

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

**Fact Sheet**

**General Permit for Domestic Sewage Treatment Lagoons– CONTINUOUS DISCHARGERS**

FACILITY: Minor Publicly- and Privately- Owned Treatment Works

PERMIT NUMBER: MTG581000

LOCATION: Statewide, except for *Indian Country*

CONTACT: Applicant

RECEIVING WATER: Statewide

I. Status of Permit

This permitting action is the renewal of the Montana Pollutant Discharge Elimination System (MPDES) *General Permit for Domestic Sewage Treatment Lagoons*. This GP has been renewed four times since it was first issued in March 1983. The most recent renewal of this GP became effective on January 1, 2013, and will expire on December 31, 2017 (“2013-issued GP”).

DEQ proposes the following changes with this renewal:

1. The Domestic Lagoon GP will be divided into two GPs:
  - *Continuous Dischargers*. MTG581000 provides permit coverage for facilities that discharge for *all or part of ten or more months per year*. This fact sheet outlines the methods, facts, and conclusions to support the 2017-issued GP for continuous dischargers.
  - *Batch Dischargers*: DEQ will develop a separate fact sheet and general permit for Domestic Sewage Treatment Lagoons that hold and release as a batch discharge.
2. DEQ modified the Technology-based Effluent Limits (TBELs). The 2017-issued GP will add the option for Treatment Equivalent to Secondary (TES) limits for 5-Day Biochemical Oxygen Demand (BOD<sub>5</sub>) for qualifying facilities. In addition, Total Suspended Solids (TSS) percent removal limits will not be required for qualifying facilities under Alternate State Requirements.
3. *Escherichia coli (E. coli)* bacteria limits have been changed from colony-forming units (cfu) to number of organisms per 100 mL to reflect the change in Montana’s Water Quality Standards that also allows most probable number (mpn).

4. Continuous dischargers under the 2017-issued GP that have Reasonable Potential (RP) to cause or contribute to an excursion of a water quality standard will be required to apply for individual permit coverage within the first two years of the general permit term.

## II. Description of Discharge and Discharging Facilities

Montana facilities eligible for coverage under the general permit for domestic sewage treatment lagoons have historically been minor facilities with an average daily design flow less than one million gallons per day (mgd). The facilities can be either facultative or aerated lagoon systems. **Attachment A** contains design criteria and receiving water information for the 25 facilities currently authorized under the 2013-issued GP as of April 2017 (all batch and continuous discharging facilities currently permitted under MTG580000, excluding Town of Columbus which has requested individual coverage). In addition, there may be additional lagoon facilities with individual MPDES permits eligible for coverage under the 2017-issued GP.

This permitting action is for the renewal of the Domestic Sewage Treatment Lagoons GP for **continuous dischargers**. The 2017-issued GP for continuous dischargers is designed to be available for coverage by those facilities discharging part or all of ten or more months per year. There are currently six (6) facilities that were permitted under the 2013-issued GP that fall under this category; they have average daily design flows that range from 0.14 mgd – 0.60 mgd.

### A. *Description of Facilities*

All lagoon systems have different engineering designs based on requirements in existence at the time of construction and/or modification:

- *Pre-1995*: the September 1, 1981, Memorandum *Wastewater Treatment Pond Design Guidelines*, from Donald G. Willems, Administrator, Environmental Sciences Division of the Department of Health and Human Services contained requirements for facilities to meet specific design criteria listed in the 1978 Ten States Standards.
- *After 1995*: design criteria contained in the *Circular WQB-2, Montana Department of Environmental Quality, Design Standards for Wastewater Facilities* which was replaced by *Circular DEQ-2, Montana Department of Environmental Quality, Design Standards for Wastewater Facilities* in 1999 and updated several times. The most recent version was issued in 2016.

