U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 8
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
STATEMENT OF BASIS

PERMITTEE:	Northern Cheyenne Utilities Commission
FACILITY NAME AND ADDRESS:	Lame Deer Wastewater Treatment Facility PO Box 747 Lame Deer, MT 59043
PERMIT NUMBER:	MT-0029360
RESPONSIBLE OFFICIAL:	Ethelyn Shoulder Blade, Acting General Manager (406) 477-6318 ethelyn.ncuc@gmail.com
FACILITY CONTACT:	Ethelyn Shoulder Blade, Acting General Manager (406) 477-6318 ethelyn.ncuc@gmail.com
PERMIT TYPE:	Indian Country, Minor, Renewal, Domestic Wastewater, POTW
FACILITY LOCATION:	45.6291° N, 106.6725° W

1 INTRODUCTION

This statement of basis (SoB) is for the issuance of a National Pollutant Discharge Elimination System (NPDES) permit (the Permit) to the Northern Cheyenne Utilities Commission (the Permittee or NCUC) for the Lame Deer Wastewater Treatment Facility (the Facility). The Permit establishes discharge limitations for any discharge of wastewater from the Facility through Outfall 001 to Lame Deer Creek. The SoB explains the nature of the discharges, the decisions for limiting the pollutants in the wastewater, and the regulatory and technical basis for these decisions.

The Facility is located on the Northern Cheyenne Reservation. The U.S. Environmental Protection Agency (EPA), Region 8 is the permitting authority for facilities located in Indian country, as defined in 18 U.S.C. § 1151, located within Region 8 states and implements federal environmental laws in Indian country consistent with the EPA Policy for the Administration of Environmental Programs on Indian Reservations and the federal government's general trust responsibility to federally recognized Indian tribes.

2 MAJOR CHANGES FROM PREVIOUS PERMIT

Major changes from the previous permit include the following:

- Five-day biochemical oxygen demand (BOD_5) and total suspended solids (TSS) percent removal effluent limitations have been added.
- Ammonia limits have been revised.
- *E. coli* monitoring requirements have been revised.
- Fecal coliform effluent limits and monitoring requirements have been removed.
- pH and temperature monitoring requirements in Lame Deer Creek (001R) have been removed.
- Requirements for implementing an Asset Management Plan (AMP) have been added (see section 10.2 of the SoB and section 6.3.3 of the Permit).
- Requirements for implementing an Industrial Waste Survey have been added (see section 10.3 of the SoB and section 8.9.2 of the Permit).

3 BACKGROUND INFORMATION

The community of Lame Deer's publicly owned treatment works (POTW) is located in southeastern Montana within the external boundaries of the Northern Cheyenne Indian Reservation, which is home to the Northern Cheyenne Tribe (NCT or the Tribe). The Facility is located at the northern end of Lame Deer along Highway 39 at coordinates 45.6291° N, 106.6725° W. The Facility has one outfall into Lame Deer Creek (Outfall 001) at coordinates 45.6281° N, 106.6755° W (Table 1). The NCUC operates the tribally-owned Facility. The NCUC was established by the Northern Cheyenne Tribal Council to administer public water and sewer related facilities and services in five communities on the Reservation, but NCUC retains general autonomy over its day-to-day operations, rate setting, and other measures necessary to achieve a sustainable business and comply with all applicable laws. However, the Tribe may subsidize the NCUC budget when shortfalls in revenue occur. The NCUC adopts

bylaws, rules, and regulations to govern itself, which are approved by the Northern Cheyenne Tribal Council.

Table 1. Description of Discharge and Monitoring Points

Outfall Serial Number	Latitude/Longitude	Receiving Water	Description
001	45.6281° N / 106.6755° W	Lame Deer Creek	Effluent discharged from the wastewater treatment lagoon discharge pipe
001-I	Approximately 45.6291° N / 106.6725° W	N/A	A location representative of the influent flow entering the wastewater treatment facility, such as the bar screen or wet well at the lift station.

3.1 Service Area Description

The Permit is for the discharge from the Facility, which serves approximately 3,500 residents in the community of Lame Deer based on the permit application (although the Indian Health Service (IHS) estimated a service population of 2,000 when they designed the 2018 upgrades, and the U.S. Census Bureau stated a census-designated place (CDP) population of 1,897 in the 2020 census). The service area does not have any combined sewers. The service area includes a few commercial or industrial dischargers such as Charging Horse Casino, Dull Knife College, Northern Cheyenne Tribal Health, IHS Northern Cheyenne Service Unit, Bureau of Indian Affairs jail, and the Northern Cheyenne Tribal Headquarters. According to the 2018 design drawings and the IHS, the Facility has a design flow rate of 0.265 million gallons per day (mgd). However, the design flow rate reported on the permit application was 0.8 mgd. The Facility has not reported actual flow for many years, so the actual discharge values are unknown. The previous SoB reported that the Facility's discharge averaged 0.55 mgd based on discharge monitoring report (DMR) data from the 2010-2015 time frame, although it mentioned that there was great discrepancy in the units being reported. According to IHS personnel, "0.6" (units unknown) is the depth measurement on the flume gage that would correspond to a flow value of approximately 0.25 mgd, so it is possible that the Facility was previously reporting staff gage levels rather than the corresponding flow values. The Facility is a continuous discharger.

3.2 Treatment Process

The Facility currently consists of a two-cell lagoon system (Figure 1). There is a third lagoon cell, but according to the Permittee, it was decommissioned in 2018-2019 and is used to store biosolids (sludge) (see below for further discussion about Cell 3). The two active treatment cells are Cell 1 (facultative) and Cell 2 (facultative, except for the Bio-Domes – see description below). The Facility has a headworks that consists of a bar screen and lift station. All sewage from the collection system gravity flows to this lift station. The lift station is equipped with a bar screen to filter out large debris prior to wastewater entering the lift station

wet well. The lift station pumps influent to Cell 1. If this lift station is non-operational, the influent gravity flows from the lift station wet well directly into Cell 2. Such a diversion from Cell 1 treatment meets the definition of a bypass, and NCUC must follow any associated bypass requirements in the Permit. Cell 1 flows into Cell 2, and effluent leaves the west corner of Cell 2 and flows through a pipe to Outfall 001, located near the southwest corner of Cell 3 (Figure 1). Effluent is currently not disinfected prior to discharge.

Cell 1 has two "fermentation pits" along the northeast side where influent from the lift station comes in. In about 2018, the Permittee baffled this section off from the rest of Cell 1 and added hundreds of floating media to act as a cover and initial temperature insulator in the fermentation pit. During the August 2022 and July 2023 EPA inspections, it was observed that the baffle cable had become disconnected, and the floating media were scattered all over Cell 1. The baffle cable was reattached during the July 2023 inspection, and the Permittee plans to collect the stray media over time as they blow to the windward shore of Cell 1.

Wastewater exits the system at the western corner of Cell 2 through a Parshall flume. The Permittee collects effluent samples and flow measurements at the Parshall flume, although the flume was coated in scum and the stage measurement markings were unreadable at the time of EPA's August 2022 site visit. Flow measurements have not been reported in the DMRs for at least the past five years. The outfall pipe runs along the northwestern berm of Cell 3 to where the former discharge point of Cell 3 was located and then flows into Lame Deer Creek immediately below the berm (Figure 1).

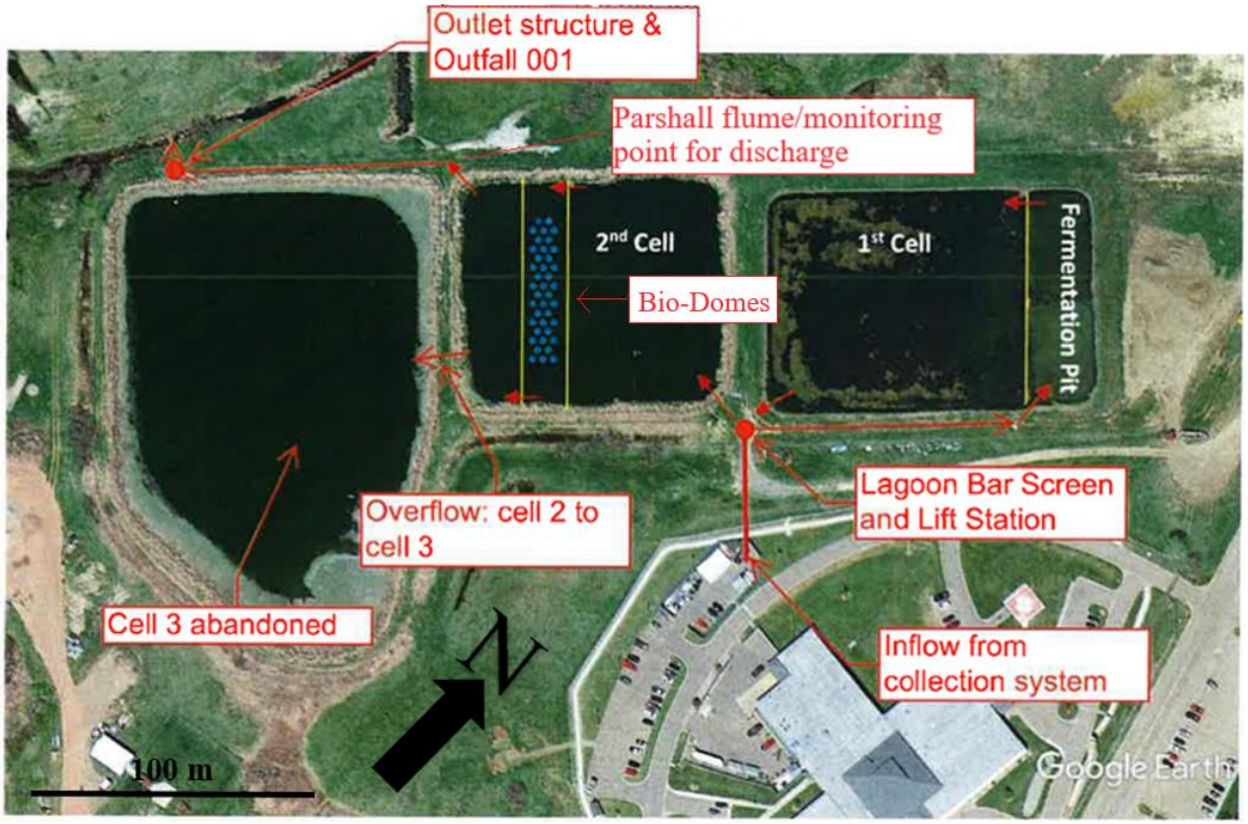
In about 2019, the Facility installed 40 Bio-Domes in Cell 2 to enhance the biological treatment of ammonia and BOD_5. The Bio-Domes can be described as submerged aerated fixed-film packed-media bioreactors. The blower building for the Bio-Domes is located in the southern corner of Cell 2 (not visible on aerial photo in Figure 1).

