

**MONTANA DEPARTMENT OF
ENVIRONMENTAL QUALITY**

Water Protection Bureau
P.O. Box 200901
Helena, MT 59620-0901

**Permit Fact Sheet
Montana Ground Water Pollution Control System (MGWPCS)**

Applicant: Sun Mountain Lumber, Inc.

Permit Number: MTX000125

Facility Name: Sun Mountain Lumber Mill

Facility Location: Section 04, Township 07 North, Range 09 West, Powell County

Facility Address: 181 Greenhouse Road, Deer Lodge, Montana

Facility Contact: April Kersch
Environmental Coordinator
Sun Mountain Lumber, Inc.

Receiving Water: Class I Ground Water

Number of Outfalls: Two

Outfall/Type: 001 – Subsurface Drainfield – Industrial Wastewater
002 – Subsurface Drainfield – Industrial Wastewater

I. PERMIT STATUS

The following fact sheet outlines the basis for renewing the MGWPCS wastewater discharge permit to Sun Mountain Lumber, LLC. (Sun Mountain), for the Sun Mountain Lumber Mill (lumber mill) located in Deer Lodge, Montana. The MGWPCS permit application and supplemental materials provide the information that serves as the basis for the development of the effluent limits and the monitoring requirements outlined within this fact sheet. The scope of this permitting action is for the operation, and maintenance of the wastewater treatment and disposal system.

A. Application Info

DEQ received a MGWPCS permit application to renew permit coverage from Sun Mountain Lumber on October 06, 2014. On October 10, 2014, DEQ replied requesting for submittal of the remaining portion of the respective application fees. On October 24, 2014, all requested fees were received by DEQ and review of the application materials commenced. On November 17, 2014, DEQ issued a deficiency notification requesting submittal of additional application information. On January 29, 2015, DEQ received all requested information and the application was subsequently deemed complete on February 05, 2015. The complete application effectively provided administrative continuance of Sun Mountain's existing permit earlier issued on March 24, 2010, until such time as the permit is reissued by DEQ.

B. Permit Changes

Since 2010, Sun Mountain has been collecting actual wastewater characteristics, ambient ground water quality data, and downgradient ground water monitoring data that was required under their current permit. This site-specific data will be used to perform a Reasonable Potential Analysis (RPA) in this fact sheet. The RPA is being completed as technical support for establishing water quality-based toxics control in this Pollution Control System permit. The analysis will result in updates to the water quality based effluent limitations as discussed further in Section IV.

In 2013, Sun Mountain introduced arsenic treatment to the wastewater generated from the Hurst hog fuel boiler which is discharged to Outfall 002. The treatment train now incorporates: a water softener, de-alkalizer system, arsenic adsorption system, deaerator, and acid injection. The de-alkalizer and acid injection is for pH adjustment prior to and after the arsenic adsorption system. The wastewater and treatment systems are further discussed in Section II.

In November 2013, Sun Mountain repaired a failing subsurface drainfield (Outfall 002). The drainfield was rehabbed in-place. Additional information on this is documented within the 2013 DEQ inspection report (DEQ, 2013) and subsequent documentation.

II. FACILITY INFORMATION

A. Facility Location

The lumber mill is located at 181 Greenhouse Road which is immediately to the south of the City of Deer Lodge. The mill is bounded to the west by Greenhouse Road and the Montana Rail Link right-of-way to the east (Figure 1).

B. Facility and Operations

The facility site has been used as a lumber mill since approximately 1961. Currently the lumber mill produces dimensional lumber for construction material. The lumber mill consists of a sawmill, planer, two boilers, jointer facility, drying kilns, log yard, log storage area, and a raw material storage area. The storage area contains wood chips, saw dust, and planer shavings. The lumber mill discharges covered under this permit originate from boilers, water softeners, and kiln heat exchangers.

The lumber mill's source water for on-site industrial use is supplied by the City of Deer Lodge. The water originates from multiple water wells located on the east side of the Clark Fork River within or near the municipal city limits (Figure 1).

This permit provides coverage for two separate subsurface drainfield structures (Figure 4). The location and contributing sources are documented in Table 1 and shown in Figure 2.

Effluent samples and flow monitoring are required to be representative of the volume and nature of the discharge. The sample and flow monitoring locations are described below within Table 1.

Table 1: Collection, Treatment, and Disposal System Summary	
Outfall 001 - Industrial Wastewater	
Method of Disposal: Infiltration to shallow ground water	
Disposal Structure: Subsurface Drainfields (Outfall 001)	
Section 04, Township 07 North, Range 09 West	
Latitude: 46.38774° North; Longitude: 112.74224° West	
Powell County	
Contributing Sources: Gas Fired Boiler, One Water Softener (regeneration).	
Average Daily Design Flow (gpd): 160 (ft ³ /day): 21	Daily Maximum Design Flow (gpd): 972 (ft ³ /day): 130
Effluent Sampling Location: EFF-001: Located near the west wall inside the gas boiler room, the effluent sample port is located just downstream of the water softener and prior to the drainfield.	
Flow Monitoring Equipment: FM-001: Totalizer flow meter with paddlewheel flow sensor.	
Flow Monitoring Location: Located in the gas boiler room, the flow meter is installed downstream of the water softener.	
Treatment: None	
Outfall 002 - Industrial Wastewater	
Method of Disposal: Infiltration to shallow ground water	
Disposal Structure: Subsurface Drainfields (Outfall 002)	
Section 04, Township 07 North, Range 09 West	
Latitude: 46.38704° North; Longitude: 112.74269° West	
Powell County	
Contributing Sources: Hurst (hog fuel) Boiler, Two Water Softeners (regeneration).	
Average Daily Design Flow (gpd): 3,352 (ft ³ /day): 448	Daily Maximum Design Flow (once a year event for maintenance) (gpd): 42,161; (ft ³ /day): 5,636
Effluent Sampling Location: EFF-002: Located on the west side of the Hurst boiler building, the effluent sample port is located downstream of the pH mixing tank/water softener and prior to the drainfield.	
Flow Monitoring Equipment: FM-002: Totalizer flow meter with magmeter.	
Flow Monitoring Location: Located in the Hurst boiler building, the flow meter is located just prior to the drainfield.	
Treatment: Kinetico Arsenic sorption system (Installed April 2013) pH Neutralization (citric acid, installed August 2011)	

C. Downgradient Water Uses

Sun Mountain Lumber provided information on the water sources for users that are downgradient of the lumber mill (Figure 1). The immediate downgradient property owners are listed as Montana Rail Link and the City of Deer Lodge (open land). There are no known water wells that have been documented on these adjacent properties.

Further downgradient are private residences and businesses that are located within (or near) the City of Deer Lodge municipal boundaries. Sun Mountain has confirmed within application materials that these buildings are on city water services.

D. Effluent Characteristics

Pursuant to ARM 17.30.1023, DEQ requires the applicant to disclose the quality of the effluent to be discharged such that the potential pollutants can be identified and the proposed discharge can be examined to determine if it will cause pollution of state water, 75-5-605, Montana Code Annotated (MCA). The applicant has provided effluent quality and monitoring data for Outfall 001 and Outfall 002 which is summarized within Appendix I.

The source water for the lumber mill is collected from ground water wells located in (or near) the City of Deer Lodge. This source water contains arsenic which is a naturally occurring trace element that is commonly associated with certain igneous, metamorphic, and sedimentary rocks, as well as geothermal environments (Welch et al., 1998). The facility's current operations (Section II.B.) results in a net water loss resulting in a concentration of arsenic in the wastewater stream.

E. Discharge Structures

There are currently two separate subsurface drainfields located on-site that dispose of wastewater associated with the use of lumber mill boilers and water softeners (Figure 4). The drainfield identified as Outfall 001 is used to dispose of the gas boiler water located near the kilns (Figure 2). The drainfield identified as Outfall 002 is used to dispose of the Hurst boiler water located near the sawmill (Figure 2). Additional information is displayed in Table 1.

F. Geology

The lumber mill is located in the Deer Lodge Valley of the Upper Clark Fork Watershed. Deer Lodge Valley is an intermontane valley surrounded by north trending mountain ranges (MBMB, 2013). The topography of the valley is dominated by broad benches that slope gradually from the mountains toward the Clark Fork River floodplain. These benches are largely on tertiary deposits and are dissected deeply by many tributary streams (Konizeski, 1968). The shallow ground water aquifer underlying the lumber mill is composed of basin fill-unconsolidated quaternary deposits (Sand and gravel; with some silt and clay (MBMG, 2013)).

