

## STATEMENT OF BASIS

PERMITTEE: City of Hardin

PERMIT NO.: MT0030767

RECEIVING WATER: Bighorn River

FACILITY: Hardin Water Treatment Plant

RESPONSIBLE OFFICIAL: Russell Dill, Public Works Director

FACILITY OPERATOR: Michael Hurff  
406 North Cheyenne Avenue  
Hardin, Montana 59034

LAGOON LOCATION: NE ¼ Section 24, Township 1S, Range 33E  
Latitude 45.732542° N and Longitude 107.580889° W  
Crow Reservation, Big Horn County, Montana

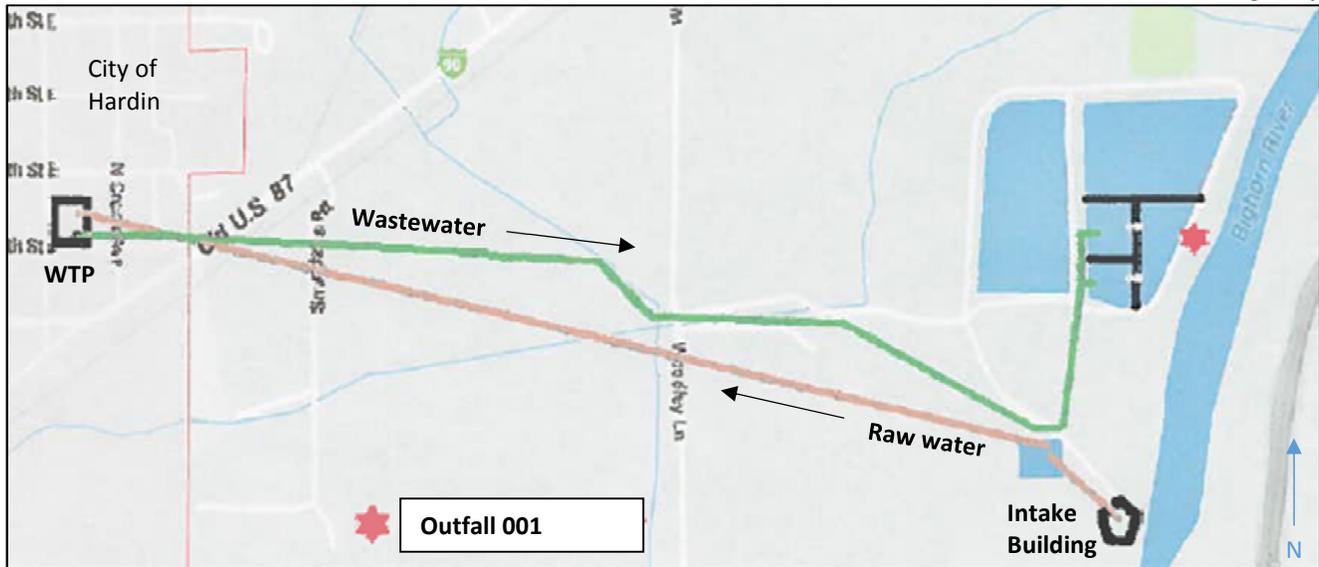
PERMIT TYPE: Indian Country, Minor Permit

### **I. Permit Status**

The current National Pollutant Discharge Elimination System (NPDES) Permit for the City of Hardin's (Hardin) water treatment plant (WTP) became effective on October 1, 2011, and expires September 30, 2016. In January 2016, Hardin submitted an application for renewal, and it was deemed complete by the U.S. Environmental Protection Agency (EPA) on February 23, 2016. Since the complete Permit application was submitted in a timely manner, the 2011 Permit will remain in effect until the Permit is re-issued.

