

**DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER QUALITY DIVISION
MONTANA POLLUTANT DISCHARGE ELIMINATION SYSTEM**

Fact Sheet

Permittee:	Town of Belt
Permit No.:	MT0021571
Receiving Water:	B & M Coulee
Facility Information:	Belt Wastewater Treatment Facility
Mailing Address:	P.O. Box 453 Belt, MT 59412
County:	Cascade
Contact:	Robin Franzen, Public Works Director
Telephone:	(406) 277-3621
Fee Information:	
Type:	Minor Publicly Owned Treatment Works
Number of Outfalls:	1 (for fee determination purposes)
Type of Outfall:	002 – Facility Discharge

I. Permit Status

The Montana Pollutant Discharge Elimination System (MPDES) permit for the Town of Belt (Town or Belt) Wastewater Treatment Facility (WWTF) was issued on July 26, 2011, became effective on September 1, 2011, and had an expiration date of August 31, 2016. The Department of Environmental Quality (DEQ) received a complete permit renewal application from the Town on March 14, 2016, and administratively extended the permit by letter dated March 23, 2016. The administratively extended permit is referenced in this Fact Sheet (FS) as the 2011-issued permit.

II. Facility Information

Current Facilities:

The Belt WWTF serves the Town of Belt, with a current population of approximately 592 people. The existing WWTF is a three-cell aerated/facultative lagoon system constructed in 1996. Cells 1 and 2 each have an effective volume of 2.7 million gallons (MG). Cell 3 is a 3.2 acre, 3.1 MG facultative lagoon cell that provides for settling of solids prior to discharge. The design flow of the facility is 0.155 million gallons per day (mgd) and the total detention time is 55 days (effective), with approximately 35 days (effective) under aeration. Outfall 002 discharges from Cell 3. The facility does not provide disinfection of the effluent. Outfall 001, which discharged infrequently from Cell 2, was eliminated in 2012.

Discharge from the facility is typically continuous, although “no discharge” was reported on the discharge monitoring report (DMR) for August, 2014. Effluent is discharged from a pipe to B & M Coulee, a tributary to Belt Creek, at approximately 47°23’36.6” N latitude, 110°55’20.3” W longitude.

Table 1: Current Design Criteria Summary* – Town of Belt WWTF	
Facility Description: Three-cell aerated/facultative lagoon system without effluent disinfection	
Construction Date: 1996	Modification Date: NA
Design Population: 825	Current Population: 592
Design Flow, Average: 0.155 mgd	Design Flow, Maximum Day: 0.450 mgd
Aerated Cells: 5.4 MG**	Third (Facultative) Cell: 3.1 MG**
Number Aerated Cells: 2	Detention Time @ Design Flow (Aeration): 35 days**
Design BOD Load: 148 lb/day	Detention Time @ Design Flow (Total): 55 days**
Design TSS Load: unknown	Collection System: Separate
Disinfection: No	Type: NA
Discharge Method: Continuous	

*Information from Statement of Basis dated April 2011 and DEQ files.

**Volume and detention times are “effective”, i.e. above the 2 foot depth.

The Town plans to upgrade its WWTF to include disposal of effluent via land application, i.e. spray irrigation on hay land during the warm weather months and storage of effluent during the cold weather months when land application is not appropriate. The intent of the WWTF upgrade project is to land-apply all effluent from the WWTF and cease discharge to B & M Coulee. After the land application system is completed and operational, a discharge to B & M Coulee would occur only as a result of an unusual situation.

The proposed upgrade of the Belt WWTF (referred to herein as the 2017 Project), will (preliminarily) include the following elements: modification of Cell 3 to provide approximately 11.9 MG of useable storage volume and install impermeable liner; modification of lagoon system piping; construction of irrigation pump station at Cell 3; install approximately 0.6 mile of 6 inch force main to the approximately 26 acre land application site; and installation of a center pivot sprinkler system. A 200-foot buffer strip beyond the reach of the sprinkler system will be provided within the land application site and the land application site will be fenced. Shallow earthen berms will be constructed where needed to prevent applied effluent from escaping the land application site. Aerated Cells 1 and 2 will be retained for treatment of the wastewater prior to storage and application to the land. It is proposed that construction on the 2017 Project will commence in July 2017 with completion of construction in September 2017.

Effluent data are summarized in Table 2. These data are based on the DMRs submitted by the Town for the discharge from the Belt WWTF for the period of record (POR) January 2013 through December 2016 plus, for metals, three sets of samples taken in 2011 and 2012. All data shown in Table 2 are from Outfall 002. No chlorination was used for effluent disinfection during the POR. In this FS, concentration levels of parameters are commonly expressed in terms of milligrams per liter (mg/L), micrograms per liter ($\mu\text{g/L}$), colony forming units per 100 milliliters (cfu/100ml) and standard units (s.u.). In addition, the terms “30-day average” and “monthly average” are used interchangeably throughout the FS, as are the terms “7-day average” and “weekly average”.

The Belt WWTF experienced numerous compliance difficulties over the years and, as a result, an Administrative Order on Consent (AOC) between DEQ and the Town was agreed upon effective January 4, 2012. Compliance issues that resulted in the AOC included more than 59 violations of the interim effluent limits of the permit from August 2007 through June 2011. Other violations included failure to conduct required monitoring and submit timely DMRs.

The 2011-issued permit has final effluent limits effective May 1, 2016. The POR for this renewal includes 40 months of interim effluent limits and 8 months of final effluent limits. The facility has experienced compliance difficulties over the POR with both the interim effluent limits and the final effluent limits for several parameters. A typographical error was noticed in the 2011-issued permit for the final concentration limits on total suspended solids (TSS). The correct final concentration limits for TSS are 45 mg/L (average monthly limit) and 65 mg/L (average weekly limit), as discussed and presented in the Statement of Basis (SOB) of April 2011. The average monthly and weekly mass limits for TSS in the 2011-issued permit are correct.

