

STATEMENT OF BASIS

PERMITTEE: Town of Lodge Grass

PERMIT NUMBER: MT0021890

RECEIVING WATER: Unnamed slough to Little Bighorn River

FACILITY: Town of Lodge Grass Treatment Plant

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LOCATION: SE1/4 Section 12, Township 65N, Range 35E
Crow Reservation, Big Horn County, Montana
Latitude 45.325367°, Longitude -107.365034°

PERMIT TYPE: Indian Country, Minor Permit, Permit Renewal

I. Permit Status

The Town of Lodge Grass' (Lodge Grass) wastewater treatment facility (WWTF) is located on the Crow Indian Reservation, which is in "Indian Country" as defined at 18 U.S.C. 1151. The Environmental Protection Agency (EPA) is responsible for implementing the National Pollutant Discharge Elimination System (NPDES) program in Indian Country within the State of Montana.

The current NPDES Permit for Lodge Grass became effective on October 1, 2010, and expired on September 30, 2015. Lodge Grass submitted a Notice of Intent (NOI) for permit coverage under the EPA Region 8 Lagoon General Permit in July 2015. The EPA determined the facility does not currently meet the eligibility requirements for the Lagoon General Permit and requested an individual permit application. Lodge Grass then submitted an application for renewal in February 2016 and it was determined to be complete on March 15, 2016. Because the NOI was submitted in a timely manner, the current permit has been administratively extended until the renewal permit is issued and in effect.

II. Facility Information

The WWTF serves approximately 1,200 residents of the Town of Lodge Grass and adjacent tribal housing. The average daily flow rate is 0.02 million gallons per day (mgd), and influent measurements collected in 2011 and 2012 indicated an average influent flow of 0.1477 mgd. The facility is a two-cell 9.30 acre, partially-aerated lagoon system without disinfection. The primary cell is 4.13 acres and was built in 1958. The secondary cell is 5.15 acres and was added in 1970. The primary cell has three surface aerators. The WWTF discharges from Outfall 001 monthly from the northeast corner of the secondary cell into a slough which drains into the Little Bighorn River.

As a result of recurrent compliance issues and an Administrative Order on Consent (AOC) filed April 6, 2015 (Docket No. CWA 08-2015-0014), the WWTF is being upgraded as part of the Lodge Grass Wastewater Improvement Project. Construction is planned to start August 2016 and be completed in spring of 2017. The existing partially-aerated two-cell lagoon system will be replaced with an aerated four-cell lagoon system with continuous discharge. The upgraded WWTF will have an average annual design flow of 0.1858 mgd and will consist of two synthetically-lined earthen basins that are divided into four cells with baffle curtains. Aeration will be provided by indoor positive displacement blowers (two active and one standby), and will be delivered via floating lateral, fine bubble diffusers. The supplied air is intended to lower five-day biological oxygen demand (BOD₅) levels and provide partial mixing in three of the four treatment cells. The fourth cell will be a quiescent zone for sludge settling. Influent flows will be measured with a Parshall flume and effluent flow metering will be done at a V-notch weir. This Permit will provide coverage for effluent discharges from both the current WWTF and the upgraded WWTF.

Additionally, approximately 2,800 linear feet of undersized and/or failing sewer mains in town will be replaced with 8-inch and 10-inch polyvinyl chloride sewer mains, and manholes and sewer service lines from the main to the property line will also be replaced. The outfall location will be moved to the southeast corner of Cell 2B at latitude 45.324360° and longitude -107.363860° and renamed Outfall 002. Figure 1 is an aerial photograph supplied by the Permittee that shows the existing WWTF layout and outfall location, as well as the planned upgrades to the lagoon system and new outfall location.