Sludge removal occurred in Cell 2 in about 2018, prior to installation of the Bio-Dome network. Cell 1 has not had any sludge removed in some time, although the previous permit stated it was going to be performed in or around 2011 (it is unclear if this was performed). The Permittee stated they collected Sludge Judge samples in 2016 and the sludge depth in Cell 1 was not a concern at that time, but no other formal monitoring of sludge depth or volume has occurred in any of the cells (see section 4.2.1 for more discussion about sludge management and removal).

As noted above, Cell 3 was intended to be decommissioned in 2018-2019; however, during the July 2023 EPA inspection, the Permittee indicated that in the weeks prior to the inspection, some wastewater had been released from Cell 2 into Cell 3 for reasons that are not entirely clear to the EPA (but may have been unintentional – or to prevent hydraulic overloading in Cell 2). Based on discussions with the Permittee and IHS representatives during and after the inspection, it is unclear to the EPA whether water observed in Cell 3 during the inspection was wastewater from Cell 2, wastewater from another influent source, accumulated precipitation, infiltrated groundwater, or some combination thereof. It is also unclear to the EPA whether Cell 3 is discharging into Lame Deer Creek via the effluent manhole structure located at the southwest corner of Cell 3. Any effluent from Cell 3 at this location would combine with effluent from Cell 2 prior to discharge into Lame Deer Creek at

Outfall 001. However, if Cell 3 was discharging, the flow and chemical composition would not be captured by the current effluent monitoring, which occurs at the Parshall flume just after it leaves Cell 2 (Figure 1). Thus, this would not meet the Permit's requirements to obtain representative volume and character of the effluent (see sections 4 and 7.1 of the Permit).

Figure 1. Facility Description



3.3 Chemicals Used

The Facility currently uses no chemicals in the treatment process.

4 PERMIT HISTORY

According to EPA records maintained for the Facility, this renewal is at least the 4th issuance of this NPDES permit. The previous permit for the Facility became effective on March 1, 2018 and was set to expire on December 31, 2022. The Facility submitted a permit renewal application prior to the permit's expiration, which the EPA received on August 22, 2022 and thus the previous permit was administratively continued.

4.1 Discharge Data – Discharge Monitoring Reports (DMRs) and Laboratory Samples

In both this permit cycle and the previous one, the Permittee has struggled to report complete DMR data and meet effluent limitations. Their DMR data has typically been only partially reported in EPA's NetDMR system and frequently contained reporting errors. For example,

out of the past 60 monthly reports, the Facility has only reported between nine and 16 months' worth of data (depending on the parameter) on their DMRs.

The Facility provided the EPA with hard copies of all lab reports from their past five years of monitoring. The EPA notes that the Facility does have lab reports for nearly every month over the past five years. A quick comparison of these lab reports with the data reported in NetDMR showed that less than 10% of the *DMR reported values* (which, as mentioned above, represent only about 25% of the required data) matched the lab report values for that reporting period. For example, the "dissolved oxygen" data reported in most DMRs appears to actually be BOD_5 data, while the ammonia data reported in the DMRs is almost entirely the "reporting limit" value from the lab report rather than the actual result.

Additionally, the pH and temperature values are all reported as lab values, which does not meet the 15-minute holding time requirement for either parameter as required in their previous permit. The EPA notes that dissolved oxygen is another parameter that must be measured within 15 minutes of sampling. For these reasons, pH, temperature, and dissolved oxygen are typically measured *in-situ*, usually with a handheld meter. This renewal permit has clearly identified these three parameters as having a 15-minute holding time and likely needing to be sampled with a handheld meter.

Furthermore, the Permittee is required to collect receiving stream pH and temperature. This data appears to have not been collected in recent years. During an August 2022 conversation with the Permittee, they mentioned that they thought the Tribe's environmental program was collecting this data. The data reported in the DMR as receiving stream pH and temperature is identical to the reported effluent pH and temperature data (which, as discussed above, were not sampled properly).

With all of these issues taken into consideration, most of the data reported in NetDMR does not provide an accurate representation of the effluent. Instead, the EPA reviewed all available hard copy laboratory reports and summarized that raw laboratory data below (Table 2). While this data still has issues as far as holding times, missing data, etc., it provides a better representation of the Facility's effluent compared to the Facility's self-reported DMR data.

Table 2. Summary of the Lab Reports Provided to the EPA by the Permittee for Outfall 001 (2018-2023)

Parameter	Permit Limit(s)	Calculated Median	Calculated Range	Number of Data Points	Number of Exceedances
Discharge Volume, million gallons per day (mgd)	N/A	Unknown	Unknown	0	N/A
5-Day Biochemical Oxygen Demand (BOD_5), mg/L	30/45 a/	29	5.5 – 87	93	42/12
Total Suspended Solids (TSS), mg/L	30/45 a/	26	ND – 115	93	33/16
Fecal coliform, #/100 mL	200/400 a/	48,500	120 – 920,000 b/	67	66
E. coli, #/100 mL	126/406 a/	46,110	46 – 1,071,000	65	64
Total Ammonia Nitrogen (as N), mg/L	Varies c/	12.4	4 – 18.8	68	Unknown c/
pH, standard units	6.5 – 9.0	Unknown d/	Unknown d/	0 d/	Unknown d/
Dissolved Oxygen, mg/L	6.5/5.0	N/A	N/A	0	N/A
Oil and Grease, mg/L	10	-	-	-	-
Temperature, C	20	Unknown d/	Unknown d/	0 d/	Unknown d/
Total Residual Chlorine, mg/L	0.011/0.019	N/A e/	N/A e/	N/A e/	N/A e/
Total Phosphorus, mg/L	N/A	2.44	2.41 – 2.47	2	N/A
Total Nitrogen, mg/L	N/A	20.4	20.1 – 20.7	2	N/A
Total Dissolved Solids, mg/L	N/A	N/A	N/A	0	N/A

a/ The Permit has two limits for this parameter – a chronic value and an acute value. The number before the slash relates to the chronic limit – a 30-day average limit, while the number after the slash relates to the acute limit – either a 7-day average or daily maximum limit, depending on the parameter.

b/ One fecal coliform value was reported as "Too Numerous To Count." The highest numeric value was used here as the upper end of the calculated range.

c/ The previous permit's ammonia limits were based on simultaneous measurements of pH and temperature. The Facility did not properly collect or report this data, so the ammonia limit and number of exceedances were not able to be calculated.

d/ The Facility reported several pH and temperature values, but none that were measured within the required 15-minute holding time.

e/ Chlorine was not used during the period of record at the Facility so this parameter was not required to be monitored.

4.2 Other Facility History

4.2.1 Sewage Sludge

The Facility is a wastewater lagoon and their records indicate that accumulation of sewage sludge (often called biosolids or "sludge") has been a concern for at least the past 25 years, but it is unclear when – or to what extent – it has been removed.

As early as 2000, notes from meetings between the EPA, the IHS, and the Facility indicate that sludge accumulation was an issue in the lagoons. Sludge may have been removed in 2000/2001, but whether it was done, and if so to what extent, is unclear from the records. According to Facility personnel, at some point in the past few decades sludge was at least partially removed and applied to nearby agricultural land owned by a local rancher. According to IHS personnel, sludge was completely removed from Cell 2 in or about 2018. The Facility removed at least 700,000 gallons of sludge from Cell 2, a small amount of which was land-applied and the majority of which was transferred to Cell 3, which has been abandoned. Sludge has not been removed or measured in Cell 1 for a long time, and there are no other known recent sludge measurements in either cell. Under a consent decree (discussed further in Section 4.2.3), by November 8, 2025, the NCUC is required to conduct a sludge depth study of the fermentation pits, Cell 1, and Cell 2 to determine the depth of sludge and submit to the EPA a proposed schedule for sludge removal or, if sludge removal is not imminently required, a proposed schedule for a future sludge depth study.

4.2.2 Inspections

The EPA conducted an on-site inspection of the Facility on August 8, 2022, and another on July 11-12, 2023. Records of earlier EPA inspections are maintained in EPA files. Some of the most recent inspection's findings are listed below:

- Required monitoring (temperature, pH, dissolved oxygen [DO], bacteria, flow, and ammonia) was not being conducted.
- Data for numerous parameters required by the Permit have been reported in NetDMR late or not at all.
- Plastic media was not in place over the fermentation pit as designed.
- Multiple Bio-Domes were not operating properly.
- Lagoon sludge inventory was unknown.
- Staffing was at low levels, resulting in necessary O&M not being met.
- Perimeter security fencing was not fully implemented.
- Excessive debris was observed at bar screen.
- Excessive cattails were observed around lagoon cells.
- Unclear whether Cell 3 was receiving water from Cell 2, and if it was discharging to Outfall 001.

The Facility is engaged in ongoing discussions with the EPA to address the most recent inspection findings.

