percentile of background plus ten percent of the water quality standard.
2. Assumed equivalent to upstream surface water concentrations because upgradient ground water data is unavailable.

The 75th percentile (background concentration for determining assimilative capacity) of the receiving water is equivalent to the nonsignificance criteria. Thus, the receiving water does not have enough assimilative capacity for the discharge to be considered a nonsignificant change in existing water quality. A mixing zone to achieve the total nitrogen nonsignificance criterion is not appropriate.

The Permittee has elected not to pursue an authorization to degrade existing water quality, which, if approved, could provide additional assimilative capacity up to the total nitrogen water quality standard.

DEQ denies the Permittee's request for a mixing zone to achieve the total nitrogen nonsignificance criterion. Water quality-based effluent limitations, developed from the nonsignificance criterion, must be achieved at the point of discharge.

2.2.8 Reasonable Potential Analysis (RPA)

No wastes may be discharged, either alone or in combination with other wastes, or activities, that will violate or can reasonably be expected to violate any of the standards. Limitations must be established in permits to control all pollutants or pollutant parameters that are or may be discharged at a level that will cause, have the reasonable potential to cause, or contribute to an excursion above any water quality standard. A "reasonable potential analysis" (RPA) is used to determine whether a discharge, alone or in combination with other sources of pollutants already present in the water body could lead to an excursion above a numeric or narrative water quality standard.

When determining the need for WQBELs for individual pollutants regulated by standards expressed in terms of concentration, DEQ primarily uses a mass-balance equation. The mass-balance equation, given below, is a steady state equation used to determine the concentration of a pollutant after accounting for other sources of pollution in the receiving water and any dilution provided by a mixing zone.

$$Q_rC_r = Q_sC_s + Q_dC_d$$

Where:

Q_s	=	critical stream design flow at point of discharge, Section 2.2.3
C_s	=	critical background pollutant concentration, Section 2.2.3
Q_d	=	critical effluent flow, Appendix 3
C_d	=	critical effluent pollutant concentration, Appendix 3
Q_r	=	resultant in-stream flow after discharge ($Q_r = Q_s + Q_d$)
C_r	=	resultant in-stream pollutant concentration

Where the projected receiving water concentration (C_r), determined from the available effluent data exceeds a numeric standard or any applicable nondegradation criterion for the parameter of concern, there is reasonable potential and WQBELs must be included in the permit.

In addition to numeric water quality standards, effluent limitations must be included in permits if there is a reasonable potential to exceed narrative standards. This includes the general prohibitions ('free from') provision in ARM 17.30.637, including toxicity.

The aggregate toxicity of the whole effluent must also be considered and effluent limitations included where there is a reasonable potential to cause or contribute to toxicity. Acute and chronic toxicity are discussed below.

Appendix 4 provides additional detail and specific procedures included in the RPA.

RPA DISCUSSION

Outfall 001

In the absence of a mixing zone, reasonable potential is assessed based on achieving the nonsignificance criteria at the point of discharge.

RPA results for outfall 001 are summarized in Appendix 4, Table 4.A.2 for the POC. Critical effluent concentrations were determined using TSD methods to first arrive at a projected maximum effluent concentration. The projected maximum effluent concentration was then compared directly to the nonsignificance criteria. Where TBELS for the subcategory apply, the TBEL values were used to assess RP. For all other parameters, RP was assessed using the values reported in the permit application. RP was demonstrated numerically for the following: Total ammonia, nitrate plus nitrite, total nitrogen, and total recoverable antimony, arsenic, beryllium, cadmium, copper, lead, mercury, selenium, silver, thallium, uranium and zinc. WQBELs are required for these parameters.

Because the reasonable potential analysis is based on estimated and not actual discharge concentrations, and the nonsignificance criteria are low thresholds that must be achieved to ensure degradation does not occur, DEQ further determined that reasonable potential exists for the following toxic, carcinogen, or harmful parameters of concern: Total phosphorus, dissolved aluminum and total recoverable barium, chromium, iron, nickel, strontium, and cyanide. WQBEL are also developed for these parameters.

DEQ did not find RP to exceed the temperature standard because the Outfall 001 discharge is via the UIG and it will be transported through a buried pipeline for a significant distance before reaching the UIG. It is assumed the effluent temperature will equilibrate with the ground water temperature before reaching surface water. The permit will require temperature monitoring in the effluent and in Sheep Creek upstream and downstream of Outfall 001.

Outfalls 002 – 014

The primary pollutants of concern from storm water are turbidity, sediment, and settleable solids. The narrative water quality standard applicable to B-1 waters requires no increase above naturally occurring concentrations of sediment or suspended sediment and settleable solids which will, or are likely to create a nuisance or render the waters harmful, detrimental, or injurious to public health, recreation, safety, welfare, livestock, wild animals, birds, fish, or other wildlife. ARM 17.30.623(d) states the maximum allowable increase above naturally occurring turbidity is five nephelometric turbidity units (NTU).

DEQ finds the technology-based BMP requirements in Section 2.1.3 will protect the narrative standards for sediment, suspended sediment, turbidity, and settleable solids.

To ensure storm water discharges cause nonsignificant changes for turbidity, BMPs developed to comply with the TBEL requirement in Section 2.1.3 must also be designed to detain storm water from a 10-year 24-hour precipitation event, or produce storm water effluent quality equivalent to storm water discharge from detention of the 10-year 24-hour event. The permit will also require turbidity monitoring of the storm water discharges and the upstream receiving water any time a discharge occurs. Receiving water quality must be measured upstream of all storm water outfalls and as close as possible to the mine operating permit boundary. If the discharge turbidity at any Outfall exceeds the upstream turbidity, the Permittee must re-evaluate the SWPPP and adjust or add to BMPs to improve control of turbidity in the discharge and notify DEQ, in writing, of the amended SWPPP and resulting BMP changes.

In addition to turbidity, DEQ considered aluminum (due to impairment on Sheep Creek) and the pollutants of concern in storm water discharges for Sector G – Metal Mining in the DEQ *Multi-Sector General Permit for Storm Water Discharges Associated with Industrial Activity* (Table 18, below). Storm water discharges from access roads at the site are storm water discharges associated with industrial activity as defined at 40 CFR 122.26(b)(14).

DEQ finds the technology-based BMP requirements in Section 2.1.3 will protect the water quality standards for these parameters.

To ensure storm water discharges cause nonsignificant changes for the Table 18 pollutants, BMPs developed to comply with the TBEL requirement in Section 2.1.3 must also be designed to detain storm water from a 10-year 24-hour precipitation event, or produce a storm water effluent quality equivalent to storm water discharge from detention of the 10-year 24-hour event. The permit requires monitoring for the Table 18 pollutants at Outfalls 003, 006, 009, and 011. Up to twice a year during a precipitation event that causes a discharge, the permittee is required to monitor Outfalls 003, 006, 009, and 011. During the same storm events, monitoring must also occur on Brush Creek upstream of Outfall 006, Little Sheep Creek upstream of Outfall 011, and Coon Creek upstream of Outfall 003.

Pollutant concentrations in the discharges should be less than or equal to the receiving water background concentration. If pollutant concentration exceeds the background concentration for any parameter in Table 18, the Permittee must re-evaluate the SWPPP and adjust or add to BMPs to improve control of the pollutant in the discharge and notify DEQ, in writing, of the amended SWPPP and resulting BMP changes.

REASONABLE POTENTIAL ANALYSIS (RPA)—WHOLE EFFLUENT TOXICITY

The water quality standards prohibit discharges that will create concentrations or combinations of materials which are toxic or harmful to human, animal, plant, or aquatic life. DEQ uses whole effluent toxicity (WET) testing to demonstrate compliance with this narrative standard. Given the nature of the treatment system, limits for toxics are set at nonsignificance levels, and the fact the discharge first passes through the ground, toxicity in the effluent is not expected. Because the Facility is a major discharger, and to comply with U.S. EPA Region 8 policy, the permit will require WET monitoring.

2.2.9 Water Quality Based Effluent Limits —Individual Pollutants

Water quality based effluent limits (WQBELs) must be calculated for both individual pollutants and for the aggregate effect of the discharge as determined by WET when there is a reasonable potential to exceed a numeric or narrative standard. The procedure and basis for these calculations are discussed in Appendix 5. WET limits are discussed in Section 2.2.10.

The procedures, model inputs and derived WLAs are described in Appendix 5 for individual pollutants. These procedures follow EPA's TSD which are based on the requirements of 40 CFR 122.44(d). WQBELs are summarized below.

Table 12 - WQBEL— Outfall 001

Parameter	Units	Proposed Effluent Limitations	
		Average Monthly	Maximum Daily
Aluminum, dissolved	µg/L	11	21
Antimony, Total Recoverable	µg/L	0.8	0.8
Arsenic, Total Recoverable	µg/L	1.0	1.0
Barium, Total Recoverable	µg/L	150	150
Beryllium, Total Recoverable	µg/L	0.8	0.8
Cadmium, Total Recoverable	µg/L	0.8	0.8
Chromium, Total Recoverable	µg/L	15	15
Copper, Total Recoverable	µg/L	1.4	2.8
Iron, Total Recoverable	µg/L	205	416
Nickel, Total Recoverable	µg/L	7.8	15
Lead, Total Recoverable	µg/L	0.5	1.0
Mercury, Total Recoverable	µg/L	0.0005	0.0005

Table 12 - WQBEL— Outfall 001			
Parameter	**Units**	**Proposed Effluent Limitations**	
		Average Monthly	Maximum Daily
Selenium, Total Recoverable	µg/L	0.6	1.2
Silver, Total Recoverable	µg/L	0.05	0.10
Strontium, Total Recoverable	µg/L	600	600
Thallium, Total Recoverable	µg/L	0.04	0.04
Uranium	µg/L	0.7	0.7
Zinc, Total Recoverable	µg/L	4.6	9.2
Cyanide, Total	µg/L	0.6	0.6
Ammonia, Total	mg/L	0.18	0.37
Nitrate plus Nitrite	mg/L	1.5	1.5
Phosphorus, Total, as P	mg/L	0.012	--
	lb/day	0.06	
Nitrogen, Total, as N	mg/L	0.09	--
	lb/day	0.43	--

Storm water discharges at Outfalls 002 – 014 must employ the use of detention basins designed to detain the 10-year 24-hour precipitation event or produce a storm water effluent quality equivalent to that produced after detention of the 10-year 24-hour event.

2.2.10 Whole Effluent Toxicity Limitations

The permit does not contain effluent limitations for WET because the WQBELs set on nondegradation levels should not result in reasonable potential for toxicity. Although the discharge will pass through the ground before reaching surface water, the ground water discharge will be in close proximity to Sheep and Coon Creeks and the Permittee has not requested a mixing zone. The permit will require quarterly WET monitoring to assess any potential toxicity in the effluent at Outfall 001. See Section 3.3 for WET monitoring and reporting requirements.

2.3 Final Effluent Limitations and Conditions

The final effluent limitations in the permit are based on the more stringent of the calculated TBELs and WQBELs for each parameter. The more stringent limitations will attain both the technology-based requirements and water quality standards. Stringency of TBEL and WQBEL must be based on a common averaging period and for metals, total recoverable method of analysis.

2.3.1 Stringency Analysis

The permit contains both technology-based effluent limitations and water quality-based numeric effluent limitations for individual pollutants. This permit's technology-based pollutant restrictions implement the minimum, applicable federal technology-based requirements for Outfall 001 and additional TBELs for Outfalls 002 - 014. In addition, the permit contains effluent limitations more stringent than the minimum, federal technology-based requirements that are necessary to meet water quality standards for cadmium, copper, lead, mercury, and zinc for Outfall 001. To protect against degradation caused by storm water, the permit includes additional BMP and monitoring requirements at Outfalls 002 – 014.

2.3.2 Anti-backsliding Analysis

This is a new permit. Anti-backsliding does not apply.

<u>Final Effluent Limitations—Outfall 001</u>

Table 13 – Final Effluent Limitations Outfall 001

Parameter	Units	Effluent Limitations		Basis
		Average Monthly	Maximum Daily	
pH	s.u.	6.0 to 9.0		NSPS
Total Suspended Solids	mg/L	20	30	NSPS
Aluminum, Dissolved	µg/L	11	21	WQBEL
Antimony, Total Recoverable	µg/L	0.8	0.8	WQBEL
Arsenic, Total Recoverable	µg/L	1.0	1.0	WQBEL
Barium, Total Recoverable	µg/L	150	150	WQBEL
Beryllium, Total Recoverable	µg/L	0.8	0.8	WQBEL
Cadmium, Total Recoverable	µg/L	0.8	0.8	WQBEL
Chromium, Total Recoverable	µg/L	15	15	WQBEL
Copper, Total Recoverable	µg/L	1.4	2.8	WQBEL
Iron, Total Recoverable	µg/L	205	416	WQBEL
Lead, Total Recoverable	µg/L	0.5	1.0	WQBEL

Table 13 – Final Effluent Limitations Outfall 001				
Parameter	Units	Effluent Limitations		Basis
		Average Monthly	Maximum Daily	
Mercury, Total Recoverable	µg/L	0.0005	0.0005	WQBEL
Nickel, Total Recoverable	µg/L	7.8	15	WQBEL
Selenium, Total Recoverable	µg/L	0.6	1.2	WQBEL
Silver, Total Recoverable	µg/L	0.05	0.10	WQBEL
Strontium, Total Recoverable	µg/L	600	600	WQBEL
Thallium, Total Recoverable	µg/L	0.04	0.04	WQBEL
Uranium	µg/L	0.7	0.7	WQBEL
Zinc, Total Recoverable	µg/L	4.6	9.2	WQBEL
Cyanide, total	µg/L	0.6	0.6	WQBEL
Ammonia, total	mg/L	0.18	0.37	WQBEL
Nitrate plus Nitrite	mg/L	1.5	1.5	WQBEL
Phosphorus, Total as P [1]	mg/L	0.012	--	WQBEL
	lb/day	0.06	--	WQBEL
Nitrogen, Total, as N [1]	mg/L	0.09	--	WQBEL
	lb/day	0.43	--	WQBEL
Footnotes: 1. Limit effective July 1 through September 30.				

There shall be no discharge of process wastewater from the mill, except that a discharge may occur under the following conditions:

1. If, as a result of precipitation (rainfall or snowmelt), the facility has an overflow or discharge from the process water pond, a discharge may occur that is equal to the volume of water in excess of the pond capacity under normal operation plus the volume of water and runoff generated from a 10-year 24-hour storm event. The facility (PWP) must be designed, constructed, and maintained to contain the maximum volume of water in the pond during normal operations plus the 10-year 24-hour precipitation event. The design volume must include the facility and all areas contributing runoff to the process water pond. Any discharge resulting from this exception must comply with the final effluent limitations and monitoring requirements applicable to Outfall 001.

2. In the event there is a buildup of contaminants in the recycle water which significantly interferes with the ore recovery process and this interference cannot be eliminated through appropriate treatment of the recycle water, a discharge in an amount necessary to correct the interference may occur after installation of appropriate treatment. The facility shall have the

burden of demonstrating to DEQ that the discharge is necessary to eliminate the interference in the ore recovery process and that the interference could not be eliminated through appropriate treatment of the recycle water. The permittee must request the discharge and provide the required justification in writing. The discharge may not occur until DEQ has provided written authorization. Any discharge resulting from this exception must comply with the final effluent limitations and monitoring requirements applicable to Outfall 001.

Final Effluent Limitations Outfalls 002 – 014

The discharge of any process wastewater or any water resulting from mine dewatering activities or mine drainage is prohibited at Outfalls 002 – 014.

Outfalls 002 – 014 are subject to the BMP requirements for storm water discharges (See Special Conditions Section 4.0). The Permittee must comply with all BMP requirements (see Special Conditions Section 4.0) and develop, implement, and maintain a Storm Water Pollution Prevention Plan (SWPPP) (see Special Conditions Section 4.0) identifying all BMPs selected for storm water control and submit the SWPPP for DEQ review. The Permittee must receive DEQ written approval of the SWPPP prior to construction of Outfalls 002 - 014.

In addition to the TBEL BMP requirements, storm water discharges at Outfalls 002 – 014 must employ the use of detention basins designed to detain the 10-year 24-hour precipitation event or achieve storm water effluent quality equivalent to that achieved after detention of the 10-year 24-hour event.

The Permittee must re-evaluate the SWPPP and adjust or add BMPs when, based on monitoring results, turbidity in the discharge at any Outfall 002-014 exceeds the upstream turbidity of the associated receiving water during each discharge event. The Permittee must adjust or add BMPs before the next storm event if possible or within a maximum timeframe of 14 days of receiving the monitoring results. If it is infeasible to adjust or add BMPs within 14 days the Permittee may request additional from DEQ. The request must be in writing, outline the reasons why the 14 day timeframe is infeasible, and may not exceed a total of 45 days. The extension request must be approved by DEQ in writing. The Permittee must notify DEQ, in writing, of the amended SWPPP and resulting BMP changes (See Reasonable Potential Analysis Section 2.2.8. and Monitoring and Reporting Requirements Section 3).

Outfalls 003, 006, 009, and 011
Up to twice a year during a precipitation event that causes a discharge, the Permittee must conduct additional monitoring for Outfalls 003, 006, 009, and 011. During the same storm events, monitoring must also occur on Brush Creek upstream of Outfall 006, Little Sheep Creek upstream of Outfall 011, and Coon Creek upstream of Outfall 003. The Permittee must re-evaluate the SWPPP and adjust or add BMPs to improve control of the pollutant in the discharge when, based on monitoring results, any parameter in Table 18 in the discharge at Outfalls 003, 006, 009 or 011 exceeds the upstream parameter concentration of the associated receiving water (See Reasonable Potential Analysis Section 2.2.8. and Monitoring and Reporting Requirements Section 3). The Permittee must adjust or add BMPs before the next storm event if possible or within a maximum timeframe of 14 days of receiving the monitoring results. If it is infeasible to adjust or add BMPs within 14 days the Permittee may request additional from DEQ. The request must be in writing, outline the reasons why the 14 day timeframe is infeasible, and may not exceed a total of 45 days. The extension request must be approved by DEQ in writing. The Permittee must notify DEQ, in writing, of the amended SWPPP and resulting BMP

changes (See Reasonable Potential Analysis Section 2.2.8. and Monitoring and Reporting Requirements Section 3).

3 MONITORING AND REPORTING REQUIREMENTS

All test procedures must be approved under 40 CFR 136, unless another method is specified in the permit. Analytical methods must achieve the required reporting value (RRV) specified in the latest version of Department Circular DEQ-7. The RRVs specified in the following monitoring tables are included for convenience and are the RRVs at the time of permit development. RRVs are subject to change during water quality standards triennial review.

3.1 Monitoring Location

The authorization to discharge is limited to the following designated outfalls. The Permittee must monitor the effluent to demonstrate compliance with the effluent limitations and other requirements of this permit at the locations specified in the table below.

