

**DEPARTMENT OF ENVIRONMENTAL QUALITY
PERMITTING and COMPLIANCE DIVISION
MONTANA POLLUTANT DISCHARGE ELIMINATION SYSTEM
(MPDES)**

Fact Sheet

PERMITTEE: Town of Ekalaka

PERMIT NUMBER: MT0020371

RECEIVING WATER: Russell Creek

FACILITY INFORMATION:

Name: Town of Ekalaka Wastewater Treatment Facility

Location: 60 Beaver Flats Road
Ekalaka MT 59324

Mailing Address: P.O. Box 338
Ekalaka, MT 59324
Carter County
Latitude 45°53'37" N Longitude 104°33'18" W

Contact: Stephen DeFord, Mayor

Telephone: (406) 775-8731

FEE INFORMATION:

Number of Outfalls: 1 (for fee determination purposes)

Type of Outfall: 001 – Public Minor POTW

I. Permit Status

The current Montana Pollutant Discharge Elimination System (MPDES) permit for the Town of Ekalaka Wastewater Treatment Facility (WWTF) became effective on November 1, 2009. The permit expired October 31, 2014. On April 14, 2014, DEQ received an application and the associated fees for renewal of the MPDES permit. DEQ issued a notice of application deficiency on May 8, 2014. The town responded to the application deficiency on June 2, 2014. The application was deemed complete on June 24, 2014. In accordance with ARM 17.30.1313, the 2009 permit is administratively extended. The administratively extended permit remains in full effect until a renewed permit is issued.

II. Facility Information

A. Facility Description

The Ekalaka WWTF serves the residents and businesses of the Town of Ekalaka with a total population of approximately 410. The WWTF is a 3-celled aerated lagoon facility. The original construction date is unknown; however the facility was upgraded in 1988. New aeration and ultraviolet (U.V.) disinfection systems were installed in 2005. Influent and effluent flow monitoring devices were installed during 2006. The facility influent can be split between the first two primary cells at the influent structure or operated in series. The third cell provides polishing prior to discharge to Russell Creek. Total detention time is approximately 35 days at design conditions. At current flows the detention time is about 70 days (2014 Technical and Financial Assistance Bureau Inspection Report). The permit application states that the design flow is 0.45 million gallons per day (mgd). However, the previous permit fact sheet and DEQ inspection reports show that the facility design flow is 0.051 mgd. The facility discharge is controlled by a float system with discharges from Outfall 001 to Russell Creek occurring approximately weekly. The discharge is considered intermittent.

Table 1 is a summary of the Town of Ekalaka WWTF design criteria from the permit application, the previous permit Statement of Basis, and an October 2014 Technical and Financial Assistance Bureau (TFAB) Inspection Report.

Table 1. Current Design Criteria Summary – Town of Ekalaka WWTF	
Facility Description: Continuous discharge 3-celled aerated lagoon with U.V. disinfection	
Construction Date: Last upgrade 1988	Modification Date(s): 2005, 2006
Design Year: 1988	
Design Flow, Average (mgd): 0.051	
Design BOD Removal (%): 89%	Design BOD Load (lb/day): 115
Design SS Removal (%): unknown	Design SS Load (lb/day): 127
Collection System: Combined [<input type="checkbox"/>] Separate [<input checked="" type="checkbox"/>]	
SSO Events (Y/N): no	Number: none
Bypass Events: no	Number: none
Inflow and Infiltration contribution (mgd): unknown	Source: none
Disinfection: Yes	Type: U.V.
Discharge Method: Intermittent	
Effluent Flow Primary Device: rectangular weir	
Effluent Secondary Flow Device: none	
Sludge Storage: none	
Sludge Disposal: land application/landfill	

B. Effluent Characteristics

Facility Discharge Monitoring Report (DMR) data from October 2010 through September 2015 are summarized in Table 2.