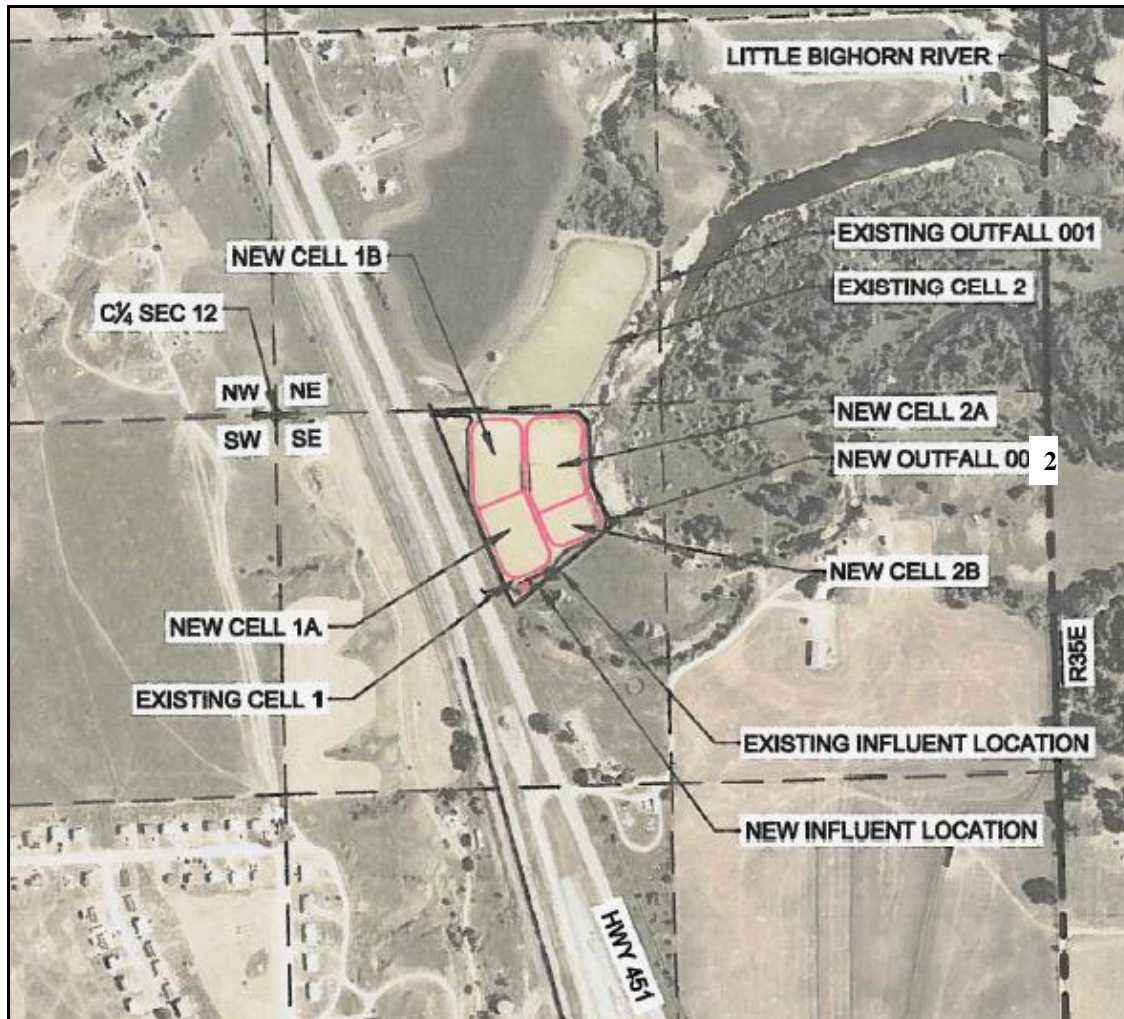


Figure 1. Aerial photograph showing the existing and future layout of the Lodge Grass WWTf.

A. Current Effluent Limits and Characteristics

The effluent limitations in the current (2010) Permit are shown below in Table 1 along with a summary of self-monitoring effluent data for Outfall 001 for the period of record (POR) from October 1, 2010, until June 1, 2016.