### Facultative Lagoon Systems

A facultative lagoon treatment system consists of treatment ponds, usually constructed of earthen materials. Facultative lagoons are not mechanically mixed or aerated and are designed to provide long detention times. Montana has required 180 days detention for discharging facultative lagoons as part of the design requirements since the early 1980s. According to the *Principles of Design and Operations of Wastewater Treatment Pond Systems for Plant Operators, Engineers, and Managers*, EPA/600/R-11/088, August 2011, facultative lagoons provide significant pollutant reductions through passive aerobic/anaerobic treatment, as follows:

- Five-day biochemical oxygen demand (BOD<sub>5</sub>): effluent concentrations may range from 20 – 60 mg/L although < 30 mg/L ‘can usually be achieved.’
- Total suspended solids (TSS): effluent concentration range from less than 30 mg/L to greater than 150 mg/L depending on algal concentrations and design parameters.
- Ammonia removal: up to 90% removal is achievable; however this removal rate is not sustainable during colder months.

- Phosphorus removal: approximately 50% removal can be expected under high pH conditions (30% removal based on DEQ information).

#### Aerated Lagoon Systems and Partial Mix Systems

Aeration is provided by either mechanical surface aerators or submerged diffused aeration systems. Aerated lagoons typically are classified by the amount of mixing provided. A partial mix system provides only enough aeration to satisfy the oxygen requirements of the system and does not provide energy to keep all TSS in suspension. Complete mix systems use approximately ten times the amount of energy as partial mix systems.

According to the 2011 *Principles of Design and Operations of Wastewater Treatment Pond Systems for Plant Operators, Engineers, and Managers*, aerated lagoons provide significant pollutant reductions, as follows:

- BOD<sub>5</sub>: effluent concentration of < 30 mg/L is typical with up to 95% removal expected (DEQ data shows ~50 mg/L BOD<sub>5</sub> is more typical).
- TSS: effluent concentrations typically range from 20 – 60 mg/L.
- Significant nitrification occurs during the summer if there is adequate Dissolved Oxygen.
- Phosphorus removal: 15 – 25% expected.

#### Other Lagoon System Operations – Land Application

MPDES permitting is not required for facilities that land-apply treated effluent *unless* the facility discharges any treated effluent to state surface water. MPDES permitting is not required for land application alone since DEQ does not consider the use of treated effluent by a properly designed and operated land application system (i.e., in accordance with Circular DEQ-2) to be a discharge.

Facilities must reduce the risk of runoff to surface water or infiltration to ground water by managing the quantity and quality of the land-applied effluent. Applying at agronomic rates in this manner will optimize plant nutrient uptake. To ensure optimal land application conditions, facilities that are otherwise required to have a MPDES permit must also comply with the land application requirements under the Special Conditions section, as discussed in Part VII.B.4 of this Fact Sheet.

#### *B. 2013-Domestic Sewage Lagoon General Permit Effluent Limits*

The 2013-issued GP included the following numeric limits on effluent quality (see **Table 1**):