Table 14 – Outfall Monitoring Locations

Outfall Designation	Monitoring Location Designation	Monitoring Description
001	001A	At the end of pipe, after all treatment processes, prior to discharge into the infiltration galleries.
002 - 014	002A – 014A	At the point of discharge from the outfall.

3.2 Monitoring Determination

Monitoring requirements for the discharges and monitoring locations described in Section 3.1 are given in the following tables specific to each monitoring location and are incorporated into the discharge permit.

<u>Outfall 001</u>

The Permittee must provide written notification to DEQ 30 days prior to commencement of discharge at Outfall 001.

Monitoring for metals discharged at Outfall 001 have been included to show compliance with the metals limitations developed in this permit. Metals monitoring results must be reported as total recoverable (except aluminum). The monitoring frequency is weekly for all parameters.

Per DEQ Circular 12-A, total nitrogen is either calculated as the sum of total Kjeldahl nitrogen and nitrite plus nitrate or measured via persulfate digestion.

When discharging to Outfall 001, effluent flow must be monitored on a continuous basis and reported as total volume per day to be consistent with state and federal regulations for flow monitoring.

By June 15 of each year, the Permittee must provide written notification to DEQ of intent to either discharge from Outfall 001 or hold wastewater in the Treated Water Storage Pond during the growing season (July – September). Monitoring frequency for total nitrogen is increased to daily during the growing season. The Permittee should plan to hold wastewater unless confident that total nitrogen effluent limits can be achieved for the entire July to September period. If total nitrogen exceeds the effluent limitation, or if daily sample results are sufficiently high that compliance with the limitation will be difficult, the discharge must be rerouted to the Treated Water Storage Pond for the remainder of the growing season.

Outfalls 002 – 014
Turbidity monitoring is required at Outfalls 002 - 014 and in each receiving water upstream of all outfall discharges during any storm event that causes a discharge at any outfall. Upstream monitoring locations on Brush Creek, Coon Creek, Little Sheep Creek, and the unnamed drainage associated with Outfall 014, must be upstream of all outfalls and as near as possible to the mine operating permit boundary. Each instream sampling location must be marked and used during each sampling event.

Semi-annual storm water discharge monitoring is also required at Outfalls 003, 006, 009, and 011, for aluminum and the parameters associated with copper mines in the DEQ *General Permit for Storm Water Discharges Associated with Industrial Activity*. Sampling must also occur upstream of Outfalls 003, 006, 009, and 011 as near as possible to the mine operating permit boundary. Total nitrogen is substituted for nitrate plus nitrite for storm water monitoring.

For all storm water discharges, sampling data shall be obtained by collecting a grab sample. The grab sample shall be taken during the first thirty minutes of the discharge. If the collection of a grab sample during the first thirty minutes is impracticable, a sample can be taken during the first hour of the discharge and the permittee shall submit, attached to the DMR form, a description of why a grab sample during the first thirty minutes was impracticable.

3.3 Whole Effluent Toxicity (WET) Testing

Whole effluent toxicity has not been assessed for the Facility discharge. No mixing zone for acute or chronic toxicity is authorized by the permit. Quarterly chronic WET testing is required to characterize the effluent. Chronic testing is used because DEQ policy requires chronic testing when the receiving water to discharge flow ratio is less than 10 to 1 and the potential for chronic effects is greater. Additional acute WET tests are not necessary because the chronic test can be used as an indicator for acute toxicity. For example, significant mortality of the test organisms during the first 24 to 96 hours of the chronic test would result in test failure and would indicate that the effluent is also acutely toxic.

Prior to commencement of the discharge at Outfall 001, the Permittee must collect samples of treated wastewater and conduct a two-species chronic WET test on *Ceriodaphnia dubia* and *Pimephales promelas*. The test must include effluent concentrations of 100, 75, 50, 25, and 12.5 % effluent, plus a control. Moderately hard reconstituted water (see test methods) may be used for effluent dilutions and the control. The test results must show that the inhibition concentration to 25% of the test population (IC_{25}) is greater than the 100% effluent concentration for both species in order to support a conclusion of no toxicity to Sheep Creek. The discharge to Outfall 001 may commence after this initial WET test is conducted and passed. Two-species WET monitoring must be conducted quarterly thereafter.

Should the initial WET test result in an IC_{25} less than or equal to 100 percent effluent, the Permittee must identify the cause of the toxicity, eliminate it, and achieve an IC_{25} greater than 100% effluent in a follow up test before the discharge may commence. An IC_{25} less than 100% effluent shows the discharge exhibits reasonable potential to cause chronic toxicity and the permit may be reopened to include a WET limit. In the event an IC_{25} greater than 100% effluent cannot be achieved, even after attempts to eliminate the toxicity, the Permittee may request a mixing zone that allows for dilution with the upgradient ground water prior to the effluent reaching Sheep Creek.

Standard WET language addressing any future toxicity as well as potential reduction in monitoring frequency will be included in the permit. All WET tests must follow the requirements for chronic testing based on EPA methods 1002.0 (*Ceriodaphia dubia*) and 1000.0 (*Pimephales promelas*).

3.4 Reporting Requirements

All monitoring results for the Outfall 001 discharge, except WET, shall be reported to DEQ monthly. WET testing results shall be reported quarterly. Storm water monitoring shall be reported either quarterly or semi-annually (see below). The Permittee must comply with reporting requirements as specified in ARM 17.30.1342 which are included in the permit.

Table 15 - Monitoring Requirements at Outfall 001					
Parameter	**Units**	**Minimum Monitoring Frequency**	**Sample Type**	**RRV**	**Basis/Comment**
Effluent Flow Rate	MGD	Continuous	Recording Device	--	Permit Compliance
pH	s.u.	1/Week	Instantaneous	0.1	Permit Compliance
Total Suspended Solids	mg/L	1/Week	Composite	1	Permit Compliance
Temperature	° F	1/Week	Instantaneous	--	Permit Compliance
Aluminum, Dissolved	µg/L	1/Week	Composite	9	Permit Compliance
Antimony, Total Recoverable	µg/L	1/Week	Composite	0.5	Permit Compliance
Arsenic, Total Recoverable	µg/L	1/Week	Composite	1	Permit Compliance
Barium, Total Recoverable	µg/L	1/Week	Composite	3	Permit Compliance
Beryllium, Total Recoverable	µg/L	1/Week	Composite	0.8	Permit Compliance
Cadmium, Total Recoverable	µg/L	1/Week	Composite	0.03	Permit Compliance
Chromium, Total Recoverable	µg/L	1/Week	Composite	10	Permit Compliance
Copper, Total Recoverable	µg/L	1/Week	Composite	2	Permit Compliance
Iron, Total Recoverable	µg/L	1/Week	Composite	20	Permit Compliance
Lead, Total Recoverable	µg/L	1/Week	Composite	0.3	Permit Compliance
Mercury, Total Recoverable	µg/L	1/Week	Composite	0.005	Permit Compliance
Nickel, Total Recoverable	µg/L	1/Week	Composite	2	Permit Compliance
Selenium, Total Recoverable	µg/L	1/Week	Composite	1	Permit Compliance
Silver, Total Recoverable	µg/L	1/Week	Composite	0.2	Permit Compliance
Strontium, Total Recoverable	µg/L	1/Week	Composite	100	Permit Compliance
Thallium, Total Recoverable	µg/L	1/Week	Composite	0.2	Permit Compliance
Uranium, Total Recoverable	µg/L	1/Week	Composite	0.2	Permit Compliance
Zinc, Total Recoverable	µg/L	1/Week	Composite	8	Permit Compliance
Cyanide, Total	µg/L	1/Week	Composite	3	Permit Compliance
Ammonia, as N	mg/L	1/Week	Composite	0.07	Permit Compliance
Nitrate+Nitrite, as N	mg/L	1/Week	Composite	20	Permit Compliance
Total Nitrogen, as N (Oct. – June)	mg/L	1/Week	Composite	70	Permit Compliance
Total Nitrogen, as N (Oct. – June)	lbs/day	1/Week	Calculate	--	Permit Compliance
Total Nitrogen, as N (July – Sep.)	mg/L	Daily	Composite	70	Permit Compliance
Total Nitrogen, as N (July – Sep.)	lbs/day	Daily	Calculate	--	Permit Compliance
Total Phosphorus	mg/L	1/Week	Composite	3	Permit Compliance
Total Phosphorus	lbs/day	1/Week	Calculate	--	Permit Compliance
Whole Effluent Toxicity IC_{25}, 3 Brood Chronic, Ceriodaphnia dubia	Percent Effluent	1/Quarter	Composite	Per Method 1002.0	Report Only
Whole Effluent Toxicity, IC_{25}, 7-day Chronic – Pimephales promelas	Percent Effluent	1/Quarter	Composite	Per Method 1000.0	Report Only

In addition to the monitoring above, the Permittee must complete and submit Parts V and VI of U.S EPA Form 2C within 6 months of commencing the discharge from Outfall 001. Analytical results are required for all parameters listed in Part V-A, B, and C, including all GC/MS fractions in Table 2C-2. Part D must also be completed as required by the Form 2C instructions.

Instream monitoring for temperature in Sheep Creek and Coon Creek is shown in Table 16. The reporting period for this monitoring is monthly, based on calendar months. The downstream location for Coon Creek is immediately upstream of the confluence with Sheep Creek.

Table 16 - Monitoring Requirements in Sheep Creek (RIV-A) and Coon Creek (RIV-B)

Parameter	Units	Minimum Monitoring Frequency	Sample Type	RRV	Basis
Temperature, upstream of Outfall 001	° F	1/Month	Instantaneous	--	Report Only
Temperature, downstream of Outfall 001	° F	1/Month	Instantaneous	--	Report Only

The reporting period for storm water monitoring in Table 17 is quarterly, based on calendar quarters. If more than one storm event occurs during the monitoring period, report the average of all samples analyzed and the maximum for each parameter. Attach bench sheets for each monitored storm event to the DMR.

Table 17 - Monitoring Requirements at Outfalls 002 - 014

Parameter	Units	Minimum Monitoring Frequency	Sample Type	RRV	Basis
Flow Rate	MGD	1/Discharge	Estimate	--	Report only
pH	s.u.	1/Discharge	Grab	0.1	Permit Compliance
Total Suspended Solids	mg/L	1/Discharge	Grab	1	Permit Compliance
Turbidity	NTU	1/Discharge	Grab	0.5	Permit Compliance

The reporting period for storm water monitoring in Table 18 is semi-annual; January through June and July through December. One storm event must be monitored in each monitoring period. Attach bench sheets for the monitored storm event to the DMR.

Table 18- Additional Monitoring Requirements at Outfalls 003, 006, 009, 011

Parameter	Units	Minimum Monitoring Frequency	Sample Type	RRV	Basis
Flow Rate	MGD	Twice/Year	Estimate	--	Report only
Aluminum, Dissolved	µg/L	Twice/Year	Grab	9	Permit Compliance

Table 18- Additional Monitoring Requirements at Outfalls 003, 006, 009, 011					
Parameter	**Units**	**Minimum Monitoring Frequency**	**Sample Type**	**RRV**	**Basis**
Antimony, Total Recoverable	µg/L	Twice/Year	Grab	9	Permit Compliance
Arsenic, Total Recoverable	µg/L	Twice/Year	Grab	0.03	Permit Compliance
Beryllium, Total Recoverable	µg/L	Twice/Year	Grab	1	Permit Compliance
Cadmium, Total Recoverable	µg/L	Twice/Year	Grab	20	Permit Compliance
Copper, Total Recoverable	µg/L	Twice/Year	Grab	0.3	Permit Compliance
Iron, Total Recoverable	µg/L	Twice/Year	Grab	0.005	Permit Compliance
Lead, Total Recoverable	µg/L	Twice/Year	Grab	0.2	Permit Compliance
Mercury, Total Recoverable	µg/L	Twice/Year	Grab	8	Permit Compliance
Nickel, Total Recoverable	µg/L	Twice/Year	Grab	3	Permit Compliance
Selenium, Total Recoverable	µg/L	Twice/Year	Grab	1	Permit Compliance
Silver, Total Recoverable	µg/L	Twice/Year	Grab	0.2	Permit Compliance
Zinc, Total Recoverable	µg/L	Twice/Year	Grab	0.1	Permit Compliance
Chemical Oxygen Demand	mg/L	Twice/Year	Calculate	0.07	Permit Compliance
Total Nitrogen, as N	mg/L	Twice/Year	Calculate or Grab	70	Permit Compliance

Monitoring requirements for storm water receiving waters are shown in the following tables. All parameters must be monitored at the following designated locations for DMR reporting purposes. Monitoring samples in Table 19 must be collected during the same storm event as the corresponding discharge samples in Tables 17. Monitoring samples in Table 20 must be collected during the same storm event as the corresponding discharge samples in Table 18.

CRK-A: Little Sheep Creek upstream of Outfall 011
CRK-B: Brush Creek upstream of Outfall 006
CRK-C: Coon Creek upstream of Outfall 003
CRK-D: Unnamed drainage upstream of Outfall 014

Table 19 - Monitoring Requirements CRK-A, CRK-B, CRK-C, CRK-D					
Parameter	**Units**	**Minimum Monitoring Frequency**	**Sample Type**	**RRV**	**Basis**
pH	s.u.	1/Discharge	Grab	0.1	Report Only
Total Suspended Solids	mg/L	1/Discharge	Grab	1	Report Only

Table 19 - Monitoring Requirements CRK-A, CRK-B, CRK-C, CRK-D					
Parameter	**Units**	**Minimum Monitoring Frequency**	**Sample Type**	**RRV**	**Basis**
Turbidity	NTU	1/Discharge	Grab	0.5	Report Only

Table 20 - Monitoring Requirements CRK-A, CRK-B, CRK-C					
Parameter	**Units**	**Minimum Monitoring Frequency**	**Sample Type**	**RRV**	**Basis**
Aluminum, Dissolved	µg/L	Twice/Year	Grab	9	Report Only
Antimony, Total Recoverable	µg/L	Twice/Year	Grab	9	Report Only
Arsenic, Total Recoverable	µg/L	Twice/Year	Grab	0.03	Report Only
Beryllium, Total Recoverable	µg/L	Twice/Year	Grab	1	Report Only
Cadmium, Total Recoverable	µg/L	Twice/Year	Grab	20	Report Only
Copper, Total Recoverable	µg/L	Twice/Year	Grab	0.3	Report Only
Iron, Total Recoverable	µg/L	Twice/Year	Grab	0.005	Report Only
Lead, Total Recoverable	µg/L	Twice/Year	Grab	0.2	Report Only
Mercury, Total Recoverable	µg/L	Twice/Year	Grab	8	Report Only
Nickel, Total Recoverable	µg/L	Twice/Year	Grab	3	Report Only
Selenium, Total Recoverable	µg/L	Twice/Year	Grab	1	Report Only
Silver, Total Recoverable	µg/L	Twice/Year	Grab	0.2	Report Only
Zinc, Total Recoverable	µg/L	Twice/Year	Grab	0.1	Report Only
Chemical Oxygen Demand	mg/L	Twice/Year	Grab	0.07	Report Only
Total Nitrogen, as N [1]	mg/L	Twice/Year	Grab	70 (2)	Report Only
Footnotes: (1) Persulfate digestion					

4 SPECIAL CONDITIONS

Special conditions are included in MPDES permits when necessary to provide for and assure compliance with additional requirements of the Montana Water Quality Act or Federal Clean Water Act and applicable regulations on a case-by-case basis. ARM 17.30.1344. Special conditions include but are not limited to: collection of additional data, studies or supplemental monitoring, preventative measures, best management practices (BMPs), compliance schedules, ground water protection, programmatic conditions such as pretreatment, sewage sludge or sewer overflow, or, toxicity studies. This section provides the rationale for the special conditions included in the permit.

4.1 Toxicity Identification Evaluation /Toxicity Reduction Evaluation

The permit has established monitoring requirements for chronic toxicity. The permit also includes a provision to develop and implement a TIE/TRE plan if monitoring indicates effluent toxicity, as defined in the permit.

4.2 Best Management Practices and Pollution Prevention

DEQ is establishing BMPs for the facility as a special condition in this permit.

4.2.1 BMPs

A number of sites and activities found at metal mining facilities require the implementation of BMPs to prevent the contamination of storm water. Implementation of BMPs are required not only for mineral extraction sites and material piles, but for discharges from roads accessing these sites. BMPs must be selected and implemented that address, at a minimum, the following areas:

- Good Housekeeping Practices;
- Minimizing Exposure;
- Erosion and Sediment Control; and
- Management of Runoff and Run-on.

An overview of the BMPs that are applicable to the facility (haul or access roads; pits or quarries; overburden, waste rock, and raw material piles; and reclamation activities) is discussed below. These BMPs are adapted from EPA's *Industrial Stormwater Fact Sheet, Sector G: Metal Mining (Ore Mining and Dressing) Facilities* (EPA-833-F-06-022, December 2006) and must be referenced and incorporated by the permittee into the facility's storm water pollution prevention plan (SWPPP).

EPA has identified a wide variety of BMPs to mitigate discharges of contaminants at mines. These controls to prevent erosion and control sedimentation are the most effective if they are installed at the inception of operations and maintained throughout active operations and reclamation of the site. The following categories describe the BMPs available for reducing pollutants in storm water discharges at metal mining facilities:

Discharge Diversions

Discharge diversions provide the first line of defense in preventing the contamination of discharges and subsequent contamination of receiving waters. Discharge diversions are temporary or permanent structures installed to divert flow, store flow, or limit storm water run-on and runoff. Diversion dikes, curbs, and berms are temporary or permanent diversion structures that prevent runoff from passing beyond a certain point, and divert runoff away from its intended path. Dikes, curbs, or berms may be used to surround and isolate areas of concern, diverting flow around piles of overburden, waste rock, and storage areas to minimize discharge contact with contaminated materials and to limit discharges of contaminated water from confined areas.

Drainage/Storm Water Conveyance Systems

Drainage or storm water conveyance systems can provide either a temporary or a permanent management practice which functions to channel water away from eroded or unstabilized areas, convey runoff without causing erosion, and/or carry discharges to more stabilized areas. The use of drainage systems as a permanent measure may be most appropriate in areas with extreme slopes, areas subject to high velocity runoff, and other areas where the establishment of substantial vegetation is infeasible or impractical. Some examples of drainage/storm water conveyance systems include: channels or gutters; open top box culverts and waterbars; rolling dips and road sloping; roadway surface water deflector; and culverts. Drainage and conveyance systems should be inspected periodically for blockages and erosion. Erosion and/or sedimentation that compromise the ability of these structures to convey storm water should be addressed. Where blockage or erosion occurs, more frequent maintenance of these structures may be required.

Runoff Dispersion

Drainage systems are most effective when used in conjunction with runoff dispersion devises designed to slow the flow of water discharged from a site. These devices also aid storm water infiltration into the soil and flow attenuation. Some examples of velocity dissipation devices include: check dams; rock outlet protection; level spreaders; serrated slopes and benched slopes; contouring; and drop structures.