Table 1. Discharge Data During the POR from October 1, 2010 to June 1, 2016							
Parameter	Units	2010 Permit Limit	Minimum Value	Maximum Value	Average Value	# of Samples	# of Exceedances
Flow	mgd	--	0.006	0.6	0.026	62	--
Biological Oxygen Demand (BOD ₅)	mg/L	45/65 ⁽¹⁾	10.9	190.0	39.6	67	16/10
Total Suspended	mg/L	100/135 ⁽¹⁾	3.4	645	53.9	67	3/3

Table 1. Discharge Data During the POR from October 1, 2010 to June 1, 2016							
Parameter	Units	2010 Permit Limit	Minimum Value	Maximum Value	Average Value	# of Samples	# of Exceedances
Solids (TSS)							
pH	s.u.	6.0 - 9.0	7.2	9.1	8.0	67	4
Fecal Coliforms	# organisms/ 100 ml	17,000/ 34,000	22	2420	783.7	32	1 ⁽²⁾
Oil and Grease	Visual	None	None	None	None	63	0 ⁽³⁾

⁽¹⁾ 30-Day Average/7-Day Average

⁽²⁾ One result was flagged as a violation because it was reported as ≥ 1600 organisms/100 ml.

⁽³⁾ No visual detections.

B. Compliance History

A review of the Discharge Monitoring Reports (DMRs) submitted since October 2010 showed the following violations:

- 16 violations of the 30-day BOD₅ limitation of 45 mg/L
- 10 violations of the 7-day BOD₅ limitation of 65 mg/L
- 3 violations of the 30-day and 7-day average TSS of 100/135 mg/L
- 4 violations of the maximum pH limitation of 9.0
- 1 violation of the 30-day and 7-day average for fecal coliforms

The EPA conducted an inspection of the WWTF on January 13, 2014. At the time of the inspection, the operator reported that all of the aerators were not functioning. DMRs and sampling documentation were complete and retained for the required amount of time, but there was no record of the required weekly inspections. Some “failure to report” violations were also noted for flow and visual oil and grease. Overall, many of the deficiencies were attributed to resource constraints and the most significant compliance issue noted was violations of the BOD₅ limits because of non-functioning aerators. The proposed resolution to these compliance issues was the AOC and associated WWTF upgrades discussed above in Section II.

III. Technology Based Effluent Limits (TBELs)

TBELs are national wastewater discharge standards developed by the EPA for certain industries. They are industry-specific and intended to represent the greatest pollutant reductions that are economically achievable for an industry. Treated effluent from the WWTF is subject to the Secondary Treatment Regulations found at 40 CFR § 133.

40 CFR § 133.102 establishes the minimum level of effluent quality attainable by secondary treatment for BOD₅, TSS, and pH. 40 CFR § 133.105 allows for the secondary treatment standards to be changed on a case-by-case basis to a different minimum level of effluent quality attainable for BOD₅, TSS, and pH for facilities eligible for treatment equivalent to secondary

(TES) treatment. 40 CFR Part 133.101(g) defines facilities eligible for TES if they meet the following requirements:

- 1) The BOD₅ 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 in 133.102(a) and (b).
- 2) A trickling filter or waste stabilization pond is used as the principal process, and
- 3) The treatment works provide significant biological treatment of municipal wastewater.

The WWTF qualifies for TES based on the following:

- 1) As shown above in Table 1, the BOD₅ and TSS effluent concentrations are consistently above the effluent quality set forth in 40 CFR § 133.102(a) and (b): 30 mg/L 30-day average and 45 mg/L 7-day average for both BOD₅ and TSS.
- 2) The WWTF's primary treatment system is waste stabilization ponds that provide significant biological treatment of municipal wastewater.