G. Hydrogeologic Characteristics

Recent data indicates that the upper contact of the shallow ground water aquifer underlying the lumber mill is approximately 14 to 22 feet below ground surface. Hydrogeologic site information that was submitted with the application is included in Appendix XI and also summarized in the Appendix IV table. This information is in supplement to the original hydrogeologic report completed in 1996 (Braun, 1996).

H. Ground Water Monitoring Wells

There are currently three viable monitoring wells on-site (MW-1, MW-2, and MW-4). All have been constructed to be representative of the shallow ground water bearing zone. One monitoring well is located upgradient (ground water flow) of the outfalls, while the other two are primarily located downgradient from either Outfall 001 or Outfall 002.

Sun Mountain Lumber has reported that information on a fourth monitoring well (MW-3) is limited and the well may currently not be viable. Information regarding these monitoring wells have been summarized and listed in Appendix II. A map showing the spatial location of these monitoring wells is displayed as Figure 3.

I. Ground Water Quality Characteristics

Sun Mountain Lumber collected ground water samples during the past permit cycle. Samples represent water quality both upgradient (ambient) and downgradient of both outfalls. The ambient monitoring has confirmed that the receiving ground water is Class I (ARM 17.30.1006). Ground water quality results are summarized in Appendix III.

III.MIXING ZONE

The Montana Water Quality Act (75-5-103, Montana Code Annotated (MCA)) states that a mixing zone is an area of the receiving water, established in a permit, where the water quality standards may be exceeded. DEQ will reauthorize the mixing zones within this permit. The mixing zone rationale is further discussed in Appendix IV.

IV.RATIONALE FOR PROPOSED DISCHARGE LIMITATIONS AND CONDITIONS

DEQ has a statutory duty to develop effluent limits and issue permits consistent with the Montana Water Quality Act, §75-5-101, MCA et seq. and rules adopted under that Act. Section IV presents the basis for discharge limitations in accordance with the requirements at ARM 17.30.1006 and ARM 17.30.1031. The bases for deriving and establishing effluent limitations are further discussed in Appendix V. Based on the information and analyses presented in Sections III and IV, pursuant to ARM 17.30.1031, DEQ proposes the following numerical effluent limitations:

Table 2: Proposed Final Effluent Limits – Outfall 001			
Parameter	Units	Effluent Limitations	Rationale
		Daily Maximum⁽¹⁾	
Arsenic, dissolved	µg/L	25	Ground Water Human Health Standard See Appendix V
Footnotes:			
(1) See definition in Part V of permit.			

Table 3: Interim Effluent Limits – Outfall 002 (effective upon issuance through the first four years)			
Parameter	Units	Effluent Limitations	Rationale
		Daily Maximum⁽¹⁾	
Arsenic, dissolved	µg/L	15	Reasonable Potential Analysis Ground Water Human Health Standard
Footnotes:			
The Interim effluent limits are effective from: TDB			
(1) See definition in Part V of permit.			

Table 4: Final Effluent Limits – Outfall 002 (effective four years after issuance)			
Parameter	Units	Effluent Limitations	Rationale
		Daily Maximum⁽¹⁾	
Arsenic, dissolved	µg/L	15	Reasonable Potential Analysis Ground Water Human Health Standard
Total Dissolved Solids	mg/L	760	Reasonable Potential Analysis Beneficial Uses
Footnotes:			
The final effluent limits are effective from: TDB			
(1) See definition in Part V of permit.			

V.RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

DEQ has a statutory duty to develop effluent limits and issue permits consistent with the Montana Water Quality Act, §75-5-101, MCA et seq. and rules adopted under that Act. ARM 17.30.1031 requires that all issued MGWPCS permits contain monitoring requirements that assure compliance with the developed numeric effluent limitations and therefore water quality standards. Effluent monitoring and ground water monitoring requirements will be required as a condition of this permit. Monitoring requirements and respective rationale is summarized in Appendix VI.

VI.SPECIAL CONDITIONS

In accordance with ARM 17.30.1031, this section contains the basis for special permit conditions that are necessary to assure compliance with the ground water quality standards and the Montana Water Quality Act. The following special condition(s) will be included in the permit.

A. Annual Compliance Status Report – Outfall 002 Final Effluent Limits

The permittee must complete a report on an annual basis which documents the status of complying with the final effluent limitations for Outfall 002 (Table 4). This report must detail any changes in operation and maintenance, plant modifications, or any other steps taken by the permittee in order to meet the final permit limits. The report must include implementation or completion dates for each respective action.

The permittee must complete the first annual report on or before the one (1) year anniversary date of the permit effective date. Thereafter, an annual report must be completed on or before the anniversary date of the permit effective date for each subsequent year within the permit cycle. All annual reports must be received by the Department, due on or before the 28th day of the month following the completion (anniversary) date(s). The action and reporting dates are listed within Table 5.

B. Monitoring and Reporting SOP Plan – Outfall 001

Current facility operations do not result in the production and on-site disposal of wastewater associated with the gas boiler (Outfall 001, Section II). However, the wastewater collection lines are currently plumbed such that the gas boiler wastewater may reach the drainfield if operations were to change. Any future gas boiler activity may lead to a higher concentration of arsenic being discharged at Outfall 001.

Therefore, in addition to the effluent limits (Section IV), Sun Mountain will be required to develop and maintain Standard Operating Procedures (SOPs) in use of Best Management Practices (BMPs) for long-term monitoring and reporting of the gas boiler. The SOPs shall at a minimum address the following:

- The long-term monitoring and reporting of the operational status of the gas boiler;
- The long-term monitoring and reporting of wastewater generated by the gas boiler;
- The long-term monitoring and reporting of the on-site disposal of wastewater generated from the gas boiler; and,
- A Sampling Procedure Plan for collection of wastewater samples at Outfall 001 such that they are representative of the nature (quality) of the monitored discharge (with or without gas boiler wastewater).

The action and reporting dates are listed within Table 5.

C. Laboratory Analytical Data Report

The permittee is to electronically compile and report all effluent and ground water sample laboratory analytical results collected over the first four years of the upcoming permit cycle. The permittee is to include the associated laboratory reporting limit for each individual analytical result. All data is to be listed cumulatively into a single Microsoft Excel document (or similar). The data will be used by the Department for effluent limitation analyses during the future permit renewal. The action and reporting dates are listed within Table 5.

VII.COMPLIANCE SCHEDULE

A compliance schedule is included to allow a reasonable opportunity for the permittee to attain or maintain compliance with permit requirements. The actions listed in the table below must be completed on or before the respective scheduled completion date. A report documenting each respective action must be received by DEQ on or before the scheduled reporting date. Completion of all actions or deliverables must be reported to DEQ in accordance with Part II.D and Part IV.G of the permit.

Table 5: Compliance Schedule					
Authority	Permit Condition	Action	Freq.	Scheduled Completion Date of Action⁽¹⁾	Scheduled Report Due Date.⁽²⁾
ARM 17.30.1031	TBD	Submit a Compliance Status Report documenting actions taken to meet the final effluent limits for Outfall 002.	Annually	<i>Complete annually on or before the anniversary of the effective date of the permit.</i>	<i>Due on or before the 28th day of the month following the completion date.</i>
ARM 17.30.1031	TBD	Develop (or update) and implement a Standard Operating Procedures plan for monitoring and sampling of the gas boiler associated with Outfall 001. ⁽³⁾	Single event	<i>One year after the effective date of the permit.</i>	<i>Due on or before the 28th day of the month following the completion date</i>
Milestone	TBD	Final Effluent Limits for Outfall 002 go into effect.	Single event	<i>Four years after the effective date of the permit.</i>	No Report Required
ARM 17.30.1031	TBD	Compile and submit an electronic record of all effluent and ground water sample laboratory analytical data that was collected over the first four years of the permit cycle.	Single event	<i>180 days prior to expiration date of the permit.</i>	<i>Due on or before the 28th day of the month following the completion date</i>
Footnotes:					
(1) The actions must be completed on or before the scheduled completion dates.					
(2) Reports must be received by DEQ on or before the scheduled report due dates. The reports must include all information as required for each applicable action as listed in Section VI .					
(3) The completed plan (action), in place of a written report, must be received by the DEQ on or before the scheduled "report" due date.					

