DEPARTMENT OF ENVIRONMENTAL QUALITY

WATER QUALITY DIVISION

MONTANA POLLUTANT DISCHARGE ELIMINATION SYSTEM (MPDES)

Permit Fact Sheet

PERMITTEE:	City of Chinook
PERMIT NO.:	MT0030473
RECEIVING WATER:	Milk River

FACILITY INFORMATION

Name:	City of Chinook Water Treatment Plant
Location:	250 Waterworks Lane Chinook, MT 59523 Blaine County
Contact:	John Blankenship, Water Superintendent PO Box 1177 Chinook, MT 59523

FEE INFORMATION

Type of Facility:	Minor Non-POTW
Number of Outfalls:	1 (For Fee Determination Only)
Type of Outfall:	001 – Process Water

I. Summary

Department of Environmental Quality (DEQ) proposes to renew the Montana Pollutant Discharge Elimination System (MPDES) permit for Chinook Water Treatment Plant (WTP), MT0030473. This fact sheet documents the legal requirements and technical rationale that serve the decision-making process involved with developing effluent limits, monitoring and reporting requirements, and special conditions which are specific to Chinook.

A. Permit Status

The previous permit became effective on December 1, 2014 and expires November 30, 2019. DEQ received the MPDES renewal permit application and applicable fees for Chinook on September 21, 2018. DEQ considered the application complete on October 9, 2018.

B. Proposed Changes to Effluent Limits

For this permit renewal, DEQ proposes the following:

- Previously set limits for total suspended solids, pH, dissolved aluminum, and total residual chlorine are retained.

II. Facility Information

A. Facility Description and Design Criteria

The City of Chinook's plant is a conventional potable water treatment plant serving approximately 1,500 residents. It is certified through DEQ's Public Water Supply program under PWSID MT0000174. The source water for Chinook is the Milk River. Raw water flows from a dam by gravity into a wet well and is pumped and metered into sediment basins prior to the facility's treatment system. The raw water is treated by in-line rapid mixing where polymers and aluminum sulfate are added. Next, the water enters one of the facilities two filter trains comprised of staged flocculation, sedimentation with tube settlers, and dual media filtration. Then, filtered water is disinfected through ultraviolet exposure, chlorinated to drinking water standards, and flows to a baffled clear well for contact time. The finished water is pumped into two elevated storage tanks for distribution to the town.

Facility wastewater consists of backwash and filter-to-waste water. Chlorinated backwash and filter-to-waste effluent are dechlorinated with sodium bisulfate and flow into two settling ponds with no biological treatment. No wastewater is recycled. The bentonite-lined settling ponds are operated in parallel. Finally, the clarified effluent is continuously discharged from the settling ponds to the Milk River through Outfall 001, which is submerged downstream from the dam. A badger flow meter is read daily to measure the continuous discharge from the settling ponds to the Milk River. The Chinook WTP Discharge Monitoring Reports (DMR) reported an average discharge of 0.05 million gallons per day (mgd).

B. Effluent Quality and Existing Permit Requirements

Table 1 lists the 2014-permit limits and effluent characteristics for Chinook for the period of record (POR), December 2014 through September 2018.

Table 1: Effluent Characteristics for the POR December 2014 through September 2018

Parameter	Units	Permit Limit		Max Value	Average Value	Sample Size
		Average Monthly [1]	Max Daily [1]			
Aluminum, Dissolved	mg/L	--	0.75	0.49	0.11	46
Chlorine, Total Residual (TRC)	mg/L	0.012 [2]	0.02 [2]	0.01	0.004	46
Total Suspended Solids (TSS)	mg/L	30	45	21.2	2.06	46
pH	s.u.	6.0 – 9.0		7.3 – 8.5[3]	7.98	46
Flow Rate	mgd	monitoring required		0.25 [4]	0.05	46

[1] See Definition section at the end of the MPDES permit for explanation of terms
[2] Values reported equal to or less than DEQ's required Reporting Value (RRV) of 0.1 mg/L are considered in compliance with this limit.
[3] Minimum to maximum reported pH values
[4] During POR, the highest daily maximum discharge was reported as 0.81 mgd in December of 2015. This high discharge event was conducted by the plant to make corrections to treatment processes and is not indicative of normal plant operations. Therefore, the second highest daily maximum is used for analysis in this fact sheet.