Sediment Control and Collection

Erosion and sediment controls limit movement and retain sediments, preventing transportation offsite. Several structural collection devices have been developed to remove sediment from runoff before it leaves the site. Several methods of removing sediment from site runoff involve diversion mechanisms previously discussed, supplemented by a trapping or storage device. Structural practices typically involve filtering diffuse storm water flows through temporary structures such as straw bale dikes, silt fences, brush barriers, or vegetated areas. Structural practices are typically low in cost. However, structural practices require periodic removal of sediment to remain functional. Several examples of sediment control and collection BMPs include: gabions, riprap, and native rock retaining walls; biotechnical stabilization; straw bale barrier; vegetated buffer strips; silt fence/filter fence; siltation berms; brush sediment barriers; sediment traps or catch basins; and sediment/settling ponds. Sediment ponds or traps located at final discharge points are designed to detain runoff from a 10-year, 24-hour precipitation event during active mining operations or achieve an effluent quality equivalent to that achieved after retention of the 10-year 24-hour event.

Vegetation Practices

Vegetation practices involve establishing a sustainable ground cover by permanent seeding, mulching, sodding, and other such practices. A vegetative cover reduces the potential for erosion of a site by: absorbing the kinetic energy of raindrops which would otherwise impact soil; intercepting water so it can infiltrate into the ground instead of running off and carrying contaminated discharges; and by slowing the velocity of runoff to promote on-site deposition of sediment. These practices include: topsoiling; broadcast seeding and drill seeding; willow cutting establishment; plastic matting, plastic netting and erosion control blankets; mulch-straw or wood chips; and compaction. Given the limited capacity to accept large volumes of runoff and potential erosion problems associated with large concentrated flows, vegetative controls should typically be used in combination with other management practices. Reclaimed vegetative cover must be similar to pre-mining vegetative cover. Permanent vegetation cover appropriate for the site typically is established by the end of the third growing season following initial seeding, although the reclaimed plant community will continue to develop. From a hydrologic perspective the objective is 75 percent cover, including litter, which defines "good" hydrologic condition for runoff and sediment modeling purposes.

Capping

Capping or sealing of waste materials is designed to prevent infiltration, as well as to limit contact between discharges and potential sources of contamination. Ultimately, capping should reduce or eliminate the contaminants in discharges. In addition, by reducing infiltration, the potential for seepage and leachate generation may also be lessened.

Treatment

In some cases (e.g., low pH and/or high metals concentrations), BMPs and sediment and erosion controls may not be adequate to produce an acceptable quality of storm water discharge. Under those circumstances additional physical or chemical treatment systems may be necessary to protect the receiving waters. Treatment practices are those methods of control which normally are thought of as being applied at the “end of the pipe” to reduce the concentration of pollutants in storm water before it is discharged. This is in contrast to many BMPs, where the emphasis is on keeping the water from becoming contaminated. Treatment practices may be required where flows are currently being affected by exposed materials and other BMPs are insufficient to meet discharge goals. These practices are usually the most resource intensive as they often require significant construction costs and monitoring and maintenance on a frequent and regular basis.

Haul Roads and/or Access Roads

Placement of haul roads or access roads should occur as far as possible from natural drainage areas, lakes, ponds, wetlands, or floodplains where soil will naturally be less stable for heavy vehicle traffic. If a haul road must be constructed near water, as little vegetation as possible should be removed from between the road and the waterway as vegetation is a useful buffer against erosion and is an efficient sediment collection mechanism. The width and grade of haul or access roads should be minimal and designed to match natural contours of the area. Construction of haul roads should be supplemented by BMPs that divert runoff from road surfaces, minimize erosion, and direct flow to appropriate channels for discharge to treatment areas or other well-stabilized areas.

Equipment/Vehicle Fueling and Maintenance

Fueling and maintenance activities should be conducted indoors or under cover on an impermeable surface. Berms, curbs, or similar means should be used to ensure that storm water runoff from other parts of the facility does not flow over maintenance and fueling areas. Runoff from fueling and maintenance areas should be collected and treated or recycled. Proper waste management and spill prevention and response procedures must be implemented. Select good housekeeping procedures to minimize the amount of contaminated runoff generated (e.g. use dry cleanup methods, use drip pans, and drain parts of fluids before disposal). Conduct inspections of fueling areas to prevent problems before they occur.

Overburden, Waste Rock, and Raw Material Piles
Overburden, topsoil, and waste rock, as well as raw material and intermediate and final product stockpiles, should be located away from surface waters, other sources of water, and from geologically unstable areas. In addition surface waters and storm water should be diverted around the piles. As many piles as possible should be revegetated (even if only on a temporary basis). At closure, remaining piles should be reclaimed.

Reclamation Activities
When a mineral deposit is depleted and operations cease, a mine site must be reclaimed according to appropriate state or federal standards. Closure activities typically include restabilization of disturbed areas such as access or haul roads, pits or quarries, sedimentation ponds or work-out pits, and remaining waste piles. Overburden and topsoil stockpiles may be used to fill in a pit or quarry (where practical). Recontouring and revegetation should be performed to stabilize soils and prevent erosion. Major reclamation activities such as recontouring roads and filling in a pit or quarry can only be performed after operations have ceased. However, reclamation activities such as stabilization of banks, reseeding, and revegetation should be implemented in mined out portions or inactive areas of a site as active mining moves to new areas.

A combination of preventive and treatment BMPs will yield the most effective storm water management for minimizing the discharge of pollutants via storm water runoff. BMPs must also address preventive maintenance records or logbooks, regular facility inspections, spill prevention and response, and employee training. All BMPs require regular maintenance to function as intended. Some management measures have simple maintenance requirements, others are quite involved. BMPs must be regularly inspected to ensure they are operating properly, including during runoff events. As soon as a problem is found, action to resolve it should be initiated immediately.

The categories discussed above are not an exhaustive list of BMPs. The permittee may identify and implement any additional BMPs that minimize and/or eliminate the generation of pollutants and the potential discharge of pollutants into state waters through normal operations and ancillary activities. Additional guidance on BMPs is available in EPA's *Guidance Manual for Developing Best Management Practices* (EPA 833-B-93-004, October 1993) and the Forest Service's *National Best Management Practices for Water Quality Management on National Forest System Lands* (USDA, Forest Service, FS-990a, April 2012).

4.2.2 Storm Water Management
The permittee must develop, maintain, and implement a Storm Water Pollution Prevention Plan (SWPPP) that describes the facility, BMPs, control measures, and monitoring procedures that will ensure compliance with the terms and conditions of the MPDES permit. The BMPs implemented at the facility may be structural or non-structural in nature. The SWPPP must be submitted to DEQ no later than 60 days after the effective date of the permit and must be approved by DEQ prior to construction and implementation. SWPPPs are intended to be maintained such that they are updated and adjusted to reflect current conditions, activities, and any storm water issues identified at the facility. The SWPPP and

any updates must be maintained onsite. Periodic evaluation of the SWPPP (once per year minimum) and the ongoing improvements to the facility, as documented in the SWPPP, will serve to improve the quality of storm water runoff.

The SWPPP must contain a narrative evaluation of the appropriateness of storm water management practices that divert, infiltrate, reuse, or otherwise manage storm water runoff such as to reduce the discharge of pollutants. The SWPPP must document, at minimum, the following:

Storm Water Pollution Prevention Team and SWPPP Administrator

The permittee must identify the staff members that comprise the facility's storm water pollution prevention team, as well as their individual responsibilities. This team must include, and the SWPPP specify, a "SWPPP Administrator." The SWPPP Administrator is the lead responsible person for ensuring the development, implementation, and maintenance of the SWPPP. The SWPPP Administrator also serves as the primary contact person regarding the SWPPP. The facility's storm water pollution prevention team is responsible for assisting the facility manager in developing and revising the facility's SWPPP as well as maintaining control measures and taking corrective actions where required. Each member of the storm water pollution prevention team must have ready access to this permit and the SWPPP.

Site Description

The SWPPP must provide a description of the nature of the industrial activities at the facility. The SWPPP must document the mining and associated activities with the potential to impact the storm water discharges covered by this permit.

Site Map

The SWPPP must include a legible map(s) of sufficient scale which clearly shows current conditions including the following:

- Map scale;
- North arrow;
- The site boundaries for the facility or activity;
- Locations of all receiving waters in the immediate vicinity of the facility;
- The location and extent of structures and impervious surfaces;
- Directions of storm water flow (use arrows);
- Locations of all existing structural storm water control measures;
- Locations of all storm water conveyances including ditches, pipes, and swales;
- Locations of all storm water outfall and monitoring points;
- Locations of storm water inlets and outfalls, with a unique identification code for each outfall;
- Locations of potential pollutant sources;
- Locations where spills or leaks have occurred;
- Locations and descriptions of all non-storm water discharges;
- Locations and sources of run-on to the facility from adjacent property that contains pollutants; and
- Locations of the following activities where such activities are exposed to precipitation:
  - Fueling stations;
  - Vehicle and equipment maintenance and/or cleaning areas;
  - Loading/unloading areas;
  - Locations used for the treatment, storage, or disposal of wastes;
  - Liquid storage tanks;

- Processing and storage areas;
- Immediate access roads and rail lines used or traveled by carriers of raw materials, manufactured products, waste material, or by-products used or created by the facility;
- Major permanent facility structures; transfer areas for substances in bulk; and
- Machinery.

In addition to the above items, the SWPPP must document the locations of the following (as appropriate):

- Mining or milling site boundaries;
- Access and haul roads;
- Outline of the drainage areas of each storm water outfall within the facility with indications of the types of discharges from the drainage areas;
- Location(s) of all permitted discharges covered under an individual MPDES permit;
- Outdoor equipment storage, fueling, and maintenance areas;
- Materials handling areas;
- Outdoor manufacturing, outdoor storage, and material disposal areas;
- Outdoor chemicals and explosives storage areas;
- Overburden, materials, soils, or waste storage areas;
- Location of mine drainage (where water leaves the mine) or other process water;
- Tailings piles and ponds (including proposed ones);
- Heap leach pads; off-site points of discharge for mine drainage and process water;
- Surface waters;
- Boundary of tributary areas that are subject to effluent limitations guidelines; and
- Location(s) of reclaimed areas.

Summary of any Potential Pollutant Sources

The permittee must document in the SWPPP areas at the facility where industrial materials or activities are exposed to storm water and from which allowable non-storm water discharges are released. Industrial materials or activities include, but are not limited to: material handling equipment or activities; industrial machinery; raw materials; industrial production and processes; and intermediate products, byproducts, final products, and waste products. Material handling activities include, but are not limited to: the storage, loading and unloading, transportation, disposal, or conveyance of any raw material, intermediate product, final product or waste product. For each area identified, the description must include:

- A list of the industrial activities exposed to storm water (e.g., material storage; equipment fueling, maintenance, and cleaning);
- A list of the pollutant(s) or pollutant constituents (e.g. crankcase oil, zinc, sulfuric acid, and/or cleaning solvents) associated with each identified activity. The pollutant list must include materials that have been handled, treated, stored, or disposed, and that have been exposed to storm water in the 3 years prior to the date of the SWPPP; and
- Documentation of where potential spills and leaks may occur that might contribute pollutants to storm water discharges, and the corresponding outfall(s) potentially affected by such spills and leaks. The permittee must document spills and leaks of oil or toxic or hazardous pollutants that actually occurred at exposed areas or that drained to a storm water conveyance, in the 3 years prior to the date of the SWPPP.

Each facility component or system must be examined for its waste minimization opportunities and its potential for discharge to state waters due to equipment failure, improper operation, and natural phenomena. This examination must include, at a minimum, all normal operations and ancillary activities including (as appropriate) material storage areas, plant site runoff, in-plant transfer, process and material handling areas, loading or unloading operations, spillage or leaks, sludge and waste disposal, or drainage from raw material storage.

Description of Control Measures and BMPs

The permittee must document in the SWPPP the location and types of control measures installed and implemented at the facility and describe how the control measure selection and design considerations were addressed. This documentation must describe how the control measures address both the pollutant sources identified and any storm water run-on that commingles with any discharges covered under this permit. Documentation of control measures must include design and maintenance criteria for permanent and temporary structural control measures (i.e. plans, detail drawings, cross-sections, specifications, narrative description, etc.) and an appropriate maintenance schedule. The selection, design, installation, and implementation of these control measures must be in accordance with good engineering practices and/or manufacturer's specifications, and the SWPPP should reference all source(s) used in BMP design, installation, implementation, and maintenance specifications (i.e. EPA, Montana Department of Transportation, or other BMP manuals). Note that the permittee may deviate from such manufacturer's specifications as long as the permittee provides justification for any deviation and includes documentation of the rationale in the part of the SWPPP that describes control measures. In addition, any other requirements for other programs or permitting activities which would meet the SWPPP requirements may be incorporated. If the permittee finds that any control measures are not achieving their intended effect of minimizing pollutant discharges, then the permittee must modify these control measures as expeditiously as practicable.

Control measures that must be documented in the SWPPP and implemented by the permittee must, at a minimum, include:

- Good Housekeeping Procedures. Keep clean all exposed areas that are potential sources of pollutants using such measures as sweeping at regular intervals, keeping materials orderly and labeled, and storing materials in appropriate containers.
- Maintenance. Regularly inspect, test, maintain, and repair all industrial equipment and systems to avoid situations that may result in leaks, spills, and other releases of pollutants in storm water discharged to receiving waters. All control measures that are used to achieve the effluent limits required by this permit must be maintained in effective operating condition. Non-structural control measures must also be diligently maintained (e.g., spill response supplies available and personnel appropriately trained). If control measures need to be replaced or repaired, then the permittee must make the necessary repairs or modifications before the next storm event.
- Spill Prevention and Response Procedures. Minimize the potential for leaks, spills and other releases that may be exposed to storm water and develop plans for effective response to such spills if or when they occur. At a minimum, the SWPPP must document and the permittee must implement the following:
    - Procedures for plainly labeling containers (e.g., "Used Oil," "Spent Solvents," "Fertilizers and Pesticides," etc.) that may be susceptible to spillage or leakage to encourage proper handling and facilitate rapid response if spills or leaks occur;
    - Preventative measures such as barriers between material storage and traffic areas, secondary containment provisions, and procedures for material storage and handling;

  - Procedures for expeditiously stopping, containing, and cleaning up leaks, spills, and other releases. Employees who may cause, detect, or respond to a spill or leak must be trained in these procedures and have necessary spill response equipment available; and
  - Procedures for notification of appropriate facility personnel, emergency response agencies, and regulatory agencies.
- Erosion and Sediment Controls. The permittee must stabilize exposed areas and contain runoff using structural and/or non-structural control measures to minimize onsite erosion and sedimentation, and the resulting discharge of pollutants. Among other actions, flow velocity dissipation devices must be placed at discharge locations and within outfall channels where necessary to reduce erosion and/or settle out pollutants. In selecting, designing, installing, and implementing appropriate control measures, the permittee is encouraged to consult with available guidance resources relating to BMPs for erosion and sedimentation, including industrial sector-specific information.
- Management of Runoff. The permittee must divert, infiltrate, reuse, contain, or otherwise reduce storm water runoff, to minimize pollutants in any discharges. In selecting, designing, installing, and implementing appropriate control measures, the permittee is encouraged to consult with available guidance resources relating to storm water BMPs for runoff management, including industrial sector-specific information.

Additionally, the permittee must address and implement the following in their SWPPP:

- The number and quantity of pollutants and the toxicity of effluent generated, discharged, or potentially discharged at the facility must be minimized by the permittee to the extent feasible by managing each influent waste stream in the most appropriate manner;
- Storm water control measures must be designed, operated, and maintained to maximize the chemical and/or physical processes that reduce or eliminate the discharge of any pollutants to state surface waters;
- Sediment ponds must be clearly staked to indicate sediment accumulation;
- The permittee must ensure proper operation and maintenance of any control and/or discharge structures;
- To the maximum extent possible, 100-foot setbacks or 35-foot vegetated buffer strips between roads and/or other impervious surfaces and any downgradient surface waters or other conduits to surface waters will be established and/or maintained;
- Where experience indicates a reasonable potential for equipment failure (e.g., a tank overflow or leakage), natural condition (e.g., precipitation), or other circumstances that may result in significant amounts of pollutants reaching state waters, the SWPPP should include a prediction of the direction, rate of flow and total quantity of pollutants that could be discharged from the facility as a result of each condition or circumstance;
- The permittee must take into account and control sediment from snow plowed or sediment removed from the mine, ancillary facilities, and roads;
- The permittee must avoid the sidecasting of soils or snow. The sidecasting of road material is prohibited on road segments within or abutting Riparian Habitat Conservation Areas in priority watersheds; and
- Discharges to frozen or snow-covered ground must be minimized or eliminated.

Any Schedules and/or Standard Operating Procedures
The SWPPP must document any control measure inspections, routine maintenance, and/or procedures that impact the potential generation and/or discharge of pollutants by the facility. The permittee must conduct a facility inspection once every 30 days and within 24 hours of a significant precipitation event of 0.5 inches or greater. At a minimum, the documentation of each routine facility inspection must include the following:

- The inspection date and time;
- The name(s) and signature(s) of the inspector(s);
- Weather information;
- A description of any discharges occurring at the time of the inspection;
- Any previously unidentified discharges of pollutants from the site;
- Any observations of obvious indicators of storm water pollution;
- Any control measures needing maintenance or repairs;
- Any failed control measures that need replacement;
- Any incidents of noncompliance observed; and
- Any additional control measures needed to comply with the permit requirements.

An inspection for a significant storm event may also be used and credited towards one of the monthly inspections.

Corrective Actions
If any of the following conditions occur, the permittee must review and revise the selection, design, installation, implementation, and maintenance of the facility's control measures to ensure that the condition is eliminated and will not be repeated in the future:

- An unauthorized release or discharge (e.g., spill, leak, or discharge of non-storm water not authorized by this or another MPDES permit) occurs at the facility;
- The permittee become aware, or DEQ determines, that the control measures are not stringent enough for the discharge to meet applicable water quality standards;
- An inspection or evaluation of the facility by a DEQ representative determines that modifications to the control measures are necessary to meet the non-numeric effluent limits in this permit; or
- An inspection finds that the control measures are not being properly operated and maintained.

Corrective Action Deadlines
If an inspection or other observation identifies storm water pollution or control measures needing repair or replacement, the permittee must document these conditions within 24 hours of making such discovery. Subsequently, within 14 days of such discovery, the permittee must document any corrective actions taken or needed, any further investigation of the deficiency, or the basis for determining that no further action is needed. If the permittee determines that any changes are necessary following the review, any modifications to the control measures must be made before the next storm event if possible, or as soon as practicable following that storm event. The permittee must document the following:

- A summary of any corrective actions taken;
- Notice of whether any SWPPP modifications are required;
- The date any corrective action was initiated; and
- The date that the corrective action was completed.