<b>Table 1: Numeric Effluent Limits for “2013-Issued GP”</b>					
<b>Technology-Based Effluent Limits</b>					
Parameter	Units	Monthly Average	Weekly Average	% Removal <sup>(1)</sup>	
5-day Biochemical Oxygen Demand <sup>(2)</sup>	mg/L	30	45	85%	
	lb/day	<i>Equation 1</i>	<i>Equation 1</i>	--	
Total suspended solids <sup>(3)</sup>	mg/L	<i>a. NSS</i>	30	45	85%
		<i>b. TES</i>	45	65	65%
		<i>c. ASR</i>	100	135	65%
	lb/day	<i>Equation 1</i>	<i>Equation 1</i>	--	
pH	s.u.	6.0 – 9.0		--	
<b>Water Quality-Based Effluent Limits</b>					
Parameter	Units	Monthly Average	Weekly Average	Maximum Daily	
<i>E. coli</i> bacteria – summer <sup>(4,5)</sup>	cfu/100 mL	126	252	--	
<i>E. coli</i> bacteria – winter <sup>(5,6)</sup>	cfu/100 mL	630	1,260	--	
Total Residual Chlorine	µg/L	11	--	19	
Other Parameters (WLA and other previous permit limits)	(7)	(7)	(7)	(7)	
Footnotes:					
(1) Monitoring for % removal was required beginning January 1, 2017.					
(2) Carbonaceous biochemical oxygen demand (CBOD <sub>5</sub> ) in lieu of 5-day Biochemical Oxygen Demand (BOD <sub>5</sub> ) was permitted upon request of the permittee.					
(3) Facilities’ TSS limits were classified under one of the following categories: (a) National Secondary Standards (NSS), (b) Treatment Equivalent to Secondary (TES), or (c) Alternate State Requirements (ASR).					
(4) After January 1, 2017, all facilities were required to comply with these <i>E.coli</i> limits from April 1 <sup>st</sup> through October 31 <sup>st</sup> on an annual basis.					
(5) Facilities required to report geometric mean if more than one sample collected during the reporting period.					
(6) After January 1, 2017, all facilities were required to comply with these <i>E.coli</i> limit from November 1 <sup>st</sup> to March 31 <sup>st</sup> on an annual basis.					
(7) Any facility with an existing Wasteload Allocation or effluent limit was required to continue to meet those limits.					

*C. Summary of Facility Discharges and Compliance*

**Table 2** summarizes the monthly average BOD<sub>5</sub> and TSS effluent concentrations for the 25 facilities currently permitted under the GP:

<b>Table 2: Summary of Monthly Average Effluent Concentrations January 2013 – December 2016</b>						
Facility Type	Number of Facilities	Units	BOD <sub>5</sub>		TSS	
			Range	95 <sup>th</sup>	Range	95 <sup>th</sup>
Continuous Discharge	6	mg/L	11 - 57	52	10 - 56	51

Overall, the 95<sup>th</sup> percentile of the monthly average BOD<sub>5</sub> concentration was 52 mg/L for continuous dischargers. The calculated 95<sup>th</sup> percentile for two of the six continuous discharging facilities could not meet the BOD<sub>5</sub> limit of 30 mg/L for the Period of Record (POR). See Part IV.A.1 of this Fact Sheet for further discussion on BOD<sub>5</sub>.

Overall, the 95<sup>th</sup> percentile of the monthly average TSS concentration was 51 mg/L for continuous dischargers. See Part IV.A.2 of this Fact Sheet for further discussion on TSS.

The monthly DMRs show an effluent pH range of 5.0 – 10.8 s.u. (the 95<sup>th</sup> percentile pH range was 5.4 – 9.5 s.u.) Two facilities had a total of three excursions below 6.0 s.u. There were a total of 10 facilities with a total of 34 excursions above 9.0 s.u.

### III. Permit Coverage

#### A. *Coverage Area*

This GP for continuous domestic sewage treatment lagoons applies to all areas of the State of Montana, except for within the boundaries of Indian Lands, National Parks, and excluded waterbodies listed in III.D.

#### B. *Regulatory Authority*

Montana Code Annotated (MCA) 75-5-605(2) prohibits the discharge of sewage, industrial wastes or other wastes into and state waters without a current permit from DEQ. The authority for DEQ to issue MPDES permits is contained in 75-5-101, MCA et seq., with implementing regulations in Administrative Rules of Montana (ARM) 17.30 Subchapter 13.

#### C. *Sources Eligible for Coverage*

To be eligible for authorization under this 2017-issued GP the domestic sewage treatment lagoon must be:

- Classified as a minor with no pretreatment program and no categorical industrial users (CIU) or significant industrial users (SIU), and
- Designed to treat an average daily flow less than 1.0 million gallons per day.