VIII.NONSIGNIFICANT DETERMINATION

DEQ has determined that the activity is not considered to be a new or increased source resulting in a change of existing water quality occurring on or after April 29, 1993 (ARM 17.30.702). DEQ has therefore not conducted a significance determination (ARM 17.30.715). The applicable water quality standards for Class I ground water are summarized in Appendix V. This permit includes monitoring, reporting, and corrective action requirements to establish, confirm, and maintain compliance with permit limitations.

IX. PUBLIC NOTICE

Legal notice information for water quality discharge permits are listed at the following website: <http://deq.mt.gov/Public/notices/wqnotices>. Public comments on this proposal are invited any time prior to close of business on August 30, 2016. Comments may be directed to:

DEQWPBPublicComments@mt.gov

or at:

Water Protection Bureau
PO Box 200901
Helena, MT 59620

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 pertinent to this permitting action and may issue a final decision within thirty days of the close of the public comment period.

All persons, including the applicant, who believe any condition of the 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). All public comments received for this draft permit will be included in the administrative record and will be available for public viewing during normal business hours.

Copies of the public notice were mailed to the applicant, state and federal agencies and interested persons who have expressed interest in being notified of permit actions. A copy of the distribution list is available in the administrative record for this draft permit. Electronic copies of the public notice, draft permit, fact sheet, and draft environmental assessment are available at the following website: <http://deq.mt.gov/Public/notices/wqnotices>.

Any person interested in being placed on the mailing list for information regarding this permit may contact the DEQ Water Protection Bureau at (406) 444-3080 or email DEQWPBPublicComments@mt.gov. All inquiries will need to reference the permit number (MTX000125), and include the following information: name, address, and phone number.

During the public comment period provided by the notice, DEQ will accept requests for a public hearing. A request for a public hearing must be in writing and must state the nature of the issue proposed to be raised in the hearing.

FIGURE 1 – Vicinity Map

FIGURE 2 – Facility Site Map

FIGURE 3 – Monitoring Well Site Map

FIGURE 4 – Line Diagram

APPENDIX I - ESTIMATED EFFLUENT QUALITY

Estimated Effluent and Influent Quality – Outfall 001.								
Parameter	Location	Units	Reported Minimum Value	Reported Average Value	Reported Average-Maximum ⁽¹⁾ Value	# of Samples	Source of Data	2010 Permit Limit
Chloride	EFF-001	mg/L	5	16	34	51	DMR	-
Chlorine, Total Residual (TRC)	EFF-001	mg/L	-	<0.1	<0.1	1	APP	-
Effluent Flow rate	FM-001	gpd	39	183	729	-	DMR	-
Fluoride, total	EFF-001	mg/L	0.7	0.8	0.9	51	DMR	-
Nitrite + Nitrate total [as N]	EFF-001	mg/L	0.34	0.41	0.45	51	DMR	-
Nitrogen, total [as N]	EFF-001	mg/L	<0.5	<0.5	0.6	51	DMR	-
pH	EFF-001	s.u.	7.4	-	7.9	12	APP	6.5-8.5
Phenolics, total	EFF-001	mg/L	<0.01	-	<0.01	1	APP	-
Phosphorus, total	EFF-001	mg/L	0.014	0.031	0.034	51	DMR	-
Specific Conductivity (@ 25°C)	EFF-001	µS/cm	392	432	493	51	DMR	-
Solids, total dissolved	EFF-001	mg/L	263	294	327	51	DMR	500
Sulfate	EFF-001	mg/L	33	41	43	51	DMR	-
Metals								
Aluminum, dissolved	EFF-001	µg/L	-	-	30	51	DMR	50-200
Antimony, dissolved	EFF-001	µg/L	<5	-	<5	1	APP	-
Arsenic, dissolved	EFF-001	µg/L	5	7	8	51	DMR	10
Beryllium, dissolved	EFF-001	µg/L	<1	-	<1	1	APP	-
Cadmium, dissolved	EFF-001	µg/L	<1	-	<1	1	APP	-
Chromium, dissolved	EFF-001	µg/L	<10	-	<10	1	APP	-
Copper, dissolved	EFF-001	µg/L	2	3	5	51	DMR	-
Iron, dissolved	EFF-001	µg/L	<20	40	40	51	DMR	300
Lead, dissolved	EFF-001	µg/L	<10	-	<10	1	APP	-
Manganese, dissolved	EFF-001	µg/L	1	1	1	51	DMR	50
Mercury, dissolved	EFF-001	µg/L	<0.1	-	<0.1	1	APP	-
Selenium, dissolved	EFF-001	µg/L	<5	-	<5	1	APP	-
Silver, dissolved	EFF-001	µg/L	<5	-	<5	1	APP	-
Thallium, dissolved	EFF-001	µg/L	<5	-	<5	1	APP	-
Zinc, dissolved	EFF-001	µg/L	10	-	10	1	APP	-
Footnotes:								
APP = Application Form GW-2 and supplemental materials.								
DMR = Self Reported Discharge Monitoring Reports								
EFF-001: See Table 1 for narrative description of sample location site.								
FM-001: See Table 1 for narrative description of flow meter location.								
Period of Record: 10/2011 through 12/2015.								
Data Not Analyzed, Not Reported, or Not Applicable displayed as "-"								
s.u. = standard units								
(1) Value shown is the average of all quarterly reported daily maximum values.								

Estimated Effluent and Influent Quality – Outfall 002.								
Parameter	Location	Units	Reported Minimum Value	Reported Average Value	Reported Maximum Value⁽¹⁾	# of Samples	Source of Data	2010 Permit Limit
Chloride	EFF-002	mg/L	11	290	676	51	DMR	250
Chlorine, Total Residual (TRC)	EFF-002	mg/L	-	<0.1	<0.1	1	APP	-
Effluent Flow rate	FM-002	gpd	838	2001	10676	-	DMR	-
Fluoride, total	EFF-002	mg/L	1.3	1.9	2.3	51	DMR	-
Nitrite + Nitrate total [as N]	EFF-002	mg/L	0.46	1.02	1.26	51	DMR	-
Nitrogen, total [as N]	EFF-002	mg/L	1.1	1.8	2.5	51	DMR	-
pH	EFF-002	s.u.	7.1	-	8.0	12	APP	6.5-8.5
Phenolics, total	EFF-002	mg/L	<0.01	-	<0.01	1	APP	-
Phosphorus, total	EFF-002	mg/L	0.038	0.089	0.161	51	DMR	-
Specific Conductivity (@ 25°C)	EFF-002	µS/cm	887	1967	2470	51	DMR	-
Solids, total dissolved	EFF-002	mg/L	852	1315	1763	51	DMR	-
Sulfate	EFF-002	mg/L	65	315	392	51	DMR	250
Metals								
Aluminum, dissolved	EFF-002	µg/L	-	-	44	51	DMR	50-200
Antimony, dissolved	EFF-002	µg/L	<5	-	<5	1	APP	-
Arsenic, dissolved	EFF-002	µg/L	8	15	20	51	DMR	10
Beryllium, dissolved	EFF-002	µg/L	<1	-	<1	1	APP	-
Cadmium, dissolved	EFF-002	µg/L	<1	-	<1	1	APP	-
Chromium, dissolved	EFF-002	µg/L	<10	-	<10	1	APP	-
Copper, dissolved	EFF-002	µg/L	11	29	43	51	DMR	-
Iron, dissolved	EFF-002	µg/L	<20	<20	<20	51	DMR	300
Lead, dissolved	EFF-002	µg/L	<10	-	<10	1	APP	-
Manganese, dissolved	EFF-002	µg/L	10	29	38	51	DMR	50
Mercury, dissolved	EFF-002	µg/L	<0.1	-	<0.1	1	APP	-
Selenium, dissolved	EFF-002	µg/L	<5	-	<5	1	APP	-
Silver, dissolved	EFF-002	µg/L	<5	-	<5	1	APP	-
Thallium, dissolved	EFF-002	µg/L	<5	-	<5	1	APP	-
Zinc, dissolved	EFF-002	µg/L	30	-	30	1	APP	-
Footnotes:								
APP = Application Form GW-2 and supplemental materials.								
DMR = Self Reported Discharge Monitoring Reports								
EFF-002: See Table 1 for narrative description of sample location site.								
FM-002: See Table 1 for narrative description of flow meter location.								
Period of Record: 10/2011 through 12/2015.								
Data Not Analyzed, Not Reported, or Not Applicable displayed as "-"								
s.u. = standard units								
(1) Value shown is the average of all quarterly reported daily maximum values.								