These time intervals are not grace periods but are schedules considered reasonable for documenting any findings and for making necessary repairs and improvements. They are included in this permit to ensure that the conditions prompting the need for these repairs and improvements are not allowed to persist indefinitely.

Effect of Corrective Action

If the event triggering the corrective action review is a permit violation then correcting it does not remove the original violation. Additionally, failing to take corrective action in accordance with this section is an additional permit violation. DEQ will consider the appropriateness and promptness of corrective action in determining potential enforcement responses to permit violations.

Employee Training

The SWPPP Administrator must ensure all employees receive in-house training, including all members of the pollution prevention team who work in areas where industrial materials or activities are exposed to storm water, or who are responsible for implementing activities necessary to meet the conditions of this permit (e.g., inspectors, maintenance personnel). Training must cover both the specific control measures used to achieve the effluent limits in this permit and the monitoring, inspection, planning, reporting, and documentation requirements in other parts of this permit. Training must be conducted at least annually at a minimum and the date of the training and employees in attendance must be documented.

SWPPP Modifications and Updates

The SWPPP must be maintained and kept up-to-date to reflect current site conditions. If construction or a change in the design, operation, or maintenance at the facility either changes the nature of pollutants discharged in storm water from the facility, or increases the quantity of pollutants discharged, then the permittee must review the selection, design, installation, implementation, and maintenance of the facility's control measures to determine if any modifications to the SWPPP are necessary. Any SWPPP modification or update must be signed by a responsible corporate official as specified in ARM 17.30.1323.

The permittee is required to operate, build, and maintain the facility and storm water practices as identified in their SWPPP. The permittee may adjust or change the control measures used to improve storm water retention and treatment. This flexibility allows the permittee to adjust practices as necessary to ensure continued compliance with the permit. The SWPPP must be kept up-to-date to document any changes in BMPs, control measures, or corrective actions. Any changes to the SWPPP must be submitted to DEQ within 30 days for review. The approved SWPPP must be publicly available on the company's website.

5 STANDARD CONDITIONS

Standard conditions must be included in all MPDES permits and the Permittee must comply with all standard conditions at all times. ARM 17.30.1342. These requirements are expressly incorporated into the permit. In addition to these requirements, ARM 17.30.1343 and 40 CFR 122.42 establishes additional conditions applicable to specific categories of MPDES permits including notification requirements for municipal and non-municipal dischargers.

The additional requirements of ARM 17.30.1343(1)(a) are included in the permit. The requirement establishes additional notification requirements for toxic pollutants that exceed a specified level, exceed the level given in the Facility's permit application or are not regulated in the permit.

6 PUBLIC PARTICIPATION

In accordance with ARM 17.30.1372, DEQ issued Public Notice No. MT-19-08 dated March 29, 2019. The public notice states that a tentative decision has been made to issue an MPDES permit for Tintina Montana, Inc, and that a draft permit, fact sheet and draft environment impact statement (EIS) have been prepared. The EIS for the Black Butte Copper Project serves as the required MEPA analysis for this draft MPDES permit. The EIS also addresses impacts subject to regulation by Air Quality and Hard Rock Mining. Public comments on the draft MPDES permit and EIS impacts related to the permit are invited any time prior to the close of business May 10, 2019. Comments may be directed to:

DEQ Water Quality Division
Water Protection Bureau
PO Box 200901
Helena, MT 59620

or DEQWPBPublicNotices@mt.gov

All comments received or postmarked prior to the close of the public comment period will be considered in the formulation of the final permit. DEQ will respond to all substantive comments and issue a final decision as soon as possible after the close of the public comment period.

All persons, including Permittees, who believe any condition of a draft permit is inappropriate or that DEQ's tentative decision to deny an application, terminate a permit, or prepare a draft permit is inappropriate, shall raise all reasonably ascertainable issues and submit all reasonably available arguments supporting their position by the close of the public comment period (including any public hearing) under ARM 17.30.1372.

6.1 Notification of Interested Parties

Copies of the public notice were mailed to the Discharger, state and federal agencies and interested persons who have expressed an interest in being notified of permit actions. A copy of the distribution list is available in the administrative record for this permit. In addition to mailing the public notice, a copy of the notice and applicable draft permit and fact sheet were posted on the DEQ website for 42 days.

Any person interested in being placed on the mailing list for information regarding this MPDES Permit should contact DEQ, reference this Facility, and provide a name, address, and phone number.

6.2 Public Hearing Written Comments

DEQ will hold two public hearings and two webinars for accepting comments on the draft permit, fact sheet and EIS. The two public meetings which include a formal public hearing will be held on:

- April 29, 2019, from 6 p.m. to 9 p.m. at Park High School located at 102 View Vista Drive, Livingston, MT and;
- April 30, 2019, from 6 p.m. to 9 p.m. at White Sulphur Springs High School located at 405 S Central Ave, White Sulphur Springs, MT.

DEQ is also hosting two webinars on May 1, 2019, and May 2, 2019, from 6 p.m. to 9 p.m. Signup instructions will be posted here http://deq.mt.gov/Land/hardrock/tintinamines at a later date; please check the webpage for more detail.

6.3 Permit Appeal

After the close of the public comment period DEQ will issue a final permit decision. A final permit decision means a final decision to issue, deny, modify, revoke and reissue, or terminate a permit. A permit decision is effective 30 days after the date of issuance unless a later date is specified in the decision, a stay is granted pursuant to ARM 17.30.1379, or the Permittee files an appeal pursuant to 75-5-403, MCA.

The Permittee may file an appeal within 30 days of DEQ's action to the following address:

Secretary, Board of Environmental Review
Department of Environmental Quality
1520 East Sixth Avenue
PO Box 200901
Helena, Montana 59620-0901

7 NONSIGNIFICANCE DETERMINATION

The Montana Water Quality Act states that it is unlawful to cause degradation of state waters without an authorization issued pursuant to 75-5-303, MCA [75-5-605(1)(d), MCA]. ARM 17.30.706(2) states that DEQ will determine whether a proposed activity may cause degradation for all activities which are permitted, approved, licensed, or otherwise authorized by DEQ, such as issuance of a discharge permit. A nondegradation analysis was conducted in Section 2 of this permit fact sheet for the proposed discharges and activities regulated by this permit. Based on this analysis DEQ has made the following determinations:

Outfall 001

The discharges from the Facility are a new source. DEQ set the effluent limits and conditions in the permit to comply with the nonsignificance criteria of ARM 17.30.715(1). Discharges in compliance with these conditions are nonsignificant and are not required to undergo review under Montana's Nondegradation Policy (75-5-303, MCA). DEQ reviewed the additional criteria in ARM 17.30.715(2) and at this time finds that cumulative impacts or synergistic effects are unlikely because the effluent limitations are stringent, the permittee has not requested a mixing zone, and there are no other known wastewater discharges to Sheep Creek, Coon Creek, Little Sheep Creek, or Brush Creek. Secondary byproducts of decomposition and possible chemical transformation of known pollutants are incorporated into the water quality standards for individual parameters. Changes in flow are addressed in the EIS. The public will have the opportunity to present substantive information during the public comment period. If such information is presented DEQ will consider it before making a final determination to issue the MPDES permit.

Outfalls 002 – 014

In accordance with ARM 17.30.715(3), DEQ may determine the significance of changes in water quality using 75-5-301(5)(c), MCA as guidance. Specifically, 75-5-301(5)(c), MCA establishes criteria for determining whether an activity results in nonsignificant changes to water quality based on the following factors:

- Equates significance with the potential for harm to human health, a beneficial use, or the environment;
- Considers both the quantity and the strength of the pollutant;
- Considers the length of time the degradation will occur; and
- Considers the character of the pollutant so that greater significance is associated with carcinogens and toxins that bioaccumulate or biomagnify and lesser significance is associated with substances that are less harmful or less persistent.

The facility's storm water controls must be designed to detain storm water from a 10-year 24-hour precipitation event, or produce a storm water effluent quality equivalent to storm water discharges from detention of the 10-year 24-hour event. Discharges from Outfalls 002-014 are expected to be as a result of precipitation falling on the drainage area of each individual outfall that is in excess of that from a 10-year, 24-hour storm event.

Similarly, discharges of storm water in excess of the 10-year, 24-hour event (e.g. a 50-year, 24-hour storm) would benefit from some initial treatment and/or retention from the storm water controls that are designed based on a 10-year, 24-hour storm event, lessening the potential impacts. These impacts would be nonsignificant in a waterbody that would be flooding as a result of the heavy precipitation. Discharges of result storm water in excess of the 10-year, 24-hour design storm (e.g. a 50-year, 24-hour storm event) do not represent discharges with the potential to harm human health, a beneficial use, or the environment since any impacts from these events occur on a much less frequent basis and are alleviated by the storm water controls based on the 10-year, 24-hour event and required as a condition of the MPDES permit for the facility.

The major pollutant of concern in storm water-driven discharges is sediment. Controlling for sediment will also control for many other pollutants since most of these constituents are attached to or become attached to sediment particles that are transported by runoff and subsequently captured by BMPs. Pollutants associated with carcinogens and toxins that bioaccumulate or biomagnify are not expected as the discharges here are comprised solely of storm water runoff. To further minimize the potential impacts from of any storm water driven discharges, DEQ is establishing the use of BMPs for the control of pollutants discharged at Outfalls 002-014 (40 CFR 122.44(k); ARM 17.30.1345); see Effluent Limitations Section 2.

BMPs are defined as a permit condition and are used in conjunction with other final effluent limits to prevent or control the discharge of pollutants to state surface waters. The MPDES permit for the facility stipulates that BMPs must be implemented prior to the commencement of any regulated activities at these outfalls. The MPDES permit also includes provisions for the ongoing evaluation of BMPs to ensure the minimization and/or elimination of pollutants contained in storm water runoff as well as the required monitoring of any discharges from Outfalls 002-014. DEQ has determined that with the proper selection, installation, and maintenance of BMPs in addition to the other final effluent limits, the discharge of storm water and storm water-driven sediment does not represent a significant change in water quality since the magnitude, duration, and frequency of any storm water discharge events (and their potential short-term impacts) are minimized and/or eliminated.

DEQ is also prohibiting the discharge of any process wastewater or mine drainage and requiring turbidity monitoring both in the effluent and in the receiving water upstream of each Outfall during each discharge event. If the turbidity in the discharge at any (Outfall 002-014) exceeds the upstream turbidity of the associated receiving water during each discharge event (See Reasonable Potential Analysis Section 2.2.8. and Monitoring and Reporting Requirements Section 3). The Permittee must adjust or add BMPs before the next storm event if possible or within a maximum timeframe of 14 days of receiving the monitoring results. If it is infeasible to adjust or add BMPs within 14 days the Permittee may request additional from DEQ. The request must be in writing, outline the reasons why the 14 day timeframe is infeasible, and may not exceed a total of 45 days. The extension request must be approved by DEQ in writing. The Permittee must notify DEQ, in writing, of the amended SWPPP and resulting BMP changes (see Final Effluent Limitations Section 2.3).

For Outfalls 003, 006, 009, and 011 up to twice a year during a precipitation event that causes a discharge, the Permittee must conduct additional monitoring. During the same storm events, monitoring must also occur on Brush Creek upstream of Outfall 006, Little Sheep Creek upstream of Outfall 011, and Coon Creek upstream of Outfall 003. The Permittee must re-evaluate the SWPPP and adjust or add BMPs to improve control of the pollutant in the discharge when, based on monitoring results, any parameter in Table 18 in the discharge at Outfalls 003, 006, 009 or 011 exceeds the upstream parameter concentration of the associated receiving water (See Reasonable Potential Analysis Section 2.2.8. and Monitoring and Reporting Requirements Section 3). The Permittee must adjust or add BMPs before the next storm event if possible or within a maximum timeframe of 14 days of receiving the monitoring results. If it is infeasible to adjust or add BMPs within 14 days the Permittee may request additional from DEQ. The request must be in writing, outline the reasons why the 14 day timeframe is infeasible, and may not exceed a total of 45 days. The extension request must be approved by DEQ in writing. The Permittee must notify DEQ, in writing, of the amended SWPPP and resulting BMP changes (see Final Effluent Limitations Section 2.3). This direct feedback requiring mechanism corrective action further reduces the potential impact for harm to human health, a beneficial use or the environment by measuring the quantity of an expected primary pollutant of concern.

Based on the discussion above, DEQ finds that, pursuant to ARM 17.30.715(3), the proposed discharge at Outfalls 002-014 are a nonsignificant change in existing water quality due to their low potential for harm to human health, a beneficial use, or the environment and in consideration of the quantity and the strength of the expected pollutants; the length of time any degradation may occur; and the expected character of the discharges (see 75-5-301(5)(c), MCA; 75-5-303(3)(c), MCA; 75-5-317(2)(b), MCA).

APPENDIX 1—WATER QUALITY STANDARDS AND NONDEGRADATION CRITERIA

Table 1.A summarizes the water quality standards applicable to Sheep Creek, Coon Creek, and ground water at Outfall 001. The acute and chronic standards that apply to Sheep Creek and Coon Creek are usually equal. Where they differ, such as for total ammonia and hardness-based metals, the more stringent criterion is shown. Likewise, the human health standards for surface water and ground water are often equal. Where they differ, the more stringent criterion is shown.

The nondegradation criteria are calculated from the most stringent water quality standard for each parameter. Where non-degradation criterion are expressed as relative to the background concentration, such as for total nitrogen, or as no increase above background, the lower bound estimate of the interquartile range (lower quartile in Appendix 2, Table 2.A.1) is used as the background concentration.

Table 1.A Water Quality Standards- Sheep Creek , Coon Creek , Ground Water

Parameter (2)	Units	Acute Water Quality Standard (S_A)	Chronic Water Quality Standard (S_C)	Human Health Water Quality Standard (S_H)	Nondegradation Category	Nonsignificance Criterion (S_N) (6)
Conventional and Nonconventional Pollutants						
Biochemical Oxygen Demand	mg/L	--	--	--	Narrative	No change
Chemical Oxygen Demand	mg/L	--	--	--	Narrative	No change
Total Organic Carbon	mg/L	--	--	--	Narrative	No change
Total Suspended Solids	mg/L	No increase above natural			Harmful	No change
Temperature	° F	1° F Increase above natural, not to exceed 67° F			Harmful	No change
Ammonia (5)	mg/L	3.2	1.5	--	Toxic	0.225
pH, range	SU	6.5 to 8.5			Harmful	No change
pH, change	SU	0.5 increase or decrease from natural			Harmful	No change
Oil & Grease	mg/L	--	--	10	Narrative	No change
Nitrate+ Nitrite	mg/L	--	--	10	Toxic	1.5
Total Nitrogen	mg/L	0.300			Nutrient	0.09 (1)
Total Phosphorus	mg/L	0.030			Nutrient	0.012 (1)
Toxic Parameters (2)						
Aluminum, dissolved	µg/L	750	87	---	Toxic	13 (3)
Antimony	µg/L	--	--	5.6	Toxic	0.84
Arsenic	µg/L	340	150	10	Carcinogen	No increase (< 1)
Barium	µg/L	--	--	1,000	Toxic	150
Beryllium	µg/L	--	--	4	Carcinogen	No increase (< 0.8)
Cadmium (4)	µg/L	2.3	0.9	5	Toxic	0.14

Table 1.A Water Quality Standards- Sheep Creek , Coon Creek , Ground Water

Parameter [2]	Units	Acute Water Quality Standard (S_A)	Chronic Water Quality Standard (S_C)	Human Health Water Quality Standard (S_H)	Nondegradation Category	Nonsignificance Criterion (S_N) [6]
Chromium	µg/L	---	---	100	Toxic	15
Copper [4]	µg/L	17.1	11.2	1,300	Toxic	1.7
Cyanide, Total	µg/L	22	5.2	4	Toxic	0.6
Iron	µg/L	--	1,000	--	Harmful	250
Lead [4]	µg/L	107	4.2	15	Toxic	0.63
Mercury	µg/L	1.7	0.91	0.05	Toxic w/BCF > 300	No increase (<0.0005)
Nickel [4]	µg/L	562	63	100	Toxic	9.5
Selenium	µg/L	20	5	50	Toxic	0.75
Silver [4]	µg/L	0.374	---	100	Toxic	0.06
Strontium	µg/L	--	--	4,000	Toxic	600
Thallium	µg/L	--	--	0.24	Toxic	0.04
Uranium	µg/L	--	--	30	Carcinogen	No increase (< 0.7)
Zinc [4]	µg/L	37	37	2,000	Toxic	5.6

1. Background concentration plus 10% of the lowest applicable water quality standard.
2. All metals are total recoverable unless otherwise noted.
3. The dissolved aluminum nondegradation criterion applies to Coon Creek.
4. Metals standards based on the 25th percentile hardness of 124 mg/L
5. Ammonia standard based on Sheep Creek 75th percentile pH of 8.3 and temperature of 8.8° C.
6. Nonsignificance criteria per ARM 17.30.715(1).

APPENDIX 2—RECEIVING WATER CHARACTERISTICS

Where receiving water quality data is available it may be used in the development of water quality based effluent limitations (WQBEL) when a dilution allowance or mixing zone is approved. In the absence of receiving water quality and quantity, effluent limits are based on meeting the applicable standard at the end-of-pipe, that is, no assimilative capacity is assumed. For new sources subject to nondegradation review, existing water quality, as defined in ARM 17.30.702, is necessary for all pollutants present in the discharge. This Appendix describes the process used to determine the receiving water concentration or value for purposes of developing WQBELs.

Receiving water quality should be based on samples collected at design conditions, this is, the critical stream flow (Q_s), as described in Section 2.2. Because Q_s is an infrequent event and data is not typically available, the background concentration (C_s) must be estimated based on water quality data that is collected outside of this flow condition. To account for the uncertainties in estimating background data, DEQ uses the upper and lower quartiles of the sample data. The upper quartile is defined as the 75th percentile of the measured or observed data and the lower quartile is the 25th percentile of the same data set. To account for the variability of the receiving water, data or measurements should be available and representative of the range of hydrologic conditions in the receiving water. Data used in this analysis is typically collected upstream of the point of discharge for flowing water bodies or outside of the influence of the discharge for non-flowing water bodies.

For most constituents, the critical background concentration is defined to be the upper quartile of the sample data for purposes of a reasonable potential analysis and determining assimilative capacity in calculating wasteload allocations (WLA) (Appendix 5). In some cases, including application of the nondegradation criteria in ARM 17.30.715(1), changes in existing water quality or the water quality standard is expressed relative to the background concentration in the receiving water. In these situations, the WLA is based on the lower bound estimate of the interquartile range (25th percentile value) to maintain the existing water quality of the receiving water. Additional details on developing WLAs and WQBELs based on these estimates are given in Appendix 5.

Receiving water characteristics for the Sheep Creek, Coon Creek, and alluvial groundwater are described in Table 2.A.1 for the POC and other descriptive parameters. These data were provided by the Permittee and are from monitoring at the site of the proposed facility. Surface water data for Sheep Creek and Coon Creek were collected at sites SW-1 and SW-3, respectively, between 2011 and 2017. Ground water data are from well MW-4 and were collected between 2011 and 2016.