40 CFR § 133.105(a) and (b) contains TES limits for BOD₅ and TSS (i.e., 30-day average is 45 mg/L and the 7-day average is 65 mg/L), and a 30-day percent removal requirement of 65 percent. The primary reasons for the percent removal requirements for TSS and BOD₅ are to promote municipalities to reduce infiltration and inflow in their collection systems and to prevent intentional dilution of the influent. The planned upgrades to the sewer system should help reduce infiltration and inflow. Also, it has been the experience of EPA Region 8 that extended detention times prevent the determination of the actual percent removals of BOD₅ in small municipal wastewater lagoon systems such as this one. The detention times in lagoon systems usually range from several weeks to several months. The lag time between when the influent enters the lagoon and when the wastewater leaves the lagoon system makes it difficult to make a valid comparison between influent and effluent concentrations. Based on professional judgment, percent removal requirements were not included in the previous Permit and will not be required in this Permit.

Effluent concentrations of TSS are also consistently above the TES, but 40 CFR 133.105(d) is a provision of the secondary treatment regulations called *Alternative State Requirements* (ASR) that allows states to adjust the minimum level of effluent quality for waste stabilization ponds to conform to the BOD₅ and TSS effluent concentrations consistently achievable through proper operation and maintenance. For waste stabilization ponds in Montana, the state has established the minimum level of effluent quality for waste stabilization ponds as 100 mg/L 30-day average and 135 mg/L for 7-day average. Because of similar treatment and climate conditions at the WWTF to other waste stabilization ponds in Montana, the Montana ASR value for TSS was previously applied to the WWTF as a TBEL and will be continued in this Permit.

A. TBEL Considerations Following the WWTF Upgrade

As BOD₅ violations are the primary driver for the WWTF upgrade, the new facility is being designed to consistently achieve the secondary treatment standards for BOD₅ of a 30-day average of 30 mg/L and a 7-day average of 45 mg/L. Although the TSS concentrations and loads

will likely decrease, the final effluent concentrations are less certain because the treatment system is still waste stabilization ponds and the improvements are largely focused on addressing BOD₅. Therefore, the applicable TBEL for BOD₅ will be shifted from TES to the secondary treatment standard after performance has stabilized following the WWTF upgrade and switch to Outfall 001. However, due to the uncertainty in TSS removal after the upgrade, the TSS TBEL based on ASR is considered applicable during the entire permit term, but may be modified in the future if effluent data demonstrate consistently lower concentrations of TSS. Table 2 summarizes the applicable TBELs for the WWTF.

Table 2. Technology Based Effluent Limitations		
Effluent Characteristic	30-Day Average	7-Day Average
BOD ₅ , mg/L (Treatment Equivalent to Secondary)	45	65
BOD ₅ , mg/L (National Secondary Standards)	30	45
Total Suspended Solids, mg/L (Alternative State Requirements)	100	135
The pH of the effluent shall not be less than 6.0 s.u. or greater than 9.0 s.u. in any single sample or analysis.		

IV. Water Quality Based Effluent Limits (WQBELs)

WQBELs, which are based on water quality standards, 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, or have the reasonable potential to cause or contribute to an exceedance of water quality standards. The purpose of this section is to provide a basis and rationale for establishing WQBELs based on the applicable water quality standards of the receiving water.

A. Receiving Waters

The discharge from the WWTF goes to a slough that flows into the Little Bighorn River. The river is approximately 0.35 miles downstream of the existing outfall. After the outfall is relocated, the river will be approximately 0.9 miles downstream. There is typically some water in the slough, but it is often ponded, and the critical low flow in the slough is zero.

B. Water Quality Considerations

The Crow Tribe does not have tribally-adopted or EPA-approved water quality standards. The EPA has national recommended water quality criteria for the protection of aquatic life and human health in surface water, which are referred to as 304(a) criteria, and they are used to inform development of WQBELs in the absence of tribal water quality standards.

C. Reasonable Potential Analysis

Pollutants typically present in treated effluent from domestic wastewater treatment facilities that may cause or contribute to exceedances of water quality standards include conventional pollutants such as biological material (measured by BOD₅), TSS, oil & grease, *Escherichia coli* (*E. coli*) bacteria, and pH; and non-conventional pollutants such as total residual chlorine (TRC), ammonia (NH₃), nitrate/nitrite (NO_{2/3}), total nitrogen (TN), and total phosphorus (TP). Based on the domestic nature of the discharge, no other parameters, including whole effluent toxicity, are anticipated to have reasonable potential to cause or contribute to exceedances of 304(a) criteria.