Table 2: DMR Effluent Characteristics for October 2010 through September 2015						
Parameter	Location	Units	2009 Permit Limit (7-d/30-d)	Maximum Value	Average Value	Number of Samples
Flow, Daily Average	Effluent	mgd	NA ⁽¹⁾	0.1	0.04	61
Biochemical Oxygen Demand (BOD ₅)	Influent	mg/L	NA ⁽¹⁾	550	260	60
	Effluent	mg/L	45/30	43	13.2	60
	Effluent	% removal	85	99	92	60
	Effluent	lb/day	19.1/12.8	20.2	4.3	60
Total Suspended Solids (TSS)	Influent	mg/L	NA ⁽¹⁾	870	245	60
	Effluent	mg/L	135/100	86	31	60
	Effluent	% removal	NA ⁽¹⁾	100	83	60
	Effluent	lb/day	42.5	52.8	11.7	60
<i>Escherichia coli</i> (<i>E. coli</i>) Bacteria, Apr. – Oct.	Effluent	Number per 100 mL	252/126	4,800	148	33
<i>E. coli</i> Bacteria, Nov. – Mar.	Effluent	Number per 100 mL	1,260/630	16,000	491	25
<i>E. coli</i> Bacteria ⁽²⁾	Effluent	Number per 100 mL	--	12	1.5	40
pH	Effluent	s.u.	6.0 to 9.0	9.9	7.1	60
pH ⁽²⁾	Effluent	s.u.	6.0 to 9.0	7.7	6.8	40
Footnotes: NA - Not applicable						
(1) No limit in previous permit, monitoring requirement only.						
(2) June 2012 through September 2015.						

C. Compliance History

Since the issuance of the 2009 permit the Town received 15 violation letters for exceedances of permit limits. Most of these exceedances were for *E. coli*, BOD percent removal, and pH. The majority of the exceedances occurred prior to 2012. DEQ and the Town entered into an Administrative Order on Consent (AOC) on June 27, 2011. Since that time DEQ technical assistance, operational changes, and improvements to the facility have resulted in compliance with the permit limits.

III. Proposed Technology-based Effluent Limits (TBELs)

A. Applicability

The Board of Environmental Review has adopted by reference 40 CFR 133 which sets minimum treatment requirements for secondary treatment or equivalent for publicly owned treatment works (POTW) [ARM 17.30.1209]. National Secondary Standards (NSS) as described in 40 CFR 133, are incorporated into all municipal permits. Secondary treatment is defined in terms of effluent quality as measured by five-day biochemical oxygen demand (BOD₅), total suspended solids (TSS), percent removal of BOD₅, TSS, and pH.

The regulations in 40 CFR 133.105 allow for the application of treatment equivalent-to-secondary effluent limitations (TES) to facilities that meet specific criteria. To qualify for TES, the facility must use either a trickling filter or waste stabilization pond as the principle process of treatment as stated in 40 CFR 133.101(g)(2) and the treatment works must also provide significant biological treatment of the municipality's wastewater [40 CFR 133.101(g)(3)]. Significant biological treatment is defined as aerobic or anaerobic treatment that consistently achieves 65% removal of BOD₅ [40 CFR 133.101(k)]. The Ekalaka WWTF is an aerated lagoon system and qualifies for consideration for TES.

As stated in 40 CFR 133.101(g)(1), facilities are further eligible for TES if the 95th percentile of the 30-day average concentration in the discharge from the treatment works exceeds the minimum level of effluent quality as set forth in 40 CFR 133.102(a)&(b) with proper operation and maintenance. Analysis of the DMR for the last 5 years shows:

- the 95th percentile for 30-day BOD₅ is 24.1 mg/L
- the 95th percentile for 30-day TSS is 70.0 mg/L

In the 2009 permit, the Ekalaka WWTF had BOD₅ concentration limitations reflective of NSS. The 95th percentile of the BOD₅ DMR data (above) indicates the facility consistently meets the NSS requirements for BOD₅. The renewed permit retains the previous permit limits for BOD₅, based on NSS. The 30-day and 7-day BOD₅ limitations are 30 mg/L and 45 mg/L, respectively.

Since September 2011 after entering into the AOC, the 5th percentile of the BOD₅ percent removal is 91.2%. This indicates compliance with the minimum BOD₅ percent removal effluent limit more than

95% of the time. The renewed permit will also retain the 2009 permit BOD₅ percent removal requirements based on NSS (85%) [40 CFR 136.102(a)(4)(iii)].

The 2009 permit limitations for TSS are based on Alternative State Requirement (ASR) of 100 mg/L (30-day average) and 135 mg/L (7-day average) for TSS, as per 40 CFR 133.103(c)&(d) and 105(d), in effect for the State of Montana, with no percent removal requirement.

