

STATEMENT OF BASIS

PERMITTEE: United States Bureau of Reclamation

PERMIT NO.: MT-0022993

RECEIVING WATERS: Yellowtail Afterbay Reservoir/Bighorn River

FACILITY: Yellowtail Dam Wastewater Treatment Facility

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LOCATION: S ½ of Section 18, Township 6S, Range 30E
Latitude 45.3075° N and Longitude 107.9575° W
Crow Reservation, Big Horn County, Montana

PERMIT TYPE: Indian Country, Minor Permit, Federal Facility, Permit Renewal

I. Permit Status

This statement of basis is for the renewal of the National Pollutant Discharge Elimination System (NPDES) permit for the Bureau of Reclamation's (BOR) Yellowtail Dam wastewater treatment facility. The current Permit was issued in 2010 with an effective date of October 1, 2010, and an expiration date of September 30, 2015. The application for permit renewal was dated April 13, 2015 and considered complete May 15, 2015. The current Permit has been administratively extended until the renewal permit is issued and in effect.

II. Facility Information

This Permit is for the discharge from the wastewater treatment facility (WWTF) that treats the sanitary wastewater from the 20 employees who work four days per week at the Yellowtail Dam and power plant. The dam, which is operated by the BOR, is located on the Bighorn River in southeastern Montana within the Crow Reservation and the National Park Service's Bighorn Canyon National Recreation Area. The WWTF is located just east of the power plant at the base of the dam and it discharges continuously near the east bank to the Yellowtail Afterbay Reservoir/Bighorn River. The design flow of the WWTF is 0.0006 million gallons per day (MGD).

The WWTF is a package plant and includes an extended mechanical aeration treatment plant with two trickling sand filters and ultraviolet (UV) disinfection. Only one sand filter is used at a time, with the other kept in reserve until it is needed. The WWTF is set into concrete. There is no flow measuring device, but effluent flows are estimated using a flow meter in the treatment/distribution system. Over the past year, the WWTF flows have averaged between 2,400 and 3,000 gallons per month. Effluent samples are collected at the sampling valve located downstream of the UV disinfection unit and just before the discharge piping goes back into the concrete.

A. Current Effluent Limits and Characteristics

The effluent limitations in the current Permit are shown below in Table 1 and a summary of self-monitoring effluent data for the period of record (POR) from October 2010 through February 2016 is included in Table 2.

Table 1. Effluent Limitations in Current Permit

Effluent Characteristic	Effluent Limitation		
	30-Day Average a/	7-Day Average a/	Daily Maximum a/
5-Day Biological Oxygen Demand (BOD ₅), mg/L	30	45	N/A
Total Suspended Solids, mg/L	30	45	N/A
Oil and Grease, mg/L	N/A	N/A	10
BOD ₅ , percent removal a/	> 85%		
TSS percent removal a/	> 85%		
The pH of the discharge shall not be less than 6.0 or greater than 9.0 at any time.			

a/ See Definitions, Part 1.1, for definition of terms.

Table 2. Summary of Self-Monitoring Data for October 2010 – October 2015

Value Reported	BOD ₅		TSS		O & G	pH	E. coli
	mg/L	% Removal	mg/L	% Removal	Visual Observation	s.u.	CFU/100 mL
Maximum	58	100	27	100	None	7.4	3500
Minimum	<4	74	<10	66	None	6.0	<1
Average	7	98	6	97	None	6.9	560
No. of Samples	57	49	62	49	60	63	17
No. of Exceedances	3	1	0	1	0	0	N/A ¹

¹Monitoring requirement only

B. Compliance History

Based on Discharge Monitoring Report (DMR) data, there were five effluent violations during the POR. The 30-day average limitation on BOD₅ of 30 mg/L was exceeded three times, with values of 33, 40, and 58 mg/L. The percent removal requirements for BOD₅ and TSS were each not met once, with values of 73% and 66%, respectively. The failure to meet the TSS removal limit occurred when the influent concentration of TSS was unusually low (i.e., 79 mg/L) because a faulty valve resulted in dilution of the influent (file memo 2015).

The WWTF was last inspected by the EPA January 18, 2012. The WWTF has had periodic reporting violations but during the inspection the only finding was related to the facility not conducting influent monitoring because of the package plant layout. The facility subsequently made changes and resolved the issue.