Critical Background Concentration (C_s) – Method of Determination

To estimate the value of C_s, the critical background receiving water pollutant concentration as described in Section 2.2 (design Conditions), the following procedure is applied.

1. Reported data must use an approved method of analysis (40 CFR 136 or other if specified) and achieve the required reporting value (RRV) in Circular DEQ-7, or achieve a level of analysis that is at least 1/10 of the lowest applicable water quality standard.
2. Reject data which has not achieved the applicable level of analysis in Step 1 or other QA/QC objectives.
3. Determine if there is sufficient data to characterize the receiving water. This data should represent the annual range of variation.

4. Determine the 25th percentile value ($C_{.25}$) of the data set
5. Determine the 75th percentile value ($C_{.75}$) of the data set

Where there is insufficient data for a parameter, C_s is undetermined and reported as ("U"). In this case, RPA and WLA/WQBEL are based on meeting the applicable water quality standard or nondegradation criteria at the end of pipe (no receiving water dilution).

For pollutants with a numeric water quality standard or non-significance criterion expressed as an *absolute value* (e.g. numeric criterion or standard):

1. If $C_{.75}$ is a quantified value (i.e. not reported as less than detect), the background concentration (C_s) is estimated by $C_{.75}$
2. If $C_{.75}$ is a non-quantified value (NQV), i.e. reported as less than detect, and if the water quality standard < NQV, DEQ will set C_s = WQS (no assimilative capacity).
3. If $C_{.75}$ is a NQV and if RRV < water quality standard, DEQ will set C_s = NQV.

For pollutants with a water quality standard or non-significance criterion expressed as a *relative value* (e.g. increase above background) based on background concentration:

1. If $C_{.25}$ is a quantified value, then $C_s = C_{.25}$
2. If $C_{.25}$ is a NQV, then C_s = NQV.

For parameters with nondegradation criterion expressed as a relative value and a numeric water quality standard expressed as an absolute value, this method may only be applied if the value determined by $C_{.25}$ is less than the applicable water quality standard.

Table 2.A.1 Receiving Water Characteristics – Sheep Creek

Parameter	*Units*	*Required Reporting Value (RRV)*	*Lower Quartile (C_{25})*	*Upper Quartile (C_{75})*	*Number of Samples*	*Undetermined Or Sample Location*
Conventional and Nonconventional Parameters						
Biochemical Oxygen Demand	*mg/L*	*--*	*---*	*---*	*---*	*U*
Chemical Oxygen Demand	*mg/L*	*--*	*---*	*---*	*---*	*U*
Total Organic Carbon	*mg/L*	*--*	*---*		*---*	*U*
Total Suspended Solids	*mg/L*	*--*	*< 4*	*10*	*40*	*SW-1*
Total Dissolved Solids	*mg/L*	*--*	*154*	*186*	*51*	*SW-1*
Temperature	*°C*	*--*	*0.1*	*8.8*	*54*	*SW-1*
Ammonia	*mg/L*	*0.07*	*--*	*--*	*--*	*U*
pH	*SU*	*0.1*	*7.7*	*8.3*	*54*	*SW-1*
Nitrate+ Nitrite	*mg/L*	*0.02*	*< 0.01*	*0.03*	*44*	*SW-1*
Nitrogen, Total Kjeldahl	*mg/L*	*--*	*0.5*	*2.4*	*10*	*SW-1*
Total Nitrogen (Jul. – Sept.)	*mg/L*	*0.07*	*0.06*	*0.09*	*5*	*SW-1*
Oil & Grease	*mg/L*	*1*	*--*	*--*	*--*	*U*
Total Phosphorus (Jul. Sept.)	*mg/L*	*0.003*	*0.0085*	*0.011*	*7*	*SW-1*
Hardness	*mg/L*	*--*	*124*	*176*	*44*	*SW-1*
Iron	*mg/L*	*0.02*	*0.15*	*0.39*	*44*	*SW-1*
Toxic Parameters						
Aluminum, dissolved	µg/L	9	< 9.0	30	44	SW-1
Antimony	µg/L	0.5	< 0.5	< 0.5	44	SW-1
Arsenic	µg/L	1	< 1	< 1	44	SW-1
Barium	µg/L	3	99	110	44	SW-1
Beryllium	µg/L	0.8	< 0.8	< 0.8	44	SW-1
Cadmium	µg/L	0.03	< 0.03	< 0.03	44	SW-1
Chromium	µg/L	10	< 9	10	44	SW-1
Cobalt	µg/L	--	< 10	< 10	44	SW-1
Copper	µg/L	2	< 2	< 2	44	SW-1
Cyanide	µg/L	3	--	--	--	U
Lead	µg/L	0.3	< 0.3	< 0.4	44	SW-1
Mercury	µg/L	0.005	< 0.005	< 0.006	44	SW-1
Molybdenum	µg/L	--	< 2	< 2		SW-1
Nickel	µg/L	2	< 1	< 1	44	SW-1
Selenium	µg/L	1	< 0.2	< 0.2	44	SW-1
Silver	µg/L	0.2	< 0.2	< 0.3	44	SW-1
Strontium	µg/L	20	101	127	44	SW-1
Thallium	µg/L	0.2	< 0.2	< 0.2	44	SW-1

Uranium	µg/L	0.2	6.1	8.0	44	SW-1
Zinc	µg/L	8	< 2	5	44	SW-1
1. All metals are total recoverable unless otherwise noted.						

Table 2.A.1 Receiving Water Characteristics – Coon Creek

Parameter	*Units*	*Required Reporting Value (RRV)*	*Lower Quartile (C_{25})*	*Upper Quartile (C_{75})*	*Number of Samples*	*Undetermined Or Sample Location*
Conventional and Nonconventional Parameters						
Biochemical Oxygen Demand	*mg/L*	--	---	---	---	*U*
Chemical Oxygen Demand	*mg/L*	--	---	---	---	*U*
Total Organic Carbon	*mg/L*	--	---		---	*U*
Total Suspended Solids	*mg/L*	--	*< 4*	*10*	*25*	*SW-3*
Total Dissolved Solids	*mg/L*	--	*209*	*224*	*28*	*SW-3*
Temperature	*°C*	--	*2.0*	*12.1*	*25*	*SW-3*
Ammonia	*mg/L*	*0.07*	--	--	--	*U*
pH	*SU*	*0.1*	*8.2*	*8.4*	*25*	*SW-3*
Nitrate+ Nitrite	*mg/L*	*0.02*	*0.04*	*0.06*	*28*	*SW-3*
Nitrogen, Total Kjeldahl	*mg/L*	--	*< 0.5*	*0.93*	*4*	*SW-3*
Total Nitrogen (Jul. – Sept.)	*mg/L*	*0.07*	*0.06*	*0.12*	*3*	*SW-3*
Oil & Grease	*mg/L*	*1*	--	--	--	*U*
Total Phosphorus (Jul. Sept.)	*mg/L*	*0.003*	*0.01*	*0.02*	*4*	*SW-3*
Hardness	*mg/L*	--	*201*	*219*	*27*	*SW-3*
Iron, Total	*mg/L*	*0.02*	*0.09*	*0.24*	*28*	*SW-3*

Table 2.A.1 Receiving Water Characteristics – Coon Creek						
Toxic Parameters						
Aluminum, dissolved	µg/L	9	9.0	11	28	*SW-3*
Antimony	µg/L	0.5	< 0.5	3	28	*SW-3*
Arsenic	µg/L	1	< 1	< 1	28	*SW-3*
Barium	µg/L	3	138	157	28	*SW-3*
Beryllium	µg/L	0.8	< 0.8	< 0.8	28	*SW-3*
Cadmium	µg/L	0.03	< 0.03	< 0.03	28	*SW-3*
Chromium	µg/L	10	4	10	28	*SW-3*
Cobalt	µg/L	--	< 10	< 10	28	*SW-3*
Copper	µg/L	2	< 10	< 10	28	*SW-3*
Cyanide	µg/L	3	--	--	--	U
Lead	µg/L	0.3	< 0.3	0.6	28	*SW-3*
Mercury	µg/L	0.005	< 0.005	< 0.005	28	*SW-3*
Molybdenum	µg/L	--	< 2	< 3	28	*SW-3*
Nickel	µg/L	2	< 1	< 1	28	*SW-3*
Selenium	µg/L	1	< 0.2	< 0.6	28	*SW-3*
Silver	µg/L	0.2	< 0.2	< 0.5	28	*SW-3*
Strontium	µg/L	20	100	111	28	*SW-3*
Thallium	µg/L	0.2	< 0.2	< 0.2	28	*SW-3*
Uranium	µg/L	0.2	<0.7	8.0	28	*SW-3*
Zinc	µg/L	8	< 2	9	28	*SW-3*

Table 2.A.1 Receiving Water Characteristics – Ground Water

Parameter	Units	Required Reporting Value (RRV)	Lower Quartile (C_{25})	Upper Quartile (C_{75})	Number of Samples	Undetermined Or Sample Location
Conventional and Nonconventional Parameters						
Biochemical Oxygen Demand	mg/L	--	---	---	---	U
Chemical Oxygen Demand	mg/L	--	---	---	---	U
Total Organic Carbon	mg/L	--	---		---	U
Total Suspended Solids	mg/L	--	< 10	< 10	14	MW-4A
Total Dissolved Solids	mg/L	--	278	296	18	MW-4A
Temperature	°C	--	4.7	7.6	18	MW-4A
pH	SU	0.1	7.2	7.3	18	MW-4A
Nitrate+ Nitrite	mg/L	0.02	< 0.01	< 0.01	18	MW-4A
Nitrogen, Total Kjeldahl	mg/L	--	--	--	--	U
Total Nitrogen (Jul. – Sept.)	mg/L	0.07	--	--	--	U
Total Phosphorus (Jul. Sept.)	mg/L	0.003	--	--	--	U
Hardness	mg/L	--	274	285	17	MW-4A
Iron, Total	mg/L	0.02				
Toxic Parameters						
Aluminum, dissolved	µg/L	9	< 9	< 9	18	MW-4A
Antimony	µg/L	0.5	< 0.5	< 0.5	18	MW-4A
Arsenic	µg/L	1	< 1	< 1	18	MW-4A
Barium	µg/L	3	182	189	18	MW-4A
Beryllium	µg/L	0.8	< 0.8	< 0.8	18	MW-4A
Cadmium	µg/L	0.03	< 0.03	< 0.03	18	MW-4A
Chromium	µg/L	10	< 10	< 10	18	MW-4A
Cobalt	µg/L	--	< 10	< 10	18	MW-4A
Copper	µg/L	2	< 2	< 2	18	MW-4A
Cyanide	µg/L	3	--	--	--	U
Lead	µg/L	0.3	< 0.3	< 0.3	18	MW-4A
Mercury	µg/L	0.005	< 0.005	< 0.005	18	MW-4A
Molybdenum	µg/L	--	< 2	< 2	18	MW-4A
Nickel	µg/L	2	< 1	< 1	18	MW-4A
Selenium	µg/L	1	< 0.2	< 0.2	18	MW-4A
Silver	µg/L	0.2	< 0.2	< 0.2	18	MW-4A
Strontium	µg/L	20	167	173	18	MW-4A

Thallium	µg/L	0.2	< 0.2	< 0.2	18	MW-4A
Uranium	µg/L	0.2	< 8	< 8	18	MW-4A
Zinc	µg/L	8	< 2	< 2	18	MW-4A

APPENDIX 3—EFFLUENT CHARACTERISTICS

The Permittee must provide quantitative data on certain pollutants in the effluent (ARM 17.30.1322). This information is used to determine if water quality-based effluent limitations, in addition to TBEL described in Section 2.1, are necessary. Effluent characterization is based on the daily discharge data for the effluent which is summarized as monthly average and daily maximum values (ARM 17.30.1304). For new facilities, pollutant concentrations must be estimated.

CRITICAL EFFLUENT POLLUTANT CONCENTRATION (C_d)

When quantitatively determining reasonable potential and assessing the need for a WQBEL, DEQ calculates a reasonable measure of the critical (maximum) effluent pollutant concentration (C_d) accounting for the variability of the effluent as determined by the coefficient of variation (CV) and sample size. This procedure accounts for the variability of the effluent as required in 40 CFR 122.44(d). Due to the non-normal distribution of most effluents and low sample frequency (small sample size), DEQ estimates C_d based on the 95th percentile of the expected effluent concentration following procedure described in Chapter 3 of EPA's *Technical Support Document for Water Quality Based Toxic Control*, EPA/505/2-90-001, March 1991 (TSD). The critical effluent pollutant concentration is based on the estimated 95th percentile value and is calculated as follows:

$$C_d = C_{d(max)} * RPMF$$

Where:

$C_{d(max)}$	=	Maximum Daily value, Tables 3.A.1 to 3.A.2	(A.1)
RPMF	=	Reasonable Potential Multiplying Factor, Table 3-2, TSD	

Estimating the CV requires that the standard deviation be calculated using the actual measured daily discharge values. Where daily discharge values are not available, as is the case with a new facility where effluent quality is estimated, DEQ assumes a CV of 0.6.

Effluent data estimated in the permit application is used for effluent characterization. These estimates are based on the quality of the ground water (to be pumped from the mine) and the type of treatment system proposed. Because the permit must require the more stringent of limits based on either TBELs or the water quality standards, the TBELs applicable to Outfall 001 are used to estimate the critical effluent concentration for pH and total metals.

CRITICAL EFFLUENT FLOW (Q_d)

Effluent flow is a measure of the average daily flow expected to occur over the next 5-year permit cycle or effective life of the regulated Facility or activity. For facilities other than publicly owned treatment works, the critical flow is based on the reported average daily flow or the maximum 30-day (monthly) average flow reported on the permit application. Effluent flow is expressed as gallons per day (GPD) or million gallons per day (MGD). For this new discharge, the projected maximum flow is the critical effluent flow. Future permit renewals, after the facility has actual discharge data, may use the reported maximum 30-day average and daily maximums.

Table 3.A.1 Effluent Conventional and Non-Conventional Pollutants - Outfall 001						
Parameter	Units	Permit Application		Coefficient of Variation (CV)	Multiplying Factor (RPMF)	Critical Effluent Concentration (C_d)
		Maximum Daily	Long-Term Average or Average Daily			
Biochemical Oxygen Demand	mg/L	2	2	0.6	6.2	12.4
Chemical Oxygen Demand	mg/L	4	4	0.6	6.2	24.8
Total Organic Carbon	mg/L	0.5	0.5	0.6	6.2	3.1
Total Suspended Solids	mg/L	1	1	0.6	6.2	6.2
Ammonia	mg/L	0.18	0.10	0.6	6.2	1.1
Temperature, winter	°C	25	25	--	--	25
Temperature, summer	°C	25	25	--	--	25
pH, maximum	SU	8.1	8.1	--	--	8.1
pH, minimum	SU	8.1	8.1	--	--	8.1
Nitrate+ Nitrite	mg/L	0.39	0.22	0.6	6.2	2.4
Total Nitrogen	mg/L	0.57	0.32	0.6	6.2	3.5
Oil & Grease	mg/L	NR	NR	--	--	U
Total Phosphorus	mg/L	0.0005	0.0005	0.6	6.2	0.003

Table 3.A.2 Toxic Pollutants [1] — Outfall 001 Estimated Effluent Quality

Parameter	Units	Permit Application		Coefficient of Variation (CV)	Multiplying Factor 95% Confidence Level	Critical Effluent Concentration (C_d)
		Maximum Daily	Long-Term Average or Average Daily			
Aluminum, dissolved	µg/L	1	1	0.6	6.2	6.2
Antimony	µg/L	0.5	0.5	0.6	6.2	3.1
Arsenic	µg/L	1	1	0.6	6.2	6.2
Barium	µg/L	1	1	0.6	6.2	6.2
Beryllium	µg/L	0.8	0.8	0.6	6.2	5.0
Cadmium	µg/L	0.03	0.03	0.6	6.2	0.2
Chromium	µg/L	1	1	0.6	6.2	6.2
Cobalt	µg/L	10	10	0.6	6.2	62
Copper	µg/L	1	1	0.6	6.2	6.2
Iron	mg/L	1	1	0.6	6.2	6.2
Lead	µg/L	0.3	0.3	0.6	6.2	1.9
Mercury	µg/L	0.005	0.005	0.6	6.2	0.03
Nickel	µg/L	1	1	0.6	6.2	6.2
Selenium	µg/L	0.2	0.2	0.6	6.2	1.2
Silver	µg/L	0.2	0.2	0.6	6.2	1.2
Strontium	µg/L	10	10	0.6	6.2	62
Thallium	µg/L	0.2	0.2	0.6	6.2	1.2
Uranium	µg/L	8	8	0.6	6.2	49.6
Zinc	µg/L	1	1	0.6	6.2	6.2
Cyanide, Total as CN	µg/L	--	--	0.6	6.2	U

Footnotes:
1. All metals are total recoverable unless otherwise specified.

Table 3.A.3 Estimated Storm Water Quality Outfalls 002 – 014

Parameter	Units	SW-14 Estimated Storm Water Quality
Dissolved Oxygen	mg/L	14.1
pH	SU	7.6
Specific Conductance	µS/cm	251.3
Total Dissolved Solids	mg/L	166.4
Total Suspended Solids	mg/L	10.4
Alkalinity (as $CaCO_3$)	mg/L	142.3
Calcium	mg/L	32.1
Chloride	mg/L	1.4
Fluoride	mg/L	0.04
Magnesium	mg/L	11.1
Potassium	mg/L	2.6
Sodium	mg/L	2.0
Sulfate	mg/L	8.3
Hardness	mg/L	177
Nitrate + Nitrite as N	mg/L	0.19
Phosphorus	mg/L	0.06
Total Persulfate Nitrogen	mg/L	0.59
Aluminum, dissolved	µg/L	< 69
Antimony, Total Recoverable	µg/L	< 0.5
Arsenic, Total Recoverable	µg/L	< 1.0
Barium, Total Recoverable	µg/L	70
Beryllium, Total Recoverable	µg/L	< 0.8
Cadmium, Total Recoverable	µg/L	< 0.03
Chromium, Total Recoverable	µg/L	< 10
Cobalt, Total Recoverable	µg/L	< 10
Copper, Total Recoverable	µg/L	< 2
Iron, Total Recoverable	µg/L	620
Lead, Total Recoverable	µg/L	< 0.3
Manganese, Total Recoverable	µg/L	7
Mercury, Total Recoverable	µg/L	< 0.005
Molybdenum, Total Recoverable	µg/L	< 2
Nickel, Total Recoverable	µg/L	< 1
Selenium, Total Recoverable	µg/L	< 0.2

Table 3.A.3 Estimated Storm Water Quality Outfalls 002 – 014		
Parameter	**Units**	**SW-14 Estimated Storm Water Quality**
Silver, Total Recoverable	µg/L	< 0.2
Strontium, Total Recoverable	µg/L	65
Silver, Total Recoverable	µg/L	<0.2
Thallium Total Recoverable	µg/L	< 0.2
Uranium, Total Recoverable	µg/L	< 8
Zinc, Total Recoverable	µg/L	< 2

APPENDIX 4—REASONABLE POTENTIAL ANALYSIS

When determining the need for WQBELs, DEQ uses estimates of critical effluent concentration and flow (Appendix 3) and the design conditions of the receiving water after accounting for any mixing zone. The resulting instream pollutant concentration is compared to the applicable numeric and narrative water quality standard or nondegradation criterion. For purposes of assessing the need for and calculating WQBELs, DEQ primarily uses the mass-balance equation given in Fact Sheet Section 2.2.8. The mass balance equation assumes steady-state conditions of discharge and receiving water, rapid and complete mixing and is based on the design condition of the receiving water. The mass-balance equation is used to determine the concentration of a pollutant after accounting for the dilution provided by a mixing zone. The mass-balance equation can be arranged to solve for the resulting instream pollutant concentration (C_R) in the receiving water after accounting for dilution and other sources of pollution.

$$C_r = (Q_s C_s + Q_d C_d) / (Q_r) \qquad \textit{Equation 4}$$

where:

Q_s	=	critical stream flow available for dilution
C_s	=	critical background receiving water pollutant concentration
Q_d	=	critical effluent flow
C_d	=	critical effluent pollutant concentration prior to discharge
Q_r	=	resultant in-stream flow after discharge ($Q_r = Q_s + Q_d$).