### **II. Facility Information**

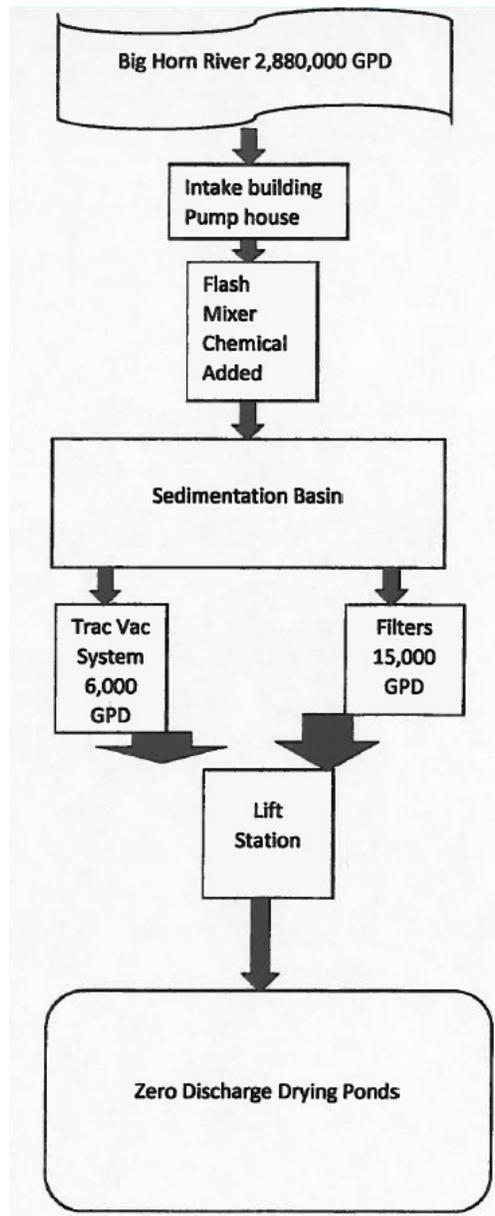
The WTP is located in the City of Hardin, Montana, which is located just outside the boundary of the Crow Indian Reservation. However, the lagoon system that receives the wastewater from the WTP and could potentially discharge is located on the west bank of the Bighorn River and within the boundary of the reservation. Figure 1 is based on a map submitted with the Permit renewal application and shows the location of the pumping station (i.e., intake building), the WTP in the City of Hardin, the lagoon system that receives the wastewater from the WTP, and the routing of flows from the river to the WTP and from the WTP to the lagoon system.



**Figure 1 – Map Showing Routing of Flows and Location of Pumping Station, WTP in Hardin and the Lagoon System Receiving Wastewater from the WTP.**

Approximately 1,700 gallons per minute of water is pumped from the Bighorn River for the WTP to provide 1,500 gallons per minute (2.16 million gallons per day) of treated water. The raw water is treated with aluminum sulfate, polyaluminum hydroxychlorosulfate, and a polymer for flocculation and then goes into a settling basin to be clarified. The sludge in the settling basin is removed three times per week with a Trac Vac system. The cleaning process takes approximately one hour and generates 100 gallons per minute of wastewater (i.e., 6,000 gallons per day). After flocculation, the treated water is filtered by sand filters and chlorinated prior to distribution. The filters are backwashed once per day and 15,000 gallons of backwash is generated during each backwash.

Both the filter backwash and wastewater from the Trac Vac go to two lagoons/drying ponds that are divided into three cells. The WTP lagoons are located next to the wastewater treatment plant for the City of Hardin. The backwash wastewater is pumped to a settling basin and then to a second cell of the lagoon. Backwash usually infiltrates or evaporates before it reaches the third cell. If the third cell fills up, wastewater can be discharged through a pipe to the Bighorn River via Outfall 001. However, the system is designed not to discharge and there has been no reported discharge. Figure 2 is excerpted from the permit renewal application and is a schematic diagram of the treatment process at the WTP.



**Figure 2 – Schematic diagram of treatment process at the Hardin WTP (from permit application).**

#### A. Compliance History

Since the WTP has not discharged, there is no effluent data to evaluate compliance. The most recent inspection conducted by the EPA was on July 10, 2013. All records met Permit requirements.

#### III. Technology-Based Effluent Limits (TBELs)

TBELs are typically based on either Effluent Limit Guidelines (ELGs) or Best Professional Judgement (BPJ) (if there are no applicable ELGs). ELGs 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.