APPENDIX II – MONITORING WELL SUMMARY

Monitoring Well Summary
Monitoring Well: MW-1
MBMG GWIC#: Unknown
Status: Constructed and actively being sampled.
Location: In between the Finger Jointer Building and the Office/Scale Shack Building. Approximately 375 feet to the west of Outfall 001 and 350 feet to the northwest of Outfall 002.
Latitude: 46.387379° North Longitude: 112.743644° West
Representation: Ambient quality of the shallow receiving ground water, upgradient of Outfall 001 and Outfall 002.
Monitoring Well: MW-2
MBMG GWIC#: Unknown
Status: Constructed and viable.
Location: On the immediate northeast corner of the Spud Cellar Building. Approximately 425 feet to the east of Outfall 001.
Latitude: 46.387990° North Longitude: 112.740437° West
Representation: Potential water quality of the shallow receiving ground water downgradient of Outfall 001.
Monitoring Well: MW-3
MBMG GWIC#: Unknown
Status: May not be viable.
Location: Approximately 70 feet to the southeast of the Sawmill/Boiler Building. Approximately 320 feet to the east-southeast of Outfall 002.
Latitude: 46.386881° North Longitude: 112.741532° West
Representation: Potential water quality of the shallow receiving ground water downgradient or sidegradient of Outfall 002.
Monitoring Well: MW-4
MBMG GWIC#: Unknown
Status: Constructed and actively being sampled.
Location: On the immediate west side of the Spud Cellar Building. Approximately 480 feet to the west-northwest of Outfall 002.
Latitude: 46.387555° North Longitude: 112.740862° West
Representation: Potential water quality of the shallow receiving ground water downgradient of Outfall 002.

Project LP Well No. #1
 Location DEER LODGE
 Engineer _____ Installed By ONEEPE DRILLING Date 6/20/02
 Method of Installation HOLLOW STEM ANGERS

LOG OF BORING AND WELL		
BORING		OBSERVATION WELL INFORMATION
Depth in ft.	Description	H. Nu Reading
3.5 - 4.5	FINE SANDS MED SANDS WITH 1/4 TO 2" GRAVEL BIGGER GRAVEL 3" 3/4 TO 4"	
8.8 - 10.8	MED SAND WITH 1/2" TO 2" GRAVEL	
13.8 - 15.8	MOSTLY FINE TO MED SAND WITH SOME 1/2" TO 1" GRAVEL	
18.8 - 20.8	MOIST SILTS AND FINE SAND	
23.8 - 25.8	WET FINE SAND WITH SILT	
28.8 - 30.8	MED TO COARSE SAND	

Type of WELL <u>Monitor Well</u>
Ground Elev. _____
Top of Riser Elev. <u>8 X 12</u>
Vented Cap <u>FLUSH MOUNT</u>
L.D. of Riser Pipe _____
Type of Pipe <u>2" PVC</u>
Type of Backfill Around Riser <u>3/8 HOLE PLUG</u>
Top of Seal Elev. <u>1.1 BGS</u>
Type of Seal Material <u>3/8 HOLE PLUG</u>
Top of Filter Elev. <u>17.8 BGS</u>
Type of Filter Material <u>10/20 SAND</u>
Size of Openings <u>0.20</u>
Diameter of Screened Tip <u>2"</u>
Bottom of Well Elev. <u>30.4</u>
Bottom of Boring Elev. <u>31.4</u>
Diameter of Boring <u>8 1/2"</u>

S.W.L. <u>26.7</u>
L ₁ = 0
L ₂ = 1.1
L ₃ = 17.8
L ₄ = 17.8
L ₅ = 20.4
L ₆ = 10'
L ₇ = .5
L ₈ = 1.0
L ₉ = 31.4

Remarks Southwest of Fingerjoint Bldg 9th

- L1 Flush MW Well Protector
- L2 Surface to Bentonite Seal
- L3 Bentonite Seal
- L4 Filter Pack
- L5 Surface to Travel Screen
- L6 Screen
- L7 Sump
- L8 Filter
- L9 Total Depth

Prepared by David Crowley #269

Project L.P Well No. # 2
 Location DEFRIDGE
 Engineer _____ Installed By ORRIS DRILLING Date 6-26-02
 Method of Installation Hollow STEEL Augers

LOG OF BORING AND WELL		
BORING		OBSERVATION WELL INFORMATION
Depth In ft.	Description	H. Nu Reading
4.4 to 6.4	COURSE SAND $\frac{1}{4}$ to $\frac{1}{2}$ GRAVEL	
7' to 8.5	GRAVEL $\frac{1}{2}$ " to 2" WITH COURSE SAND	
9.4 to 11.4	$\frac{1}{4}$ " to $\frac{1}{2}$ " GRAVEL WITH COURSE SAND WATER 9.2	
14.4 to 16.4	COURSE SAND WITH $\frac{1}{4}$ " to $\frac{1}{2}$ " GRAVEL	
	T.D 18.2	

Type of WELL <u>PROCTOR WELL</u>
Ground Elev. _____ Top of Riser Elev. <u>2.5 stick up</u>
Vented Cap
L.D. of Riser Pipe <u>5' steel</u>
Type of Pipe <u>2" PVC</u>
Type of Backfill Around Riser <u>3/8 Hole PLUG</u>
Top of Seal Elev. <u>0</u>
Type of Seal Material <u>3/8 Hole PLUG</u>
Top of Filter Elev. <u>5.8 @ 6.5</u>
Type of Filter Material <u>10/20 SAND</u>
Size of Openings <u>0.20</u>
Diameter of Screened Tip <u>2"</u>
Bottom of Well Elev. <u>18.2</u>
Bottom of Boring Elev. <u>18.9</u>
Diameter of Boring <u>8 1/4"</u>

Remarks Northeast of Spud Celler JB

Prepared by Dave Crawley #269

L1 Push MTWV Protocol
 L2 Surface to Bottom of Seal
 L3 Bottom of Seal
 L4 Filter Pack
 L5 Surface to Top of Screen
 L6 Screen
 L7 Sand
 L8 Part Hole
 L9 Total Depth

APPENDIX III - GROUND WATER QUALITY MONITORING RESULTS

Ground Water Monitoring Results										
Monitor Source ⁽¹⁾	Representation	Parameter	Units	Reported Minimum Value	Reported Average Value	Reported Maximum Value ⁽²⁾	# of Samples	Source of Data		
MW-1	Ambient Ground Water Quality	Chloride	mg/L	3	4	6	17	DMR		
		Fluoride, total	mg/L	0.2	0.3	0.4	17	DMR		
		Nitrite + Nitrate total [as N]	mg/L	0.19	0.33	0.59	17	DMR		
		pH	s.u.	6.60	7.21	7.90	16	APP		
		Phosphorus, total	mg/L	0.077	0.277	1.160	17	DMR		
		Specific Conductivity (@ 25°C)	µS/cm	301	364	445	17	DMR		
		Solids, total dissolved	mg/L	85	207	265	17	DMR		
		Static Water Level (SWL)	ft-bgs	22.00	24.37	26.00	17	DMR		
		Sulfate	mg/L	13	25	45	17	DMR		
		Metals								
		Aluminum, dissolved	µg/L	30	135	460	17	DMR		
		Arsenic, dissolved	µg/L	2	4	5	17	DMR		
		Copper, dissolved	µg/L	2	9	10	17	DMR		
		Iron, dissolved	µg/L	9	124	570	17	DMR		
		Manganese, dissolved	µg/L	10	11	20	17	DMR		
MW-4	Downgradient Ground Water Quality	Chloride	mg/L	7	44	121	17	DMR		
		Fluoride, total	mg/L	0.2	0.4	0.5	17	DMR		
		Nitrite + Nitrate total [as N]	mg/L	0.01	0.09	0.49	17	DMR		
		pH	s.u.	6.60	6.79	7.34	16	APP		
		Phosphorus, total	mg/L	0.385	0.969	2.280	17	DMR		
		Specific Conductivity (@ 25°C)	µS/cm	528	728	967	17	DMR		
		Solids, total dissolved	mg/L	318	455	558	17	DMR		
		Static Water Level (SWL)	ft-bgs	14.00	15.81	19.50	17	DMR		
		Sulfate	mg/L	11	40	81	17	DMR		
		Metals								
		Aluminum, dissolved	µg/L	30	46	110	17	DMR		
		Arsenic, dissolved	µg/L	2	7	19	17	DMR		
		Copper, dissolved	µg/L	6	10	10	17	DMR		
		Iron, dissolved	µg/L	50	9626	28700	17	DMR		
		Manganese, dissolved	µg/L	920	1953	3890	17	DMR		

Footnotes:

APP = Application Form GW-2 and supplemental materials.

bgs = below ground surface

Blank Cell: data received not quantified

DMR = Self-Reported Discharge Monitoring Reports

Period of Record: 10/2011 through 12/2015.

s.u. = standard units

MW-1 was self-reported as being dry on 03/08/2011, 11/15/2012, and 06/12/2013.