4.2.3 Enforcement Actions

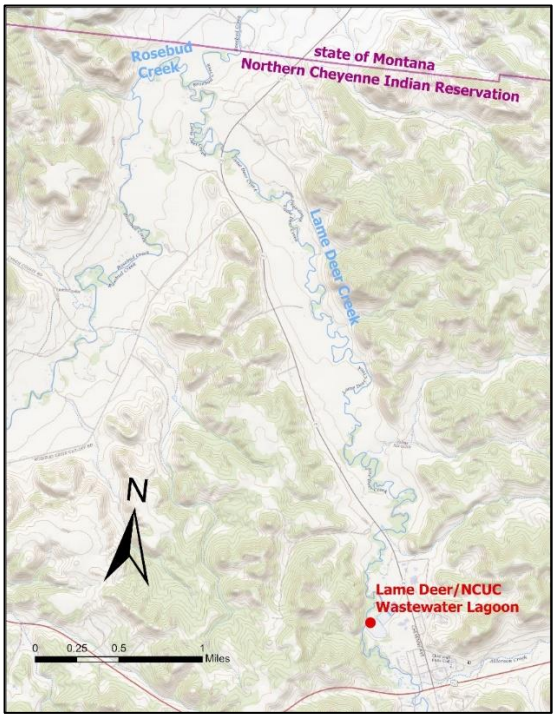
NCUC is currently under a federal judicial consent decree (Civil Action No. *21-cv-4-SPW-TJC*, entered August 30, 2021) which requires, among other things, significant physical and operational improvements to the Facility and to improve the financial capacity of NCUC to ensure sustained public health and environmental compliance. The consent decree resolved prior alleged violations of the Clean Water Act and NPDES regulations at the Facility and includes a civil penalty to address past violations and stipulated penalties to resolve any future violations during the five-year minimum effective period of the consent decree.

5 DESCRIPTION OF RECEIVING WATER

The Facility's discharge enters Lame Deer Creek near the western corner of Cell 3 (Figure 1). From the Facility, Lame Deer Creek flows approximately 11 miles north-northwest to its confluence with Rosebud Creek (Figure 2). The confluence is immediately south of the northern border of the Northern Cheyenne Indian Reservation. From the confluence, Rosebud Creek flows north through the state of Montana approximately 110 miles before joining the Yellowstone River near Forsyth, Montana.

During the August 2022 EPA inspection, Lame Deer Creek had a small amount of flow above the Facility's discharge, but the stream was effluent dominated immediately downstream of the Facility's discharge. Flow data from Lame Deer Creek collected by the Northern Cheyenne Tribe's Environmental program shows 15 flow readings at or near the Facility, with flow measurements ranging from 0.1 cfs to 0.9 cfs. This data suggests there is very little dilution flow in the stream. The Facility is in Hydrologic Unit Code (HUC) 10100003 (Rosebud Creek).

Figure 2. Facility Receiving Water



6 PERMIT LIMITATIONS

6.1 Technology Based Effluent Limitations (TBELs)

The secondary treatment standards (40 CFR Part 133) have been developed by the EPA and represent the level of effluent quality attainable through the application of secondary or equivalent treatment. The regulation applies to all publicly owned treatment works (POTWs). The TBELs potentially applicable to the Facility are listed below (Table 3).

Table 3. Secondary treatment standards (STS) and Treatment equivalent to secondary treatment standards (TES)

Parameter	Basis	30-day average (mg/L)	7-day average (mg/L)	30-day average percent removal (%)
BOD_5	STS	30	45	85
TSS	STS	30	45	85
BOD_5	TES	45	65	65
TSS	TES	45	65	65
pH	STS/TES	Maintained within the limits of 6.0 to 9.0*		

* There are a few exceptions to the pH requirements.

40 CFR § 133.102 provides the basic national secondary treatment standards (STS) that apply as a minimum level of effluent quality applicable to POTWs across the country. 40 CFR § 133.105 provides less stringent standards that may be applied to certain types of facilities that employ treatment technologies deemed equivalent to secondary treatment (TES) (Table 4). The TES requirements recognize that POTWs or other facilities treating sewage with trickling filters or waste stabilization ponds (i.e., wastewater treatment ponds) are capable of achieving significant reductions in BOD_5 and TSS but might not consistently achieve all of the STS. To be eligible for discharge limitations based on TES, a POTW must meet all of the following criteria specified in 40 CFR § 133.101(g):

- The BOD_5 and TSS effluent concentrations consistently achievable through proper operation and maintenance of the treatment works exceed the minimum level of the effluent quality set forth as STS in Table 3;
- A trickling filter or waste stabilization pond is used as the principal process; and
- The treatment works provides significant biological treatment of municipal wastewater, which is defined in 40 CFR § 133.101(k) as the use of an aerobic or anaerobic biological treatment process in a treatment works to consistently achieve a 30-day average of at least 65 percent removal of BOD_5.

The Facility's principal biological treatment system consists of waste stabilization ponds. The Facility's discharge data (section 4.1) shows that the Facility has achieved its permit limits for BOD_5 and TSS based on STS for more than half of its samples. Therefore, the BOD_5 and TSS concentration-based limitations that apply to the Facility are based on the STS at 40 CFR § 133.102(a) and (b): the 30-day average BOD_5 and TSS concentrations shall not exceed 30

mg/L, and the 7-day average concentrations shall not exceed 45 mg/L. Furthermore, the pH range of 6.0 to 9.0 applies as a TBEL regardless of whether the STS or the TES are applied.

The previous permit did not include percent removal requirements for BOD_5 and TSS required by 40 CFR § 133.102(a)(3). The rationale was that the long hydraulic residence time in the lagoon made it impractical to compare influent samples directly with effluent samples. However, this is not an allowable exemption from these requirements, and thus the percent removal requirements are being added for Outfall 001. The percent removal requirements for both BOD_5 and TSS will be based on the 65% TES standards in 40 CFR § 133.105(a)(3) and (b)(3). The TES values were used for percent removal based on the Facility meeting the bulleted points above for percent removal.

- It is yet unknown what percent removal the Facility may be able to consistently achieve, although a single sample taken by the EPA in July 2023 for both BOD_5 and TSS was greater than 65% but less than 85%, which doesn't meet the minimum level of effluent quality for STS.
- The Facility is a waste stabilization pond.
- Setting permit limits to 65% removal will ensure that the Facility meets the definition of "significant biological removal" above.

The EPA will review all available data and reassess this decision at the next permit reissuance to see if the Facility can meet the STS requirements for percent removal (Table 3).

In addition to meeting the regulatory requirements, adding percent removal requirements ensures significant biological treatment occurs, encourages the Facility to address any infiltration and inflow problems, and provides data to better support future decision making and overall lagoon function. This addition will require that an additional sampling location be added to collect influent BOD_5 and TSS data at a representative influent point to the Facility (e.g., prior to any treatment) so that the percent removal can be calculated (Table 1). The bar screen or wet well at the lift station would be an ideal location for collecting these influent samples.

EPA Region 8 has also developed a technology-based and water quality-based guidance on oil and grease for POTWs. It states "if a visible sheen or floating oil is detected in the discharge, a grab sample shall be taken immediately, analyzed and recorded in accordance with the requirements of 40 CFR Part 136. The concentration of oil and grease shall not exceed 10 mg/L in any sample." The visual narrative "sheen or floating oil" requirement was developed in alignment with 40 CFR § 401.16 which lists "oil and grease" as a conventional pollutant (as related to technology-based limitations in line with 40 CFR § 125.3(h)(1)) pursuant to section 304(a)(4) of the Act, as well as the NCT water quality standards (see section 6.2.6). This consideration for oil and grease will be included in the Permit.

6.2 Water Quality Based Effluent Limitations (WQBELs)

WQBELs must be established for any parameters where TBELs are not sufficient to ensure water quality standards will be attained in the receiving water (40 CFR § 122.44(d)). The parameters that must be limited are those that are or may be discharged at a level that will

cause, have the reasonable potential to cause, or contribute to an exceedance of water quality standards.

The Facility discharges to Lame Deer Creek. The receiving water is within the Northern Cheyenne Reservation and thus the Tribe's water quality standards (WQS) apply. The Tribe has adopted designated uses, numeric and narrative water quality criteria, and antidegradation requirements as part of their WQS. The EPA has reviewed the applicable Tribal water quality standards for consideration of the development of WQBELs and also evaluated whether any total maximum daily loads (TMDLs) apply.

This discharge is located approximately 12 stream miles upstream from the Reservation boundary with the state of Montana. Based on the relatively small flow rate of the discharge, the moderate dilution provided by Rosebud Creek (still within the Reservation), and the distance from the discharge point to the border with the state of Montana, the EPA did not consider Montana's WQS in the development of the Permit.

According to Appendix H (Designated Use Tables) of the NCT WQS, the stream classifications and uses for Lame Deer Creek include Class 1 Cold Water – Salmonid Propagation/Growth, Recreation – Incidental Contact, Drinking – Conventional Treatment, Wildlife, Agriculture, Industrial, Cultural, and Wetland. Downstream Rosebud Creek has similar stream classifications and uses such that protection of Lame Deer Creek will ensure protection of Rosebud Creek.

In consideration of standards based on early life stages present (ammonia and dissolved oxygen) and based on local knowledge about spawning times, the EPA assumed that early life stages of both salmonid and non-salmonid fishes are present in Lame Deer Creek year-round. Early life stages include all embryonic and larval stages and all juvenile forms of fish to 30 days following hatching.

Although the NCT has adopted WQS that have been approved by the EPA, they have not listed water bodies as impaired, nor developed a 303(d) list to require Total Maximum Daily Loads (TMDLs). Thus, there are no TMDLs to consider for the Permit at this time. The Permit contains a reopener provision that would allow the Permit to be reopened to include any applicable Waste Load Allocation developed and approved by the NCT and the EPA.

The following pollutants were identified as pollutants of concern and were further analyzed to determine whether they would need to be limited in the Permit.

6.2.1 BOD_5 and TSS

The Tribe does not have any numeric WQS *directly* related to BOD_5 or TSS, but several of their narrative criteria address emulsions and sludge, floating debris, scum, odors, colors, and other conditions, etc. Implementation of the BOD_5 and TSS secondary treatment standards will adequately protect several of the Tribe's narrative criteria (see Section 6.2.12).