There are no ELGs for water treatment plants. However, 40 CFR § 133.102 includes secondary treatment standards attainable through secondary or equivalent treatment, and the settling pond

technology used by the WTP is comparable to a waste stabilization pond, which qualifies as equivalent to secondary treatment. The secondary treatment standards for total suspended solids (TSS) and pH in Table 1 were previously used as TBELs for the WTP based on BPJ, which is authorized in 40 CFR § 125.3(c)(2), and they will be continued in this Permit. Because the discharge from the WTP only contains flocculated material from the source water and filter backwash effluent, the biological oxygen demand (BOD) limits and percent removal requirements for TSS and BOD that are part of the national secondary treatment standards are not applicable and will not be applied as TBELs.

<b>Table 1: Technology Based Effluent Limitations</b>			
<b>Effluent Characteristic</b>	<b>Units</b>	<b>30-Day Average</b>	<b>7-Day Average</b>
TSS	mg/L	30	45
The pH of the effluent shall not be less than 6.0 nor greater than 9.0 in any single sample or analysis.			

#### **IV. Water Quality-Based Effluent Limitations (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**

Any discharge from the WTP lagoon system would go to the Bighorn River less than a mile upstream of the confluence with the Little Bighorn River, and approximately 3.7 miles upstream of the Reservation boundary. The Bighorn River flows from south to north and flow in the river is regulated by the Yellowtail Dam, which is located approximately 40 miles upstream of the City of Hardin. It is approximately another 35 miles from Hardin to the confluence with the Yellowstone River. With the exception of the Little Bighorn River, there are no major tributaries to the Bighorn River between the Yellowtail Dam and the confluence with the Yellowstone River. The USGS has three active stream gaging stations on the Bighorn River: just downstream from the Yellowtail Afterbay Dam (#06287000, Bighorn River at St. Xavier, MT), eight miles upstream of Hardin (#06288400, Bighorn River at Two Leggins Bridge near Hardin), and about three miles from the confluence with the Yellowstone River (#06294500, Bighorn River above Tullock Creek near Bighorn, MT). Based on data compiled by the United States Geological Survey in the *Statistical Report of Streamflow in Montana and Adjacent Areas, Water Years 1900 through 2009*, the 7Q10 flow (i.e., seven-day, ten-year low flow) for the gage near St. Xavier is 793 cubic feet per second (cfs), and the 7Q10 flow for the gage above Tullock Creek is 986 cfs. The gage closest to Hardin (06288400) has only been in operation since 2012, which is a short time period to generate streamflow statistics. However, in comparing the annual flow for the water years 2013 – 2015, it has between 83 and 90 percent of the flow at the gage above Tullock Creek. Using the low end of that range to be more conservative, 83 percent of the 7Q10 for the gage above Tullock Creek is 818 cfs, and likely a good approximation of the 7Q10 value for the Bighorn River near Hardin.

## B. Water Quality Considerations

The Crow Tribe does not have tribally-adopted or EPA-approved water quality standards. However, the Tribe has assigned designated uses for the Bighorn River from the Yellowtail Dam to the Reservation boundary, which is the segment where the WTP could potentially discharge. These uses include all life stages of salmonids, drinking water after conventional treatment, full contact recreation, and agricultural and industrial use.

The northern boundary of the Reservation is located approximately four stream miles downstream of the WTP lagoon system. Although Montana's water quality standards do not apply on the Crow Reservation, NPDES permits must ensure that effluent limitations result in attainment of downstream water quality standards (40 CFR § 122.4(d)). The State has classified the Bighorn River downstream of the Reservation as a B-2 water. This classification has 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. The segment of the Bighorn River downstream of the Reservation until the mouth at the Yellowstone River is listed on the 2016 303(d) List as impaired for lead and mercury.

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 the development of WQBELs in the absence of tribal water quality standards. Additionally, because of the proximity of the WTP to the Reservation boundary and State waters, Montana's water quality standards are also used to inform the development of WQBELs and ensure the Permit is protective of Montana's water quality standards.

## C. Reasonable Potential Analysis

Besides TSS and pH, the other pollutants of concern based on treatment processes at the WTP are aluminum and total residual chlorine (TRC). Montana has a narrative water quality standard for sediment; no WQBEL is necessary because the TSS TBEL is sufficient to protect the narrative water quality standard. Typically, reasonable potential for causes of impairment downstream of a facility is also evaluated. Based on the treatment process at the WTP and because it has not discharged and does not plan to discharge except in a case of emergency, there is no reasonable potential for it to cause or contribute to exceedances of the lead or mercury standards downstream. The applicable Montana water quality standards and 304(a) criteria are summarized in Table 2.