1. Conventional Pollutants

TSS, BOD₅, and pH – The WWTF provides a significant reduction in biological material and solids through secondary treatment, and as there are no applicable numeric water quality standards for TSS and BOD₅, no WQBELs are necessary. However, the EPA's 304(a) criterion for pH in freshwater is 6.5 to 9.0, which is more stringent than the TBEL, and will apply as the WQBEL. Monthly monitoring will be required for effluent BOD₅, TSS, and pH.

Oil and Grease – Although no oil sheen has been observed on the effluent during the POR, there is potential for oil and grease in the effluent due to schools and commercial businesses that generate oil and grease in the service area. However, since sampling was not previously required in the absence of a visible sheen, the concentration in the effluent relative to the permit limit of 10 mg/L cannot be evaluated. The requirement for visual observations will be removed but semi-annual sampling will be required so a quantitative reasonable potential analysis can be conducted during the next permit cycle.

The narrative limit, which is based on the 304(a) criterion, will be continued in this Permit; it requires that "Surface waters shall be virtually free from floating nonpetroleum oils of vegetable or animal origin, as well as petroleum-derived oils." Because of the potential for oil and grease in the effluent, the WQBEL for oil and grease of 10 mg/L will be continued in this Permit. The numeric limit (i.e., 10 mg/L) is used by the EPA Region 8 as a translation of the narrative 304(a) criterion for oil and grease pursuant to CWA § 301(b)(1)(C).

E. coli – The bacterial limit in the current Permit set to protect recreational uses is for fecal coliform. However, reasonable potential for *E. coli* will be evaluated instead of fecal coliform because it is a subset of fecal coliform. The EPA has found *E. coli* to be a better indicator organism for pathogens, and it is the current bacterial indicator for fecal contamination in the EPA 304(a) recreational water quality criteria. Since bacterial criteria are protecting recreational uses, the EPA in Region 8 no longer allows mixing zones in NPDES permits to meet bacterial limits. Therefore, the reasonable potential analysis is based on evaluating if concentrations at the end-of-the-pipe exceed the EPA's recreational water quality criteria for *E. coli*.

The EPA's recommended recreational water quality criteria are as follows: a monthly geometric mean of 126 colony forming units (cfu)/100 mL and a statistical threshold value (STV), which should not be exceeded by more than 10 percent of samples, of 410 cfu/100 mL. Based on 32 samples collected during the POR, 24 samples exceeded the monthly geometric mean criterion

and 15 of the samples (i.e., 47%) exceeded the STV. Therefore, there is reasonable potential for *E. coli*, and WQBELs will be based on meeting the EPA 304(a) recreational water quality criteria at the end-of-the-pipe. Since the WWTF does not currently disinfect its wastewater, and disinfection is not part of the upcoming upgrade, a compliance schedule will be issued to meet the new limit. Monthly monitoring will be required.

2. Non-conventional Pollutants

TRC – The WWTF does not disinfect its effluent so there is no reasonable potential for TRC. No effluent limit or monitoring is needed.

NH₃, NO_{2/3}, TN, and TP – There is no available effluent data for any of the nutrient parameters. The Crow Tribe has a water quality monitoring station (LBHR-065) on the Little Bighorn River approximately 1.5 miles upstream of where the slough flows into the river, and TN and TP were measured there in September 2015. To better evaluate the reasonable potential for the discharge from the WWTF to affect water quality in the Little Bighorn River, nutrient monitoring will be required at the new outfall (001) for NO_{2/3}, TN, and TP. Quarterly monitoring will be required for NO_{2/3} to collect sufficient data for reasonable potential analysis and seasonal monthly monitoring will be required for TN and TP because they are most likely to affect beneficial uses during the warmest months.