If no mixing zone is requested or granted, then $Q_s = 0$ and $C_d = C_r$.

Where a parameter is subject to a technology-based effluent limitation (TBEL) from the federal ELGs, the TBEL is used as the critical effluent concentration (C_d).

Where the resulting pollutant concentration (C_r**)** exceeds the applicable water quality standard or nondegradation criterion, there is reasonable potential and a WQBEL is required for that parameter and must be included in the permit.

DEQ may also perform a narrative reasonable potential analysis based on the stringency of the nonsignificance criteria and/or where effluent concentrations provided by the Permittee are estimates rather than actual effluent monitoring data.

RPA results are given in Tables 4.A.1 for Outfall 001, and are discussed in Section 2.2.8.

Table 4.A.1 Reasonable Potential Analysis: Outfall 001 Discharging to Sheep Creek, Coon Creek and Alluvial Ground Water									
Parameter	**Units**	**Nondegradation Criterion**	**Critical Effluent Concentration C_d**	**Critical Background Receiving Water Concentration C_s**	**Critical Stream Flow Acute (MGD) ($Q_{S/A}$)**	**Critical Stream Flow Chronic/HH/Nutrients (MGD) ($Q_{S/A}$)**	**Projected Receiving Water Concentration Acute ($C_{R/A}$)**	**Projected Receiving Water Concentration Chronic/HH/ Nutrients. ($C_{R/C}$)**	**WQBEL Needed Based on Equation 4?**
Total Ammonia	mg/L	0.225	1.1	NA	0	0	1.1	1.1	Yes
Nitrate + Nitrite	mg/L	1.5	2.4	NA	0	0	2.4	2.4	Yes
Total Nitrogen	mg/L	0.12	3.5	NA	0	0	3.5	3.5	Yes
Total Phosphorus	mg/L	0.012	0.003	NA	0	0	0.003	0.003	No
Aluminum, dissolved	µg/L	13	6.2	NA	0	0	6.2	6.2	No
Antimony	µg/L	0.84	3.1	NA	0	0	3.1	3.1	Yes
Arsenic	µg/L	< 1	6.2	NA	0	0	6.2	6.2	Yes
Barium	µg/L	150	6.2	NA	0	0	6.2	6.2	No
Beryllium	µg/L	< 0.8	5.0	NA	0	0	5.0	5.0	Yes
Cadmium, TR	µg/L	0.14	50 (1)	NA	0	0	50	50	Yes
Chromium	µg/L	15	6.2	NA	0	0	6.2	6.2	No
Copper, TR	µg/L	1.7	150 (1)	NA	0	0	150	150	Yes
Iron	µg/L	130	6.2	NA	0	0	6.2	6.2	No
Lead, TR	µg/L	0.63	300 (1)	NA	0	0	300	300	Yes
Mercury, TR	µg/L	< 0.0005	1.00 (1)	NA	0	0	1.0	1.0	Yes
Nickel	µg/L	9.5	6.2	NA	0	0	6.2	6.2	No
Selenium	µg/L	0.75	1.2	NA	0	0	1.2	1.2	Yes
Silver	µg/L	0.06	1.2	NA	0	0	1.2	1.2	Yes

Strontium	µg/L	600	10	NA	0	0	10	10	No
Thallium	µg/L	0.04	1.2	NA	0	0	1.2	1.2	Yes
Uranium	µg/L	0.7	49.6	NA	0	0	49.6	49.6	Yes
Zinc	µg/L	5.6	750(1)	NA	0	0	750	750	Yes
Cyanide, Total[2]	µg/L	0.6	U	U	0	20	U	U	U

Footnotes:
1. Technology-based Effluent Limit
2. Cyanide is listed as believed absent on the permit application and instream data is unavailable.

APPENDIX 5—Waste Load Allocations (WLA) and Effluent Limitations

For pollutants with RP, water quality based effluent limitations (WQBELs) are based on procedures described in EPA's *Technical Support Document for Water Quality Based Toxic Control*, EPA/505/2-90-001, March 1991 (TSD) with minor modifications to accommodate the specific requirements of Montana's water quality standards.

The mass-balance equation may be arranged to calculate an acceptable effluent concentration or WLA that does not exceed the water quality standard as follows

$$WLA = C_d = Q_rC_r - Q_sC_s / Q_d$$

where,

WLA	=	waste load allocation (C_d in the mass-balance equation)
C_r	=	applicable standard or nonsignificance criterion (acute, chronic, nutrient, HH)
Q_r	=	downstream flow after available mixing ($Q_s + Q_d$)
C_s	=	receiving water pollutant concentration (background)
Q_s	=	upstream flow available for dilution
Q_d	=	discharge flow

For those parameters where no mixing zone is considered,

$$WLA = C_d = C_r$$

The WLA is then translated into an effluent limitation depending on the type of standard. These procedures are described below. All WLAs are expressed in units of concentration, unless the standard is expressed in other units. Values for the applicable standards and background concentrations are given in Appendix 1 and 2, respectively.

The background concentration affects the determination of the WLA for both new and existing sources. For existing sources where the background concentration as measured by the 75th percentile ($C_{.75}$) exceeds the applicable water quality standard, the WLA is set at the standard (WLA = Standard) and no mixing zone is granted. For new sources discharging to high quality water, the background concentration may already exceed the nondegradation threshold (S_n). To protect existing water quality, no increase above background concentration is allowed without an authorization to degrade. The process for assigning a WLA is summarized below.

PROCEDURES FOR TRANSLATING WLA INTO PERMIT LIMITATIONS

Aquatic Life Effluent Limitations: In most cases, there are two aquatic life WLAs, namely a WLA based on the acute aquatic life standard (WLA_a) and a WLA based on the chronic aquatic life standard (WLA_c). For each of these WLAs, there is a corresponding long-term average effluent concentration (LTA) calculated by multiplying the WLA by a factor (WLA multiplier). This multiplier is a statistically-based factor derived from the ratio of the WLA, set at a specific percentile value, to the LTA. The value of the multiplier varies depending on the coefficient of variation (CV) of the data set, the percentile value for the WLA (e.g., 99th percentile), and whether the WLA is based on an acute (1-hour average) or chronic (4-day average) water quality standard. DEQ sets the WLA at the 99th percentile of the lognormal distribution. The equations for the WLA multipliers ($\text{WLA multiplier}_{acute99}$, $\text{WLA multiplier}_{chronic99}$) and the corresponding LTAs are shown below:

$$\text{WLA multiplier}_{acute99} = \text{EXP}\ (0.5\sigma^2 - z\sigma)$$
$$\text{WLA multiplier}_{chronic99} = \text{EXP}\ (0.5\sigma_4^2 - z\sigma_4)$$

Where
σ = standard deviation
$\sigma = [ln(CV^2 + 1)]^{0.5}$
$\sigma^2 = ln(CV^2 + 1)$
$\sigma_4 = [ln(CV^2/4 + 1)]^{0.5}$
$\sigma_4^2 = ln(CV^2/4 + 1)$

z = 2.326 for 99th percentile probability basis

$$LTA_a = WLA_a * \text{WLA multiplier}_{acute99}$$
$$LTA_c = WLA_c * \text{WLA multiplier}_{chronic99}$$

Because the calculated LTAs do not have different averaging periods, they can be directly compared to select the most protective aquatic life LTA. This LTA is the basis for calculating effluent limitations that protect aquatic life from both acute and chronic effects. The corresponding CV used in the RPA is used for calculating the aquatic life WLAs. Calculated acute and chronic LTAs are given in below.

The two aquatic life LTAs, acute and chronic, represent two performance levels that the Facility would need to maintain. By comparing the two LTAs and selecting the minimum LTA as the basis for the calculated WQBELs, the procedure ensures that the AML and MDL are based on a single performance level that will protect against both acute and chronic effects.

$$LTA_m = \text{Minimum of } LTA_a \text{ and } LTA_c$$

Effluent limitations for protection of aquatic life are calculated by multiplying the most protective aquatic life LTA by multipliers, which are based on the lognormal distribution. Each multiplier is a statistically-based factor reflects the relationship between the LTA and the effluent limitations. The value of the multiplier for each effluent limitation varies depending on:

- the **probability basis** of the effluent limitation (i.e., the percentile value on the lognormal distribution of effluent pollutant concentrations where the limitation will be set, such as 95th percentile or 99th percentile);
- the **CV** of the data set (0.6 where data is estimated); and
- the **number of samples** (for the AML) that will be averaged in order to measure compliance with the effluent limitation. In this permit n = 4 for all parameters because weekly monitoring is required for most parameters.

The AML and MDL multipliers are based on the following:

- setting the AML at a 95th percentile occurrence probability and the MDL at a 99th percentile occurrence probability. These probability bases are consistent with EPA's recommendations in the TSD and consistent with the probability bases EPA uses to derive technology-based requirements in the effluent guidelines;
- the CV used in the reasonable potential determination or a default CV of 0.6 if a CV cannot be calculated); and
- the actual monthly sampling frequency that will be required in the permit, unless the planned sampling frequency is one time per month or less (e.g. quarterly); if the sampling frequency that will be specified in the permit is one time per month or less, DEQ uses a value for sampling frequency (n) in the formula for calculating the AML that is greater than one. This procedure assumes a sampling frequency of two to four times per month in order to ensure that the AML will not exceed any of the calculated WLAs, as recommended in EPA's TSD (pp. 107-108).

The formulae for calculating the AML and the MDL from the most protective aquatic life LTA are shown below:

$AML_{aquatic\ life} = LTA \times AML_{multiplier95}$
$MDL_{aquatic\ life} = LTA \times MDL_{multiplier99}$

$AML_{multiplier95} = e\text{^}(z\sigma_n - 0.5\sigma_n^2)$

Where:
$\sigma_n = [ln(CV^2/n + 1)]^{0.5}$
$\sigma_n^2 = ln(CV^2/n + 1)$
z = 1.645 for 95th percentile probability basis
n = number of samples per month that will be required in the permit

$MDL_{multiplier99} = e\text{^}(z\sigma - 0.5\sigma^2)$

Where:
$\sigma_n = [ln(CV^2 + 1)]^{0.5}$
$\sigma_n^2 = ln(CV^2 + 1)$
z = 2.326 for 99th percentile probability basis

Some aquatic life water quality standards are expressed as a single numeric value that defines a single acceptable level of effluent quality; consequently there will be only a single corresponding WLA. DEQ uses the recommendations in the TSD and applies the following procedure:

- Consider the single WLA to be WLA_c;
- Using the CV determined in the reasonable potential analysis, calculate an LTA that will allow the effluent to meet WLA_c using the equations for the chronic WLA above; and
- Derive an AML and MDL based on the LTA and CV using the equations above.

Human Health Effluent Limitations*:* Montana's numeric human health numeric standards are expressed as values that may not be exceeded in the receiving water. Because of this requirement, it is necessary to set human health effluent limitations that meet a given WLA on a daily basis. DEQ uses the following approach to establish the effluent limitations for protection of human health:

For parameters where the human health standard is the limiting standard, the AML is set equal to the WLA_h, as stated in TSD Section 5.4.4. However in accordance with Circular DEQ-7 Footnote 16, receiving water "concentrations may not exceed" any HHS, so the MDL is also set at the WLA_h.

Nonsignificance Criteria Effluent Limitations: Nonsignificance criteria are determined based on the lowest applicable standard for a pollutant, typically the chronic aquatic life standard or the human health standard. Effluent limitations are calculated from the most stringent water quality standard and the nonsignificance criteria using the procedures for aquatic life standards and human health standards described above. The nonsignificance criterion is substituted for the aquatic life standard and the human health nonsignificance criterion for the human health water quality standard.

Permittees who are unable to comply with a WQBEL based on a nondegradation criterion may submit an authorization to degrade state waters under ARM 17.30.706.

The final WQBELs for a given parameter are determined as follows:

- For **discharges subject to nondegradation criteria** DEQ calculates an aquatic life AML and MDL based on the chronic nondegradation standard using the procedures for aquatic life effluent limitations described above. DEQ then compares these values to the AML and MDL calculated from human health nondegradation criterion determined using the procedures for human health effluent limitations. The lowest AML and the lowest MDL are the final calculated WQBELs because the lowest of each of these limitations will assure attainment of all water quality standards and nondegradation criteria.

The calculated WQBELs must be compared to TBELs for the same parameter to determine the final permit effluent limitations that meet the requirements of Section 301 of the federal Clean Water Act (CWA) and protect the designated uses of the receiving water required by Section 302 of the federal CWA. This stringency analysis is discussed in Section 2.3 of the permit fact sheet.

FINAL CALCULATED WQBEL

WQBEL calculations for Outfall 001 are summarized in the following table.

WLA for all parameters are based on achieving the lowest applicable water quality standard or nonsignificance criterion of the three receiving waters (Sheep Creek, Coon Creek and ground water).

Table 5.A.1 WQBELs Outfall 001

Parameter [1]	Units	Chronic Nonsignificance Wasteload Allocation (WLA_c)	Human Health Nonsignificance Wasteload Allocation (WLA_h)	Chronic Long Term Average (LTA_c)	Aquatic Life AML	Aquatic Life MDL	Human Health AML	Human Health MDL	Final WQBELs		Basis for WQBEL Calculations
									AML	MDL	
Aluminum, diss	µg/L	13	--	6.85	11	21	--	--	**11**	**21**	Nondegradation
Ammonia, total	mg/L	0.225	--	0.12	0.18	0.37	--	--	**0.18**	**0.37**	Nondegradation
Nitrate + Nitrite	mg/L	--	1.5	--	--	--	1.5	1.5	**1.5**	**1.5**	Nondegradation
Total Nitrogen	mg/L	0.09	--	0.055	0.09	--	--	--	**0.09**	**--**	Nondegradation
Total Phosphorus	mg/L	0.012	--	0.008	0.012	--	--	--	**0.012**	**--**	Nondegradation
Cyanide, Total	µg/L	0.8	0.6	0.4	0.7	1.2	0.6	0.6	**0.6**	**0.6**	Nondegradation
Antimony	µg/L	--	0.8	--	--	--	0.8	0.8	**0.8**	**0.8**	Nondegradation
Arsenic	µg/L	23	1	12	19	37	1	1	**1**	**1**	Nondegradation
Barium	µg/L	--	150	--	--	--	150	150	**150**	**150**	Nondegradation
Beryllium	µg/L	--	0.8	--	--	--	0.8	0.8	**0.8**	**0.8**	Nondegradation
Cadmium	µg/L	0.14	0.8	0.07	0.11	0.23	0.8	0.8	**0.8**	**0.8**	Nondegradation
Chromium	µg/L	--	15	--	--	--	15	15	**15**	**15**	Nondegradation
Copper	µg/L	1.7	195	0.9	1.4	2.8	195	195	**1.4**	**2.8**	Nondegradation
Iron	µg/L	250	--	132	205	416	--	--	**205**	**416**	Nondegradation
Nickel	µg/L	9.5	15	5	7.8	16	15	15	**7.8**	**15**	Nondegradation
Lead	µg/L	0.63	2.3	0.3	0.5	1.0	2.3	2.3	**0.5**	**1.0**	Nondegradation
Mercury	µg/L	0.14	0.0005	0.07	0.1	0.2	0.0005	0.0005	**0.0005**	**0.0005**	Nondegradation
Selenium	µg/L	0.75	7.5	0.4	0.6	1.2	7.5	7.5	**0.6**	**1.2**	Nondegradation
Strontium	µg/L	--	600	--	--	--	600	600	**600**	**600**	Nondegradation

Table 5.A.1 WQBELs Outfall 001

Parameter [1]	Units	Chronic Nonsignificance Wasteload Allocation (WLA_c)	Human Health Nonsignificance Wasteload Allocation (WLA_h)	Chronic Long Term Average (LTA_c)	Aquatic Life AML	Aquatic Life MDL	Human Health AML	Human Health MDL	Final WQBELs		Basis for WQBEL Calculations
									AML	MDL	
Thallium	µg/L	--	0.04	--	--	--	0.04	0.04	**0.04**	**0.04**	Nondegradation
Silver	µg/L	0.06	15	0.03	0.05	0.1	15	15	**0.05**	**0.1**	Nondegradation
Uranium	µg/L	--	0.7	--	--	--	0.7	0.7	**0.7**	**0.7**	Nondegradation
Zinc	µg/L	5.6	300	3.0	4.6	9.2	300	300	**4.6**	**9.2**	Nondegradation

Footnotes:
1. All metals are total recoverable unless otherwise specified.