The 95th percentile effluent quality for TSS, as noted above, exceeds both the NSS 30-day limitation of 30 mg/L and the 45 mg/L TES limitation. The ASR limits from the 2009 permit are continued in this permit renewal without a percent removal requirement.

B. Mass-based Limitations

Mass-based limits were calculated in the 2009 permit using the following equation and the TBELs limitations as proposed above:

$$\text{Load (lb/day)} = \text{Design Flow (mgd)} \times \text{Concentration Limit (mg/L)} \times 8.34 \text{ (lb}\cdot\text{L)/(mg}\cdot\text{gal)}$$

BOD₅

Mass-based Load Limitation:

$$\text{30-day average BOD}_5 \text{ load (lb/d)} = (0.051 \text{ mgd})(30 \text{ mg/L})(8.34) = 12.8 \text{ lb/d}$$

$$\text{7-day average BOD}_5 \text{ load (lb/d)} = (0.051 \text{ mgd})(45 \text{ mg/L})(8.34) = 19.1 \text{ lb/d}$$

TSS

Mass-based Load Limitations:

$$\text{30-day average TSS load (lb/d)} = (0.051 \text{ mgd})(100 \text{ mg/L})(8.34) = 42.5 \text{ lb/d}$$

$$\text{7-day average TSS load (lb/d)} = (0.051 \text{ mgd})(135 \text{ mg/L})(8.34) = 57.4 \text{ lb/d}$$

Loading limits for technology-based parameters of concern will apply to the effluent and will be maintained at the more stringent of the nondegradation allocations or mass-based loading limits calculated in this permit renewal.

C. Nondegradation Load Allocations

The provisions of ARM 17.30.701 - 718 (Nondegradation of Water Quality) apply to new or increased sources of pollution [ARM 17.30.702(18)]. Sources that are in compliance with the conditions of their permit and do not exceed the limits established in the permit or determined from a permit previously issued by the Department are not considered new or increased sources.

Nondegradation threshold values for the Ekalaka WWTF were calculated for BOD₅ and TSS during issuance of the 2009 permit. The BOD₅ and TSS allocations (12.8 lb/day and 42.5 lb/day respectively) were based on the design flow of 0.051 mgd and the concentration-based BOD₅ and TSS limits.

The average loads discharged by the facility from October 2010 through September 2015 were 4.3 lb/day for BOD₅ and 11.7 lb/day for TSS. Therefore, the facility is not a new or increased source.

D. Proposed TBELS

Table 5. Outfall 001 Proposed TBELS				
Parameter	Concentration (mg/L)		Load (lb/day)	
	Weekly Average ⁽¹⁾	Monthly Average ⁽¹⁾	Weekly Average ⁽¹⁾	Monthly Average ⁽¹⁾
BOD ₅	45	30	19.1	12.8
TSS	135	100	57.4	42.5
pH, s.u	Within the range of 6.0 to 9.0 (instantaneous)			
BOD ₅ Percent Removal (%)	85 %			
(1) See Definition section at end of permit for explanation of terms				

IV. Water Quality-based Effluent Limits (WQBELs)

A. Scope and Authority

The Montana Water Quality Act (Act) states that a permit may only be issued if the Department finds that the issuance or continuance of the permit will not result in pollution of any state waters [75-5-401(2), Montana Code Annotated (MCA)]. Montana water quality standards at ARM 17.30.637(2) require that no wastes may be discharged such that the waste either alone or in combination with other wastes will violate or can reasonably be expected to violate any standard. ARM 17.30.1344(1) adopts by reference 40 CFR 122.44 which states that MPDES permits shall include limits on all pollutants which will cause, or have a reasonable potential to cause an excursion of any water quality standard, including narrative standards. The purpose of this section is to provide a basis and rationale for establishing WWTF effluent limits, based on Montana water quality standards that will protect designated uses of the receiving stream.

The Act authorizes the issuance of point source discharge permits on a listed water body pending completion of a Total Maximum Daily Load (TMDL) provided that: 1) the discharge is in compliance with the provisions of 75-5-303 (Nondegradation Policy), MCA; 2) the discharge will not cause a decline in water quality for the parameters for which the water body is listed; and, 3) the minimum treatment requirements under 75-5-703(10), MCA are met.

B. Receiving Water

The Ekalaka WWTF discharges to Russell Creek. Previous permits and DEQ inspection reports state that Russell Creek is ephemeral. This designation is continued in this permit renewal.