6.2.2 pH

The Tribal WQS for waters with freshwater aquatic life includes a pH range of 6.5 to 9.0. Specifically, the standard states that "Induced variation of hydrogen ion concentration (pH) within the range of 6.5 to 9.0 must be less than 0.5 pH unit. Natural pH outside this range must be maintained without change. Natural pH above 7.0 must be maintained above 7.0." This standard is difficult to implement without detailed knowledge of the receiving water flows and pH at any given time, so the EPA has simplified implementation by requiring the Facility to discharge within the stated range (i.e., 6.5 to 9.0) at all times. This pH range is also more protective than the NCT Human Health pH range of 5.0 to 9.0.

6.2.3 E. coli

The EPA identified a typographical error in the latest revision of the NCT WQS regarding the *E. coli* criteria, after approving the WQS package. It is the EPA's understanding (confirmed by the Tribe) that the Tribe intended to adopt the recommended water quality criteria for *E. coli* of 126 #/100 mL as a 30-day geometric mean in any 30-day period (GM), and no more than 10% of samples in that 30-day period may exceed 410 #/100 mL as a statistical threshold value (STV). While the Tribe did adopt the GM criterion, the STV was erroneously dropped for Incidental Contact Recreation in the final document. These *E. coli* criteria (126 #/100 mL GM and 410 #/100 mL STV) apply year-round to protect both Full and Incidental Contact Recreation uses.

Pathogens such as *E. coli* are present in domestic sewage. Consumption of these pathogens can cause severe illness, especially in young children, the elderly, and those with compromised immune systems. For these reasons, *E. coli* are a pollutant of concern in domestic wastewater discharges. The Facility does not currently disinfect its wastewater prior to discharge to Lame Deer Creek. The Facility's effluent data is poorly documented, but a review of their lab reports shows that *E. coli* is regularly discharged at ~10^5 #/100 mL into Lame Deer Creek. EPA Region 8 does not allow for any type of mixing zone for bacteria – the relevant water quality standard is applied at the end of pipe. Based on these factors, the EPA has determined that there is reasonable potential to exceed the *E. coli* standard, and that effluent limitations are necessary.

Due to the various testing methods for bacteria approved in 40 CFR Part 136, and the variability in lab testing methods, EPA Region 8 implements bacteria permit limits as a generic number per volume analyzed (i.e., "Number/100 mL" or "#/100 mL"), rather than as a specific method (i.e., colony forming units [cfu] per 100 mL or most probable number [mpn] per 100 mL).

The previous permit contained a 30-day average (geometric mean) limit of 126 #/100 mL and a daily maximum limit of 406 #/100 mL. These values were based on the previous NCT WQS. As discussed above, the Tribe's revised WQS are based on the EPA's 2012 recommended water quality criteria values of 126 #/100 mL as a 30-day GM, and 410 #/100 mL as a STV. The duration and frequency of the STV value is "there should not be greater than a ten percent excursion frequency of the selected STV magnitude in the same 30-day interval." The EPA has determined that the "10% may not exceed" duration and frequency is

best implemented in the Permit as a daily maximum. Implementing an effluent limit requiring internal calculations is difficult in NetDMR as it is not easily set up to do this. Furthermore, since the Facility is only required to sample for bacteria once per month (see section 7.1), the daily maximum and '10% may not exceed' criteria have the same meaning if the Facility samples fewer than 10 times per month. This also provides consistency with how the EPA has issued other NPDES permits with considerations for similar criteria. The EPA will retain the 126 #/100 mL for 30-day average effluent limitation, and to avoid backsliding concerns will retain the 406 #/100 mL value for the daily maximum effluent limitation (which is slightly more protective than the value of 410 #/100 mL that the Tribe meant to adopt).

6.2.4 Fecal coliform

Bacteria such as fecal coliform are present in domestic sewage. Fecal coliform have been used as pollutants of concern in domestic wastewater, but scientific advancements in microbiological, statistical, and epidemiological methods have demonstrated that culturable enterococci and *E. coli* are better indicators of fecal contamination than fecal coliforms (EPA, 2012 RWQC). The NCT WQS previously contained numeric criteria for both fecal coliform and *E. coli*, but in 2023 they revised their WQS to remove fecal coliform and rely solely on *E. coli*. This revision was approved by the EPA on September 19, 2023 because it is consistent with EPA's currently recommended recreational water quality criteria issued pursuant to CWA Section 304(a).

The previous permit contained limits for fecal coliforms. These limits will be removed in the Permit based on the removal of the fecal coliform WQS. This does trigger backsliding considerations and is discussed further in section 6.5.

6.2.5 Temperature

The Tribe's temperature water quality criteria for Class 1 Cold water allows a slight increase or decrease in naturally occurring water temperatures. The previous permit implemented an instantaneous temperature effluent limit of 20° C, based on the maximum temperature value of 20° C in the NCT WQS (Appendix G, "Class 1 Cold water fishery" column). To avoid any backsliding concerns, the EPA will retain the maximum temperature effluent limit and also work with the Facility to collect meaningful data such that the temperature limit may be refined or modified in the future.

6.2.6 Oil and Grease

The NCT WQS include a narrative criterion which states Tribal waters must be free from substances that may or will *create floating debris, scum, a visible oil film (or be present in concentrations at or above 10 mg/L) or globules of grease or other floating materials* (NCT WQS, Section 1.3.5(A)(2)). EPA Region 8 has developed a protocol for limiting oil and grease (see section 6.1) that aligns closely with the NCT WQS. The protocol uses a dual approach: frequent visual observations of the discharge, looking for a visible sheen or floating oil, and when either of those is observed, a sample must be immediately taken and

analyzed for oil and grease with an effluent limitation of 10 mg/L. This same approach was taken in the previous permit and will be retained.

Additionally, the previous permit contained a narrative prohibition against visible sheens, floating debris, scum or other floating materials. This narrative prohibition is commonly used in many NPDES permits throughout the country and Region 8 to protect against pollutants that would cause or contribute to exceedances of narrative criteria such as the one discussed above. The EPA will retain this narrative prohibition based on professional judgment.

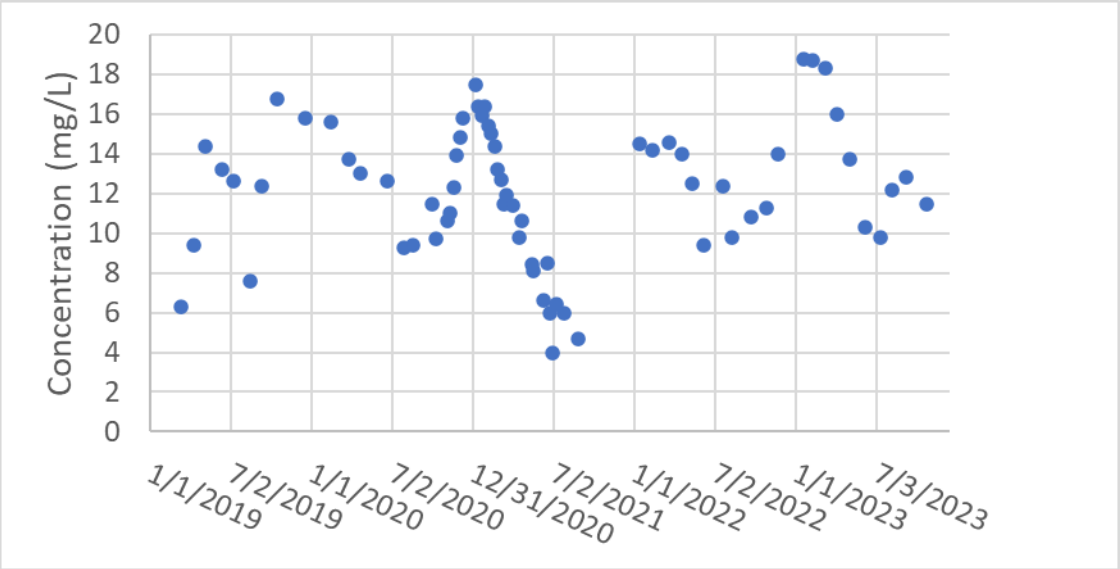
6.2.7 Ammonia

Ammonia WQS are typically pH and temperature dependent. As pH and temperature in the receiving water increase, the toxicity of ammonia to aquatic life increases. At high pH values, ammonia is much more likely to be present in its toxic (un-ionized) form, while higher temperatures are generally more stressful for many types of aquatic life.

Ammonia is a pollutant of concern in domestic wastewater discharges. The Facility displays a semi-typical ammonia discharge pattern for a basic lagoon – higher ammonia removal in the summer when nitrifying bacteria are more active, and lower (or no) ammonia removal in the winter when those bacteria are less active or dormant (Figure 3). However, the past two years of data show much less ammonia removal, even in the summer. Based on these factors, the EPA has determined that there is reasonable potential to exceed the ammonia standard, and that effluent limitations are necessary.

The previous permit implemented ammonia limits based on collecting monthly pH and temperature values and calculating a “moving” ammonia limit each month. While accurate, this method leads to several issues. First and foremost, if a facility doesn’t collect a reliable pH and temperature measurement each month, then there is no way to determine the limit that month. Additionally, it is harder for the Facility to target a value when the limit changes each month, and harder for the permitting authority to establish compliance and enforcement objectives when it changes each month (e.g., NetDMR cannot easily flag exceedances when effluent limits are calculated monthly). For this renewal, the EPA will take a more traditional approach and calculate a protective permit limit as a function of pH and temperature data in the receiving stream.

Figure 3. Facility Ammonia Discharge Concentrations (2019-2023)



Under the previous permit, the Permittee was required to collect monthly pH and temperature data in the receiving stream. During the August 2022 EPA inspection, the Permittee mentioned that they haven't collected any data because they thought the Tribe was collecting the data. A review of data from the Water Quality Portal shows that the Tribe has been collecting data – they have reported 86 pH measurements and 152 temperature measurements in Lame Deer Creek either just upstream or a few miles downstream of the Facility. This data was collected between 2005 and 2023. Furthermore, while this data was collected primarily in the warmer months, there is data for all months of the year.