(1) Refer to Section II of the Fact Sheet for the existing location of the monitoring wells.

(2) Maximum value recorded of all monthly or quarterly reported values.

APPENDIX IV – MIXING ZONE RATIONALE

The Montana Water Quality Act (75-5-103, Montana Code Annotated (MCA)) states that a mixing zone is an area of the receiving water, established in a permit, where the water quality standards may be exceeded. Mixing zones are subject to the conditions imposed by DEQ and consistent with the rules adopted by the Board of Environmental Review (Board).

Standard mixing zones were established by DEQ in the previous permit (DEQ, 2010) for both outfalls. The applicant has requested reauthorization of both ground water mixing zones. DEQ determines whether a mixing zone is appropriate pursuant to the requirements and procedures of ARM 17.30.501 et seq. DEQ must conduct a water quality assessment in accordance with ARM 17.30.506 to determine if and what type of mixing zone may be authorized. A person applying to DEQ for a mixing zone must indicate the type of mixing zone requested and supply information of sufficient detail for DEQ to make a determination regarding the authorization of the mixing zone (ARM 17.30.515).

A mixing zone may be denied if it will threaten or impair existing uses (Section IV) in accordance with ARM 17.30.505. In making this determination DEQ will consider whether current available data can accurately predict ground water or pollutant movement, or whether there is sufficient unpredictability that might result in adverse impacts due to a particular concentration of a parameter within the mixing zone [ARM 17.30.506; and 517].

For purposes of authorization determination, DEQ will reference the following rules for water quality assessment of the mixing zone. A mixing zone may be granted for individual parameters in a discharge (ARM 17.30.505). As part of the water quality assessment described above, the concentration of pollutants at the downgradient boundary of the mixing zone must be estimated in accordance with ARM 17.30.517 to determine if the discharge qualifies for a ground water mixing zone. After an assessment of the application information (ARM 17.30.505), DEQ will reauthorize the mixing zones for the parameters listed within the table below as the potential impact to beneficial uses may be minimal (Section II and Section IV). Mixing zone information has been summarized in the table below.

Hydrogeologic and Mixing Zone Information			
Parameter	Units	Outfall 001	Outfall 002
		Value	Value
Mixing Zone Type	-	Standard	Standard
Authorized Parameters, with respective Ambient Ground Water Concentration (MW-1)	-	Arsenic, 4 µg/L Fluoride, 0.3 mg/L Nitrogen, 0.33 mg/L TDS, 207 mg/L	Arsenic, 4 µg/L Fluoride, 0.3 mg/L Nitrogen, 0.33 mg/L TDS, 207 mg/L
Ground Water Flow Direction	azimuth/bearing	E06°N	E06°N
Length of Mixing Zone	feet	500	500
Thickness of Mixing Zone	feet	15	15
Outfall Width, Perpendicular to Ground Water Flow Direction	feet	13.7	38.8
Width of Mixing Zone at Down Gradient Boundary	feet	101.2	126.3
Cross Sectional Area of Mixing Zone (A)	ft ²	1518	1894.5
Hydraulic Conductivity (K)	feet/day	26	26
Hydraulic Gradient (I)	ft/ft	0.008	0.008
Volume of Ground Water Available for Mixing (Q _{gw})	ft ³ /day	318	397

APPENDIX V - RATIONALE FOR PROPOSED DISCHARGE LIMITATIONS AND CONDITIONS

DEQ has a statutory duty to develop effluent limits and issue permits consistent with the Montana Water Quality Act, §75-5-101, MCA et seq. and rules adopted under that Act. Section IV presents the basis for discharge limitations in accordance with the requirements at ARM 17.30.1006, and ARM 17.30.1031.

A. Water Use Classification & Applicable Water Quality Standards

The receiving water is Class I ground water and high quality waters of the state (75-5-103, MCA). The quality of Class I ground water must be maintained so that these waters are suitable for the following beneficial uses with little or no treatment (ARM 17.30.1006):

- Public and private water supplies;
- Culinary and food processing purposes;
- Irrigation;
- Drinking water for livestock and wildlife; and,
- Commercial and industrial purposes.

Persons may not cause a violation of the following specific water quality standards in Class I ground water, pursuant to ARM 17.30.1006, except within a DEQ approved mixing zone as provided in ARM 17.30.1005:

- The human health standards for ground water listed in Circular DEQ-7;
- For concentrations of parameters for which human health standards are not listed in DEQ-7, no increase of a parameter to a level that renders the waters harmful, detrimental, or injurious to the beneficial uses listed for Class I water. DEQ may use any pertinent credible information to determine these levels; and,
- No increase of a parameter that causes a violation of the nondegradation provisions of 75-5-303, MCA.

The nondegradation rules (ARM 17.30.701, et seq.) implement Montana's nondegradation policy, which applies to any activity of man resulting in a new or increased source which may cause degradation (ARM 17.30.705). DEQ has determined that the activity is not considered to be a new or increased source resulting in a change of existing water quality occurring on or after April 29, 1993 (ARM 17.30.702). DEQ will therefore not be conducting a significance determination (ARM 17.30.715).

The applicable ground water standards pursuant to ARM 17.30.1006 for the identified parameters are summarized in the table below and will be used as the basis for developing effluent limitations in the permit.

Applicable Ground Water Quality Standards.			
Parameter⁽¹⁾	Units	17.30.1006(1)(b)(i) Human Health Standards - Ground Water	17.30.1006(1)(b)(ii) Beneficial Uses - Ground Water
Arsenic, dissolved	µg/L	10.0	-
Fluoride, total	mg/L	4.0	-
Nitrogen, Nitrate + Nitrite (as N)	mg/L	10.0	-
Nitrogen, Total (TN)	mg/L	-	10.0
Solids, Total Dissolved	mg/L	-	500
Footnotes:			
Dissolved: Metal parameters will be analyzed using the dissolved portion (0.45 micron filter), ARM 17.30.1006.			
These standards establish the maximum allowable changes in ground water quality and are the basis for limiting discharges to ground water, ARM 17.30.1005(1); Circular DEQ-7 (2012), Footnote 16.			
(1) The list only includes identified parameters of interest.			

B. Pollutants and Parameters of Interest (POI)

DEQ has identified pollutants and parameters of interest (POI's) for the lumber mill's discharge based on the previous permit's administrative record (DEQ, 2010), Sun Mountain's recent application and supplemental materials, and monitoring data collected over the previous permit cycle.

As documented in Section I.B., Sun Mountain has recently added treatment for arsenic. As arsenic is a carcinogen (DEQ Circular 7), it may be considered more harmful (75-5-301, MCA) than parameters having only a secondary drinking water standard (e.g. odor, taste; not listed within DEQ Circular 7). Therefore the focus on arsenic should continue to be the priority (DEQ, 2013) as the potential impact to the beneficial uses of the receiving ground water may be greater (Section V.A.). Secondary parameters are not individually listed as POIs; however, DEQ will maintain the total dissolved solids (TDS) parameter as it is a measurement of all dissolved ions and is a general indicator of the overall quality of ground water.