Russell Creek is in the upper Little Missouri watershed, hydrologic unit code (HUC) 10110201. The stream is not listed on the 2014 303(d) list of impaired streams.

C. Applicable Water Quality Standards

Discharges to ephemeral streams are subject to the general provisions of ARM 17.30.635 through 637, 641, 645, and 646 but not to the specific water quality standards of ARM 17.30.620 through 629 [ARM 17.30.637(6)]. In addition to these standards, dischargers are also subject to the mixing zone rules at ARM 17.30 Subchapter 5 and the nondegradation rules at ARM 17.30 Subchapter 7.

D. Mixing Zone

The receiving water is ephemeral, therefore mixing is not applicable. The 2009 permit did not include a mixing zone and no mixing zone is granted in this renewal.

E. Basis and Proposed Water Quality-based Effluent Limits

ARM 17.30.1345 requires WQBELs to be developed for any pollutant for which there is reasonable potential for discharges to cause or contribute to exceedences of instream numeric or narrative water quality standards. Pollutants of concern applicable to the Ekalaka WWTF and Russell Creek are discussed below.

1. Conventional Pollutants

Total Suspended Solids (TSS), Biochemical Oxygen Demand (BOD₅) - The facility provides a significant reduction in biological material and solids through secondary treatment (Section III). No additional WQBELs are required for these parameters. The permit will include the narrative standards at ARM 17.30.637(1)(a) and (b) prohibiting objectionable sludge deposits or emulsions beneath the surface of the water or upon adjoining shorelines and floating debris, scum, visible oil film, or other floating materials.

Because the discharge is intermittent within each monitoring period, the monthly average load for BOD₅ and TSS shall be based on the average of the daily flow measurements (including days of zero discharge) and calculated as follows:

Average monthly BOD₅ or TSS concentration (mg/L) * Average monthly flow (MGD) * 8.34

Similarly, the maximum 7-day average load shall be calculated as:

BOD₅ or TSS concentration (mg/L) * Highest average weekly flow (MGD) * 8.34

pH – ARM 17.30.635(2) requires that sewage receive a minimum of secondary treatment as defined in 40 CFR 133 (NSS). The application of NSS provides a TBEL for pH within the range of 6.0 to 9.0. No

additional WQBEL for pH is required.

Oil and Grease (O&G) - ARM 17.30.637(1)(b) requires state waters be free from substances attributable to municipal discharges that will result in concentrations of oil and grease at or in excess of 10 mg/L. The 2009 permit included an effluent limit for oil and grease based on this standard. The facility's quarterly monitoring consistently shows detectable concentrations of oil and grease in the discharge. This permit renewal will continue the effluent limit and quarterly monitoring for oil and grease. The permit will also include the narrative standard prohibiting a visual oil film.

Escherichia coli (E. coli) Bacteria – There is an approved point source TMDL WLA for the Ekalaka WWTF for Russell Creek that limits fecal coliform bacteria to 200 colony forming units (cfu) as a 30-day geometric mean and 400 cfu as a 7-day geometric mean, effective between April 1 and October 31. *E. coli* standards replaced the fecal coliform standards. The standards for *E. coli* and fecal coliform are considered linearly equivalent. The applicable standards for *E. coli* are:

- a. April 1 through October 31, of each year, the geometric mean number of the microbial species *E. coli* must not exceed 126 colony forming units (cfu) per 100 milliliters (mL), nor are 10% of the total samples during any 30-day period to exceed 252 cfu per 100 mL [ARM 17.30.623(2)(a)(i)]; and
- b. November 1 through March 31, of each year, the geometric mean number of *E. coli* shall not exceed 630 cfu per 100 mL and 10% of the samples during any 30-day period may not exceed 1,260 cfu per 100 mL [ARM 17.30.623(2)(a)(ii)].

The 2009 *E. coli* limits are continued in the renewed permit as 30-day geometric mean and 7-day geometric mean of 126 cfu and 252 cfu respectively (April through October); 630 cfu and 1260 cfu limits apply November through March.

2. Nonconventional Pollutants

Nutrients (Total Nitrogen and Total Phosphorus as P): Russell Creek in the area of discharge is not listed as impaired for nutrients, the discharge is not a new or increased source, and the water quality standards for TN and TP do not apply to discharges to ephemeral streams. TN and TP limits and monitoring are not necessary.