The NCT WQS (Section 1.9.1.6) specify the 80th percentile of all samples that are representative of the site should be used for receiving water "critical conditions." The WQS do not specify whether pH and temperature data should be used as paired data or otherwise, but in this case the data was analyzed and found that there was no correlation between pH and temperature; therefore the EPA analyzed them separately so as to better approximate the duration and frequency of the water quality standard (Table 4).

Table 4. Stream pH and temperature conditions in Lame Deer Creek, 2005-2023

Parameter	June – August, 80th percentile of data	September – May, 80th percentile of data	Number of Samples
pH (standard units)	8.5	8.5	86 (38 "warm", 48 "cold")
Temperature (C)	22.7	13.9	152 (66 "warm", 86 "cold)

The Permit contains two separate seasonal ammonia limits – a "warm" season limit and a "cold" season limit. While the NCT WQS do not require seasonal limits, they may be used as an optional implementation tool. Seasonal ammonia limits can assist lagoons in meeting

criteria since lagoons have a seasonal performance aspect to them. The seasonal breaks were tied to when the water temperatures changed noticeably in the late spring and early fall – about May/June, and again about August/September. These seasonal breaks also resulted in a robust and balanced dataset for both seasons. To be clear, the determination of the "warm" and "cold" season was based on permit writer discretion – it was not a function of the NCT WQS. These permit limits will be based on a "warm" season from June 1 through August 31 when water temperatures are warm and the lagoon's bacteria can reasonably be expected to be oxidizing ammonia, and a "cold" season from September 1 through May 31 when the lagoon and/or receiving streams are colder, and the lagoon's bacteria may not be as active.

When calculated using the NCT WQS, the pH and temperature critical conditions from Table 4 equate to the criteria shown in Table 5. For the acute values, the EPA used the formula for 'Salmonids Present' since the stream is listed as having a salmonids propagation/growth use (see section 6.2). For the chronic values, the EPA defaults to the formula for "Fish Early Life Stages Present" unless site-specific data indicates otherwise (also see discussion in section 6.2). It should be noted that at temperatures above 16 °C, ammonia toxicity is the same for fish early life stages present or absent. These criteria will be implemented as permit effluent limitations in place of the previous ammonia effluent limits. While the new permit limits are implemented differently than the previous limits, the underlying designated uses, criteria, and calculations are the same in both cases, so anti-backsliding concerns don't apply.

Table 5. Calculated Permit Limitations for Ammonia (mg/L)

Parameter	30-Day Average/Chronic	Daily Maximum/Acute
Warm Season (June through August)	0.64	2.14
Cold Season (September through May)	1.17	2.31

6.2.8 Dissolved Oxygen (DO)

The relevant NCT criteria for DO is that it must not be reduced below the applicable values from Appendix C (page 86) of their WQS. The chart ranges in value from 3.0 mg/L to 9.5 mg/L, depending on the fishery (e.g., coldwater, cool, or warmwater), duration and frequency, and the presence of early life stages of fish. It is unknown whether the receiving water is meeting the values listed in the chart. However, the receiving stream is effluent dominated much of the year, so it is likely that the Facility's DO concentrations have a large influence on the receiving stream's ambient DO conditions.

The previous permit contained DO effluent limitations for both a 7-Day Mean (6.5 mg/L) and a 1-Day Minimum (5.0 mg/L). These values are based on the Tribe's "coldwater aquatic life, early life stages present" WQS when early life stages are directly exposed to the water column, and were added in the previous permitting cycle based on the Facility's consistent exceedance of the BOD_5 technology-based effluent limits.

The DMR data shows that DO values were inconsistently reported and appear to be BOD_5 data that was reported in the wrong location. Because the Facility's data is unusable to perform any further analyses, the EPA has no data to re-assess the previous determination that the discharge has reasonable potential to cause or contribute to an exceedance of the applicable WQS in the receiving stream, and therefore the numeric DO effluent limitations will be retained in the Permit. Monitoring requirements for DO are discussed further below in section 7.1.6.

6.2.9 Metals

Metals are present in small quantities in domestic sewage, but the primary source of metals in a municipal wastewater system are industrial sources. The Facility is a minor POTW, and Lame Deer is a small community with limited industrial users. The only known industrial users are a small tribal college and a small hospital. Another common source of metals in small towns is a drinking water treatment plant – backwash from filters and settling basins and the use of alum may all contribute to concentrated amounts of metals. However, according to Facility personnel, the Lame Deer drinking water treatment processes do not discharge any backwash or cleaning water to the community's sanitary sewer system. For these reasons, the EPA does not consider metals to be a pollutant of concern at the Facility.

The EPA is requiring the Facility to complete an Industrial Waste Survey (IWS) (see section 10.3) within one year of the Permit effective date. The IWS will ensure the Facility knows the sources and types of pollutants that may be introduced to the system and will provide the EPA with more qualitative data to reassess metals concerns in the future.

6.2.10 Whole Effluent Toxicity (WET)

Many toxic pollutants have cumulative effects on aquatic organisms that cannot be detected by individual chemical testing. However, laboratory tests can measure toxicity directly by exposing living organisms to the wastewater and measuring their responses. Because these tests measure the aggregate toxicity of the whole effluent, this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

The NCT WQS include a narrative criterion, which states Tribal waters must be free from substances that may or will *create concentrations or combinations of materials which are toxic or harmful to human, animal, plant, or aquatic life…* (NCT WQS, Section 1.3.5(A)(4)). Discharge data from the Facility indicates that the effluent is chemically consistent, and the Facility uses no chemicals at any point during the treatment process. The Facility is a POTW that treats domestic wastewater from a small community without any known significant industrial users. For these reasons, the chemical-specific effluent limitations are sufficient to attain and maintain any applicable water quality criteria and prevent toxicity in the receiving water. Therefore, WET effluent limitations and monitoring will not be required. The Permit contains a reopener provision if the need for WET effluent limitations or monitoring is determined at a future date.

6.2.11 Total Residual Chlorine (TRC)

The TRC limitations are based on the numeric criteria established in the Tribe's WQS of 0.019 mg/L (acute, 1-hour average) and 0.011 mg/L (chronic, 4-day average). If a disinfection system that uses chlorine is eventually installed, TRC limitations will apply and TRC monitoring will be required weekly; until then (as long as no chlorine is used in the treatment process) the TRC limitations and monitoring will not apply.

The EPA is setting the minimum level at 0.05 mg/L when using 40 CFR 136 methods. The Permittee shall conduct analyses of total residual chlorine in accordance with these methods and report actual analytical values. Measured values greater than or equal to 0.05 mg/L will be considered exceedances of the effluent limitations and values less than 0.05 mg/L will be considered to be in compliance with the effluent limitations. For average effluent limits, compliance shall be determined by taking the arithmetic mean of values reported for a specified averaging period, using zero (0) for any value reported at a concentration less than the minimum level and comparing that mean to the appropriate average effluent limit. An arithmetic mean that is less than or equal to the average effluent limit shall be considered in compliance with that effluent limit.

6.2.12 Narrative Criteria

The NCT WQS (Section 1.3.5(A) and (B)) include narrative criteria applicable to all Reservation waters:

A. Reservation surface waters must be free from substances which are or may become injurious to public health, safety, welfare, or any of the designated or existing beneficial uses. Such substances may or will:

    1. Settle to form objectionable sludge deposits or emulsions beneath the surface of the water or upon adjoining shorelines;
    2. Create floating debris, scum, a visible oil film (or oil be present in concentrations at or in excess of 10 milligrams per liter) or globules of grease or other floating materials;
    3. Produce odors, colors or other conditions which create a nuisance or render undesirable tastes to fish flesh or make fish inedible;
    4. Create concentrations or combinations of materials which are toxic or harmful to human, animal, plant or aquatic life except for pesticide application as described in the Tribe's WQS; and
    5. Create conditions which produce undesirable aquatic life.

B. No pollutants may be discharged which, either alone or in combination with other pollutants, will cause exceedances of surface water quality standards or criteria.

Several of these narrative criteria are protected by existing permit limits already discussed (see section 6.2.1 and 6.2.10). Additionally, the previous permit included a narrative effluent limit stating that "there shall be no discharge of floating debris, scum, or other floating materials." This limit will be retained in the Permit to ensure partial protection of narrative

criteria #2 above (the rest of #2 is protected by the oil and grease limitations – see section 6.2.6).

The NCT WQS also include a narrative criterion which states Tribal waters must be free from substances that may or will *create conditions which produce undesirable aquatic life* (NCT WQS, Section 1.3.5(A)(5)). The NCT have not developed a numeric translator for implementing this narrative criterion at this time. However, a primary driver of undesirable aquatic life is nutrient enrichment (i.e., nitrogen and phosphorus enrichment) of streams, and discharges from POTWs are typically high in nutrients. Based on the EPA's multiple site visits, ongoing work on developing narrative translators, and the limited number of nutrient sampling results available from the prior permit term, nutrient limits will not be included in the Permit at this time. The EPA will include monitoring requirements for nutrients in the Permit (see section 7.1.11). If this additional data shows that the discharge has reasonable potential to cause or contribute to an exceedance of the narrative criteria in the receiving stream or other downstream waters, nutrient controls will be included in the next permit cycle.

Due to the source of the water, the type of facility, its treatment processes and discharge type, and the rationale described in this section, the EPA finds that there is not reasonable potential to cause or contribute to an exceedance of any of these narrative WQS, and no additional effluent limitations will be included in the Permit.

The Tribe will be provided a copy of the draft Permit and draft SoB for review during the Clean Water Act Section 401 certification process. If the Tribe does not agree the draft Permit conditions ensure compliance with applicable numeric or narrative criteria, they may provide additional Permit conditions in their 401 certification.

6.3 Final Effluent Limitations

Applicable TBELs and WQBELs were compared, and the most stringent of the two was selected for the following effluent limits (Table 6).