The WWTF exceeded the 30-day average five-day biochemical oxygen demand (BOD_5) concentration limit 15 times during the POR (interim and final limits for BOD_5 are the same), which represents a 32% violation rate. The 7-day average BOD_5 concentration limit was exceeded seven times during the POR. Numerous violation letters were sent by DEQ for permit effluent BOD_5 limit violations during the POR. The 95th percentile value for effluent BOD_5 from the WWTF calculates to be 70 mg/L, well above both the 30-day average BOD_5 limit and the 7-day average BOD_5 limit.

Table 2: Effluent Characteristics for the Period January 2013 through December 2016

Parameter	Units	2011-Permit Limits ⁽¹⁾	Minimum ⁽²⁾	Maximum	Average ⁽²⁾	Number of Samples ⁽²⁾
Flow, Daily Average	mgd	-	0.02	0.04	0.03	47
5-Day Biochemical Oxygen Demand ⁽³⁾	mg/L	30/45	7	100	28	47
Total Suspended Solids ⁽³⁾	mg/L	45/65	1	108	44	47
pH ⁽⁴⁾	s.u.	6.0 – 9.0	7.2	8.9	-	47
<i>Escherichia coli</i> ⁽⁵⁾	cfu/100ml	126/252	49	18,321	2,695	27
<i>Escherichia coli</i> ⁽⁶⁾	cfu/100ml	630/1,260	728	33,930	6,377	20
Oil & Grease	mg/L	10	ND	3	2	8
Temperature	°C	-	1.6	22.3	10.7	47
Chlorine, Total Residual ⁽⁷⁾	mg/L	0.011/0.019	“no chlorination”			-
Ammonia, as N	mg/L	-	0.02	12.9	7.7	47
Kjeldahl Nitrogen, as N	mg/L	-	8.1	19.6	13.6	15
Nitrate + Nitrite, as N	mg/L	-	0.02	0.49	0.14	16
Total Nitrogen, as N	mg/L	-	8.6	19.6	13.8	15
Total Phosphorus, as P	mg/L	-	0.52	5.59	3.83	47
Arsenic, Total Recoverable ⁽⁷⁾	µg/L	7/10	ND ⁽⁸⁾	1	1	10
Cadmium, Total Recoverable ⁽⁷⁾	µg/L	0.34/0.50	ND ⁽⁸⁾	ND ⁽⁸⁾	ND ⁽⁸⁾	10
Iron, Total Recoverable ⁽⁷⁾	µg/L	1,123	30	160	92	10
Lead, Total Recoverable ⁽⁷⁾	µg/L	4.5/6.5	ND ⁽⁸⁾	ND ⁽⁸⁾	ND ⁽⁸⁾	10
Zinc, Total Recoverable ⁽⁷⁾	µg/L	96/140	ND ⁽⁸⁾	20	11	10
Chromium, Total Recoverable	µg/L	-	ND ⁽⁸⁾	ND ⁽⁸⁾	ND ⁽⁸⁾	5
Copper, Total Recoverable	µg/L	-	2	4	3	5
Mercury, Total Recoverable	µg/L	-	ND ⁽⁸⁾	ND ⁽⁸⁾	ND ⁽⁸⁾	5
Selenium, Total Recoverable	µg/L	-	ND ⁽⁸⁾	ND ⁽⁸⁾	ND ⁽⁸⁾	2
Silver, Total Recoverable	µg/L	-	ND ⁽⁸⁾	ND ⁽⁸⁾	ND ⁽⁸⁾	5
Hardness, as CaCO ₃	mg/L	-	327	403	366	10
Salinity	mg/L	-	0.43	0.60	0.52	9

Footnotes:

1. Metals limits effective May 1, 2016. Oil & Grease limit is maximum daily limit.
2. Number of samples are months in which a discharge occurred & the effluent was sampled for the parameter. No discharge was reported for August 2014. Minimum & average values are from actual discharges. Effluent characteristics for metals include 1 sample in 2011 & 2 samples in 2012.
3. 30-day average/7-day average limits.
4. Minimum & Maximum reported each month.
5. Geometric mean rather than average for *E. coli*. Limits effective April 1 through October 31.
6. Geometric mean rather than average for *E. coli*. Limits effective November 1 through March 31.
7. 30-day average/maximum daily limits.
8. ND is “not detected at laboratory reporting levels”. ND level for cadmium is 0.08 µg/L and ND level for lead is 0.5 µg/L. The ND levels for the non-limited metals of chromium, mercury, selenium and silver complied with the reporting levels required by the permit.

The WWTF has exceeded the (correct) 30-day average TSS concentration limit 18 times during the POR. That represents a 38% violation rate for the 30-day average TSS limit. The 7-day average TSS concentration limit was exceeded eight times during the POR. Numerous violation letters were sent by DEQ for permit effluent TSS limit violations during the POR, only two of which were for exceedences of the final TSS concentration limits that were in error. The 95th percentile value for effluent TSS from the WWTF calculates to be 83 mg/L, well above both the 30-day average TSS limit and the 7-day average TSS limit, based on TES.

The final and interim effluent limits for *Escherichia coli* (*E. coli*) bacteria are the same and were applicable on the effective date of the 2011-issued permit. The *E. coli* limits represent the water quality standards for B & M Coulee, with winter limits and more stringent summer limits. The WWTF exceeded the 30-day average effluent limits for *E. coli* during all but one month of the POR. In addition, the 7-day average effluent limits for *E. coli* were exceeded in all but two months during the POR. The *E. coli* effluent limit exceedences are to be expected because the WWTF does not have effluent disinfection capabilities. Numerous violation letters were sent by DEQ for permit effluent *E. coli* limit violations during the POR.