Although ammonia is toxic at low concentrations, any ammonia discharged from the current and future outfall location is likely converted to nitrate via nitrification prior to the effluent-dominated slough flowing into the Little Bighorn River. Therefore, to assist with evaluating the reasonable potential for ammonia to exceed 304(a) criteria in the Little Bighorn River, instead of requiring effluent monitoring for ammonia, semi-annual ambient monitoring will be required in the slough at a location of channelized flow before it joins the river.

All applicable WQBELs discussed above are summarized in Table 3.

Table 3. Water Quality Based Effluent Limitations		
Effluent Characteristic	Effluent Limitations	
	30-Day Average a/	Daily Maximum a/
<i>E. coli</i> , cfu/100 mL	126	410
Oil and Grease, mg/L	--	10
The pH of the discharge shall not be less than 6.5 or greater than 9.0 at any time.		
There shall be no discharge which causes a visible oil sheen, floating solids, or foam in other than trace amounts in the receiving water.		

V. Effluent Limitations

Discharge from the lagoon system will occur through Outfall 001 until the upgrades are complete and the facility begins discharging through Outfall 002. Effective upon Permit issuance, the discharge from either Outfall 001 or 002 shall, at a minimum, meet the proposed interim effluent limitations in Table 4. Limits are based on the most stringent of either the TBELs or WQBELs presented in Sections III and IV, respectively.

Table 4. Interim Effluent Limitations: Outfall 001/Outfall 002			
Effluent Characteristic	Effluent Limitation		
	30-Day Average	7-Day Average	Maximum Daily Limit
BOD ₅ , mg/L	45	65	--
Total Suspended Solids, mg/L	100	135	--
Oil and Grease, mg/L	--	--	10
The pH of the discharge shall not be less than 6.5 s.u. or greater than 9.0 s.u. at any time.			
There shall be no discharge which causes a visible oil sheen, floating solids, or foam in other than trace amounts in the receiving water.			

⁽¹⁾ See Definitions, Part 1.1, for definition of terms.

Effective June 1, 2018, unless noted otherwise in the footnotes, and continuing for the duration of the Permit cycle, the effluent quality discharged by the WWTF through Outfall 002 shall at a minimum, meet the limitations in Table 5.

Table 5. Final Effluent Limitations: Outfall 001			
Effluent Characteristic	Effluent Limitation		
	30-Day Average	7-Day Average	Maximum Daily Limit
BOD ₅ , mg/L	30	45	--
Total Suspended Solids, mg/L	100	135	--
Oil and Grease, mg/L	--	--	10
<i>E. coli</i> , #/100 ml ⁽²⁾	126	--	410
The pH of the discharge shall not be less than 6.5 s.u. or greater than 9.0 s.u. at any time.			
There shall be no discharge which causes a visible oil sheen, floating solids, or foam in other than trace amounts in the receiving water.			

⁽¹⁾ See Definitions, Part 1.1, for definition of terms.

⁽²⁾ Effective June 1, 2021.

VI. Self-Monitoring Requirements

With the exception of total ammonia, sampling shall be conducted at Outfall 001/002. Discharge monitoring for Outfall 001 will be conducted at a Parshall Flume and for Outfall 002 will be conducted at a weir. Sampling will be required as listed in Table 6.

Table 6. Self-Monitoring Requirements			
Parameter	Frequency	Sample Type ⁽¹⁾	Required Reporting Value
Flow, mgd	Monthly	Instantaneous	N/A
BOD ₅ , mg/L	Monthly	Grab	2
Total Suspended Solids, mg/L	Monthly	Grab	1
pH, standard units	Monthly	Instantaneous	0.1
<i>E. coli</i> , # org/100 ml	Monthly	Grab	1
Total Nitrogen as N, mg/L	Monthly ⁽²⁾	Calculated or Grab	0.100
Total Phosphorus as P, mg/L	Monthly ⁽²⁾	Grab	0.010
Nitrate + Nitrite as N, mg/L	Monthly ⁽²⁾	Grab	0.020
Oil and Grease, mg/L	Semi-annual	Grab	0.1
Total Ammonia as N, mg/L	Semi-annual	Grab ⁽³⁾	0.07

⁽¹⁾ See Definitions, Part 1.1, for definition of terms.