C. Compliance History

DEQ conducted a compliance evaluation inspection of Chinook WTP on December 13, 2017. No violations were issued during this inspection, nor were there any reported exceedances during the POR.

III. Proposed Technology-Based Effluent Limits (TBELs)

A. Applicable Guidelines

Technology-based effluent limitations (TBELs) represent the minimum treatment requirements implemented in MPDES permits. National Effluent Limit Guidelines (ELGs) have not been promulgated for discharges of treated wastewater from potable WTPs. When the United States Environmental Protection Agency (EPA) has not promulgated a standard for a specific industry, permit limits may be based on best professional judgement (BPJ). Development of a limit through BPJ considers the same statutory factors that EPA staff would use to promulgate a national effluent guideline and applies to specific circumstances relating to the applicant.

The Montana Board of Environmental Review (BER) has adopted general treatment requirements that establish the degree of wastewater treatment required to restore and maintain the quality of surface waters. This rule states that the degree of wastewater treatment is based on the surface water quality standards; the State's nondegradation policy; present and anticipated beneficial uses of the receiving water; the quality and flow of the receiving water; the quantity and quality of sewage; industrial wastes and other wastes to be treated; and the presence or absence of other sources of pollution in the same watershed.

B. Concentration-Based Limits

The existing TSS TBELs were set in the 2009-permit based on BPJ and will be retained in this renewal. DEQ determined that the effluent quality for treatment of WTP backwash solids is equivalent to national secondary treatment standards (NSS) for municipal domestic wastewater treatment lagoons as shown below:

Average Monthly Limit (AML): 30 mg/L
Maximum Daily Limit (MDL): 45 mg/L

Chinook WTP is not subject to an ELG or other production or mass-based limits. The limits above are commonly applied in WTP permits in lieu of ELGs. Limits for TSS will be retained and apply to the effluent set at 30 mg/L (AML) and 45 mg/L (MDL). In addition, limits representing NSS and restricting the effluent values for pH to 6.0-9.0 s.u. were set in the 2009-permit and will be retained.

C. Nondegradation Load Allocations

The most stringent long-term nondegradation threshold values for TSS were established in the 2009-issued permit of 55 lbs/day. This load allocation was calculated using the maximum 30-day average flow of 0.22 mgd (from the POR April 2003 through September 2008), the AML concentration of 30 mg/L, and a conversion factor as shown below:

TSS Nondegradation Load: 0.22 mgd x 30 mg/L x 8.34 = 55 lbs/day

This is compared to the maximum 30-day average load for this POR:

TSS Max 30-day Average: 0.09 mgd x 4.8 mg/L x 8.34 = 3.6 lbs/day

Chinook is an existing source and therefore is not a new or increased discharge. As shown, the WTP did not exceed the nondegradation load allocation during the POR, December 2014 through September 2018.

D. Final Technology-Based Effluent Limitations

This permit will retain TBELs based on BPJ and National Secondary Standards for TSS and pH as shown in Table 2.

Table 2. Technology-Based Effluent Limits for Outfall 001

Parameter	Units	Effluent Limits	
		Average Monthly	Average Weekly
Total Suspended Solids (TSS)	mg/L	30	45
pH	s.u.	6.0 – 9.0 (instantaneous)	

IV. Water Quality-Based Effluent Limitations

A. Applicable Guidelines

The Montana Water Quality Act states that a permit may only be issued if DEQ finds that it will not result in pollution of state waters. MPDES permits shall include limitations on all pollutants which will cause, or have reasonable potential to cause, an excursion of any water quality standard (WQS) including narrative standards. Water quality-based effluent limits (WQBELs) are designed to protect water quality standards and are required when TBELs are not adequately protective. The purpose of this section is to provide a basis and rationale for establishing effluent limits that will protect designated uses of the receiving water based on Montana water quality standards and water use classifications.