Monthly DMRs indicate that neither the pH limits nor the effluent limit for oil and grease (O&G) were exceeded during the POR.

The final effluent limits of the 2011-issued permit included average monthly limits (AML) and maximum daily limits (MDL) for arsenic, cadmium, iron (AML only), lead and zinc concentrations; and AML load limits for the same metals. All metals are analyzed and reported as total recoverable (TR). For the POR, and including one set of samples taken in 2011 and two sets of samples taken in 2012, no TR metals levels were reported that exceeded the final effluent limits that became effective May 1, 2016.

III. Technology-based Effluent Limits

a. Applicability to Technology-based Limits

The Montana Board of Environmental Review, in Administrative Rules of Montana (ARM) 17.30.1203, adopted by reference 40 Code of Federal Regulations (CFR) 133 which defines minimum treatment requirements for secondary treatment, or the equivalent, for publicly owned treatment works (POTW). Secondary treatment is defined in terms of effluent quality as measured by BOD₅, TSS, percent removal of BOD₅ and TSS, and pH.

These requirements may be modified on a case-by-case basis for facilities that are eligible for treatment equivalent to secondary treatment (TES) or alternative state requirements (ASR) for TSS as provided for in 40 CFR 133.105. To determine if a facility is eligible for TES the facility must meet the requirements of 40 CFR 133.101(g) summarized as follows:

- 1) The BOD₅ and TSS effluent concentrations consistently achievable through proper operation and maintenance of the treatment works exceed the minimum effluent quality described for secondary treatment in 40 CFR 133.102,
- 2) The treatment works utilize a trickling filter or waste stabilization pond, and

- 3) The treatment works utilize biological treatment that consistently achieves a 30-day average of at least 65% removal.

The Belt WWTF exceeded the 30-day average concentration limit for BOD₅ approximately 32% of the time and exceeded the 7-day average concentration limit approximately 15% of the time over the POR. A properly designed and operated aerated lagoon system is considered to be capable of meeting the national secondary treatment standards (NSS) for BOD₅ on a consistent basis.

The technology-based effluent limits (TBELs) in the 2011-issued permit are based on NSS for BOD₅ and pH; and are based on the TES for TSS. The 2011-issued permit limits for BOD₅ are effluent concentrations plus 85% removal and concentrations plus 65% removal for TSS. Both BOD₅ and TSS also have mass limits. As discussed on page 3 of this FS, the final TSS effluent concentration limits in the 2011-issued permit were a typographical error and should have been TES limits rather than NSS. The final TSS effluent mass limits in the 2011-issued permit were based on TES and were correct.

Based on a review of the DMR data for the POR, the effluent from the WWTF would not have met upgraded TSS standards such as the NSS, which are 30 mg/L for a 30-day average concentration limit and 45 mg/L for a 7-day average concentration limit. In fact, the WWTF only complied with the TES 30-day average concentration limit 62% of the time. Application of TSS effluent limits based on NSS is not appropriate for the current WWTF.

Proposed TBEL-based effluent limits are shown on Table 3. The BOD₅ limit is NSS and includes a requirement for 85% removal. The pH limit is NSS. The TSS limit is TES for lagoons (including aerated lagoons) with a requirement for 65% removal. Mass limits for both BOD₅ and TSS are included in accordance with ARM 17.30.1345(8)(a) and are based on design flow.

Mass Limit Calculations:

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

BOD ₅ :	30-day Ave:	Load = (0.155)(30)(8.34) = 38.8 = 39 lb/day
	7-day Ave:	Load = (0.155)(45)(8.34) = 58.2 = 58 lb/day
TSS:	30-day Ave:	Load = (0.155)(45)(8.34) = 58.2 = 58 lb/day
	7-day Ave:	Load = (0.155)(65)(8.34) = 84.0 = 84 lb/day

Table 3: Technology-based Effluent Limits				
Parameter	Units	30-Day Average	7-Day Average	Rationale
BOD ₅	mg/L	30	45	40 CFR 133.102(a)
	lb/day	39	58	
	% removal	85%	-	
TSS	mg/L	45	65	40 CFR 133.105(b)
	lb/day	58	84	
	% removal	65%	-	
pH	s.u.	6.0-9.0 (instantaneous)		40 CFR 133.102 (c)

b. Nondegradation Allocated Loads

Nondegradation allocated loads for BOD₅ and TSS were not officially developed for the Belt WWTF under a previous permitting action. However, had such nondegradation loads been developed in the mid-1990s, they would likely have reflected the design criteria established for the existing WWTF, which was constructed in 1996. The design criteria included a design flow of 0.155 mgd (see Table 1) and a design monthly average effluent BOD₅ of 30 mg/L and a design monthly average effluent TSS of 100 mg/L.

Table 4 summarizes the 1996 design effluent loads for the WWTF and the actual calculated average loads discharged from the WWTF for the three full calendar years in the POR, i.e. 2014, 2015 and 2016. The data indicate that the facility did not exceed the 1996 WWTF design loads for effluent BOD₅ and TSS.

Table 4: Comparison of 1996 WWTF Design Loads & Actual Loads				
Parameter	Design Load (lb/day)	Actual Load* (lb/day)		
		2014	2015	2016
BOD ₅	39	6.0	8.6	6.4
TSS	129	11.8	14.2	11.1

*Actual loads are based on annual averages of the monthly values reported on DMRs. 2014 data based on 11 months because the WWTF did not discharge in August 2014.