#### D. *Sources Ineligible for Coverage*

1. DEQ may deny a general permit application for discharge under the general provisions of ARM 17.30.1341(4) for any of the following:
  - a. The specific source applying for authorization appears unable to comply with:
    - effluent limitations or other terms and conditions of the permit;
    - water quality standards established pursuant to 75-5-301, MCA; or
    - prohibition of any discharges to which the regional administrator has objected in writing.
  - b. The discharge is different in degree or nature from discharges reasonably expected from sources or activities within the category described in the General Permit.
  - c. An MPDES permit or authorization for the same operation has previously been denied or revoked.
  - d. The discharge to be authorized under a general MPDES permit is also included within an application or is subject to review under the Major Facility Siting Act, 75-20-101, *et seq.*, MCA.
  - e. The point source will be located in an area of unique ecological or recreational significance. Such determination must be based upon considerations of Montana stream classifications adopted under 75-5-301, MCA, impacts on fishery resources, local conditions at proposed discharge sites, and designations of wilderness areas under 16 USC 1132 or of wild and scenic rivers under 16 USC 1274.

2. In addition, the following sources are excluded from coverage from this GP:
  - a. Discharges to Outstanding Resource Waters or to those waterbodies classified as A-1 or A-Closed waters [ARM 17.30.601 *et seq.*].
  - b. The facility is a “new or increased source” that discharges to “high quality water,” as defined in the Nondegradation of Water Quality Subchapter 7 [ARM 17.30.701 *et seq.*].
  - c. The facility is required to have a pretreatment program (see 40 CFR 403.3), or accepts discharge from users that are CIU or SIU.
  - d. Any facility covered under an individual MPDES permit with site-specific WQBELs cannot request coverage under this GP.

*E. Requirements for Continuing Authorization under the GP*

All authorizations under the 2013-issued GP expire on December 31, 2017, along with the expiration of the GP. For coverage under the 2017-issued General Permit permittees must submit a complete renewal application package. A complete renewal application package must include:

- A complete Notice of Intent application form (NOI-581) provided by DEQ,
- A copy of the consultation letter from the Montana Sage Grouse Habitat Conservation Program (if applicable), and
- Renewal application fee of \$800 per outfall

DEQ must receive the complete application package on or before **December 31, 2017** at the following address:

Department of Environmental Quality  
Water Protection Bureau  
PO Box 200901  
Helena, MT 59620-0901

A facility’s coverage under the 2017-issued GP is effective January 1, 2017, or later, upon receiving an Authorization Letter from DEQ.

*F. Requirements for New Authorizations under the General Permit*

Existing facilities with coverage under an Individual MPDES permit can obtain first-time coverage under the 2017-issued GP by submitting a complete application package. The application package must include:

- A complete application form Notice of Intent (NOI-581) provided by DEQ,
- A copy of the consultation letter from the Montana Sage Grouse Habitat Conservation Program (if applicable), and
- The appropriate application fee.

A facility’s coverage under the 2017-issued GP is effective January 1, 2017, or later, upon receiving an Authorization Letter from DEQ.

### *G. Termination of General Permit Coverage*

Permittees under the 2017-issued GP may terminate coverage. The permittee must submit a Notice of Termination (NOT) form to DEQ indicating the reason why permit coverage is no longer required. The permittee remains responsible for all applicable fees including annual fees until DEQ processes and notifies the permittee that permit coverage is terminated. Failure to submit a termination request shall result in accrual of annual fees.

#### *Replace General Permit coverage with an Individual MPDES permit*

Permittees under the 2017-issued GP may apply for coverage under an Individual MPDES permit. A facility remains covered under the General Permit until the effective date of the Individual MPDES Permit. Authorization under the General Permit will terminate on the effective date of the Individual MPDES permit.

### *H. Transfer of Coverage*

To transfer permit coverage under the General Permit to a different entity, the owner or operator must submit a complete Permit Transfer Notification form provided by DEQ and a \$500 permit transfer fee. The original owner or operator is responsible for all terms and conditions of the permit until DEQ notifies the new owner.