APPENDIX 6 - Figures

Figure 1. Facility Site Map

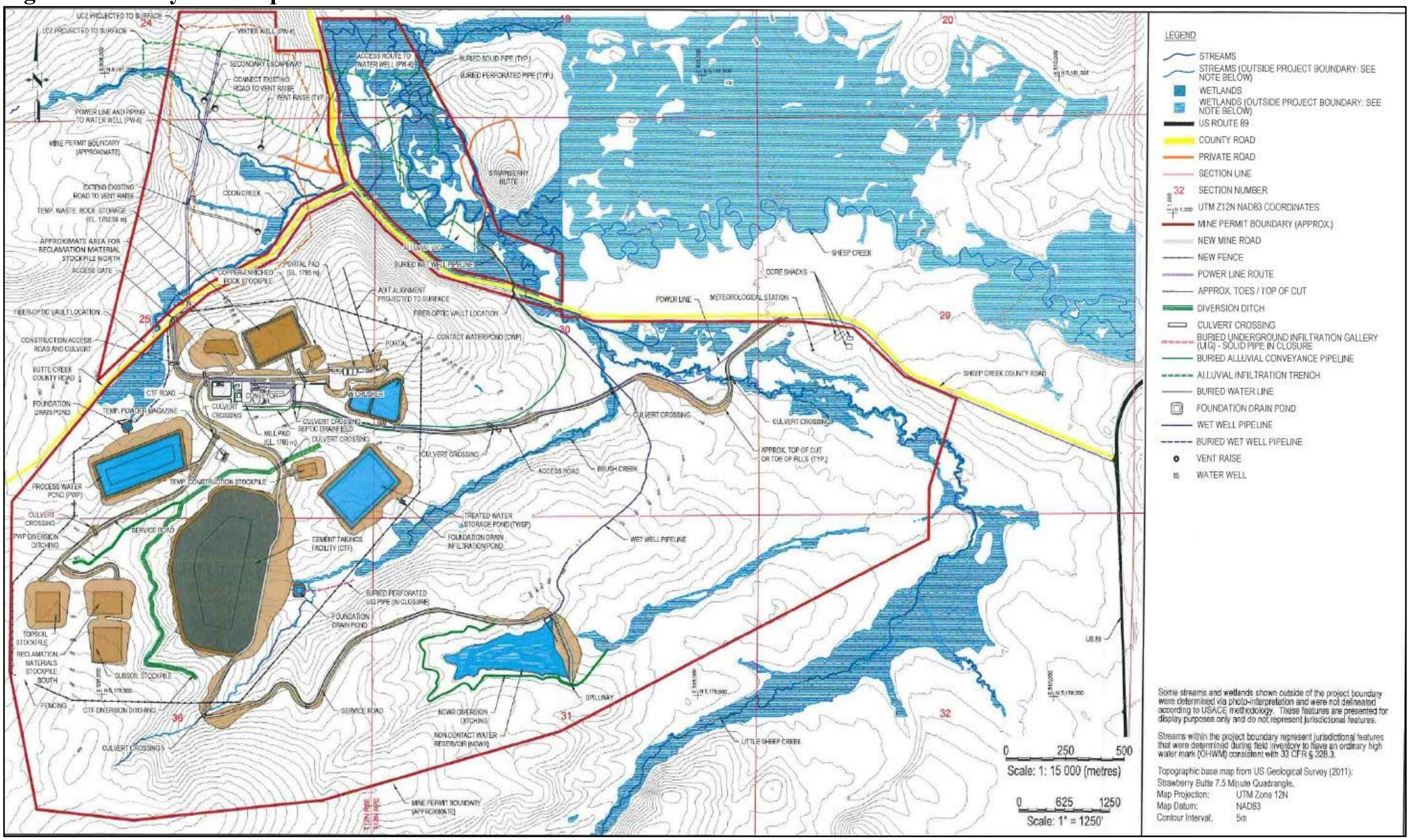


Figure 2. Treatment Process Flow

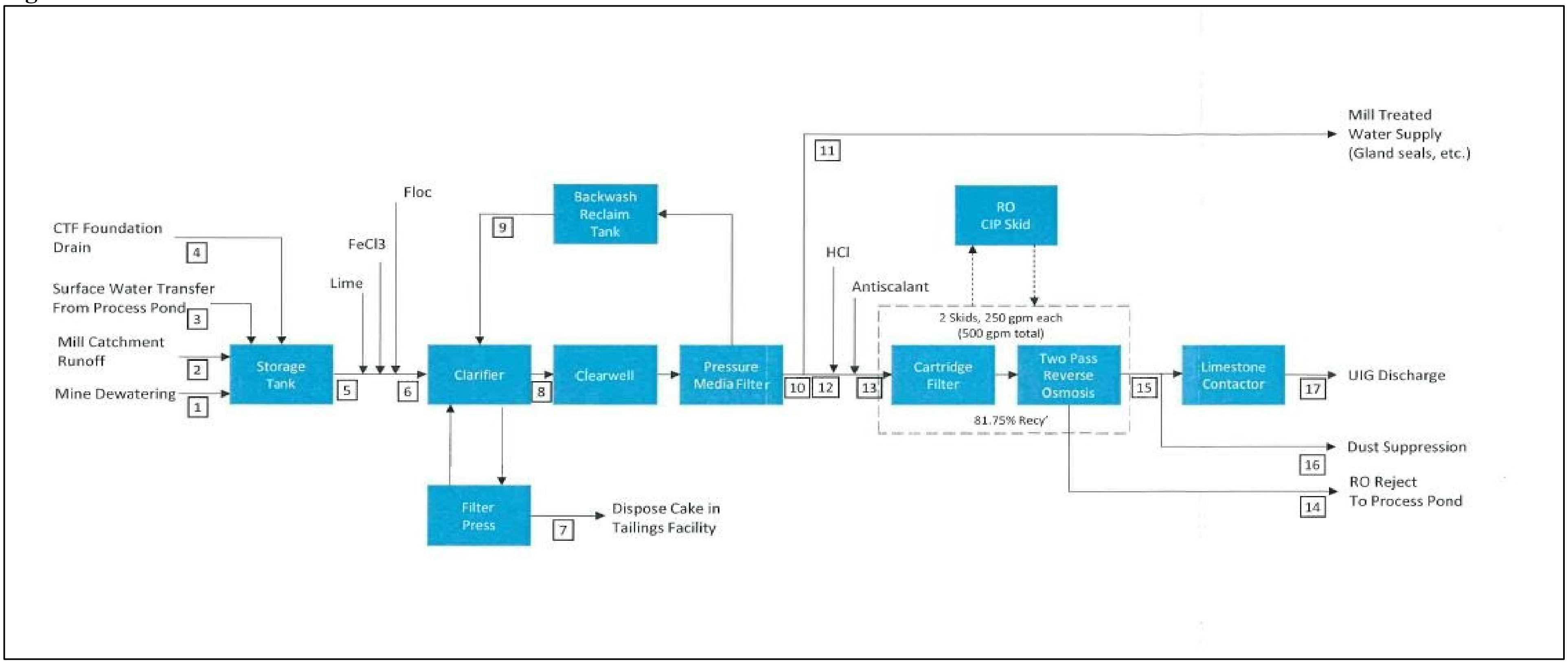


Figure 3. Water Balance

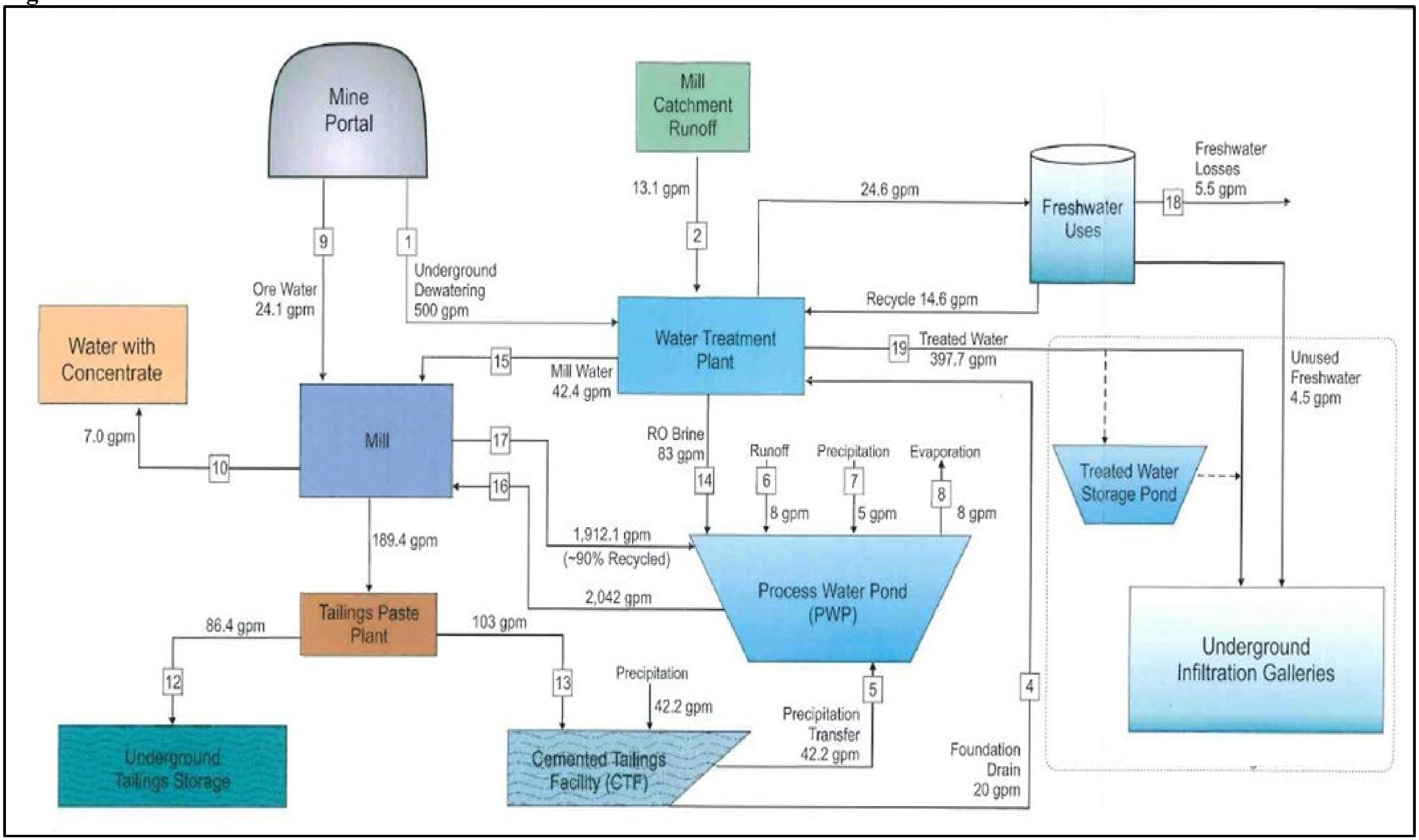


Figure 4. Water Balance Seasonal Discharge Detail

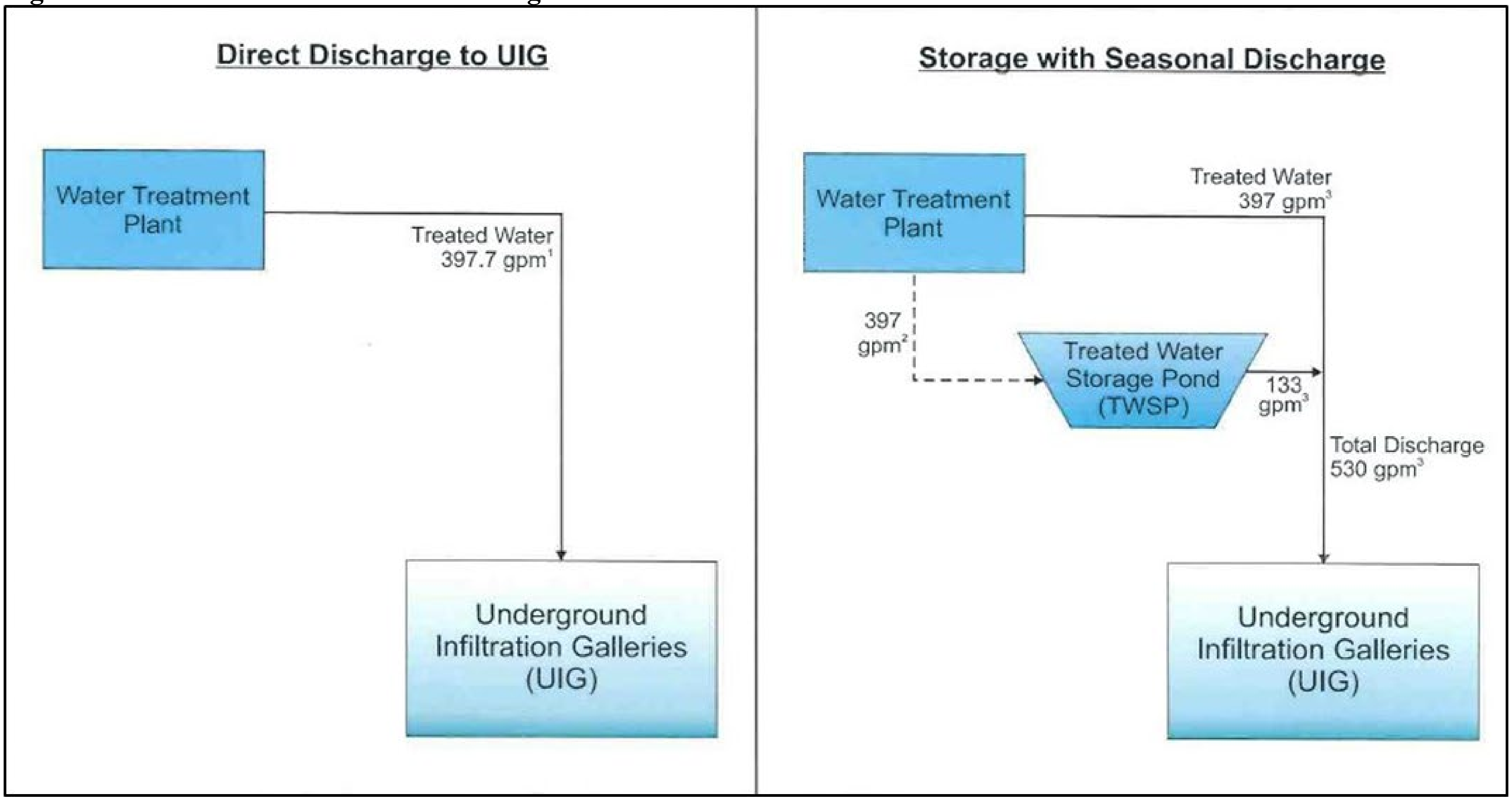


Figure 5. Outfall 001

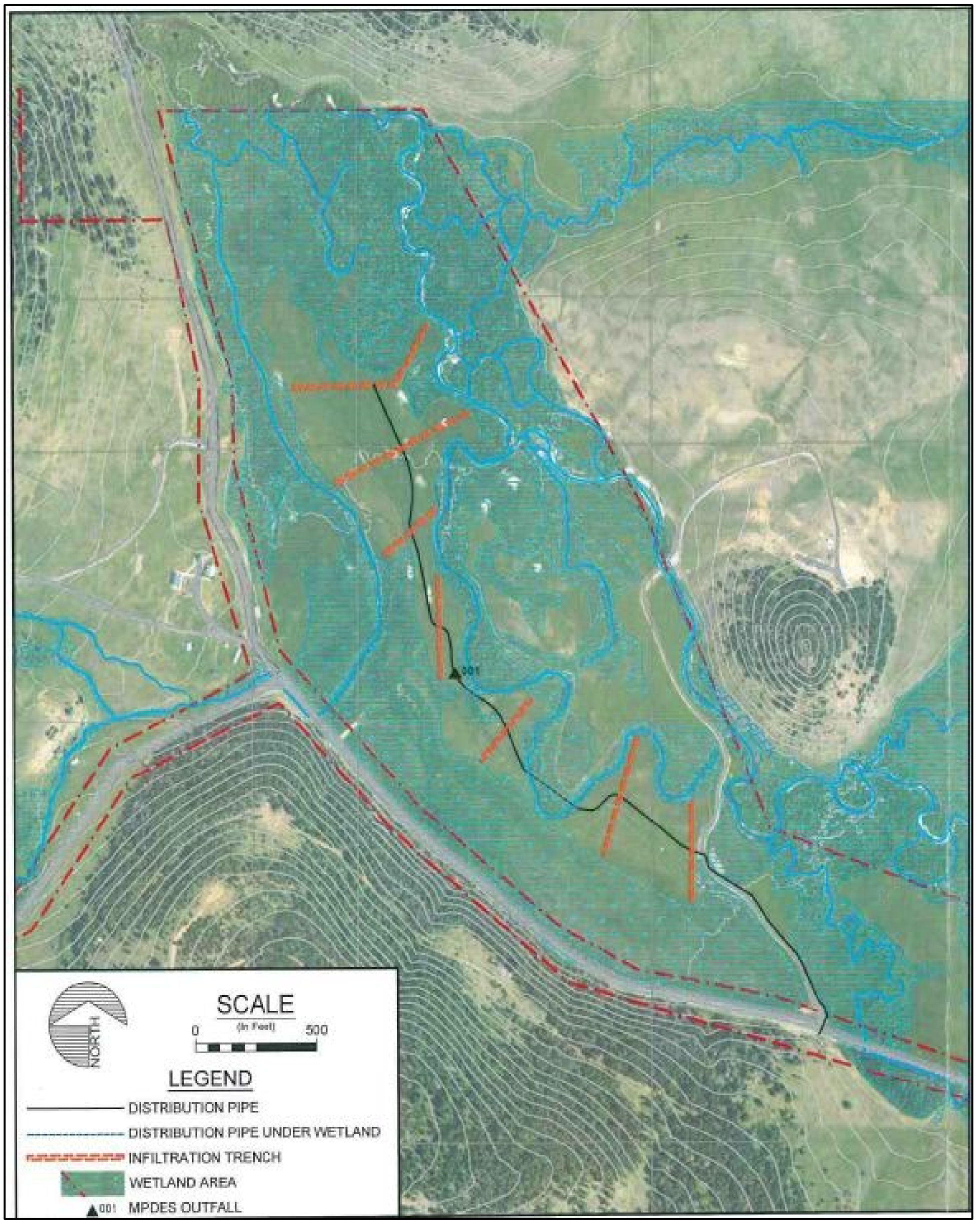
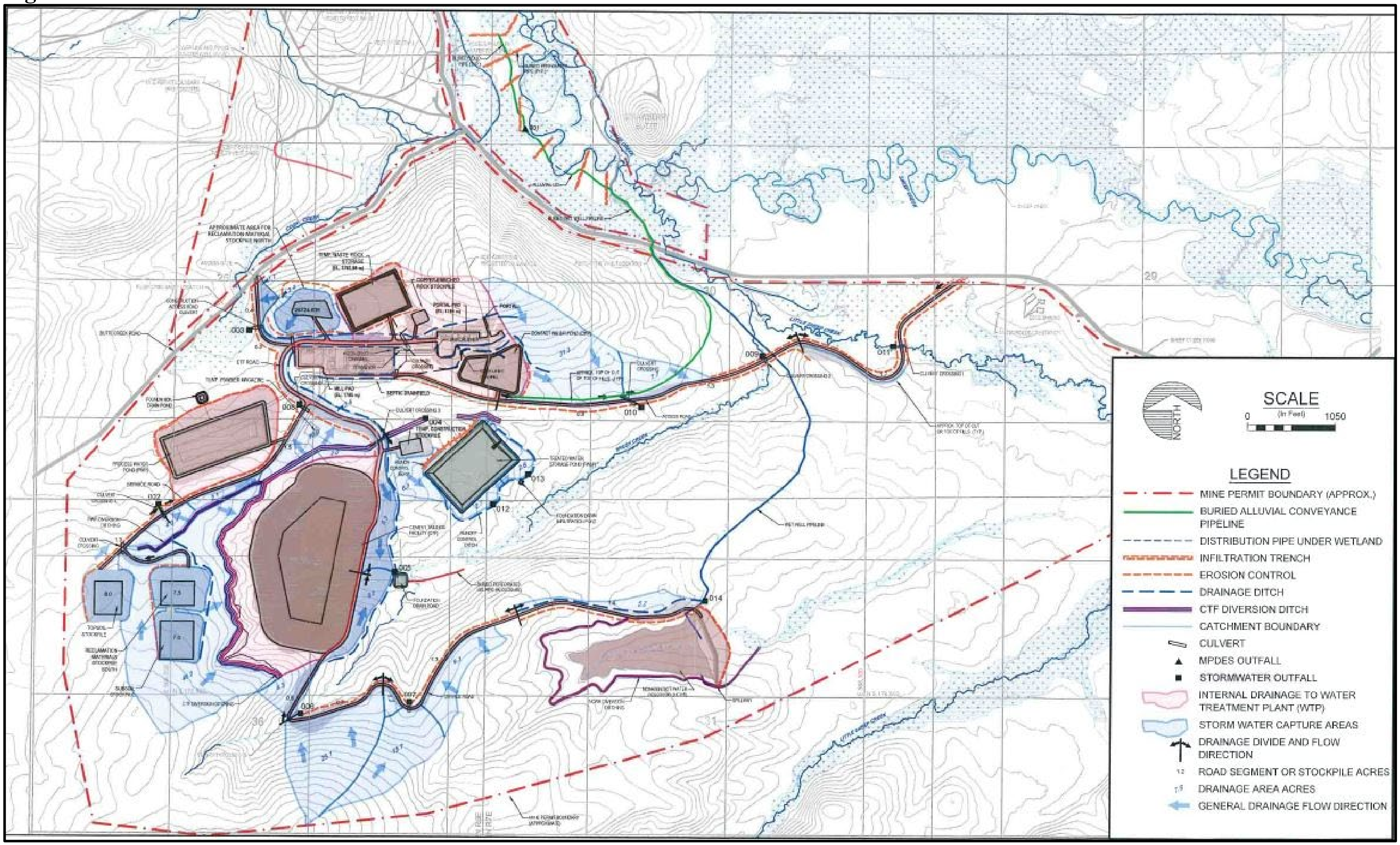