IV. Water Quality-based Effluent Limits

a. Scope and Authority

Permits are required to include water quality-based effluent limits (WQBELs) when TBELs are not adequate to prevent excursions of state water quality standards (40CFR 122.44 and ARM 17.30.1344). ARM 17.30.637(2) states that no wastes may be discharged that can reasonably be expected to violate any state water quality standards. Montana water quality standards (ARM 17.30.601, *et.seq.*) define both water use classifications for all state waters and numeric and narrative standards that protect those designated uses.

b. Receiving Water

The Belt WWTF discharges treated effluent to B & M Coulee, a tributary to Belt Creek. B & M Coulee is ephemeral in nature. Because of the discharge from the Belt WWTF, B & M Coulee contains treated effluent for at least part of the approximately 0.1 mile above its confluence with Belt Creek. It is not known whether or not the wetted portion of B & M Coulee that results from the Belt WWTF discharge, actually reaches Belt Creek on a year-round basis. Belt Creek below Otter Creek to the Missouri River is classified B-2 according to Montana Water Use Classifications [ARM 17.30.610(1)(c)(ii)]. However, B & M Coulee is classified as B-1 according to Montana Water Use Classifications [ARM 17.30.610(1)(c)(iii)].

Waters classified B-2 are to be maintained suitable for drinking, culinary, and food processing purposes, after conventional treatment; bathing, swimming, and recreation; growth and marginal propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply [ARM 17.30.624(1)].

Waters classified B-1 are to be maintained suitable for drinking, culinary, and food processing purposes, after conventional treatment; bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply [ARM 17.30.623(1)].

Belt Creek, in the vicinity of the Town of Belt and B & M Coulee, is located within the Missouri-Sun-Smith watershed identified as United States Geological Survey (USGS) Hydrological Unit Code (HUC) 10030105 and Montana assessment unit MT41U001_012. This assessment unit was listed as “not fully supporting beneficial uses” on the 2016 303(d) list. The probable impaired uses are agriculture, aquatic life and drinking water. Insufficient information exists to determine if the beneficial use of primary contact recreation is fully supported or not fully supported. The probable causes for impairment are aluminum, cadmium, iron, lead, zinc, salinity, sedimentation/siltation, alteration in stream-side or littoral vegetative covers, and other anthropogenic substrate alterations. The probable sources are acid mine drainage, impacts from abandoned mine lands, channelization, grazing in riparian or shoreline zones, and new highway/road/bridge/infrastructure construction.

Total Maximum Daily Loads (TMDLs) were developed by DEQ for metals in the assessment unit in 2010 and approved by EPA in 2011. The pertinent report for development of the metal TMDLs is The Missouri-Cascade and Belt TMDL Planning Area Metals Total Maximum Daily Loads and Framework Water Quality Improvement Plan (PLAN), dated January 24, 2011. Metals for which TMDLs were developed for lower Belt Creek are arsenic, cadmium, iron, lead and zinc.

No United States Geological Survey (USGS) gaging stations exist on Belt Creek and none exist on B & M Coulee. Since B & M Coulee is an ephemeral stream, except where wetted by the discharge from the Belt WWTF, the 7-day, 10-year low flow (7Q10) of B & M Coulee is zero. Very little flow data exist for Belt Creek in the vicinity of Belt and B & M Coulee. In June and again in August of 2009, DEQ measured streamflows in Belt Creek at five locations from above Belt to several miles downstream from B & M Coulee. The June flows at the five locations averaged 363.3 cubic feet per second (cfs) and the August flows at the five locations averaged 26.2 cfs. In addition, on August 27, 2003, the Montana Bureau of Mines and Geology (MBMG) measured a flow in Belt Creek of 0.2 cfs at a location in Belt (information provided by Water Quality Planning Bureau, DEQ). DEQ also measured flows in June of 1973 (100cfs), September of 1973 (0.1 cfs) and June of 1975 (150 cfs). Although lower Belt Creek streamflow data are very limited, the 10th percentile value of existing flow data is 0.2 cfs [0.13 mgd]. The 10th percentile value is considered to be a reasonable estimation of a 7Q10 for lower Belt Creek. Using the same limited flow data, the seasonal (July-October) 14-day, 5-year low flow (14Q5) is estimated as the 20th percentile value, which also calculates to be 0.2 cfs [0.13 mgd].

There are insufficient water quality data on Belt Creek in the vicinity of the Town of Belt to provide a meaningful representation of the ambient water quality of lower Belt Creek, except for hardness and metals data presented in the PLAN and limited flow data.

c. Water Quality Standards

Discharges to surface waters classified B-1 and B-2 are subject to the specific water quality standards of ARM 17.30.623 (for B-1), ARM 17.30.624 (for B-2), Circular DEQ-7, and the general provisions of ARM 17.30.635 through 637. Discharges are also subject to ARM 17.30 Subchapter 5 (Mixing Zones), Subchapter 7 (Nondegradation of Water Quality), and Circular DEQ-12A (Montana Base Numeric Nutrient Standards).

d. Mixing Zone

A mixing zone is an area where effluent mixes with the receiving water and certain water quality standards may be exceeded [ARM 17.30.502(6)]. A mixing zone must be of the smallest practicable size, have a minimum effect on water uses, and have definable boundaries [MCA 75-5-301(4)]. No mixing zone will be granted that will impair beneficial uses [ARM 17.30.506(1)]. Acute 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 [ARM 17.30.507(1)(b)].

The discharge must comply with the general prohibitions 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.

ARM 17.30.505(1) provides that DEQ will determine the applicability of a mixing zone and, if applicable, its size, configuration, and location. Mixing zones are considered on a case-by-case basis. DEQ may decide to not grant a mixing zone or may decide to grant one of the four types of mixing zones, i.e. nearly-instantaneous, standard, alternative or modified, or source-specific mixing zone. Mixing zones are granted on a parameter-by parameter basis only and are not granted for TBELs based on NSS, effluent guidelines or other technology-based standards.