B. Receiving Water

The Chinook WTP discharges to the Milk River. The Milk River is classified as B-3 according to Montana Water Use Classifications. Waters classified B-3 are to be maintained suitable for drinking, culinary, and food processing purposes, after conventional treatment; bathing, swimming, and recreation; growth and propagation of non-salmonid fishes and associated aquatic life, waterfowl and furbearers; and agriculture and industrial water supply.

The Milk River segment near Chinook is listed as impaired on the 2016 303(d) list citing partial support for drinking water. The probable cause is mercury with sources most likely being natural sources, dams or impoundments, and agriculture. Impairments for primary contact recreation and aquatic life have not been assessed. A total maximum daily load (TMDL) for the Milk River segment has not been completed. Chinook's processes do not include mercury and it is therefore assumed that the WTP does not discharge mercury into the Milk River.

The Milk River 7-day 10-year low flow (7Q10) near Outfall 001 was calculated as 4.42 mgd using USGS StreamStats data. This low flow is consistent with previously assessed stream gauge data from the 2014-permit, establishing the 7Q10 as 4.36 mgd. Therefore, DEQ determined the conditions of the Milk River segment near Chinook have remained consistent and will apply in further discussion of mixing zones and available dilution in this fact sheet.

C. Applicable Water Quality Standards & Pollutants of Concern

The discharge from Chinook must comply with general prohibitions (narrative standards) of ARM 17.30.637(1) which require that state waters, including mixing zones, must be free from substances which will:

(a) settle to form objectionable sludge deposits or emulsions beneath the surface of the water or upon adjoining shorelines;
(b) create floating debris, scum, a visible oil film (or be present in concentrations at or in excess of 10 milligrams per liter), or globules of grease or other floating materials;
(c) produce odors, colors or other conditions as to which create a nuisance or render undesirable tastes to fish flesh or make fish inedible;
(d) create concentrations or combinations of materials which are toxic or harmful to human, animal, plant or aquatic life; and
(e) create conditions which produce undesirable aquatic life.

The need for additional WQBELs is determined based on a reasonable potential (RP) analysis for pollutants to determine if numeric or narrative water quality standards may be exceeded. Pollutants present in treated effluent from water treatment facilities, and those that are specific to Chinook, are summarized in Table 3.

Table 3. Identification of Pollutants of Concern

Parameter	Basis for Pollutant of Concern
Total Suspended Solids (TSS)	TBEL, previous permit
pH	TBEL, previous permit
Dissolved Aluminum	Known present, previous permit
Total Residual Chlorine (TRC)	Known present, previous permit

D. Mixing Zone

A mixing zone is an area where the effluent mixes with the receiving water and certain water quality standards may be exceeded. A mixing zone is granted on a case-by-case basis, must be the smallest practicable size with definable boundaries, and have a minimum effect on water uses. Mixing zones are not granted for technology-based standards. Acute aquatic life standards for any parameter may not be exceeded in any portion of the mixing zone unless DEQ specifically finds that allowing minimal initial dilution will not threaten or impair existing beneficial uses. Any previously allowed mixing zone will remain designated in a renewed permit unless there is evidence that the previously allowed mixing zone will impair existing or anticipated uses. The following mixing zones were allowed in the 2009 and 2014 permits and will be retained:

Standard Mixing Zone - The mean average flow from Chinook is less than one mgd and the dilution ratio with the Milk River is less than 100:1 (4.42 mgd 7Q10 stream flow/ 0.46 mgd max 30-day average discharge). Therefore, a standard mixing zone is granted, and discharge limits are based on the eligibility for a dilution ratio of 25% for dissolved aluminum (chronic only).