Pollutants & Parameters of Interest - Outfall 001	
Parameter	Basis for Identifying as a Pollutant of Interest
Arsenic	Detected/Ground Water Human Health Standard/2010 Permit
Fluoride	Detected/Ground Water Human Health Standard
Nitrogen	Detected/Additive/Ground Water Human Health Standard
Total Dissolved Solids	Detected/Beneficial Uses/2010 Permit

Pollutants & Parameters of Interest - Outfall 002	
Parameter	Basis for Identifying as a Pollutant of Interest
Arsenic	Detected/Ground Water Human Health Standard/2010 Permit
Fluoride	Detected/Ground Water Human Health Standard
Nitrogen	Detected/Additive/Ground Water Human Health Standard
Total Dissolved Solids	Detected/Beneficial Uses

Each individual POI is described in further detail below.

C. Reasonable Potential Analysis (RPA)

A RPA is used to determine whether a discharge to ground water, either alone or in combination with other sources, could lead to an excursion above an applicable water quality standard. DEQ will conduct a RPA for each POI as identified in Section V.B. Pending the outcome of the assessment, development of an effluent limitation or mitigation through best management practices (BMPs) may be established.

The RPA is based on statistical procedures outlined in the United States Environmental Protection Agency (USEPA) Technical Support Document (TSD) document (USEPA, 1991). This includes use of a mass-balance equation, which is a simple steady-state model, used to determine the POI concentration after accounting for other sources of pollutants in the receiving water and any dilution as provided by a mixing zone. The mass-balance equation (Equation 1) derived for ground water is as follows:

Equation 1:

$$Q_{gw}C_{gw} + Q_{eff}C_{eff} = Q_{comb}C_{proj}$$

Where:

Q_{gw}	=	ground water available for mixing
C_{gw}	=	ambient receiving ground water concentration
Q_{eff}	=	maximum design capacity of wastewater system
C_{eff}	=	adjusted critical effluent pollutant concentration (TSD - 95%)
Q_{comb}	=	combined ground water and effluent ($Q_{comb} = Q_{gw} + Q_{eff}$)
C_{proj}	=	projected pollutant concentration (after available mixing)

The adjusted effluent concentration is based on the 95th percentile of the expected effluent concentration observed or predicted in the discharge. DEQ follows the estimation procedures described in the USEPA TSD document to estimate the 95th percentile of the daily values, by multiplying the maximum discharge concentration observed during the period of record by the TSD (Table 3-2) multiplier factor.

The mass-balance equation can be expressed in terms of the dilution ratio at the downgradient edge of the mixing zone when authorized. The dilution ratio is the volume of ground water available for mixing to the volume of effluent. Below is the mass-balance equation (Equation 2) arranged to solve for the projected pollutant concentration receiving water concentration:

Equation 2:

$$C_{proj} = \frac{C_{eff} + (D \times C_{gw})}{(1 + D)}$$

Where:
D = dilution ratio (Q_{gw}/Q_{eff})

After available mixing, if the projected pollutant concentration (C_{proj}) exceeds any applicable water quality standard then there is a reasonable potential and an effluent limit or BMP must be developed. The tables below provide a summary of the RPA for both outfalls. Effluent limitations are further discussed in the following section.

Reasonable Potential Analysis Summary - Outfall 001.										
Parameter	Units	Water Quality Standard ⁽¹⁾	Observed Effluent Conc. Value ⁽²⁾	# of Samples ⁽³⁾	TSD Multiplier	Adjusted Effluent Conc. Value	Mixing Zone-Parameter Authorized?	Projected Pollutant Conc. ⁽⁴⁾	Limit Needed?	Reason
Arsenic	µg/L	10.0	7	36	1.06	7	Y	5	Y ⁽⁵⁾	See Rationale located in Appendix V
Fluoride	mg/L	4.0	0.8	16	1.07	0.9	Y	0.5	N	PPC < WQS
Nitrite + Nitrate	mg/L	10.0	0.5	16	1.28	0.6	Y	0.4	N	PPC < WQS
TDS	mg/L	500	290	35	1.04	301	Y	239	N	PPC < WQS

Footnotes:
PPC = Projected Pollutant Concentration
TSD = USEPA Technical Support Document For Water Quality-Based Toxics Control, EPA/505/2-90-001.
WQS = Water Quality Standard
(1) See Appendix V for listed water quality standards.
(2) Application Form GW-2 Supplement (DEQ, 2015)
(3) Application Form GW-2 Supplement (DEQ, 2015)
(4) Projected pollutant (effluent) concentration includes dilution when mixing has been authorized.
(5) Will maintain the effluent limit for arsenic (DEQ, 2010). Please refer to rationale located in Appendix V.

Reasonable Potential Analysis Summary - Outfall 002.										
Parameter	Units	Water Quality Standard ⁽¹⁾	Observed Effluent Conc. Value ⁽²⁾	# of Samples ⁽³⁾	TSD Multiplier	Adjusted Effluent Conc. Value	Mixing Zone-Parameter Authorized?	Projected Pollutant Conc. ⁽⁴⁾	Limit Needed?	Reason
Arsenic	µg/L	10.0	16	36	1.09	17	Y	16	Y	PPC > WQS
Fluoride	mg/L	4.0	2.0	36	1.07	2.1	Y	1.9	N	PPC < WQS
Nitrite + Nitrate	mg/L	10.0	1.9	35	1.13	2.1	Y	2.0	N	PPC < WQS
TDS	mg/L	500	1300	35	1.11	1447	Y	1316	Y	PPC > WQS

Footnotes:
 PPC = Projected Pollutant Concentration
 TSD = USEPA Technical Support Document For Water Quality-Based Toxics Control, EPA/505/2-90-001.
 WQS = Water Quality Standard
 (1) See Appendix V for listed water quality standards.
 (2) Application Form GW-2 Supplement (DEQ, 2015)
 (3) Application Form GW-2 Supplement (DEQ, 2015)
 (4) Projected pollutant (effluent) concentration includes dilution when mixing has been authorized.

D. Development of Effluent Limits

ARM 17.30.1006 sets forth the basis for developing effluent limitations that will protect water quality. The ground water quality standards establish the maximum allowable changes to ground water quality; are the basis for limiting discharges to ground water; and may only be exceeded within a mixing zone authorized by DEQ.

1) Water Quality Based Effluent Limitations

ARM 17.30.1006 sets forth the basis for developing effluent limitations based on water quality for the parameters listed below. The allowable discharge concentrations will be derived from a mass-balance equation pursuant to ARM 17.30.517. The mass-balance equation provided in Equation 1 has been arranged to calculate effluent limits so that the discharge does not cause or contribute to an exceedance of the applicable water quality standard. This equation can be applied to any effluent and receiving water where the applicable dilution ratio is known. This equation will be used for all parameters which have been authorized for mixing (Appendix IV).

Equation 3:

$$C_{\text{lim}} = C_{\text{std}} + D(C_{\text{std}} - C_{\text{gw}})$$

Where:

C_{lim} = effluent limitation concentration

C_{std} = water quality standard concentration

C_{gw} = ambient receiving ground water concentration

D = dilution ratio ($Q_{\text{gw}}/Q_{\text{eff}}$)

a. Arsenic

Effluent limits and effluent monitoring were established for arsenic within the 2010 permit (DEQ, 2010) for both Outfall 001 and Outfall 002. Arsenic is present within the lumber mill's source water provided by the City of Deer Lodge (Section II) which may be concentrated due to on-site operations. Self-reported effluent monitoring data (Section II) indicates that arsenic has at times exceeded the ground water human health standard at end-of-pipe for both outfalls. Therefore, arsenic limits will be maintained within the proposed renewed permit for both Outfalls. The limits have been updated based on recent ambient ground water quality and site-specific information. The proposed final effluent limits are displayed in Section II.

b. Fluoride

Effluent monitoring was established for fluoride within the 2010 permit (DEQ, 2010) for both Outfall 001 and Outfall 002. Fluoride may originate within the source water provided by the City of Deer Lodge (Section II.D).

The RPA above indicated that there is not a reasonable potential for effluent fluoride concentrations to exceed the respective ground water human health standard at either outfall. Therefore, effluent limits for fluoride will not be established within the proposed permit.

c. Nitrogen

Effluent monitoring was established for nitrogen parameters within the 2010 permit (DEQ, 2010) for both Outfall 001 and Outfall 002. Nitrates may originate within the source water provided by the City of Deer Lodge (Section II.D). In addition, Sun Mountain submitted a list of additives and amendments (Appendix VIII) that indicates nitrogen may also be added to the process water.