No mixing zone was allowed in B & M Coulee or in Belt Creek in the 2011-issued permit and a mixing zone was not specifically requested in the permittee's application for permit renewal.

e. Basis for WQBELs (Reasonable Potential and Calculations)

Permits are required to include WQBELs when TBELs are not adequate to protect water quality standards and no wastes may be discharged that can reasonably be expected to violate any standard. The need for WQBELs is determined based on reasonable potential (RP) calculations for certain pollutants to determine if numeric or narrative water quality standards may be exceeded. DEQ uses a mass balance equation (*Equation 1*) to determine reasonable potential based on the *EPA Technical Support Document for Water Quality-based Toxics Control (TSD)* and CIRCULAR DEQ-7.

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

Where:

- C_{RP} = receiving water concentration (RWC) after mixing, mg/L
- C_E = 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

Pollutants typically present in effluent from municipal wastewater treatment facilities that may cause or contribute to exceedences of water quality standards include conventional pollutants such as biological material (measured by BOD₅), TSS, O & G, *E. coli* and pH; non-conventional

pollutants such as TRC, ammonia, nitrate/nitrite, TN and TP; and toxic pollutants such as volatile organics and metals.

B & M Coulee certainly does not support a fishery. For Belt Creek in the general vicinity of B & M Coulee, Montana Fisheries Information System (MFISH) lists several species of fish as being common, including brown trout, rainbow trout and mountain whitefish, which are salmonids; and longnose dace, longnose sucker, mottled sculpin and white sucker, which are non-salmonids. MFISH did not identify any species of fish as being abundant.

Based on “Spawning Times of Montana Fishes,” Don Skaar, Montana Department of Fish, Wildlife & Parks, 3/6/01, salmonid fishes may be present in early life stages in this reach of Belt Creek year-round. Common non-salmonid fishes are present in early life stages from mid-March through July, depending on the species. Accordingly, salmonid and non-salmonid fishes are assumed to be present in early life stages in Belt Creek in the vicinity of B & M Coulee year-round.

1. Conventional Pollutants

TSS, BOD₅, and pH – The WWTF provides a significant reduction in biological material and solids through NSS for BOD₅ and pH and TES for TSS, as addressed in Section III. No additional WQBELs will be necessary for these parameters. Monthly monitoring will be required for effluent BOD₅, TSS and pH, as well as influent BOD₅ and TSS.

O & G – The 2011-issued permit has a daily maximum limit of 10 mg/L for O & G, along with a twice per year monitoring requirement. Effluent monitoring during the POR found a maximum level of O & G of 3 mg/L in two samples of a total of eight samples. Based on a calculated coefficient of variation (CV) of 0.4, the TSD Table 3.2 multiplier for eight samples is 1.6. Application of the TSD multiplier results in a TSD calculated maximum effluent value for O & G of 4.8 mg/L. RP does not exist to exceed the requirements of ARM 17.30.637(b) and an effluent limit is not needed for O & G. However, semi-annual monitoring for O & G will be required.

E. coli – The 2011-issued permit had effluent limits for *E. coli* that are the water quality standards for B & M Coulee, applied at the end of the pipe.

The water quality standards for B & M Coulee for *E. coli* are:

- April 1 through October 31, of each year, the geometric mean number of *E. coli* may not exceed 126 cfu/100ml and 10% of the total samples may not exceed 252 cfu/100ml during any 30-day period [ARM 17.30.623(2)(a)(i)]; and
- November 1 through March 31, of each year, the geometric mean number of *E. coli* may not exceed 630 cfu/100ml and 10% of the samples may not exceed 1,260 cfu/100ml during any 30-day period [ARM 17.30.623(2)(a)(ii)].

The effluent limits on *E. coli* from the 2011-issued permit will be retained in the renewed permit. The monitoring frequency for *E. coli* will be reduced to once per week.

2. Non-conventional Pollutants

TRC – Chlorination is not currently utilized to disinfect the Belt WWTF effluent. The 2011-issued permit has effluent limits for TRC of 0.011 mg/L (average monthly limit) and 0.019 mg/L (maximum daily limit), applicable in the event that chlorination is used to disinfect the WWTF effluent in order to meet effluent *E. coli* limits. Due to limitations in current TRC measurement technology, levels measured at a detection limit of 0.1 mg/L or less are considered in compliance with the effluent TRC limits.

Analytical methods in 40 CFR Part 136 require chlorine samples to be analyzed immediately. On-site analysis for TRC using an approved method is required. The method must obtain a minimum detection level of 0.1 mg/L.

The effluent limits on TRC from the 2011-issued permit will be retained in the renewed permit to cover the possibility that chlorination will be used to disinfect the Belt WWTF effluent. Monitoring requirements for TRC will remain the same as in the 2011-issued permit, i.e. once per day if chlorination is used for effluent disinfection.

Total Ammonia-N – There are no total ammonia-N (ammonia) limits in the 2011-issued permit. Ammonia limits are developed based on standards that account for a combination of pH and temperature of the receiving stream, the presence or absence of salmonid fishes (trout, whitefish and salmon), and the presence or absence of fish in early life stages. Water quality standards for ammonia and the resultant effluent limits are determined on a year-round basis, rather than on a seasonal basis.

Neither salmonids nor non-salmonids are present in B & M Coulee, which is the receiving water for the Belt WWTF discharge, at a point located approximately 0.1 mile above the confluence of B & M Coulee with Belt Creek. However, salmonids are assumed to be present in Belt Creek in early life stages year-round. Non-salmonids are present in Belt Creek in early life stages from mid-March through July, depending on the species.

Since B & M Coulee is an ephemeral stream, except for the Belt WWTF discharge, no instream background ammonia, pH or temperature levels exist. Accordingly, ammonia effluent limits on the discharge from the Belt WWTF are not required, unless the discharge to and through B & M Coulee would create RP for ammonia in Belt Creek.