3. Toxic Pollutants

Whole Effluent Toxicity (WET) Testing - ARM 17.30.637(1)(d) requires that state water be free from substances attributable to municipal waste that create condition which are harmful or toxic to human, animal, plant or aquatic life, except the Department may allow limited toxicity in a mixing zone provided that there is no acute lethality to organisms.

The Ekalaka WWTF is a small discharge with no identified industrial contributions. No WET testing is required for this permit cycle.

V. Proposed Final Effluent Limitations

Outfall 001

Final Limitations

Upon the effective date of the permit and lasting until the term of the permit, the quality of effluent discharged by the facility shall, as a minimum, meet the limitations as set forth below:

Table 6. Final Effluent Limitations, Outfall 001				
Parameter	Units	Average Monthly Limit⁽¹⁾	Average Weekly Limit⁽¹⁾	Maximum Daily Limit⁽¹⁾
BOD ₅	mg/L	30	45	NA
	lb/day	12.8	19.1	NA
BOD ₅ , percent removal	%	85 ⁽²⁾		
TSS	mg/L	100	135	NA
	lb/day	42.5	57.4	NA
pH	S.U.	6.0 – 9.0		
<i>E. coli</i> Bacteria ^(3,4)	cfu/100 mL	126	252	---
<i>E. coli</i> Bacteria ^(4,5)	cfu/100 mL	630	1,260	---
Oil and Grease	mg/L	NA	NA	10

Footnotes: NA means not applicable.
 (1) See Definition section at end of permit for explanation of terms.
 (2) Minimum. The arithmetic mean for effluent samples collected in a period of 30 consecutive days shall not exceed 15% of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period.
 (3) This limit applies during the period April 1 through October 31.
 (4) Report Geometric Mean if more than one sample is collected during reporting period.
 (5) This limit applies during the period November 1 through March 31.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

There shall be no discharge which causes visible oil sheen in the receiving stream.

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. Self-Monitoring Requirements

All analytical procedures must comply with the specifications of 40 CFR Part 136. Samples shall be collected, preserved and analyzed in accordance with approved procedures listed in 40 CFR 136. Starting with the effective date of the permit and lasting for the duration of the permit cycle, self-monitoring of effluent discharged at Outfall 001 shall be conducted at the discharge structure and samples will reflect the nature and volume of the monitored discharge. Table 7 summarizes the monitoring requirements for Outfall 001.

Table 7. Outfall 001 Monitoring Requirements					
Parameter	Unit	Sample Location	Sample Frequency	Sample Type ⁽¹⁾	Reporting Requirement
Flow	MGD	Effluent	Daily	Instantaneous ⁽²⁾	Max Daily & Avg. Monthly
5-Day Biochemical Oxygen Demand (BOD ₅)	mg/L	Influent	1/Month	Grab	Avg. Monthly
	mg/L	Effluent	1/Month	Grab	Avg. Weekly & Avg. Monthly
	lb/day	Effluent	1/Month	Calculated	Avg. Weekly & Avg. Monthly
	% Removal	Effluent	1/Month	Calculated	Average Monthly
Total Suspended Solids (TSS)	mg/L	Influent	1/Month	Grab	Average Monthly
	mg/L	Effluent	1/Month	Grab	Avg. Weekly & Avg. Monthly
	lb/day	Effluent	1/Month	Calculated	Avg. Weekly & Avg. Monthly
pH	s.u.	Effluent	1/Month	Instantaneous	Weekly Min & Max
<i>E. coli</i> Bacteria	cfu/100 mL	Effluent	1/Month	Grab	Max Weekly & Monthly Geometric Mean
Oil & Grease ⁽³⁾	mg/L	Effluent	1/Quarter	Grab	Maximum
Oil & Grease, visual sheen	Presence	Effluent	1/Quarter	Visual	Maximum
Footnotes:					
(1) See Definitions section at end of permit for explanation of terms.					
(2) Flow rate may also be calculated from daily totalizer readings.					
(3) Use EPA Method 1664, Revision A: N-Hexane Extractable Material (HEM).					

VII. Nonsignificance Determination

The proposed effluent limits and discharge flows for the Ekalaka WWTF do not constitute a new or increased source of pollutants pursuant to ARM 17.30.702(16). Therefore, a nonsignificance analysis is not required [ARM 17.30.705(1)].

VIII. Other Information

Not applicable