<b>Pollutant</b>	<b>Montana Acute/Chronic</b>	<b>EPA 304(a) Acute/Chronic</b>
Aluminum <sup>1</sup> , µg/L	750/87	750/87
Total Residual Chlorine, µg/L	19/11	19/11
pH	6.5 – 9.0	6.5 – 9.0

<sup>1</sup>Montana's standard is for dissolved aluminum and the Blackfeet's standard and 304(a) criterion is for total recoverable aluminum.

The Montana water quality standards and 304(a) water quality standards are identical for TRC and pH but differ for aluminum in that Montana's standard applies to the dissolved fraction while the EPA CWA Section 304(a) criterion applies to the total recoverable fraction. The EPA believes it is reasonable and appropriate as a technical matter to include the EPA CWA Section 304(a) criterion to develop the

aluminum effluent limitation for this Permit, which will also comply with the State of Montana's water quality standard for aluminum.

The EPA Region 8 uses the methods described in the *Technical Support Document for Water Quality-based Toxics Control*, EPA, 1991 (TSD) to assess reasonable potential. The reasonable potential calculation (Equation 1) uses the receiving water concentration, the maximum projected effluent concentration, the design flow of the WTP, and the applicable receiving water flow to determine if the receiving water concentration after mixing ( $C_d$ ) exceeds the applicable water quality standard. If  $C_d$  is greater than the applicable water quality criteria, a WQBEL is required for the pollutant and must be included in the permit.

$$C_d = \frac{C_E Q_E + C_S Q_S}{Q_E + Q_S} \quad (\text{Equation 1})$$

Where:

$C_d$ =	receiving water concentration (RWC) after mixing, mg/L
$C_E$ =	critical effluent concentration, mg/L
$C_S$ =	RWC upstream of discharge, mg/L
$Q_S$ =	applicable receiving water flow, mgd
$Q_E$ =	facility design flow rate, mgd

**Total Recoverable Aluminum** – Because the facility has not discharged, there is no effluent data from the WTP to update the reasonable potential analysis. However, the reasonable potential analysis will be conducted using aluminum data from the Crow Agency Water Treatment Plant (MT0030538), which has a similar treatment system to the Hardin WTP. Since the Crow Agency Permit was re-issued in 2013, the maximum dissolved aluminum concentration out of eight samples is 0.82 mg/L. Following the TSD procedures and using the maximum measured concentration, the 95<sup>th</sup> percentile critical effluent concentration is 1.54 mg/L. Water samples were collected from the Bighorn River near St. Xavier in 2014/2015 to support development of the Crow Regional Water Treatment Plant, and provide an estimate of background concentrations of aluminum in the Bighorn River near Hardin; all total and dissolved aluminum samples were less than the detection limit of 0.03 mg/L. Backwashing and using the Trac Vac generates approximately 21,000 gallons per day (0.032 cfs) of wastewater at the WTP. Since the dilution ratio is of the river's 7Q10 to the potential discharge from the WTP is 25,562:1, full mixing with the 7Q10 flow is used as the applicable receiving flow, which is consistent with Montana's chronic mixing zone policy. As shown below, plugging these values into Equation 1 yields a  $C_d$  of 0.03 mg/L, which is less than the chronic standard of 0.087 mg/L. Therefore, there is no reasonable potential for chronic toxicity from aluminum and a monthly effluent limit to protect the chronic aquatic life standard is unnecessary.

$$C_d = (1.54 * 0.032 + 0.03 * 818) / 818.032 = 0.03 \text{ mg/L}$$

To prevent acute toxicity, no mixing is allowed for acute aquatic life standards. Following Equation 1 but providing no mixing zone (i.e.,  $Q_s = 0$ ), the  $C_d$  is 1.54 mg/L, which exceeds the acute standard of 0.75 mg/L. Therefore, the WQBEL is based on meeting the standard at the end of the pipe; to protect against acute toxicity to aquatic life the daily maximum limit for total recoverable aluminum will be 0.75 mg/L.