In accordance with standard mixing zone procedures, the length of a standard mixing zone must not extend downstream more than one-half the mixing width distance or ten times the stream width, whichever is more restrictive. DEQ defined a standard mixing zone for Chinook in the 2009-permit as 10 times the stream width, which in the case of the Milk River is 1,000 feet downstream from the point of discharge for chronic aquatic life standards.

Alternative Mixing Zone - In addition, DEQ determined that allowing an alternative mixing zone for total residual chlorine (TRC) will not threaten or impair existing beneficial uses. For an alternative mixing zone, 10% dilution for TRC effluent limits based on chronic aquatic life standards and 1% for limits based on acute aquatic life standards is allowed. Beginning at the point of discharge, alternative TRC mixing zone dimensions extend 100 feet downstream for chronic standards and 10 feet downstream for acute standards as established in the 2014-permit.

E. Reasonable Potential Analysis

The RP analysis predicts the impact of the discharge on the receiving water under design conditions. WQBELs are developed for each parameter that demonstrates RP to cause an exceedance of a water quality standard. DEQ uses a mass-balance equation (shown below) and a statistical approach outlined in Chapter 3 of EPA's *Technical Support Document for Water Quality-based Toxics Control* (EPA's TSD Manual) to determine RP for individual pollutants.

$$Q_rC_r = Q_sC_s + Q_dC_d \text{ (}\textit{Equation 1}\text{)}$$

Q_r = resulting in-stream flow after discharge ($Q_s + Q_d$; mgd)
C_r = resulting downstream pollutant concentration (after available dilution; mg/L)
Q_s = receiving water flow rate above point of discharge (mgd)
C_s = upstream receiving water pollutant concentration (mg/L)
Q_d = effluent flow rate (facility design flow rate; mgd)
C_d = effluent pollutant concentration (mg/L)

To determine if RP exists and begin solving for the variables listed in Equation 1, the facility's maximum reported effluent concentration (C_{max}) is converted into the projected critical effluent concentration (C_d). This process accounts for variation in effluent concentrations and is summarized in Table 4.

Table 4. Critical Effluent Concentrations								
	CV	Sample Size	→	TSD Multiplier	x	C_{max}	=	**C_d**
Dissolved Aluminum	0.68	46		1.07		0.49 mg/L		**0.52 mg/L**
Total Residual Chlorine	0.15	46		1.02		0.01 mg/L		**0.01 mg/L**

Next, the critical upstream flow (Q_s) is determined from the 7Q10 of the Milk River and the available dilution granted by the mixing zones discussed in section IV(D.)

Table 5. Critical Upstream Flow				
	7Q10 Low Flow	x Dilution (%)	=	**Q_s**
Aluminum, acute	4.42 mgd	0		**0 mgd**
Aluminum, chronic		25		**1.11 mgd**
TRC, acute		1		**0.04 mgd**
TRC, chronic		10		**0.44 mgd**

Equation 1 is then rearranged to solve for the receiving water pollutant concentration (C_r) with the variables specific to Chinook WTP and the Milk River. According to the calculations below, if the receiving water concentration exceeds the WQS, RP exists and a WQBEL must be established for those parameters. Since chlorine dissipates rapidly, the background concentration of TRC in the Milk River is assumed to be 0 mg/L. A background concentration of 0.04 mg/L is used for dissolved aluminum as established in the 2014-permit from previous upstream monitoring (more recent data is not available). For discharge flow rate (Q_d), the maximum flow from the POR was used for acute parameters and the maximum 30-day flow was used for chronic parameters.