Table 6. Final Effluent Limitations for Outfall 001

Effluent Characteristic	**30-Day Average Effluent Limitations a/**	**7-Day Average Effluent Limitations a/**	**Daily Maximum Effluent Limitations a/**	**Limit Basis b/**
Flow, mgd	report only	N/A	report only	N/A
Biochemical Oxygen Demand (BOD_5), mg/L	30	45	N/A	TBEL
BOD_5 percent removal, % c/	≥65%	N/A	N/A	TBEL
Total Suspended Solids (TSS), mg/L	30	45	N/A	TBEL
TSS percent removal, % c/	≥65%	N/A	N/A	TBEL

Effluent Characteristic	**30-Day Average Effluent Limitations a/**	**7-Day Average Effluent Limitations a/**	**Daily Maximum Effluent Limitations a/**	**Limit Basis b/**
Escherichia coli (*E. coli*), Number/100 mL	126 d/	N/A	406	WQBEL/PP
Oil and Grease (O&G), mg/L	N/A	N/A	10	TBEL/WQBEL
Total Residual Chlorine (TRC), mg/L	0.011 e/	N/A	0.019 e/	WQBEL
Total Ammonia Nitrogen (as N), mg/L **September 1 – May 31**	1.17	N/A	2.31	WQBEL
Total Ammonia Nitrogen (as N), mg/L **June 1 – August 31**	0.64	N/A	2.14	WQBEL
Temperature, °C	report only	N/A	20	N/A
Dissolved Oxygen, mg/L	N/A	≥6.5	≥5.0 f/	WQBEL
Total Kjeldahl Nitrogen (TKN), mg/L	report only	N/A	report only	N/A
Nitrate+Nitrite (as N), mg/L	report only	N/A	report only	N/A
Total Nitrogen, mg/L	report only	N/A	report only	N/A
Total Phosphorus, mg/L	report only	N/A	report only	N/A
Total Dissolved Solids (TDS), mg/L	report only	N/A	report only	N/A
pH, standard units	Must remain in the range of 6.5 to 9.0 *at all times*			WQBEL
Narrative Limitations	There shall be no visible sheen in the receiving water or adjoining shoreline. There shall be no discharge of floating debris, scum, or other floating materials			WQBEL

a/ See section 1 of the Permit for definition of terms.

b/ WQBEL = Limitation based on water quality-based effluent limit; TBEL = Limitation based on technology based effluent limit; PP = Limitation based on previous permit.

c/ The arithmetic mean of the concentration for effluent samples collected in a 30-day consecutive period shall not exceed 15 percent of the arithmetic mean of the concentration for influent samples collected at during the same period (i.e., a minimum 85 percent removal). To calculate percent removal, use the following equation (replacing X with either BOD_5 or TSS):
Percent Removal = $(X_{30\text{-day average, influent}} - X_{30\text{-day average, effluent}})/(X_{30\text{-day average, influent}}) * 100\ \%$

d/ The 30-day average limit for *E. coli* is calculated as a geometric mean.

e/ The TRC limit is only applicable if chlorine is used in the treatment process (e.g. for disinfection). The minimum limit of analytical reliability for TRC is considered to be 0.05 mg/L. For purposes of this permit and calculating averages and reporting in the DMR form, analytical values *less than* 0.05 mg/L shall be considered in compliance with this permit.

f/ This is a daily **minimum** effluent limitation.

6.4 Antidegradation

The NCT WQS include antidegradation provisions (NCT WQS, Section 1.4.1). Antidegradation refers to actions taken to maintain existing uses and water quality, and is applicable to all surface waters of the Tribe. All surface waters within the Northern Cheyenne Reservation are subject to Tier 1 (existing use) protection, while some Tribal surface waters are also subject to Tier 2 (high quality water) protection as well. Tier 3 (outstanding tribal resource water) protection is reserved for waters of exceptional quality, or waters of ecological, recreational, or cultural significance, and must be specifically adopted as a revision to the Tribe's WQS for the segment. The EPA typically assumes that all Tribal surface waters are subject to Tier 2 (high quality water) protection, unless otherwise noted by the Tribe (the NCT WQS, Section 1.4.5(A)(3) states that "In general, it is presumed that a majority of tribal waters qualify for Tier 2 protection"). The EPA believes this receiving stream is not subject to Tier 3 protection.

This NPDES permit renewal is not a new or expanded discharge – discharges from the Facility are existing and are not expanded. Additionally, no degradation of existing effluent quality or increases in discharge flows are proposed. No exceedances of numeric or narrative criteria will be allowed in the Permit. For these reasons, the EPA believes renewal of the Permit satisfies NCT antidegradation requirements for both Tier 1 and Tier 2 protection. The NCT Environmental program will review the Permit during the Clean Water Act Section 401 certification process and may provide feedback on the EPA's antidegradation determination at that time.

6.5 Anti-Backsliding

Federal regulations at 40 CFR § 122.44(l)(1) require that when a permit is renewed or reissued, interim effluent limitations, standards or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit unless the circumstances on which the previous permit were based have materially and substantially changed since the time the Permit was issued and would constitute cause for permit modification or revocation and reissuance under 40 CFR § 122.62.

This permit renewal complies with anti-backsliding regulatory requirements. With the exception of fecal coliform, all effluent limitations, standards, and conditions in the Permit are either equal to or more stringent than those in the previous permit.

Regarding fecal coliform, the NCT WQS were revised in 2023. The Tribe removed the fecal coliform criteria entirely and now uses the EPA-recommended *E. coli* criteria. Section 303(d)(4)(b) of the Clean Water Act allows a permit to be renewed, reissued, or modified that contains a less stringent effluent limitation for a pollutant if those effluent limitations are based on state water quality standards and the revision is consistent with the antidegradation policy in place. In this situation, there is no longer a fecal coliform standard, and all antidegradation requirements are being met (see section 6.4). Therefore, there are no anti-backsliding concerns associated with the removal of the fecal coliform limitation.

7 MONITORING REQUIREMENTS

7.1 Self-Monitoring Requirements – Effluent and Influent

In this section, the EPA lays out the basis for assigning monitoring frequencies and types to the various pollutants in the Permit. The monitoring frequency should be sufficient to characterize the effluent quality and to detect events of noncompliance, considering the need for data and, as appropriate, the potential cost to the Permittee. All monitoring requirements are further discussed below and listed in either Table 7 (effluent monitoring) or Table 8 (influent monitoring). Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, as required in 40 CFR § 122.41(j), unless another method is required under 40 CFR subchapters N or O.

7.1.1 Flow monitoring

The previous permit required the Facility to monitor effluent flow on a daily frequency using an instantaneous/grab sample. For the renewal, the EPA will require a weekly frequency using a grab sample (which is equivalent to an instantaneous measurement – see section 1 of the Permit for definitions). The EPA is changing the frequency from daily to weekly to better align with other required monitoring events and inspections. Lagoons typically have relatively steady flow rates and do not fluctuate greatly over short periods of time. Thus, weekly, instantaneous/grab flow measurements are appropriate for a lagoon with a long retention time such as the Facility. While only weekly observations are required in the Permit, the EPA encourages the Facility to observe and record flow rates on a more frequent basis. More flow measurements result in more accurate reporting of 30-day averages and a more representative dataset of daily maximum flows.

During the August 2022 EPA inspection, the Parshall flume itself, as well as the measuring gage on the flume, were coated with scum and unreadable. To obtain accurate flow measurements, it is important that the Permittee clean both the flume and the measuring gage so they are readable and do not obstruct flow. The Permittee must also locate and maintain (or post near the flume) a flume discharge table/chart, specific to the flume installed at the Facility, that correlates the stage on the Parshall flume to an accurate flow measurement. A copy of this chart may be available at either NCUC headquarters, IHS records, or could be obtained directly from the manufacturer. The Facility must report the *actual flow values* in their DMR. The staff gage level from the flume gage is not equivalent to the actual flow value, which is determined by using the flume discharge table to transform the staff gage level to a corresponding flow.

7.1.2 BOD_5 and TSS

The previous permit required the Facility to monitor effluent BOD_5 and TSS on a monthly frequency using a grab sample. This monthly frequency and sample type will be retained in the Permit. Note that the Facility will also have to collect influent BOD_5 and TSS, and calculate the BOD_5 and TSS percent removal on a monthly frequency. While effluent BOD_5 and TSS are usually collected by composite samples, exceptions are made for waste stabilization ponds (lagoons) with a retention time greater than 24 hours. The Facility's

retention time is approximately 30 days, so a grab sample method will be adequate to characterize the effluent. A monthly frequency and grab sample are appropriate for a lagoon with a long retention time such as the Facility.

Influent sampling for both BOD_5 and TSS should occur at or near the same time as the effluent sampling. Influent samples shall be taken, if possible, at a location prior to entering the lagoons such as the bar screen or wet well of the lift station. Influent samples shall be taken on a monthly frequency, and as a grab sample.

7.1.3 pH

The previous permit required the Facility to monitor effluent pH on a weekly frequency using an instantaneous/grab sample. This monthly frequency and grab sample type (which is equivalent to an instantaneous measurement – see section 1 of the Permit for definitions) will be retained in the Permit. Note that pH samples must be analyzed within 15 minutes of collection and are not amenable to compositing. For this reason, most facilities use an *in situ* meter, such as a pH meter, to measure it directly in the field. A weekly frequency is appropriate for a lagoon with a long retention time such as the Facility.

7.1.4 *E. coli*

The previous permit required the Facility to monitor effluent *E. coli* five times per month using a grab sample. The Tribe's WQS have changed, allowing for less samples per month. Therefore, the sampling frequency will be changed to monthly, and the grab sample type retained, in the Permit. Additionally, *E. coli* samples have a short hold time of 8 hours and not amenable to compositing. A monthly frequency is appropriate for a lagoon with a long retention time such as the Facility.

7.1.5 Oil and Grease

The previous permit required the Facility to monitor effluent oil and grease on a weekly frequency using a visual inspection, followed by an immediate grab sample if any oil and grease were observed. This protocol is being retained in the Permit. A visual inspection is part of basic operation and maintenance of a Facility such as this (see sections 6.2 and 6.3 of the Permit), and a weekly visual assessment is in line with other lagoon permits issued by the EPA in Region 8. A grab sample is required because oil and grease is not amenable to compositing unless composited in the lab.