#### IV. Technology-based Effluent Limitations

##### A. *Concentration and Mass-based Limits*

Technology-based Effluent Limits (TBELs) for publically owned treatment works (POTWs) are set forth in 40 CFR 133 -- minimum treatment requirements for secondary treatment or equivalent. Secondary treatment is defined in terms of effluent quality as typically measured by pH, BOD<sub>5</sub>, TSS, and percent removal of BOD<sub>5</sub> and TSS. Domestic sewage treatment lagoons may be regulated by one of three levels of treatment contained in 40 CFR 133, which DEQ identifies as follows:

- National Secondary Standards (NSS) – default minimum level of effluent quality attainable by secondary treatment [40 CFR 133.102];
- Treatment Equivalent-to-Secondary (TES) – minimum level of effluent quality attainable by *facilities eligible for treatment equivalent to secondary treatment* (a waste stabilization pond that achieves a 30-day average of at least 65% removal of BOD<sub>5</sub> and the facility's discharge has been shown to meet the *effluent concentration consistently achievable through proper operation and maintenance (O&M)* [40 CFR 133.105]; or
- Alternative State Requirements (ASR) – further adjusted minimum level of TSS for wastewater treatment when the principal process for secondary treatment is a waste stabilization pond system that achieves a 30-day average concentration of 45 mg/L BOD<sub>5</sub> or less [40 CFR 133.103(c)].

“Waste stabilization ponds” as referenced in the Secondary Treatment Regulations are now commonly referred to as “wastewater treatment lagoons” which includes both facultative and aerated lagoons.

There are no federal treatment requirements that apply specifically to privately-owned treatment works discharging domestic sewage. When EPA has not promulgated a standard for a specific industry, permit limits may be based on best professional judgment (BPJ) [40 CFR 125.3(c) and ARM 17.30.1203(5)]. Privately-owned treatment works provide the same function and would not have any unique factors or significant technical differences from POTWs that would affect the information published in 49 Federal Register (FR) 37006, September 20, 1984. DEQ determined that the TBELs for privately-owned treatment works in this permit are based on BPJ, and will be identical to the 40 CFR 133 requirements for POTWs.

##### 1. **BOD<sub>5</sub> concentration-based limits**

All of the general permits renewals issued since the original *General Discharge Permit for Facultative Sewage Lagoons* issued in 1983 have required NSS for BOD<sub>5</sub>. Based on literature review, both facultative and aerated lagoons *should* be able to achieve NSS (monthly average of less than 30 mg/L) for effluent BOD<sub>5</sub> concentrations with good design and proper O&M (see Part II.A). However, review of effluent quality between January 2013 and December 2016 shows that the 95<sup>th</sup> percentile for two of the six continuous dischargers could not meet NSS for BOD<sub>5</sub>. DEQ finds it is appropriate to expand TBELs to include TES for this GP renewal -- as long as proper O&M has been conducted, these facilities would be more appropriately permitted under TES.

Therefore, DEQ will allow a facility using wastewater treatment lagoons as the primary treatment to comply with TES rather than NSS, provided it meets all of the following criteria as specified under 40 CFR 133.101(g):

- the facility certifies that they have applied good operation & maintenance (O&M),
- the monthly average 95<sup>th</sup> percentile for the last two to four years is greater than 30 mg/L BOD<sub>5</sub> (except for values attributable to upsets, bypasses, and operational errors or other unusual conditions) and/or the weekly average for the same period is greater than 45 mg/L, and
- the facility achieves a 30-day average of at least 65% removal of BOD<sub>5</sub>. The 2013-issued GP included the requirement for all facilities to demonstrate compliance with the BOD<sub>5</sub> (or, if appropriate, CBOD<sub>5</sub>) percent removal requirement of 85% no later than January 1, 2017. The removal efficiencies for the 25 authorized facilities were not available at the time of drafting this fact sheet. The equation for percent removal is shown in Part IV.E of this Fact Sheet.

Therefore, each facility covered under this GP will be assigned either NSS or TES for BOD<sub>5</sub>, as appropriate. The BOD<sub>5</sub> effluent limits for both categories are listed below.