III. Technology Based Effluent Limits (TBELs)

Although the WWTF treats sanitary wastewater and the facility is owned by a governmental agency, it is not considered a publicly owned treatment works (POTW) under the Clean Water Act (CWA) because it is owned by the federal government. To be considered a POTW, the treatment works must be owned by a state or municipality (as defined by section 502(4) of the CWA). There are no promulgated TBELs that apply to the discharge from this facility. However, the TBELs in the current Permit were determined using best professional judgement (BPJ) as provided for by section 402(a)(1) of the CWA. Because sanitary wastewater is being treated, BPJ was used to set the effluent limitations the same as the National Secondary Standards (NSS) as described in 40 CFR Part 133.102. Secondary treatment is defined in terms of effluent quality as measured by BOD₅, TSS, pH, and percent removal of BOD₅ and TSS.

The primary reasons for the percent removal requirements for TSS and BOD₅ in the NSS are to promote municipalities to reduce infiltration and inflow in their collection systems and to prevent intentional dilution of the influent. Because the wastewater at the Yellowtail Dam WWTF differs from a municipality and goes directly

from the power plant to the WWTF, infiltration and intentional dilution are not concerns and the percent removal requirements for TSS and BOD₅ are not applicable to this facility. Therefore, the TBELs for BOD₅, TSS, pH from the current Permit are being continued in this Permit (see Table 1), however, the percent removal requirements for TSS and BOD₅ will be removed. Under CWA § 402(o)(2)(B)(ii), the removal of the TSS and BOD₅ removal requirements from this Permit is not considered backsliding (i.e., relaxation of the permit limit) because these provisions were previously mistakenly applied as TBELs.

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 the Afterbay Reservoir/Bighorn River downstream of the Yellowtail Dam. The reservoir is approximately 2.2 miles long, has a surface area of approximately 181 acres, and a capacity of approximately 3,140 acre-feet. The primary purpose of the reservoir is to minimize the downstream effects of variable flows coming from the Yellowtail Dam. Minimum flows from Yellowtail Dam are unknown, but there is a USGS gaging station on the Bighorn River (USGS 06287000) just downstream from the Afterbay Reservoir dam. The flow records for this gaging station for the period October 1, 1985, to December 1, 2014, show a minimum daily flow of 999 cubic feet per second (cfs). The BOR tries to maintain a minimum flow of 2,000 or 2,500 cfs from the reservoir if the water is available. To maintain that minimum level of discharge from the Afterbay, discharges from the dam into the reservoir must be roughly the same. According to the Permittee, the flow from the dam into the reservoir is very seldom zero, and then only of a brief period of time. Using the minimum flow measured at the gaging station since 1985 to represent the critical condition for the reservoir (i.e., 999 cfs) and the design flow for the WWTF of 0.000928 cfs (0.0006 MGD), the dilution ratio for the discharge is 1,076,277:1.

B. Water Quality Considerations

The Crow Tribe does not have tribally-adopted or the 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.

Although Montana's water quality standards do not apply on the Crow Reservation, the state has classified Bighorn Lake/Yellowtail Reservoir (upstream of the dam) before it enters the Reservation as a C-3 water, and the Bighorn River downstream of the Reservation as a B-2 water. Both of these classifications have a suite of designated uses that apply: drinking, culinary, and food processing; bathing, swimming, and recreation; growth and propagation of fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply. These classifications give an indication of the potential uses of the Bighorn River downstream of the Yellowtail Dam. Additionally, Afterbay Reservoir is commonly used for recreation and fishing.

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 BOD_5), TSS, oil and grease, *Escherichia coli* (*E. coli*) bacteria and pH; and non-conventional pollutants such as total residual chlorine (TRC), ammonia (NH_3), nitrate/nitrite ($NO_{2/3}$), total nitrogen (TN), and total phosphorus (TP). Based on the domestic nature of the discharge and the extremely high dilution ratio, no other parameters are anticipated to have reasonable potential to cause or contribute to exceedances of 304(a) criteria or Montana water quality standards downstream in the Bighorn River.

1. Conventional Pollutants

TSS, BOD_5 , 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 BOD_5 , 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 BOD_5 , TSS, and pH.