7.1.6 Dissolved Oxygen (DO)

The previous permit required the Facility to monitor for dissolved oxygen on a monthly frequency using a grab sample. This monthly frequency and grab sample type will be retained in the Permit. Note that dissolved oxygen samples must be analyzed within 15 minutes of collection and are not amenable to compositing. For this reason, most facilities use an *in situ* meter to measure it directly in the field. A monthly frequency and grab sample are appropriate for a lagoon with a long retention time such as the Facility.

7.1.7 Total Residual Chlorine

The previous permit required the Facility to monitor for total residual chlorine on a weekly frequency using a grab sample, but only if chlorine was used as part of the disinfection process. Chlorine was not used in the last permit cycle. However, the Facility may be addressing bacteria in this permit cycle, so this weekly frequency and grab sample type will be retained in the Permit, with a footnote indicating they only apply when chlorine is being used in the treatment process. A weekly frequency and grab sample are appropriate for a parameter such as chlorine that can have major impacts on the downstream aquatic community. Note that total residual chorine samples must be analyzed within 15 minutes of collection and are not amenable to compositing.

7.1.8 Ammonia

The previous permit required the Facility to monitor effluent ammonia on a monthly frequency using a grab sample. This monthly frequency and grab sample type will be retained in the Permit. A monthly frequency and grab sample are appropriate for a lagoon with a long retention time such as the Facility.

7.1.9 Temperature

The previous permit required the Facility to monitor effluent temperature on a weekly frequency using an instantaneous/grab sample. This weekly frequency and grab sample type (which is equivalent to an instantaneous measurement – see section 1 of the Permit for definitions) will be retained in the Permit. Note that temperature samples must be analyzed within 15 minutes of collection and are not amenable to compositing. For this reason, most facilities use an *in situ* meter, such as a calibrated thermometer, to measure it directly in the field. A weekly frequency and grab sample are appropriate for a lagoon with a long retention time such as the Facility.

7.1.10 Total Dissolved Solids (TDS)

TDS monitoring can help better characterize a facility's effluent, identify any potential impacts on designated uses of receiving waters (such as agriculture), and identify other issues that may be affecting a facility, such as influent from industrial users having a detrimental effect on biological activity within the wastewater treatment facility.

The previous permit required the Facility to monitor effluent TDS on a quarterly frequency using a grab sample. This quarterly frequency and grab sample type will be retained in the Permit. A quarterly frequency is appropriate for a non-limited parameter such as TDS, and grab samples are appropriate where the effluent quality is expected to have low variability.

7.1.11 Nutrients

The previous permit required the Facility to monitor the effluent for nutrients (including total nitrogen and total phosphorus) on a quarterly frequency using a grab sample. The quarterly frequency and grab sample type will be retained in the Permit. Quarterly sampling is appropriate for non-limited parameters, and grab samples are appropriate where the

effluent quality is expected to have low variability. However, this renewal will specify that total nitrogen must be calculated by collecting both a Nitrate+Nitrite sample and a Total Kjeldahl Nitrogen (TKN) sample, and summing the two measurements. This data will be used to provide future evaluation of the need for WQBELs and to assure attainment of narrative criteria from the Tribe's WQS.

Table 7. Monitoring and Reporting Requirements for Outfall 001

Effluent Characteristic	Monitoring Frequency	Sample Type a/	Data Value Reported on DMR b/
Flow, mgd c/	Weekly	Grab	Daily Max. 30-Day Avg.
O&G, visual	Weekly	Visual	Narrative
O&G, mg/L d/	Immediately if visual sheen detected	Grab	Daily Max.
pH, standard units e/	Weekly	Grab	Minimum Maximum
Temperature, °C e/	Weekly	Grab	Daily Max. 30-Day Avg.
Total Residual Chlorine, mg/L f/	Weekly	Grab	Daily Max. 30-Day Avg.
Dissolved Oxygen (DO), mg/L e/	Monthly	Grab	Daily Min. 7-Day Avg.
BOD_5, mg/L	Monthly	Grab	30-Day Avg. 7-Day Avg. 30-Day Avg. % removal
TSS, mg/L	Monthly	Grab	30-Day Avg. 7-Day Avg. 30-Day Avg. % removal
E. coli, number/100 mL	Monthly	Grab	Daily Max. 30-Day Avg.
Total Ammonia Nitrogen (as N), mg/L	Monthly	Grab	Daily Max. 30-Day Avg.
Total Kjeldahl Nitrogen (TKN), mg/L	Quarterly	Grab	Daily Max. 30-Day Avg.
Nitrate+Nitrite (as N), mg/L	Quarterly	Grab	Daily Max. 30-Day Avg.
Total Nitrogen, mg/L g/	Quarterly	Calculated	Daily Max. 30-Day Avg.
Total Phosphorus, mg/L	Quarterly	Grab	Daily Max. 30-Day Avg.
Total Dissolved Solids (TDS), mg/L	Quarterly	Grab	Daily Max. 30-Day Avg.

a/ See section 1 of the Permit for definition of terms.

b/ Refer to the Permit for requirements regarding how to report data on the DMR.
c/ Flow measurements of effluent volume shall be made in such a manner that the Permittee can affirmatively demonstrate that representative values are being obtained. The average flow rate in million gallons per day (mgd) during the reporting period and the maximum flow rate observed, in mgd, shall be reported.
d/ If a visible sheen or floating oil is observed in the discharge, a grab sample shall be taken immediately, analyzed and recorded in accordance with the requirements of 40 CFR Part 136. The concentration of oil and grease shall not exceed 10 mg/L in any sample.
e/ This sample must be analyzed within 15 minutes of collection per 40 CFR Part 136.
f/ Monitoring for total residual chlorine is only required during periods when and if the effluent is chlorinated.
g/ For the purposes of the Permit, the term "Total Nitrogen" is defined as the calculated sum of analytical results from "Total Kjeldahl Nitrogen (TKN)" plus "Nitrate+Nitrite."

Table 8. Monitoring and Reporting Requirements for Outfall 001-I (Influent)

Effluent Characteristic	Monitoring Frequency	Sample Type a/	Data Value Reported on DMR b/
BOD_5, mg/L c/	Monthly	Grab	30-Day Avg. (also use for % removal calculation at Outfall 001)
TSS, mg/L c/	Monthly	Grab	30-Day Avg. (also use for % removal calculation at Outfall 001)

a/ See section 1 of the Permit for definition of terms.
b/ Refer to the Permit for requirements regarding how to report data on the DMR.
c/ These are influent samples (see Table 1 for a description of Monitoring Location 001-I), and should be taken at a location representative of the influent flow entering the wastewater treatment facility, such as the bar screen or wet well at the lift station/headworks.

7.2 Self-Monitoring Requirements – Ambient

The previous permit required the Facility to monitor Lame Deer Creek for both temperature and pH on a monthly frequency. This was to provide data to calculate an in-stream water quality criteria for ammonia (which is pH and temperature dependent). During development of the Permit, the EPA found that the Tribe's Environmental program has collected a robust pH and temperature dataset on Lame Deer Creek and continues to collect this data. This data is of high quality and provides an ideal basis for calculating the Tribe's water quality criteria. Because of this, the pH and temperature monitoring requirements in Lame Deer Creek are being removed from the Permit.

8 SPECIAL CONDITIONS

There are no special conditions in the Permit. However, an Industrial Waste Survey requirement has been added to the Permit (see section 10.3) and is identified for cross-

referencing in the Special Conditions section of the Permit to draw attention to this new requirement.

9 REPORTING REQUIREMENTS

Reporting requirements are based on requirements in 40 CFR §§ 122.44, 122.48, and Parts 3 and 127. A discharge monitoring report (DMR) frequency of monthly was chosen, because the Facility monitors monthly and submits monthly DMRs, and typically discharges continuously. The Facility previously reported on a monthly basis so this represents no change to the current reporting frequency.

10 COMPLIANCE RESPONSIBILITIES AND GENERAL REQUIREMENTS

10.1 Inspection Requirements

On a weekly basis, unless otherwise modified in writing by the EPA, the Permittee shall inspect its treatment facility. The Permittee shall document the inspection, as required by the Permit (see section 6.2 of the Permit). Inspections are required to regularly identify and resolve any issues that might interfere with proper operation and maintenance per 40 CFR § 122.41(e). The EPA typically requires a weekly inspection for wastewater lagoons.

10.2 Operation and Maintenance

40 CFR § 122.41(e) requires permittees to properly operate and maintain at all times, all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this permit. In addition to an operation and maintenance plan, regular facility inspections, an asset management plan (AMP), and consideration of staff and funding resources are important aspects of proper operation and maintenance. Asset management planning provides a framework for setting and operating quality assurance procedures and helps to ensure the Permittee has sufficient financial and technical resources to continually maintain a targeted level of service. Consideration of staff and funding provide the Permittee with the necessary resources to operate and maintain a well-functioning facility.

An AMP can be used to forecast relevant needs and costs associated with long-term compliance concerns, particularly in communities that could be impacted by emerging or increased flooding risk, risk of wildfires, or drought risk. While flooding and wildfires can lead to damage to critical infrastructure, droughts could reduce flows in receiving waters resulting in more stringent permit limits in the future. Long-term construction, additional operation and maintenance, and funding plans for upgrading or relocating critical infrastructure may be necessary to mitigate these concerns. Facilities may also consider optimizing their energy efficiency, which can yield substantial economic benefits and help cut down on associated emissions.

Operation and maintenance requirements have been established in section 6.3 of the Permit to help ensure compliance with the provisions of 40 CFR § 122.41(e).

10.3 Industrial Waste Management

The Facility is a POTW as defined in 40 CFR § 403.3(q). The Permit contains requirements for the Permittee to protect the POTW from pollutants which would inhibit, interfere with, or otherwise be incompatible with operation of the treatment works including interference with the use or disposal of municipal sludge. Pass through and interference are defined in 40 CFR §§ 403.3(p) and (k), respectively.