The RPA indicated that there is not a reasonable potential for effluent nitrogen concentrations to exceed the respective ground water human health standard for both outfalls. Therefore, effluent limits for nitrogen will not be established within the proposed permit.

d. Total Dissolved Solids (TDS)

Effluent limits (Outfall 001) and effluent monitoring (Outfall 001 and Outfall 002) was established for TDS within the 2010 permit (DEQ, 2010). Self-reported effluent monitoring data (Section II.D.) indicates that TDS for both outfalls (at times) has exceeded the effluent limit established within the 2010 permit. TDS may originate within the source water provided by the City of Deer Lodge (Section II.D) and is likely concentrated due to on-site operations (Section II.E.) and source water amendments (Appendix VIII).

TDS is generally considered to be an indicator of the overall water quality of ground water. TDS is the term used to describe the inorganic salts and small amounts of organic matter

present in solution in water. The principal constituents are usually calcium, magnesium, sodium, and potassium cations and carbonate, hydrogen-carbonate, chloride, sulfate, and nitrate anions (WHO, 1996).

Recent ground water sampling performed by Sun Mountain has reconfirmed that the receiving ground water is Class I (Section II.I.). As such, the respective beneficial uses (Appendix V) need to be maintained. As the RPA indicated, there is a reasonable potential for effluent TDS concentrations to exceed 500 mg/L at Outfall 002. Therefore, a TDS effluent limit will be proposed within this permit for Outfall 002.

E. Final Effluent Limitations

Based on the information and analyses presented in Sections III and IV and pursuant to 75-5-402, MCA and ARM 17.30.1031, DEQ proposes to establish or maintain numerical effluent limitations. The proposed final limitations are the most stringent applicable limitations for each individual parameter as developed above. Effluent limits based on water quality standards are expressed as a daily maximum concentration. The proposed final effluent limits are displayed in Section IV. Interim effluent limits have been established at Outfall 002 in order to allow a reasonable opportunity for Sun Mountain to attain compliance with the final effluent limitations for TDS. The interim effluent limits are also displayed in Section IV.

APPENDIX VI – RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

ARM 17.30.1031 requires that all issued MGWPCS permits contain monitoring requirements that assure compliance with the developed numeric effluent limitations and the water quality standards. Effluent monitoring and ground water monitoring requirements will be maintained as conditions of this permit.

A. Effluent Monitoring - Compliance

Final numeric effluent limitations are maintained in this permit with specific magnitudes and durations based on site-specific conditions that ensure the discharge will not cause or contribute to an exceedance of an applicable water quality standard (see Sections III and IV). Accordingly, the permittee will be required to monitor and report monitoring results at a specified frequency in order to demonstrate compliance with the applicable effluent limitations. Effluent monitoring and reporting requirements are summarized in the tables below.

B. Effluent Monitoring - Sampling

Samples shall be representative of the nature of the monitored discharge (Permit Part II.A.). As discussed in Section II., the effluent sample locations have been established prior to discharge at each outfall. Metal parameters will be analyzed using the dissolved portion of the sample (0.45 micron filter), ARM 17.30.1006. Effluent sample requirements for both outfalls are listed in the tables below.

C. Discharge Monitoring

Measurements shall be representative of the volume of the monitored discharge (Permit Part II.A.). The applicant will be required to maintain and report flow measurements using a flow-measuring device capable of measurements that are within 10 percent of the actual flow (Permit Part II.B.). The flow measuring devices and location descriptions are summarized in Section II. Flow measurement requirements for both outfalls are listed in the tables below.

Effluent Monitoring and Reporting Requirements – Outfall 001							
Parameter/Method	Monitor Location	Units	Sample Type⁽¹⁾	Minimum Sample Frequency	Reporting Requirements⁽¹⁾⁽²⁾	Report Freq.	Rationale
Chloride	EFF-001	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly	CPR
Flow Rate, Effluent ⁽³⁾	FM-001	gpd	Continuous	1/Month	Quarterly Average	Quarterly	CPR
Fluoride, total	EFF-001	mg/L	Grab	1/Month	Quarterly Average Daily Maximum	Quarterly	PC, CPR
Nitrogen, Nitrite+Nitrate (as N)	EFF-001	mg/L	Grab	1/Month	Quarterly Average Daily Maximum	Quarterly	PC, CPR
Nitrogen, Total Kjeldahl (TKN)(as N)	EFF-001	mg/L	Grab	1/Month	Quarterly Average Daily Maximum	Quarterly	PC, CPR
Nitrogen, Total (as N) ⁽⁴⁾	EFF-001	mg/L	Grab	1/Month	Quarterly Average Daily Maximum	Quarterly	PC, CPR
pH	EFF-001	mg/L	Grab or Instantaneous	1/Month	Quarterly Average	Quarterly	CPR
Specific Conductivity (@ 25°C)	EFF-001	mg/L	Grab or Instantaneous	1/Month	Quarterly Average	Quarterly	CPR
Solids, Total Dissolved	EFF-001	mg/L	Grab	1/Month	Quarterly Average Daily Maximum	Quarterly	PC, CPR
Metals							
Aluminum, dissolved	EFF-001	µg/L	Grab	1/Quarter	Quarterly Average	Quarterly	CPR
Arsenic, dissolved	EFF-001	µg/L	Grab	1/Month	Quarterly Average Daily Maximum	Quarterly	PC, CPR
Copper, dissolved	EFF-001	µg/L	Grab	1/Quarter	Quarterly Average	Quarterly	CPR
Zinc, dissolved	EFF-001	µg/L	Grab	1/Quarter	Quarterly Average	Quarterly	EC
Footnotes:							
CPR: Current Permit Requirement.							
EC: Effluent Characterization							
EFF-001: Located near the west wall inside the gas boiler room, the effluent sample port is located just downstream of the water softener and prior to the drainfield.							
FM-001: Located in the gas boiler room, the flow meter is installed downstream of the water softener.							
PC: Permitting Compliance or identified as a parameter of interest.							
Dissolved: Metal parameters will be analyzed using the dissolved portion (0.45 micron filter), ARM 17.30.1006(6).							
If no discharge occurs during the reporting period, “no discharge” shall be recorded within the effluent Discharge Monitoring Report (DMR) report.							
Grab sample will represent concentration for a 24 hour period.							
Parameter analytical methods shall be in accordance with the Code of Federal Regulations, 40 CFR Part 136, unless specified above.							
(1) See definitions in Part V of the permit.							
(2) Daily Maximum: Report highest measured daily value for the reporting period on Discharge Monitoring Report (DMR) form.							
(3) Requires recording device or totalizing meter, must record daily effluent volume.							
(4) Total Nitrogen is the sum of Nitrate + Nitrite and Total Kjeldahl Nitrogen.							