**TRC** – A mixing zone was previously allowed for TRC, but because of the toxicity of chlorine and the applicable standards being less than the detection level, a mixing zone will no longer be allowed. Therefore, the WQBELs for TRC will be based on meeting the water quality standard at the point of discharge.

**pH** – The 304(a) criterion and Montana pH criterion for the Bighorn River downstream of the Reservation is 6.5 to 9.0 standard units, which is more stringent than the TBEL of 6.0 to 9.0. This standard was previously used as the effluent limit and will be continued in this Permit.

#### A. Final Effluent Limitations

The proposed effluent limitations in Table 3 will be applied to the discharge at Outfall 001 during periods of discharge, 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. Section 402(o) of the Clean Water Act and 40 CFR 122.44(l) require, with some exceptions, that effluent limits or conditions in reissued Permits be at least as stringent as those in the existing Permit. All final effluent limits in Table 3 are at least, or more stringent, than the limits in the existing Permit. The effluent limits for TSS and pH are the same, the TRC limit became more stringent, and the aluminium limit changed from dissolved to total recoverable.

Effluent Characteristic	30-Day Average <u>a/</u>	Daily Maximum <u>a/</u>
Total Suspended Solids, mg/L	30	N/A
Total Recoverable Aluminum, mg/L	N/A	0.75
Total Residual Chlorine, mg/L <u>b/</u>	0.011	0.019
The pH of the discharge shall not be less than 6.5 or greater than 9.0 at any time.		

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

b/ For the purposes of the Permit, the minimum limit of analytical reliability in the analysis for total residual chlorine is considered to be 0.05 mg/L, and analytical values less than 0.05 mg/L shall be considered to be in compliance with this Permit.

#### VI. Self-Monitoring Requirements

If a discharge occurs from the lagoon, the following samples will be collected at the pipe located on the southeast side of the third cell. The self-monitoring requirements are the same as the previous Permit. The reporting requirement for self-monitoring will be changed so that reporting is only required if the WTP is discharging from Outfall 001.

Effluent Characteristic	Frequency	Sample Type <u>a/</u>
Total Flow, mgd <u>b/</u>	Weekly <u>c/</u>	Instantaneous
Total Suspended Solids, mg/L	Monthly <u>c/</u>	Grab
Total Recoverable Aluminum, mg/L	Monthly <u>c/</u>	Grab
pH, s.u.	Weekly <u>c/</u>	Instantaneous or Grab
Total Residual Chlorine, mg/L <u>d/</u>	Weekly <u>c/</u>	Instantaneous or Grab

a/ See Definitions, Part I.A. of the Permit for definition of terms.

b/ 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 during the reporting period and the daily maximum flow (maximum volume discharged during a 24-hour period) shall be reported. The date and time of the start and termination of each discharge shall be reported.

c/ Weekly inspections shall be conducted to determine if a discharge is occurring, has occurred, or is likely to occur. If a discharge is occurring, samples shall be taken at the frequency given in the above table. A minimum of one sample for each effluent characteristic shall be taken during each discharge. A written record of the weekly inspections must be maintained in a log book.

## 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](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. Endangered Species Act Requirements

Section 7(a) of the Endangered Species Act (ESA) 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 (USFWS), Information for Planning and Conservation (IPaC) website (<https://ecos.fws.gov/ipac/>) on July 25, 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 USFWS under the ESA. 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 potential discharge from the lagoon system for the wastewater from the Hardin WTP 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 in Big Horn County, Montana, there were several buildings in the City of Hardin, but nothing listed along the Bighorn River from the vicinity of the lagoon system north to the county line. 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. During the public comment period, the EPA notified the Tribal Historic Preservation Officer of the planned issuance of this NPDES Permit and requested their input on potential effects on historic properties and the EPA's preliminary determination of no effect. No response was received.

## 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. No comments were received during the public comment period.

Permit drafted by Robert D Shankland, SEE, Wastewater Unit, 8P-W-WW, July 26, 2016.

Revised by Lisa Kusnierz, Wastewater Unit, 8P-W-WW, August 22, 2016.

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