- (2) Monthly monitoring between July 1 and September 30 only. Total Nitrogen may be measured directly or calculated as the sum of Nitrate + Nitrite and Total Kjeldahl Nitrogen.
- (3) Monitoring for total ammonia shall be conducted in the channelized section of the slough before it enters the Little Bighorn River.

A. Discharge Monitoring Reports

With this Permit issuance, the Permittee must electronically report DMRs using *NetDMR*. Information on getting started with *NetDMR* is available at: https://netdmr.epa.gov/netdmr/public/getting_started.htm. If you have any DMR questions or concerns regarding *NetDMR*, please contact the EPA's Policy, Information Management and Environmental Justice Program, DMR Coordinator at (303) 312-6056. See Section 2.4 of the Permit, Reporting of Monitoring Results, for additional information.

VII. Compliance Schedule

Compliance schedules are authorized under 40 CFR § 122.47 and are intended to be used when compliance with water quality based effluent limits is not feasible upon permit issuance. They provide a timeline for permittees to meet new or lower effluent limits and must require compliance as soon as possible. The Permit includes much lower effluent limits for *E. coli* and BOD₅, and a compliance schedule is included in the Permit to allow time for the upgraded treatment system to decrease BOD₅ concentrations in the effluent and for the facility to identify and install a disinfection system and obtain additional funding for disinfection. The Permittee will have until June 1, 2018, approximately one year after the proposed completion of the upgrade, to meet the final BOD₅ WQBEL (Table 5). Because the Permittee is initiating an upgrade in 2016 that does not include disinfection, it will have until June 1, 2021 to meet the *E. coli* WQBEL (Table 5). Since the compliance schedule for *E. coli* is longer than one year, annual milestones are required (40 CFR § 122.47) and are included in the Permit.

VIII. Endangered Species Act Requirements

Section 7(a) of the Endangered Species Act requires federal agencies to ensure that any actions authorized, funded or carried out by an agency are not likely to jeopardize the continued existence of any federally-listed endangered or threatened species or adversely modify or destroy critical habitat of such species. According to U.S. Fish & Wildlife Service, Information for Planning and Conservation (IPaC) website (<https://ecos.fws.gov/ipac/>) on June 29, 2016, there are no federally listed threatened and endangered species and no critical habitat found in the project area.

Since there are currently no federally listed species in the project area, the EPA finds that reissuance of this Permit will have no effect on any of the species listed by the U.S. Fish and Wildlife Service under the Endangered Species Act. Therefore, no consultation is required.

IX. National Historic Preservation Act (NHPA) 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 EPA has

evaluated its planned reissuance of the NPDES Permit for the Lodge Grass WWTF to assess this action's potential effects on any listed /eligible historic properties or cultural resources. In a review of properties on the National Register of Historic Places, there are no listed properties in the project vicinity. Additionally, the upgrades to the lagoon system are associated with ground disturbance in the same area as the existing system. Therefore, the EPA does not anticipate any impacts on listed/eligible historic properties or cultural resources. During the public comment period, the EPA will notify the Tribal Historic Preservation Officer of the planned issuance of this NPDES Permit and request input on potential effects on historic properties and the EPA's preliminary determination of no effect.

X. Miscellaneous

The renewal Permit will be issued for a period of approximately five years. The Permit effective and expiration dates will be determined at the time of Permit issuance.

Permit drafted by Lisa Kusnierz, 8MO, July 6, 2016.

Permit reviewed by Amy Clark, Qian Zhang, VelRey Lozano, and Robert D Shankland, Wastewater Unit, 8P-W-WW, August 25, 2016.