Table 6. Receiving Water Pollutant Concentration and RP Analysis											
	((C_s (mg/L)	Q_s) (mgd)	+	(C_d (mg/L)	Q_d)) (mgd)	/	($Q_s + Q_d$) (mgd)	=	C_r (mg/L)	< or >	WQS (mg/L)	**RP?**
Aluminum, acute	0.04	0		0.52	0.25		0.25		0.52	<	0.75	**no**
Aluminum, chronic	0.04	1.11		0.52	0.09		1.20		0.076	<	0.087	**no**
TRC, acute	0	0.04		0.01	0.25		0.29		0.009	<	0.019	**no**
TRC, chronic	0	0.44		0.01	0.09		0.53		0.002	<	0.011	**no**

F. Proposed WQBEL Limits

Conventional Pollutants:

TSS and pH – The facility provides a significant reduction in solids and protects water quality standards through TSS and pH TBELs (section III). No additional WQBELs will be required for these parameters.

Non-conventional Pollutants:

Total Residual Chlorine – The WTP employs chlorine to disinfect processed water prior to distribution to the public water supply system. The addition of chlorine results in the added

process of dechlorination to backwash and filter-to-waste water prior to discharge from Outfall 001. As shown in the RP analysis in Table 6, no RP exists for TRC to exceed a receiving water quality standard. However, the 2014-permit calculated an MDL of 0.020 mg/L and an AML of 0.012 mg/L using an alternative mixing zone. These effluent limits will be retained to protect aquatic life standards.

Toxic Pollutants:

Dissolved Aluminum - The WTP employs aluminum sulfate as a coagulation agent to aid in flocculation, sedimentation, and filtration. Although the wastewater lagoons at the WTP are designed to remove the settleable portion of total recoverable aluminum, wastewater generated from this treatment process still contains dissolved aluminum. The analysis in Table 6 shows no RP to exceed a water quality standard. However, the 2009 and 2014-permit included a limit for aluminum set at 0.75 mg/L (MDL), which will be retained to protect aquatic life standards.

V. Final Effluent Limits

The final effluent limits in Table 7 will be applied to the discharge at Outfall 001 beginning on the permit effective date and lasting through the term of the permit.

Table 7. Outfall 001 Final Effluent Limits (1)

Parameter	Units	Maximum Daily Limit	Average Monthly Limit
Total Suspended Solids	mg/L	45	30
pH	s.u.	6.0 – 9.0	
Dissolved Aluminum	mg/L	0.75	--
Total Residual Chlorine (2)	mg/L	0.02	0.012

(1) See Definitions section at the end of the MPDES permit for explanation of terms
(2) The permittee will be in compliance if the TRC does not exceed the minimum detection level (ML) of 0.1 mg/L

There shall also be no discharge of floating solids or visible foam other than in trace amounts.
There shall be no discharge which causes visible oil sheen in the receiving water.
There shall be no discharge that settles to form objectionable sludge deposits or emulsions beneath the surface of the water or upon adjoining shorelines.

VI. Monitoring and Reporting Requirements

A. Outfall 001

Monitoring requirements are based on the type of treatment facility and the method of discharge. The samples collected and analyzed must be representative of the volume and nature of the facility's discharge. The Required Reporting Value (RRV) is DEQ's best determination of a level of analysis that can be achieved using EPA-approved methods or methods approved by DEQ.

Monitoring will start with the effective date of the permit and last for the duration of the permit cycle. All analytical procedures must comply with the specifications of 40 CFR Part 136. Chinook must submit NetDMR results for each month by the 28th of the following month. Chinook will

monitor the effluent quality at the point of discharge from Outfall 001 before it enters the Milk River.

The monitored parameters and frequency requirements are presented in Table 8. Monitoring is required during periods of discharge. If no discharge occurs during the reported period, "no discharge" shall be reported on the NetDMR.

Table 8. Monitoring Requirements for Outfall 001

Parameter	Units	Type [1]	Minimum Frequency	RRV [2]
Flow Rate	mgd	Instantaneous	Continuous	--
Total Suspended Solids	mg/L	Grab	1/Week	10
pH	s.u.	Instantaneous	1/Week	0.1
Dissolved Aluminum	mg/L	Grab	1/Week	0.009
Total Residual Chlorine	mg/L	Grab	5/Week	0.1

[1] See Definition section at end of permit for explanation of terms
[2] Required reporting value. Analysis must achieve these, or lower, RRVs

VII. Special Conditions

No special conditions or compliance schedules are included in this permit.