Oil and Grease – The WWTF Permit currently has an effluent limitation for oil and grease of 10 mg/L. A review of the permit application and past permit records indicates the 10 mg/L limit was intended to protect water quality in the Big Horn River and was a translation of the 304(a) criteria for oil and grease pursuant to CWA § 301(b)(1)(C). This narrative criterion requires that “Surface waters shall be virtually free from floating nonpetroleum oils of vegetable or animal origin, as well as petroleum-derived oils.” However, both the current permit application and the permit record support a conclusion that oil and grease is not a pollutant of concern for this facility, and the permit limit is unnecessary. The sole source of influent to the facility is sanitary wastewater from the toilets and sinks serving the approximately 20 employees working at the Yellowtail Dam site. In addition, based on the required daily monitoring via observation, there have been zero observances of oil and grease since the limit was put in place in the 2005 permit. In light of this information, the EPA has concluded that oil and grease was mistakenly identified as a pollutant of concern for this facility, and there is no reasonable potential for oil and grease to be in the discharge and thus to cause or contribute to an exceedance of the narrative 304(a) criteria in the Bighorn River. As a result, the EPA has concluded that the 10 mg/L oil and grease effluent limit is not necessary to protect water quality, and thus does not belong in the Permit.

Generally, the Clean Water Act prohibits the reissuance of permits containing water quality based effluent limits that “are less stringent than the comparable effluent limitations in the previous permit.” CWA § 402(o)(1). Section 402(o)(2) provides some exceptions to this general rule. Under this section of the Act, a NPDES permit may be modified to contain less stringent effluent limits if “information is available which was not available at the time of permit issuance . . . and which would have justified the application of a less stringent effluent limitation at the time of permit issuance” In the present case, oil and grease monitoring data that was not available at the time of issuance clearly indicates that the discharge lacks the reasonable potential to cause or contribute to an exceedance of the narrative 304(a) water quality criterion for oil and grease. Similarly, the current permit application and permit record indicate that there are no identifiable sources of petroleum products or other oils and greases in the system. Thus, removal of the oil and grease effluent limit is permissible and does not constitute backsliding under the CWA. However, because it is possible that small quantities of oil and grease could be introduced to the system via a toilet or sink, the narrative prohibition on a visible oil sheen will remain in the Permit.

E. coli – The current Permit does not have a limit but has monitoring requirements for *E. coli*. Because bacterial criteria are protecting recreational uses, the EPA in Region 8 no longer allows mixing to meet bacterial criteria. 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*. Although the WWTF has UV disinfection, based on 17 samples collected during the POR, five samples exceeded the monthly geometric mean criterion of 126 colony forming units (cfu)/100 mL and four of the samples exceeded the statistical threshold value of 410 cfu/100 mL (which should not be exceeded by more than 10 percent of samples). 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 already has UV disinfection, the new limit will be effective with the issuance of this Permit. Monthly monitoring will be required.

2. Non-conventional Pollutants

TRC – UV light treatment is used for effluent disinfection, so there is no reasonable potential for TRC and no effluent limit or monitoring is needed.

NH₃, NO_{2/3}, TN, and TP – There is no available effluent or ambient data for any of the nutrient parameters. However, effluent data are available from a similar facility at Libby Dam (MT0022390), which has a 0.006 MGD package plant that treats domestic wastewater from 30 employees. Twelve samples were analyzed for the above parameters between 2010 and 2013 and the maximum effluent concentrations are summarized in Table 3.

Table 3. Nutrient values from effluent at Libby Dam WWTF in mg/L

Ammonia	NO _{2/3}	TN	TP
0.48	56.0	56.6	11.7

All samples were below the detection limit for ammonia. Based on data at the USGS gage (06287000), summer temperatures in the Bighorn River rarely exceed 19 °C, and the pH values are typically around 8.0. Using these values, the applicable 304(a) chronic aquatic life criterion is 0.83 mg/L, which is greater than the maximum measured effluent concentration at Libby Dam. Given this, the concentrations measured in the river, and the dilution ratio, there is no reasonable potential for ammonia and no effluent limit is needed. No monitoring will be required.

The EPA 304(a) criterion for nitrate of 10 mg/L is based on protecting human health and the drinking water use. Assuming the design flow of 0.0006 MGD was being discharged into the river at a flow of 999 cfs, the discharge would not change the nitrate concentration of the river and there is no reasonable potential for nitrate. Therefore, no effluent limits are necessary for NO_{2/3}, and given the extremely high dilution ratio, no monitoring will be required.

Although Montana Department of Environmental Quality (DEQ) has identified the Bighorn River downstream of the Crow Reservation as non-wadeable and has no applicable numeric criteria for TN and TP, and there are no 304(a) criteria, DEQ does have ecoregional criteria for wadeable streams in the Northwestern Great Plains, where the Yellowtail WWTF is located. The criteria, which apply from July 1 to September 30, will be used as a screening tool for the reasonable potential analysis. The ecoregional value for TN is 1.3 mg/L and for TP is 0.150 mg/L. Just like with nitrate, if it were assumed that the WWTF was discharging at its design flow of 0.0006 MGD into the river at a flow of 999 cfs, the discharge would not change the concentration of the river and there is no reasonable potential TN and TP. Therefore, no effluent limits are necessary for TN and TP, and given the extremely high dilution ratio, no monitoring will be required.