No data exist regarding pH, temperature and background ammonia in Belt Creek in the vicinity of the Belt WWTF. Further, as discussed previously, no data exist regarding the frequency and quantity of the discharge from the WWTF to B & M Coulee that actually reaches Belt Creek. The flow, pH, temperature or ammonia levels in any wastewater that actually reaches Belt Creek is also unknown. Accordingly, calculation of the possibility of RP existing in Belt Creek as a result of the Belt WWTF discharge to B & M Coulee is not possible at this time because of the lack of information, as discussed above. In addition, as discussed previously, the Town of Belt

plans to land apply the effluent from the WWTF upon completion of the 2017 Project, which will effectively eliminate the discharge to B & M Coulee.

No effluent limits on ammonia will be applied to the discharge from the Belt WWTF during this renewal cycle. However, flow, ammonia, pH and temperature monitoring requirements will be retained in the renewed permit. Instream monitoring of B & M Coulee and Belt Creek above and below the confluence with B & M Coulee does not appear to be practical because the property between the Belt WWTF and Belt Creek is privately owned and access for monitoring purposes cannot be assured.

Nitrate plus Nitrite Nitrogen (NO₃/NO₂) – There are no NO₃/NO₂ limits in the 2011-issued permit. The human health water quality standard for NO₃/NO₂ in waters to be maintained suitable for drinking is 10 mg/L.

NO₃/NO₂ effluent limits on the discharge from the Belt WWTF are not required, unless the discharge to and through B & M Coulee would create RP for NO₃/NO₂ in Belt Creek.

Table 2 shows that for the POR, effluent NO₃/NO₂ levels are very low, averaging 0.14 mg/L, with a maximum level of only 0.49 mg/L reported. Based on a calculated CV of 1.14, the TSD Table 3-2 multiplier is 1.9. Applying the multiplier to the maximum reported value, the calculated maximum effluent NO₃/NO₂ concentration is 0.93 mg/L. With a TSD maximum NO₃/NO₂ level of 0.93 mg/L, there is no need for calculations to determine if RP exists. RP does not exist with NO₃/NO₂ levels this low, i.e. below the water quality standard. No effluent limits on NO₃/NO₂ will be applied to the discharge from the Belt WWTF during this renewal cycle.

Nutrients (TN and TP) – As discussed previously, the lower reach of Belt Creek is listed as impaired on the 2016 303(d) list, but TN and TP are not identified as probable causes for the impairments.

Numeric water quality standards for TN and TP have been adopted in Circular DEQ-12A (DEQ-12A) for Belt Creek in the Town of Belt area, which is in the Level III Northwestern Glaciated Plains Ecoregion. The numeric water quality standards for TN and TP are 1,300 µg/L and 110 µg/L, respectively, both effective from June 16 to September 30. Critical stream-flow for application of the standards and for determining RP is the seasonal (July-October) 14Q5 low flow.

Similar to the earlier discussion with respect to effluent limits for the parameter ammonia, effluent limits for nutrients for the discharge from the Belt WWTF are not required, unless the discharge to and through B & M Coulee would create RP for nutrients in Belt Creek.

No data exist regarding background levels of TN and TP in Belt Creek in the vicinity of the Belt WWTF. Further, it is not known whether or not the discharge from the Belt WWTF to B & M Coulee actually reaches Belt Creek during the months of June through September. Calculation of the possibility of RP existing in Belt Creek for nutrients as a result of the Belt WWTF discharge to B & M Coulee is not possible at this time because of the lack of information, as discussed above.

3. Toxic Pollutants

Metals – Effective May 1, 2016, the 2011-issued permit contained the following effluent limits for metals, which were developed in accordance with the metals waste load allocations for lower Belt Creek from the PLAN:

<u>Metal</u>	<u>MDL, µg/L</u>	<u>AML, µg/L</u>	<u>AML, lbs/day</u>
Arsenic, Total Recoverable	10	7	0.0090
Cadmium, Total Recoverable	0.50	0.34	0.00044
Iron, Total Recoverable	-	1,123	1.45
Lead, Total Recoverable	6.5	4.5	0.0058
Zinc, Total Recoverable	140	96	0.124

The permittee was required to sample the WWTF effluent for the limited metals twice per year and for the metals chromium, copper, mercury, selenium and silver once per year. The metals sampling results are shown on Table 2. For the metals with effluent limits effective May 1, 2016, no levels were reported for any metal that would have exceeded the permit effluent limits (10 samples total). For the metals with monitoring requirements only, all except copper were reported as “not detected at laboratory reporting levels” (ND), with laboratory reporting levels in compliance with the required reporting values (RRV) of the permit. Total recoverable copper was present in five of five samples with a maximum level of 4 µg/L and an average level of 3 µg/L. The levels of total recoverable copper measured in the Belt WWTF effluent are not high enough to cause RP in Belt Creek.

Because the effluent limits for total recoverable arsenic, cadmium, iron, lead and zinc in the 2011-issued permit are based on waste load allocations for lower Belt Creek established in the PLAN, the effluent limits are required to be included in the renewed permit. However, the monitoring frequency requirement for the limited metals will be reduced to once per year. Further, the requirement to monitor the WWTF effluent for total recoverable chromium, copper, mercury, selenium and silver will not be included in the renewed permit. Although aluminum is included in the 2016 303(d) list as a parameter of concern, sampling of the WWTF effluent for dissolved aluminum will not be required because no industrial source of aluminum exists in Belt.