**a. National Secondary Standards**

Montana's domestic sewage lagoon general permit has required facilities to meet NSS for BOD<sub>5</sub> since 1983, and it will continue to be the baseline (default) requirement for BOD<sub>5</sub>:

- 30 mg/L monthly average,
- 45 mg/L weekly average, and
- 85% removal (see Part IV.E for equation).

**b. Treatment Equivalent to Secondary**

TES requirements are contained in 40 CFR 133.105, and allow facilities to meet limits that are slightly relaxed from the NSS. Specifically, facilities subject to TES have the following BOD<sub>5</sub> effluent limits:

- 45 mg/L monthly average;
- 65 mg/L weekly average; and
- 65% removal (see Part IV.E for equation).

**c. Carbonaceous Biochemical Oxygen Demand**

The total biological oxygen demand of a wastewater is composed of two components – a carbonaceous oxygen demand and a nitrogenous oxygen demand. It has been reported that as much as 60 percent of the BOD<sub>5</sub> violations nationally may have been caused by nitrification in the BOD<sub>5</sub> test rather than by improper design or operation (Hall and Foxen 1983), *Aerated Lagoon Technology*, by Linvil G. Rich, Alumni Professor Emeritus, Dept of Environ. Eng. and Science, Clemson University <http://www.lagoonsonline.com/technote1.htm>

In lieu of BOD<sub>5</sub> limits, a permittee may request 5-day carbonaceous biochemical oxygen demand (CBOD<sub>5</sub>) limits, as follows:

- NSS: 25 mg/L monthly average and 40 mg/L weekly average CBOD<sub>5</sub> [40 CFR 133.102(a)(4)].
- TES: 40 mg/L monthly average and 60 mg/L weekly average CBOD<sub>5</sub> [40 CFR 133.105(e)].

The permittee may make this request as part of the renewal process or a separate modification.

## 2. TSS concentration-based limits

Until 2013, all of the general permits renewals issued since the original General Discharge Permit for *Facultative Sewage Lagoons* (changed to *Domestic Sewage Treatment Lagoons* in 1999) required facilities to meet the ASR effluent limits of 100 mg/L TSS (monthly average) and 135 mg/L TSS (weekly average), without a TSS percent removal requirement. Subsequently, the 2013-issued GP required all applicable facilities to meet NSS effluent limits, unless they demonstrate their eligibility to meet TES or ASR, and added monitoring to meet the TSS percent removal requirement beginning January 1, 2017.

Algal blooms and design problems can cause elevated TSS concentrations even with proper O&M. Based on a review of the TSS data for facilities authorized under the 2013-issued GP, three of the six continuous discharging facilities could meet NSS, two could meet TES, and one could meet ASR.

For the 2017-issued GP, DEQ will continue to require all facilities to meet NSS for TSS unless they demonstrate their eligibility to meet TES or ASR as detailed below. In summary, the following effluent limits will apply to facilities authorized under the 2017-issued GP for continuous dischargers:

### 1. National Secondary Standards

The baseline (default) TSS requirement is NSS effluent limits of:

- 30 mg/L monthly average
- 45 mg/L weekly average, and
- 85% removal (see equation in Part IV.E of this Fact Sheet.)

### 2. Treatment Equivalent to Secondary

TES requirements are contained in 40 CFR 133.105, and allow facilities to meet limits that are slightly relaxed from the NSS. Specifically, facilities subject to TES have the following TSS effluent limits:

- 45 mg/L monthly average;
- 65 mg/L weekly average; and
- 65% removal (see equation in Part IV.E of this Fact Sheet.)