The Facility is required to conduct an Industrial Waste Survey (IWS), as described in the Permit, within one year of the Permit effective date. An IWS is required to ensure the POTW is able to identify potential pollutants and potential pollutant sources in the collection system so to better protect their wastewater treatment facility. The Facility has at times struggled to meet basic national secondary standards for BOD_5 and TSS, and is not treating ammonia as well as might be expected, especially during the summer months. One reason for this could potentially be damage to bacteria within the lagoon system caused by pollutants in the influent. Additionally, there were several findings in the most recent inspection report that indicate a better knowledge of the discharges to the collection system would benefit the Permittee. Finding #9 states that excessive wipes and other debris (disposable gloves) were observed at the lift station bar screen, and that Facility personnel stated it was coming from industrial users. Prior to installation of the bar screen and recent lift station renovation, the Facility's lift station had been adversely impacted by solid debris clogging pumps, rendering the lift station inoperable for months or years at a time. Finding #13 states that NCUC operators suspected potential stormwater inflow from a local facility. Both of these findings indicate that better knowledge of the industrial users in the collection system would benefit the Permittee.

10.4 Per- and Polyfluoroalkyl Substances (PFAS)

The EPA's PFAS Strategic Roadmap directs the Office of Water to leverage NPDES permits to reduce PFAS discharges to waterways "at the source and obtain more comprehensive information through monitoring on the sources of PFAS and quantity of PFAS discharged by these sources." The December 5, 2022 EPA memorandum, "Addressing PFAS Discharges in NPDES Permits and Through the Pretreatment Program and Monitoring Programs" suggests quarterly sampling is appropriate for many POTWs. However, there are no suspected non-domestic sources of PFAS within the service area. The Facility serves a few thousand residents of the community of Lame Deer, a small college, a casino, and a few small town businesses. The low likelihood of detectable PFAS present in wastewater does not warrant the expenditure of resources by this small community at this time. Therefore, EPA Region 8 is not requiring this Facility to monitor PFAS in the Permit.

11 ENDANGERED SPECIES CONSIDERATIONS

The Endangered Species Act of 1973 requires all Federal Agencies to ensure, in consultation with the U.S. Fish and Wildlife Service (FWS), that any Federal action carried out by the Agency is not likely to jeopardize the continued existence of any endangered species or threatened species (together, "listed" species), or result in the adverse modification or destruction of habitat of such species that is designated by the FWS as critical ("critical

habitat"). See 16 U.S.C. § 1536(a)(2), 50 CFR Part 402. When a Federal agency's action "may affect" a protected species, that agency is required to consult with the FWS (formal or informal) (50 CFR § 402.14(a)).

The U.S. Fish and Wildlife Information for Planning and Conservation (IPaC) website (https://ecos.fws.gov/ipac/) was accessed on December 28, 2023 to determine federally-listed Endangered, Threatened, Proposed and Candidate Species for the area near the Facility. The IPaC Trust Resource Report findings are provided below in Table 9. The designated area utilized was identified in the IPaC search and covers the immediate outfall area and the receiving water downstream for approximately 15 miles.

Table 9. IPaC Federally listed Threatened and Endangered Species

Species	Scientific Name	Species Status	Designated Critical Habitat
Northern Long-eared Bat	*Myotis septentrionalis*	Threatened	There are no critical habitats at this location.
Monarch Butterfly	*Danaus plexippus*	Candidate	Not applicable

11.1 Biological Evaluation

The proposed action is reissuance of this NPDES permit, which authorizes discharge from a wastewater lagoon to Lame Deer Creek. This is a continuation of existing operating conditions; no significant changes to discharge volumes or water quality are planned or expected due to the reissuance of this Permit. There is no consumptive use of groundwater or surface water; thus, neither water depletions nor incidental take are expected as a result from this Permit. Permit effluent limitations are protective of receiving water quality.

There are no critical habitats in the action area. The EPA conducted an analysis on the potential effects of the proposed action on the two species in Table 9, and downstream consideration of another endangered species. These biological evaluations are provided below and are based on information obtained from the IPaC site and knowledge regarding the proposed action.

Northern Long-eared Bat, *Myotis septentrionalis* – This species' listing was changed from threatened to endangered on April 1, 2023. There is no critical habitat for this species in the action area. The Facility discharges treated wastewater to an existing stream; the EPA believes these actions are unlikely to affect neither the northern long-eared bat nor its habitat. However, the EPA conducted a project determination in IPaC on December 28, 2023 (project code: 2024-0030735) and received an automated concurrence letter stating that the project "may affect, but is not likely to affect" the northern long-eared bat. The EPA did not hear anything further from the FWS regarding this letter. Based on this interaction and the EPA's analysis of the proposed action, the EPA has determined that this federal action may affect, but is not likely to adversely affect, this species.

Monarch butterfly, *Danaus plexippus* – This species is currently listed as a candidate species. There are generally no section 7 requirements for candidate species. However, the EPA

believes reissuance of the Permit will have minimal impact on this species for the reasons listed in the first paragraph of this section.

Pallid sturgeon, *Scaphirhynchus albus* – Although outside the action area, the EPA considered the downstream effects that this discharge may have on the endangered pallid sturgeon inhabiting the Yellowstone River. This discharge is located approximately 120 miles upstream of the Yellowstone River and is therefore well mixed and attenuated by the time it reaches the river. According to the USGS, the Yellowstone River at Forsyth, Montana (USGS gage 06295000) has a critical 7Q10 low flow of 2,580 cfs, or 1,667 mgd. Even at these low flows, there is approximately 3,000 times dilution provided in the Yellowstone River. Due to the large dilution factor and the distance between the discharge and the Yellowstone River, the EPA believes this discharge will have "no effect" on the pallid sturgeon or its critical habitat.

Since the only "may affect, but is not likely to adversely affect" finding was verified by the FWS using their IPaC project determination (and no further follow up was received from the FWS), there is no follow up required with the FWS.

12 NATIONAL HISTORIC PRESERVATION ACT REQUIREMENTS

Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470(f) requires that federal agencies consider the effects of federal undertakings on historic properties. The first step in this analysis is to consider whether the undertaking has the potential to affect historic properties, if any are present. See 36 CFR § 800.3(a)(1). Permit renewals where there is no new construction are generally not the type of action with the potential to cause effects on historic properties.

13 401 CERTIFICATION CONDITIONS

The Northern Cheyenne Tribe is the Clean Water Act (CWA) Section 401 certifying authority for the Permit, and a CWA Section 401 certification will be requested prior to Permit finalization.

14 MISCELLANEOUS

The effective date of the Permit and the Permit expiration date will be determined upon issuance of the Permit. The intention is to issue the Permit for a period not to exceed 5 years.

Permit drafted by Erik Makus, U.S. EPA, (406) 457-5017 (December 2023)

ADDENDUM

AGENCY CONSULTATIONS

On December 28, 2023, the FWS concurred with the EPA's preliminary conclusion that the Permit reissuance is not likely to adversely affect listed species.

During public notice, the Tribal Historic Preservation Office was notified of the EPA's preliminary determination that the Permit reissuance will not impact any historic properties. The EPA did not hear back from them.

On February 22, 2024, the EPA sent a CWA Section 401 certification request to the Northern Cheyenne Tribe. On April 15, 2024, the Tribe granted Section 401 certification without additional conditions.

NEIGHBORING JURISDICTIONS

The EPA conducted a neighboring jurisdiction analysis of water resources located downstream from the Facility and outside the boundaries of the Northern Cheyenne Indian Reservation in accordance with 40 CFR § 121.13, and determined that authorized discharges from the Facility may affect water quality in the state of Montana. The EPA made this determination on April 25, 2024, and documented the factors considered in the administrative record for this permit. On May 9, 2024, the EPA notified the state of Montana in writing regarding this determination. The state of Montana did not respond to this notification within the 60 days allowed by 40 CFR Part 121.

PUBLIC NOTICE AND RESPONSE TO COMMENTS

The Permit and statement of basis were public noticed on the EPA's website on February 22, 2024. The EPA received comments from the Permittee. The comment(s) received and the response(s) are provided below.

Comment:

The Permittee commented on the addition of requirements for implementing an Asset Management Plan (AMP) in section 6.3.3 of the Permit. They noted that they are currently subject to a consent decree, which requires reporting of several asset-related metrics. They were concerned with redundancy of submitting a yearly AMP and asked that the AMP either not be included in the Permit, or recognize that compliance with the Consent Decree fulfills the AMP requirements.

Response:

The Asset Management Plan (AMP) is a relatively new addition to many NPDES permits issued in Region 8. The AMP language is purposefully broad as to allow each facility to develop a plan with a level of detail that is appropriate for them. The AMP helps to ensure the Permittee has sufficient financial and technical resources to continually maintain a targeted level of service (see section 10.2 of this document for more information regarding the AMP).

Ultimately, the EPA believes the AMP will result in cost savings and enhanced permit compliance for facilities.

The EPA is aware of the ongoing consent decree (discussed in section 4.2.3 of this document). The consent decree does require some reporting of assets, a financial management plan, and other metrics designed to ensure compliance with the Permit. The EPA agrees that avoiding redundancy would make sense; thus, any efforts that overlap between the consent decree and the AMP could be used to satisfy the AMP requirements. The AMP could simply incorporate by reference any relevant asset management information from the consent decree.

The EPA also notes that the comment suggests that the AMP must be submitted annually. This is not the case. The Permit only requires that the Permittee "develop, maintain, and implement an AMP" within one year of the effective date of the Permit. Once it is developed, maintained, and implemented, it would be retained by the Permittee and made available for review by the EPA upon request, similar to the O&M Manual (see section 6.3.1.1 of the Permit) and/or the Inspection Log (see section 6.2.2 of the Permit). There are no explicit requirements to submit the AMP to the EPA. The EPA is happy to work further with the Permittee as they develop their AMP.

No changes were made to the final Permit.

Comment:

In several instances, the Permittee noted that they supported or accepted many of the changes made to the Permit.

Response:

The EPA appreciates your feedback.

No changes were made to the final Permit.