Salinity – The 2011-issued permit required twice per year effluent monitoring for salinity. Salinity monitoring was required because the 2010 303(d) list included salinity as a probable cause of impairment. The PLAN addressed salinity issues in lower Belt Creek by (1) establishing a target salinity level of 1,000 micro-Siemens per centimeter (µS/cm) of specific conductance and (2) using the TMDLs for metals as a surrogate for controlling salinity. A salinity value of 0.5 mg/L on the DMRs roughly equates to a specific conductance of 1,000 µS/cm and the average salinity value reported for the effluent from the Belt WWTF is 0.52 mg/L. Accordingly, the salinity level in the effluent from the Belt WWTF is close to the target level for salinity established in the PLAN for lower Belt Creek. As discussed previously, the Belt WWTF discharges to B & M Coulee, an ephemeral tributary to Belt Creek, rather than direct to Belt Creek. Monitoring the Belt WWTF discharge for salinity will not be required in the renewed permit.

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 conditions which are toxic or harmful to human, animal, plant or aquatic life, except DEQ may allow limited toxicity in a mixing zone provided that there is no acute lethality to organisms. The Belt WWTF is a small discharger of less than 0.155 mgd with no identified industrial contributions. No WET testing will be required with this permit cycle.

V. Final Effluent Limits

Beginning on the effective date of the permit and lasting through the term of the permit, the quality of effluent discharged by the facility through Outfall 002 shall, as a minimum, meet the limits as set forth below:

Table 5: Final Effluent Limits				
Parameter	Units	Average Monthly Limit ¹	Average Weekly Limit ¹	Maximum Daily Limit ¹
Biochemical Oxygen Demand (BOD ₅)	mg/L	30	45	--
	lbs/day	39	58	--
BOD ₅ , Removal	%	85	--	--
Total Suspended Solids (TSS)	mg/L	45	65	--
	lbs/day	58	84	--
TSS, Removal	%	65	--	--
<i>Escherichia coli</i> (<i>E. coli</i>) ^{2,4}	cfu/100ml	126	252	--
<i>Escherichia coli</i> (<i>E. coli</i>) ^{3,4}	cfu/100ml	630	1,260	--
Total Residual Chlorine (TRC) ⁵	mg/L	0.011	--	0.019
Total Recoverable Arsenic ⁶	µg/L	7	--	10
	lbs/day	0.0090	--	--
Total Recoverable Cadmium ⁶	µg/L	0.34	--	0.50
	lbs/day	0.00044	--	--
Total Recoverable Iron ⁶	µg/L	1,123	--	--
	lbs/day	1.45	--	--
Total Recoverable Lead ⁶	µg/L	4.5	--	6.5
	lbs/day	0.0058	--	--
Total Recoverable Zinc ⁶	µg/L	96	--	140
	lbs/day	0.124	--	--
pH	s.u.	6.0-9.0 (instantaneous)		
Footnotes:				
1 See Definition section at end of permit for explanation of terms.				
2. This limitation applies from April 1 through October 31.				
3. This limitation applies from November 1 through March 31.				
4. Report Geometric Mean if more than one sample is collected in the reporting period.				
5. The permittee will be in compliance with the average monthly limitation if the TRC does not exceed the minimum detection level (ML) of 0.1 mg/L.				
6. Metals shall be analyzed as total recoverable, use EPA Method (Section) 4.1.4 [EPA 600/4-79-020, March 1983] or equivalent.				

VI. Self-Monitoring & Other Requirements

a. Self-Monitoring

Effluent flow measurements for Outfall 002 are taken from the “V-notch” weir in the discharge structure from Cell 3. Effluent samples for all parameters must be obtained from the effluent weir box. Alternative flow measurement and effluent sample locations may be utilized upon written approval of DEQ.

Influent samples for BOD₅ and TSS are to be taken from the lift station wet wells, composited in proportion to flow from each of the lift stations. Since the lift stations may operate infrequently, contributing flows for purposes of proportioning the composite samples may be based on the total sewage pumped at each lift station during the 24-hr period immediately preceding the day of sampling. Records shall be kept of all calculations used for compositing the influent samples.

Influent samples for BOD₅ and TSS need not be taken during months where no discharge occurs. Influent samples must be taken in any month where a discharge occurs.

Table 6: Monitoring Requirements (Continued Next Page)

Parameter	Unit	Sample Location	Sample Frequency	Sample Type ¹	ML ⁷
Flow	mgd	Effluent	1/Week	Instantaneous	0.001
Biochemical Oxygen Demand (BOD ₅)	mg/L	Influent	1/Month	Composite	10
	mg/L	Effluent	1/Month	Grab	2
	% Removal ²	NA	1/Month	Calculated	0.1
	lbs/day	Effluent	1/Month	Calculated	0.1
Total Suspended Solids (TSS)	mg/L	Influent	1/Month	Composite	10
	mg/L	Effluent	1/Month	Grab	10
	% Removal ²	NA	1/Month	Calculated	0.1
	lbs/day	Effluent	1/Month	Calculated	1
pH	s.u.	Effluent	1/Month	Instantaneous	0.1
Temperature	°C	Effluent	1/Month	Instantaneous	0.1
<i>Escherichia coli</i> ³	cfu/100ml	Effluent	1/Week	Grab	1
Total Residual Chlorine (TRC) ⁴	mg/L	Effluent	1/Day	Grab	0.1
Oil and Grease ⁵	mg/L	Effluent	2/Year	Grab	0.1
Total Ammonia as N	mg/L	Effluent	1/Month	Grab	0.07
Total Nitrogen as N ⁶	mg/L	Effluent	1/Month	Calculated	0.1
	lbs/day	Effluent	1/Month	Calculated	0.1
Total Phosphorus as P ⁶	mg/L	Effluent	1/Month	Grab	0.003
	lbs/day	Effluent	1/Month	Calculated	0.01

Footnotes:

1. See Definition section at end of permit for explanation of terms.
2. See narrative discussion in Part I of permit for additional details.
3. Report geometric mean if more than one sample taken during the reporting period.
4. The Permittee is only required to sample for TRC if chlorine is used as a disinfectant in the treatment process. If chlorine is *not* used, write "NA" on the DMR for this parameter.
5. Use EPA Method 1664, Revision A: N-Hexane Extractable Material (HEM), or equivalent.
6. **Monitoring for TN and TP required June 1 through September 30 only.** TN is calculated as the sum of nitrate + nitrite (as N) plus total kjeldahl nitrogen (as N) concentrations.
7. ML is the minimum detection level. Analyses for all parameters must be to the ML listed in the permit for the parameter.
8. Metals shall be analyzed as total recoverable; use EPA method (Section) 4.1.4 [EPA 600/4-79-020, March 1983] or equivalent.