Figure 6. Storm Water Outfall Locations



Appendix 7 – Low Flow Statistics Methodology

DEQ Low Flow Stats Calculations for the Black Butte Copper Project MPDES Permit

DEQ used the following methodology to determine the annual 7Q10 and summer 14Q5 values ("low flow stats") at the Black Butte Copper Project proposed discharge point. This methodology generally follows our standard process for determining low flow statistics (DEQ, 2017).

The proposed discharge point is located on Sheep Creek near White Sulphur Springs at approximate coordinates 46.7797, -110.9056. Sheep Creek had one long-term USGS gaging station (USGS 06077000 Sheep Cr nr White Sulphur Springs MT), located upstream of the proposed discharge point. Additionally, there is currently a Hydrometrics gaging station (SW-1) located downstream of the proposed discharge point that records data spring through fall only due to the heavy ice and snowpack in the region. The drainage areas, periods of record, and most recent collection year for the USGS gage and the Hydrometrics gage, and the drainage area of Sheep Creek at the proposed discharge point, are listed below (Table 1).

Table 1. Data Summary for USGS Gage Locations and Proposed Discharge Point

Location	Drainage Area (square miles)	Period of Record
USGS 06077000	43.1	1941-1972
Hydrometrics gage @ SW-1	78.4	2012-present
Sheep Creek at the proposed discharge point	74.1	-

The suitability of a gage as a basis for low flow stats depends on proximity to the facility (in terms of drainage area), the period of record, and how recent the data collection is. Based on these criteria, USGS 06077000 is marginally suited as a base for low flow stats at the proposed site. It has an adequate period of record (30 years), but the most recent data over 45 years old, and it is located relatively far from the proposed discharge point (the drainage area ratio is 1.72, which is outside the recommended USGS range of 0.5 to 1.5 - USGS, 2015).

The Hydrometrics gage (SW-1) is much closer in terms of drainage area to the proposed discharge point (drainage area ratio is 0.945). However, it has only been collecting data since 2012, and does not have complete records for the entire year (typical collection dates appear to be March through November). Thus, this gage cannot be used solely to calculate reliable low flow stats.

Both Hydrometrics and DEQ have collected paired flow measurements at both the site of the former USGS gage (USGS-SC1, or nearby at SHEPC08), and at either SW-1 or at DEQ's site SHEPC07 (Figure 1).

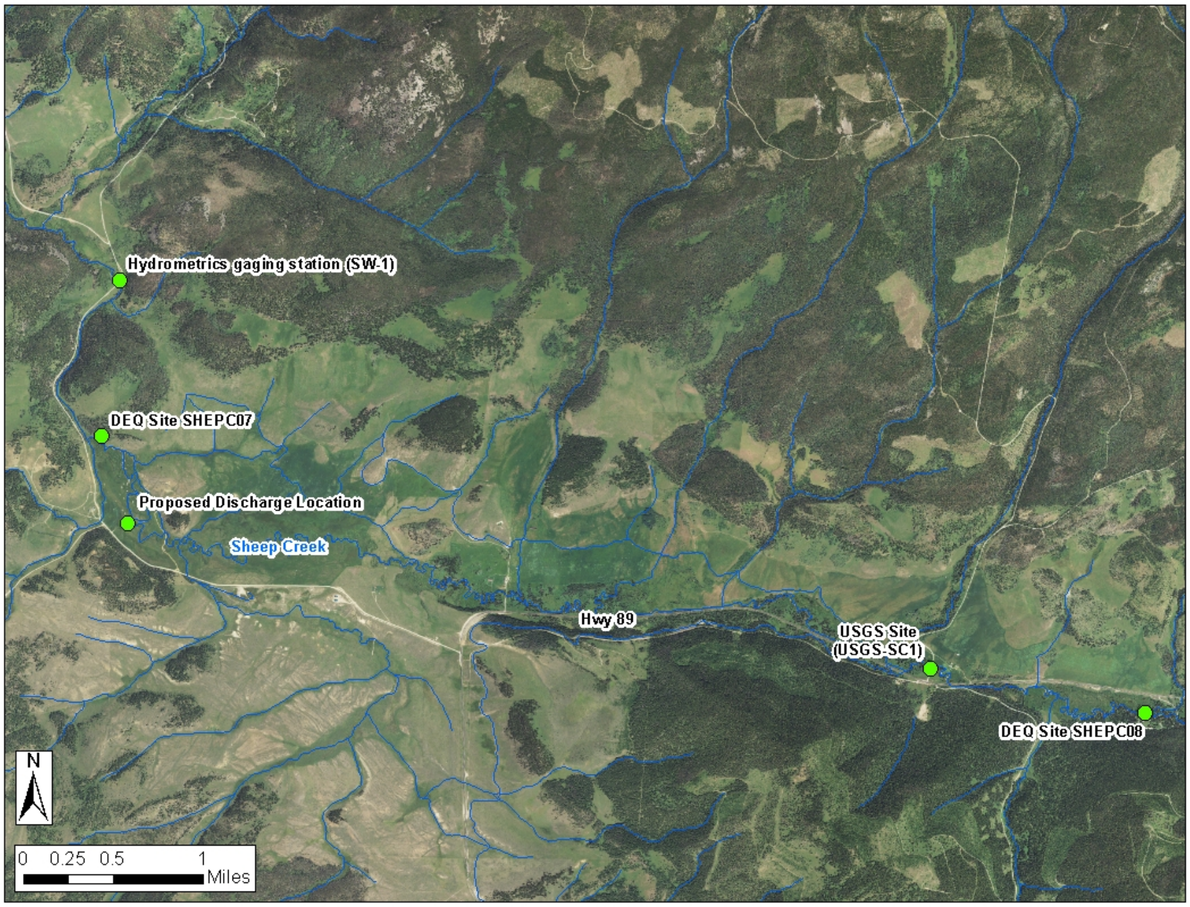


Figure 1. Regional Map showing discharge and sampling locations

The goal of this exercise is to use the observed data in the watershed (paired flow data, USGS data at 06077000, and the Hydrometrics gage at SW-1) to determine reasonable and scientifically defensible low flow stats at the proposed discharge point. Thus, the long term low flow stats at the former USGS gage provide a starting point for further discussion. 7Q10 values were calculated using March 1 as the start of the climatic year, and 14Q5 values were calculated using July 1 – October 31 as the period of interest, per DEQ regulations (ARM 17.30.635) (Table 2).

Table 2. Low Flow Stats Calculations at USGS 06077000

Statistic	Climatic Years Used	Period of Record (Years/Seasons)	Value (cfs)
7Q10	1942-1971	30	4.87
14Q5	1942-1971	30	11.7

As mentioned above, there are several factors which suggest using the traditional approach of a drainage area ratio at this gage as a basis for low flow stats at the proposed discharge point is not appropriate. These are briefly described below.

- The drainage area ratio (1.72) is outside of the recommended ratio of $0.5 < A_u/A_g < 1.5$ (USGS, 2015).
- Data at this site was collected between 45 and 75 years ago. Data this old can show hydrologic shifts as compared to more recent data due to climatic trends.
- Just downstream of the USGS gage location, two large irrigation ditches exit the stream, one on each side of the creek. One irrigates land along Sheep Creek, while the other appears to irrigate along Sheep Creek before crossing the hydrologic divide into the Newlan Creek watershed. DEQ staff visually observed significant flow diversions in these ditches in the summer of 2018. These ditches likely reduce flows significantly below this gage during the summer months (when the 14Q5 is calculated). Furthermore, according to the NASS statistics, approximately 750 acres of irrigated agriculture are in the watershed between the USGS location and the proposed discharge point, compared to zero acres of irrigated agriculture above the USGS location.
- DEQ and Hydrometrics stream flow measurements between 2014 and 2018 indicate that this portion of the stream is often a losing reach during portions of the summer. These measurements indicate that a simple drainage area ratio (or one based on precipitation) would not be a reliable method, since the forcing function may be irrigation.

DEQ did a comparison to nearby gages that might have similar hydrology and may be candidates for record extension techniques (USGS, 1982). We found three relatively nearby gages with flow records that overlapped the period 1940-1970, and included the present day. These gages were on the Smith River, Belt Creek, and South Fork Mussellshell River. Unfortunately, all three of these gages have a large gap in the 80s/90s/00s. When plotted vs. the paired Sheep Creek data, only Belt Creek showed a decent correlation (r2 = 0.87), whereas Smith River (r2=0.68) and SF Mussellshell River (r2=0.56) showed weaker correlations. All three showed poor correlation during low flow periods. And when the Belt Creek gage was used to extend the record on Sheep Creek, it did not substantially change the 14Q5 value (11.7 to 11.8 cfs) and only added a few more years of data, so we looked at other methods that relied on observed data to calculate the 7Q10 and the 14Q5 (DEQ, 2017).

7Q10:

DEQ used the paired flow data collected at either USGS-SC1 or SHEPC08 (these were considered close enough for this determination, although the SHEPC08 site has about 10% less watershed area than USGS-SC1 and may need a small adjustment in the future), and at either SHEPC07 or SW-1 for the downstream location (Table 1, Figure 1). There were 43 paired flow measurements using all data, but 13 of these were multiple measurements taken in the same month, and were not temporally independent. These multiple values taken in a single month were averaged and only one value was used for that month, leaving 30 independent paired flow measurements (Table 3). The median ratio between the two sites was 1.16 (r2 = 0.88) – that is, the flows at the proposed discharge point are, on median, 1.16 times higher than the flows at the USGS location. The SW-1 location is a few miles downstream of the proposed discharge point (adding about 6% more drainage area), but was considered close enough for comparisons for this permitting cycle. As more data becomes available at that station, this increased drainage area will be taken into consideration using standard USGS methods (USGS, 2015).

Table 3. Data used for 7Q10 ratio determination (green rows represent averaged monthly values)

Sampling Date	Month	SW-1/ SHEPC07 flows (cfs)	USGS site/ SHEPC08 flows (cfs)	Ratio
5/1/2014	5	176.03	91.37	1.93
6/1/2014	6	149.68	114.40	1.31
7/8/2014	7	63.69	55.8	1.14
8/21/2014	8	25.48	26.35	0.97
10/29/2014	10	20.8	17.95	1.16
3/26/2015	3	40.99	19.56	2.10
4/29/2015	4	103.33	56.8	1.82
5/1/2015	5	111.80	79.11	1.41
6/1/2015	6	85.99	73.65	1.17
7/1/2015	7	22.57	25.07	0.90
8/1/2015	8	13.87	14.75	0.94
9/1/2015	9	25.32	17.03	1.49
10/8/2015	10	19.46	11.41	1.71
11/17/2015	11	8.83	9.27	0.95
4/1/2016	4	74.00	32.59	2.27
5/1/2016	5	126.70	93.11	1.36
6/1/2016	6	61.51	56.74	1.08
7/7/2016	7	17.3	20.9	0.83
8/22/2016	8	10.15	14.04	0.72
9/21/2016	9	19.65	13.27	1.48
10/21/2016	10	22.16	13.53	1.64
11/10/2016	11	21.19	12.81	1.65
4/20/2017	4	40.26	18.65	2.16
5/10/2017	5	102.2	53.5	1.91
6/12/2017	6	43.6	50.4	0.87
7/27/2017	7	18.9	18.8	1.01
8/28/2017	8	13.6	12	1.13
9/11/2017	9	10.69	10.03	1.07
8/6/2018	8	31.54	28.61	1.10
9/13/2018	9	12.2	17.1	0.71

Median: 1.163

The ratio of 1.16 was applied to the 7Q10 value at the USGS location. The resulting 7Q10 values is 1.163*4.87 = **5.67 cfs**. Note that preliminary daily flows collected by Hydrometrics at the SW-1 site indicate that the actual 7Q10 value may be lower than this (the seven-day low flow in 2017 was 5.1 cfs). If the gage is maintained until the next permitting cycle, there will be 10 years of data at this location and it may be used in the 7Q10 calculation.

14Q5:

Using the same dataset above, but only keeping values taken in the 'summer' season (July – October), there are 20 pairs of measurements at the two locations. However, three of the DEQ/Hydrometrics measurements were concurrent in the same month, and therefore not temporally independent. These multiple values taken in a single month were averaged and only one value was used for that month, leaving 17 independent paired flow measurements (Table 4). The median ratio between the two sites is about 1.10 (r2 = 0.85) – that is, the flows at the proposed discharge point are, on median, 1.10 times higher than the flows at the USGS location. The SW-1 location is a few miles downstream of the proposed discharge point (adding about 6% more drainage area), but was considered close enough for comparing in this permit cycle. If we focus on just the lowest flows in the table, the ratio is lower – less than 1 in many cases.

Table 4. Data used for 14Q5 ratio determination (green rows represent averaged monthly values)

Sampling Date	Month	SW-1/ SHEPC07 flows (cfs)	USGS site/ SHEPC08 flows (cfs)	Ratio
7/8/2014	7	63.69	55.8	1.14
8/21/2014	8	25.48	26.35	0.97
10/29/2014	10	20.8	17.95	1.16
7/1/2015	7	22.57	25.07	0.90
8/1/2015	8	13.87	14.75	0.94
9/1/2015	9	25.32	17.03	1.49
10/8/2015	10	19.46	11.41	1.71
7/7/2016	7	17.3	20.9	0.83
8/22/2016	8	10.15	14.04	0.72
9/21/2016	9	19.65	13.27	1.48
10/21/2016	10	22.16	13.53	1.64
7/27/2017	7	18.9	18.8	1.01
8/28/2017	8	13.6	12	1.13
9/11/2017	9	10.69	10.03	1.07
10/17/2017	10	17.55	9.77	1.80
8/6/2018	8	31.54	28.61	1.10
9/13/2018	9	12.2	17.1	0.71

Median: 1.102

Since DEQ wanted to incorporate the four years of complete summer flow data from the Hydrometrics gage at SW-1, a slightly different method was used in this situation. The ratio of 1.102 was applied to the 14-day low flow values at the gaged site to come up with approximate 14-day low flow values at the proposed discharge point, and then the four complete years of Hydrometrics data (2014-2017) were added to this dataset to calculate a 14Q5 using 34 years of data (Table 5). The resulting 14Q5 value was **11.8** cfs. This is basically equivalent to the 14Q5 at the USGS site (11.7 cfs). But based on the significant summer irrigation withdrawals in the region between the two locations, this seems reasonable. It is also worth noting that at the next permitting cycle, the data collected near the site at SW-1 by Hydrometrics will factor more heavily into the formula, as there will be 10 years of data at that point. Their data currently suggests that the 14Q5 may be much lower than 11.8 (uncalibrated 14-day low flow values of 8.5 cfs in 2015, and 6.1 cfs in 2017 were observed).

Table 5. 14Q5 calculations at the proposed discharge point

Year	14Q Low Flow (cfs)	Count (days)	Log 14Q
2017	6.1	110	0.79
2015	8.5	110	0.93
1961	10.7	10.68	1.03
1958	10.9	10.89	1.04
1944	11.0	10.99	1.04
1956	12.0	11.96	1.08
1943	12.4	12.44	1.09
2016	12.7	110	1.10
1952	13.5	13.46	1.13
1945	13.7	13.7	1.14
1957	13.7	13.7	1.14
1960	13.9	13.85	1.14
1942	14.0	14.01	1.15
1951	14.1	14.09	1.15
1954	14.3	14.33	1.16
1949	14.7	14.72	1.17
1971	16.3	16.29	1.21
1963	14.9	14.88	1.17
1955	15.9	15.9	1.20
1962	16.2	16.22	1.21
1947	16.3	16.29	1.21
1953	16.3	16.29	1.21
1966	16.6	16.61	1.22
1964	17.6	17.55	1.24
1950	17.6	17.63	1.25
1970	18.2	18.18	1.26
1959	18.3	18.26	1.26
1967	18.3	18.26	1.26
1969	18.6	18.58	1.27
1946	18.8	18.81	1.27
1968	21.8	21.8	1.34
1948	22.4	22.43	1.35
2014	25.1	110	1.40
1965	33.5	33.53	1.53
	average		1.180
	standard deviation		0.134
	skew		-0.335
	probability		0.2

count		34
frequency factor interpolated		-0.8212
14Q5 value (cfs)		11.77

References

DEQ, Low Flow Stat Methodology (draft), 2017.
USGS, A Comparison of Four Streamflow Record Extension Techniques, Hirsch, 1982.
USGS, Montana StreamStats, SIR 2015-5019, 2015.