Effluent Monitoring and Reporting Requirements – Outfall 002							
Parameter/Method	Monitor Location	Units	Sample Type⁽¹⁾	Minimum Sample Frequency	Reporting Requirements⁽¹⁾⁽²⁾	Report Freq.	Rationale
Chloride	EFF-002	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly	CPR
Flow Rate, Effluent ⁽³⁾	FM-002	gpd	Continuous	1/Month	Quarterly Average	Quarterly	CPR
Fluoride, total	EFF-002	mg/L	Grab	1/Month	Quarterly Average Daily Maximum	Quarterly	PC, CPR
Nitrogen, Nitrite+Nitrate (as N)	EFF-002	mg/L	Grab	1/Month	Quarterly Average Daily Maximum	Quarterly	PC, CPR
Nitrogen, Total Kjeldahl (TKN)(as N)	EFF-002	mg/L	Grab	1/Month	Quarterly Average Daily Maximum	Quarterly	PC, CPR
Nitrogen, Total (as N) ⁽⁴⁾	EFF-002	mg/L	Grab	1/Month	Quarterly Average Daily Maximum	Quarterly	PC, CPR
pH	EFF-002	mg/L	Grab or Instantaneous	1/Month	Quarterly Average	Quarterly	CPR
Specific Conductivity (@ 25°C)	EFF-002	mg/L	Grab or Instantaneous	1/Month	Quarterly Average	Quarterly	CPR
Solids, Total Dissolved	EFF-002	mg/L	Grab	1/Month	Quarterly Average Daily Maximum	Quarterly	PC, CPR
Metals							
Aluminum, dissolved	EFF-002	µg/L	Grab	1/Quarter	Quarterly Average	Quarterly	CPR
Arsenic, dissolved	EFF-002	µg/L	Grab	1/Month	Quarterly Average Daily Maximum	Quarterly	PC, CPR
Copper, dissolved	EFF-002	µg/L	Grab	1/Quarter	Quarterly Average	Quarterly	CPR
Zinc, dissolved	EFF-002	µg/L	Grab	1/Quarter	Quarterly Average	Quarterly	EC
Footnotes:							
CPR: Current Permit Requirement.							
EC: Effluent Characterization							
EFF-002: Located on the west side of the Hurst boiler building, the effluent sample port is located downstream of the pH mixing tank/water softener and prior to the drainfield.							
FM-002: Located in the Hurst boiler building, the flow meter is located just prior to the drainfield.							
PC: Permitting Compliance or identified as a parameter of interest.							
Dissolved: Metal parameters will be analyzed using the dissolved portion (0.45 micron filter), ARM 17.30.1006(6).							
If no discharge occurs during the reporting period, “no discharge” shall be recorded within the effluent Discharge Monitoring Report (DMR) report.							
Grab sample will represent concentration for a 24 hour period.							
Parameter analytical methods shall be in accordance with the Code of Federal Regulations, 40 CFR Part 136, unless specified above.							
(1) See definitions in Part V of the permit.							
(2) Daily Maximum: Report highest measured daily value for the reporting period on Discharge Monitoring Report (DMR) form.							
(3) Requires recording device or totalizing meter, must record daily effluent volume.							
(4) Total Nitrogen is the sum of Nitrate + Nitrite and Total Kjeldahl Nitrogen.							

D. Ground Water Quality Monitoring

As a special condition (ARM 17.30.1031), existing ground water monitoring requirements will be maintained in this permit to provide for long term ambient and downgradient monitoring of the shallow aquifer. Ground water monitoring requirements will be maintained for monitoring wells MW-1 and MW-4. Ground water monitoring will be used for mixing zone determination, aquifer characterization, and in collection of data that is required for future permit renewal (Part III.A., Duty to Reapply).

Ground water monitoring and reporting requirements are summarized in the following table. All analytical methods must be in accordance with the Code of Federal Regulations, 40 CFR Part 136 for each monitored parameter. Metal parameters will be analyzed using the dissolved portion (0.45 micron filter), ARM 17.30.1006. The existing ground water monitoring wells shall be maintained and monitored during the term of the upcoming permit cycle.

Ground Water Monitoring and Reporting Requirements, MW-1 & MW-4 Separately

Parameter/Method	Monitor Location ⁽¹⁾	Units	Sample Type ⁽²⁾	Minimum Sampling Frequency	Reporting ⁽²⁾ Requirements	Reporting Frequency	Rationale
Chloride	MW-1 & MW-4	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly	CPR
Fluoride, total	MW-1 & MW-4	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly	CPR, PC
Nitrogen, Nitrite+Nitrate (as N)	MW-1 & MW-4	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly	CPR, PC
Nitrogen, Total Kjeldahl (TKN)(as N)	MW-1 & MW-4	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly	AC, PC
Nitrogen, Total (as N) ⁽³⁾	MW-1 & MW-4	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly	AC, PC
pH	MW-1 & MW-4	s.u.	Grab or Instantaneous	1/Quarter	Quarterly Average	Quarterly	AC
Solids, Total Dissolved	MW-1 & MW-4	mg/L	Grab	1/Quarter	Quarterly Average	Quarterly	CPR, PC
Specific Conductivity @ 25°C	MW-1 & MW-4	µS/cm	Grab or Instantaneous	1/Quarter	Quarterly Average	Quarterly	CPR
Static Water Level (SWL) ⁽⁴⁾	MW-1 & MW-4	ft-bmp	Instantaneous	1/Quarter	Quarterly Average	Quarterly	CPR
Metals							
Aluminum, dissolved	MW-1 & MW-4	µg/L	Grab	1/Quarter	Quarterly Average	Quarterly	CPR
Arsenic, dissolved	MW-1 & MW-4	µg/L	Grab	1/Quarter	Quarterly Average	Quarterly	CPR, PC
Copper, dissolved	MW-1 & MW-4	µg/L	Grab	1/Quarter	Quarterly Average	Quarterly	CPR
Zinc, dissolved	MW-1 & MW-4	µg/L	Grab	1/Quarter	Quarterly Average	Quarterly	AC

Footnotes:

AC: Aquifer Characterization, or fate and transport

CPR: Current Permit Requirement.

ft-bmp: feet below measuring point

PC: Permitting Compliance or identified as a parameter of interest

s.u.: standard units

At no time shall the permittee mark or state "no discharge" within any monitoring well DMR report.

Dissolved: Metal parameters will be analyzed using the dissolved portion (0.45 micron filter), ARM 17.30.1006.

Each monitor well to be individually sampled and analyzed for each respective parameter listed above.

If any monitoring well(s) are abandoned, destroyed or decommissioned, or are no longer able to be sampled due to fluctuations in the ground water table; the permittee shall install a new well to replace the abandoned, destroyed, decommissioned, or non-viable well(s).

Parameter analytical methods shall be in accordance with the Code of Federal Regulations, 40 CFR Part 136, unless specified above.

Submittal of discharge monitoring report forms (DMRs) will be required, regardless of the operational status of the facility or of each individual monitoring well.

(1) Refer to Section II of the Fact Sheet for the existing location of the monitoring wells.

(2) See definitions in Part V of the permit.

(3) Total Nitrogen is the sum of Nitrate + Nitrite and Total Kjeldahl Nitrogen.

(4) Measuring point (point of reference) for SWL measurements shall be from established measuring point and measured to within 1/100th of one foot.

APPENDIX VII - REFERENCES CITED

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- Subchapter 2 - Water Quality Permit Fees.
- Subchapter 5 – Mixing Zones in Surface and Ground Water.
- Subchapter 7 – Nondegradation of Water Quality.
- Subchapter 10 – Montana Ground Water Pollution Control System.
- Subchapter 13 – Montana Pollutant Discharge Elimination System.

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Department of Environmental Quality, Water Quality Circulars:

- Circular DEQ-2 – Design Standards for Wastewater Facilities.
- Circular DEQ-4 – Montana Standards for On-Site Subsurface Sewage Treatment Systems.
- Circular DEQ-7 – Montana Numeric Water Quality Standards, Required Reporting Values, and Trigger Values.

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U.S. Environmental Protection Agency, 1991. *Technical Support Document for Water Quality-Based Toxics Control* (TSD). EPA-505/2-90-001. U.S. Environmental Protection Agency, Office of Water, Washington, DC. <www.epa.gov/npdes/pubs/owm0264.pdf>.

Welch, A.H., Lico, M.S., and Hughes, J.L., 1988, Arsenic in ground water of the western United States: *Ground Water*, vol. 26, no. 3, p. 333–347.

World Health Organization. 1996. WHO Guidelines for Drinking-water Quality, WHO/SDE/WSH/03.04/16.

Prepared By: Chris Boe, July 25, 2016

APPENDIX VIII – Additives and Amendments

Additives and Amendments		
Product	Substance	Use
Nalco 8735	Sodium Hydroxide (NaOH) Potassium Hydroxide (KOH)	pH Stabilizer
Nalco Elimin-OX	Carbohydrazide (CH ₆ N ₄ O)	Oxygen Scavenger
Nalco NexGuard 22310	Sodium Sulfate (Na ₂ SO ₄)	Boiler Water Treatment
Nalco Tri-ACT 1820	Cyclohexylamine (C ₆ H ₁₃ N) Diethylethanolamine (C ₄ H ₁₁ NO) Morpholine (C ₄ H ₉ NO)	Corrosion Inhibitor
Nalco Iron Remover 8344	Citric Acid (C ₆ H ₈ O ₇)	pH Adjustments Iron Remover

APPENDIX IX– Flow Meter Description

APPENDIX X – Monitoring Well and Flow Meter Installation Report

APPENDIX XI – Hydrogeology Report