Table 6: Monitoring Requirements

Parameter	Unit	Sample Location	Sample Frequency	Sample Type ¹	ML ⁷
Arsenic, Total Recoverable ⁸	µg/L	Effluent	1/Year	Grab	1
	lbs/day	Effluent	1/Year	Calculated	0.001
Cadmium, Total Recoverable ⁸	µg/L	Effluent	1/Year	Grab	0.03
	lbs/day	Effluent	1/Year	Calculated	0.0004
Iron, Total Recoverable ⁸	µg/L	Effluent	1/Year	Grab	20
	lbs/day	Effluent	1/Year	Calculated	0.1
Lead, Total Recoverable ⁸	µg/L	Effluent	1/Year	Grab	0.3
	lbs/day	Effluent	1/Year	Calculated	0.001
Zinc, Total Recoverable ⁸	µg/L	Effluent	1/Year	Grab	8
	lbs/day	Effluent	1/Year	Calculated	0.1
Hardness, as CaCO ₃	mg/L	Effluent	1/Year	Grab	1

Footnotes:

1. See Definition section at end of permit for explanation of terms.
2. See narrative discussion in Part I of permit for additional details.
3. Report geometric mean if more than one sample taken during the reporting period.
4. The Permittee is only required to sample for TRC if chlorine is used as a disinfectant in the treatment process. If chlorine is *not* used, write "NA" on the DMR for this parameter.
5. Use EPA Method 1664, Revision A: N-Hexane Extractable Material (HEM), or equivalent.
6. **Monitoring for TN and TP required June 1 through September 30 only.** TN is calculated as the sum of nitrate + nitrite (as N) plus total kjeldahl nitrogen (as N) concentrations.
7. ML is the minimum detection level. Analyses for all parameters must be to the ML listed in the permit for the parameter.
8. Metals shall be analyzed as total recoverable; use EPA method (Section) 4.1.4 [EPA 600/4-79-020, March 1983] or equivalent.

b. Sludge Requirements

This permit will contain standard conditions requiring compliance with 40 CFR 503 for any removal or disposal of biosolids from the Belt WWTF.

c. Pretreatment Program

The facility is not currently operating under the EPA Pretreatment Program. The permit will include standard language restricting introducing certain pollutants to the Belt WWTF and requiring the facility to provide adequate notice to DEQ if a new source, volume or character of industrial pollutant is introduced to the system.

VII. Nonsignificance Determination

The facility must meet present permit limits for BOD₅, TSS, pH, TRC, *E.coli*, arsenic, cadmium, iron, lead and zinc. The discharge does not constitute a new or increased source of pollutants pursuant to ARM 17.30.702(17). Therefore, a nonsignificance analysis is not required [ARM 17.30.705(1)].

VIII. Compliance Schedules

No compliance schedules. Permittee is under schedule to upgrade to meet current effluent limits by AOC.

IX. Information Sources

- a. 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.
- b. US Code of Federal Regulations, 40 CFR Parts 122-125, 130-133, & 136.
- c. Montana Code Annotated (MCA), Title 75-5-101, *et seq.*, "Montana Water Quality Act," 2011.
- d. 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- Nondegradation of Water Quality.
 - Subchapter 12 - Montana Pollutant Discharge Elimination System (MPDES) Standards.
 - Subchapter 13 - MPDES Permits.
- e. Montana Department of Environmental Quality Circular DEQ-7, Montana Numeric Water Quality Standards, October 2012.
- f. Integrated 303(d)/305(b) Water Quality Report for Montana (2016).
- g. McCarthy, P.M., 2016, Streamflow Characteristics Based On Data Through Water Year 2009 For Selected Streamflow Gaging Stations In Or Near Montana: U.S. Geological Survey Scientific Investigations Report 2015-5019-E, XX.
- h. US EPA Technical Support Document for Water Quality-Based Toxics Control, EPA/505/2-90-001, March 1991.
- i. US EPA National Pollutant Discharge Elimination System (NPDES) Permit Writers' Manual, EPA 833-K-10-001, September 2010.

- j. Montana Department of Fish, Wildlife and Parks, Don Skaar, Spawning Times of Montana Fishes, March 2001.
- k. Montana Fisheries Information System (MFISH)
- l. MPDES Permit Number MT0021571:
 - 1. Administrative Record.
 - 2. Renewal Application NPDES Form 2A, March 2016.
- m. NCI Engineering Company, Town of Belt Wastewater Preliminary Engineering Report, 2012, with 2015 Update.
- n. Montana DEQ Circular DEQ-12A, Montana Base Nutrient Standards, July 2014.
- o. Montana DEQ Circular DEQ-12B, Nutrient Standards Variances, July 2014.
- p. DEQ, The Missouri-Cascade and Belt TMDL Planning Area Metals Total Maximum Daily Loads and Framework Water Quality Improvement Plan, January 24, 2011.

FS Prepared By: James F. Brown, February 2017