VIII. Public Participation

A. Public Notice

DEQ issued a public notice stating that a tentative decision has been made to issue an MPDES permit to the Town of Chinook and that a draft permit, fact sheet, and environmental assessment (EA) have been prepared. Details are below:

- Public Notice No. MT-19-01 dated January 14, 2019
- Public comments are invited any time prior to the close of business February 14, 2019
- Comments may be directed to:

  Department of Environmental Quality
  Water Protection Bureau — DEQWPBPublicComments@mt.gov
  PO Box 200901 — or
  Helena, MT 59620
- All comments received or postmarked prior to the close of the public comment period will be considered in the formulation of the final permit.
- DEQ will respond to all substantive comments and issue a final decision within sixty days of the close of the public comment period or as soon as possible thereafter.

All persons, including the applicant, who believe any condition of the draft permit is inappropriate shall raise all reasonably ascertainable issues and submit all reasonably available arguments supporting their position by the close of the public comment period.

B. Notification of Interested Parties

Copies of the public notice were mailed to the discharger, state and federal agencies, and persons who have expressed an interest in being notified of permit actions. A copy of the distribution list is available in the administrative record for this permit.

In addition to mailing the public notice, a copy of the notice and applicable draft permit, fact sheet and EA are posted on DEQ's website for 30 days. Any person interested in being placed on the mailing list for information regarding the MPDES permit should contact DEQ, reference this facility, and provide a name, address, and email address.

C. Public Hearing

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

D. Permit Appeal

After the close of the public comment period DEQ will issue a final permit decision, which is a final decision to issue, deny, modify, revoke and reissue, or terminate a permit. A permit decision is effective 30 days after the date of issuance unless a later date is specified in the decision, a stay is granted, or the applicant files an appeal.

Chinook may file an appeal within 30 days of DEQ's action to the following address:

Secretary, Board of Environmental Review
Department of Environmental Quality
1520 East Sixth Avenue
PO Box 200901
Helena, Montana 59620-0901

E. Additional Information

Requests for additional information or questions regarding this permit should be directed to the Water Protection Bureau at 406-444-5546

IX. Information Sources

Administrative Rules of Montana Title 17 Chapter 30 – Water Quality

- Subchapter 2 – *Water Quality Permit and Application Fees*
- Subchapter 5 – *Mixing Zones in Surface and Ground Water*
- Subchapter 6 – *Montana Surface Water Quality Standards and Procedures*
- Subchapter 7 – *Nondegredation of Water Quality*
- Subchapter 12 – *Montana Pollutant Discharge Elimination (MPDES) Standards*
- Subchapter 13 – *Montana Pollutant Discharge Elimination (MPDES) Permits*

CWAIC: Clean Water Act Information Center, Department of Environmental Quality. 2018. Accessed October 2018.

Federal Water Pollution Control Act (Clean Water Act), 33 U.S.C. §§ 1251-1387, October 18, 1972, as amended 1973-1983, 1987, 1988, 1990-1992, 1994, 1995 and 1996.

Integrated 303(d) Water Quality Report for Montana (2016).

Montana Code Annotated (MCA), Title 75-5-101, *et seq.*, "Montana Water Quality Act."

Montana DEQ. 2018. *Compliance Evaluation Inspection Report, City of Chinook.*

Montana DEQ. 2017. *Department Circular DEQ-7, Montana Numeric Water Quality Standards.*

Montana DEQ. Montana Pollutant Discharge Elimination System (MPDES) Permit Number MT0030473

- Administrative Record
- Renewal Application Forms DEQ-1 and EPA Form 2A, September 2018

US Code of Federal Regulations, 40 CFR Parts 122-125, 130-133, & 136.

USGS Stream Stats: *streamstats.usgs.gov*. Accessed November 2018