V. Final Effluent Limitations

The effluent limitations in Table 4 will be applied to the discharge at Outfall 001, effective upon issuance of the Permit and remain in effect for the duration of the permit cycle. Limits are based on the most stringent of either the TBELs or WQBELs presented in Sections III and IV, respectively.

Table 4. Final Effluent Limitations for Outfall 001

Effluent Characteristic	Effluent Limitations		
	30-Day Average a/	7-Day Average a/	Daily Maximum a/
BOD ₅ , mg/L	30	45	N/A
TSS, mg/L	30	45	N/A
<i>E. coli</i> , cfu/100 mL	126	N/A	410
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 of floating solids or visible foam in other than trace amounts. There shall be no discharge which causes a visible oil sheen in the receiving water.			

a/ See Definitions, Part 1.1, for definition of terms.

VI. Self-Monitoring Requirements

The following requirements in Table 5 apply to Outfall 001. The effluent self-monitoring requirements for BOD₅ and TSS will remain the same as the existing Permit, but no influent monitoring is required because of the removal of the percent removal requirements. Since the effluent is entirely domestic wastewater and the WWTF has a documented history of pH values in a narrow range, pH monitoring will be decreased from weekly to monthly. Because the new Permit has a limit for *E. coli*, the monitoring frequency will increase from quarterly to monthly. Due to the low rate of the discharge, the facility cannot measure effluent flow with a meter. However, the facility does meter the flow rates from its distribution system during the four days employees are at the dam, and since most of that water ends up at the WWTF, it is representative of effluent flows. Therefore, effluent flow rates will be based on measurements collected at the water treatment/distribution system.

Table 5. Self-monitoring requirements for Outfall 001

Effluent Characteristic	Frequency	Sample Type a/
Total Flow, gallons	Daily b/	Instantaneous
Total BOD ₅ , mg/L	Monthly	Composite
TSS, mg/L	Monthly	Composite
<i>E. coli</i> , cfu/100 mL	Monthly	Grab
pH, units	Monthly	Grab

a/ See Definitions, Part 1.1, for definition of terms.

b/ Flow will be measured on a daily basis while the facility is staffed but will be reported as total flow (gallons per month).

A. Discharge Monitoring Reports

Discharge Monitoring Report (DMR) forms for the remainder of the year will be mailed out shortly. However, if the facility does not discharge, no DMR needs to be submitted. The Permittee may elect to use *NetDMR* to electronically submit DMRs instead of mailing paper DMRs. However, starting December 21, 2016, permittees must electronically report DMRs using *NetDMR*. 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. 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 and Wildlife Service, Information for Planning and Conservation (IpaC) website (<https://ecos.fws.gov/ipac/>) on April 19, 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.

VIII. 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 Yellowtail Dam WWTF to assess this action's potential effects on any listed or eligible historic properties or cultural resources. In a review of properties on the National Register of Historic Places, the only listed property in the project vicinity is the Bighorn Ditch Headgate, located approximately 0.7 miles downstream from the dam at the mouth of Bighorn Canyon. The EPA does not anticipate any impacts on listed/eligible historic properties or cultural resources because this Permit is a renewal and will not be associated with any significant ground disturbance or significant changes to the volume or point of discharge. The EPA notified the Tribal Historic Preservation Officer of the planned issuance of this NPDES Permit during the public comment period and did not receive a response regarding potential effects on historic properties or the EPA's preliminary determination of no effect.

IX. 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 Robert D Shankland, SEE, Wastewater Unit, 8P-W-WW, December 9, 2015.

Permit edited by Lisa Kusnierz, 8MO, April 19, 2016.

Permit reviewed by Al Garcia, Amy Clark, Qian Zhang, Robert Shankland, Craig Jorgenson, Wastewater Unit, 8P-W-WW, May 3, 2016.

X. Public Notice and Response to Comments

The Permit and statement of basis were public noticed in the Big Horn County News on July 28, 2016. The public comment period extended for 30 days and the documents were posted on the EPA's website. No comments were received during the public comment period. The civil and criminal penalties in Section 3.2 of the Permit were revised following the public comment period to reflect penalty increases that took effect August 1, 2016.