DEQ determined that in order to qualify for TES, a facility under this 2017-issued GP must meet all of the following:

- i. The TSS *effluent concentrations consistently achievable through proper operation and maintenance* exceeds the minimum level of effluent quality set forth as NSS [40 CFR 133.101(g)(1)]. This criterion is satisfied if the 95<sup>th</sup> percentile value for the monthly average TSS concentration in a period of at least two years is greater than 30 mg/L. In addition the applicant must certify that O&M is properly performed on the facility;
- ii. The facility uses a waste stabilization pond as the principle treatment process. Waste stabilization ponds include both facultative and aerated lagoons; and
- iii. The facility provides significant biological treatment. To assure that significant biological treatment is provided, the facility must achieve greater than 65% BOD<sub>5</sub> removal.

### 3. Alternate State Requirements

The general requirements for ASR for TSS are contained in 40 CFR 133.103(c). The Montana-specific ASR was published in the Federal Register on September 20, 1984 (49 FR 37005). Specifically, facilities covered under the 2017-issued GP for continuous dischargers that are subject to ASR have the following TSS effluent limits:

- 100 mg/L monthly average;
- 135 mg/L weekly average; and
- Monthly average mass limit as a substitute for percent removal (see equation in Part IV.E of this Fact Sheet.)

DEQ has determined that in order to qualify for ASR for TSS, a facility under the 2017-issued GP must meet all of the following:

- i. The TSS *effluent concentrations consistently achievable through proper operation and maintenance* exceeds the minimum level of effluent quality set forth as TES. This criterion is satisfied if the 95<sup>th</sup> percentile value for the monthly average TSS concentration in a period of at least two years is greater than 45 mg/L. In addition the applicant must certify that O&M is properly performed on the facility;
- ii. The facility uses a waste stabilization pond system. Waste stabilization ponds include both facultative and aerated lagoons; and
- iii. The facility provides significant biological treatment. To assure that significant biological treatment is provided, the facility must achieve 45 mg/L or less BOD<sub>5</sub> concentration on a monthly average basis.

### 3. Mass-based Effluent Limits (BOD<sub>5</sub>/CBOD<sub>5</sub> and TSS)

Facilities are required to meet both concentration-based and mass-based limits [ARM 17.30.1345(8)(a)]. Both monthly and weekly average mass-based (load) limits for BOD<sub>5</sub> (or CBOD<sub>5</sub>) and TSS will be calculated individually for each facility, based on a facility's average daily design flow and the monthly and weekly average concentration limits. The equation for calculating mass-based load limits is shown in Part IV.E of this Fact Sheet.

The monthly average mass-based limits for BOD<sub>5</sub> and TSS will be compared against the nondegradation allocated loads and the most stringent for each will be included as the monthly average permit limit.

#### *B. pH*

The 2013-issued GP required effluent pH to remain within the range of 6.0 – 9.0 s.u. unless a variation occurred which was due to natural biological processes. The domestic lagoon GP has historically allowed this deviation. However, there is no way for facilities regulated under this GP to demonstrate compliance with this exception. DEQ proposes to remove this exclusion and maintain the pH effluent limit to remain within the range of 6.0 – 9.0 s.u. at all times.

#### *C. Nondegradation Allocated Loads*

New or increased sources as defined in Montana's Nondegradation Policy are not eligible for coverage under the 2017-issued GP. Therefore, a new or increased source must apply and obtain coverage under an individual MPDES permit.

Sources that are in compliance with the conditions of their permit and do not exceed the limitations established in the permit or determined from a permit previously issued by DEQ are not considered new or increased sources.

DEQ calculates nondegradation load allocations for parameters with permit limitations in place on April 29, 1993. DEQ has addressed this requirement in the 2013-issued GP by maintaining monthly average BOD<sub>5</sub> and TSS load allocations for each facility based on the most stringent average daily design flow and monthly average BOD<sub>5</sub> and TSS concentration limits since 1993. The 2013-issued GP included BOD<sub>5</sub> and TSS nondegradation allocations for each facility using the equation used to calculate mass-loading (see Part IV.E):

$$\text{Monthly Average Load Allocation (lb/day)} = \text{Most Stringent [avg daily design flow (mgd) x monthly avg concentration limit (mg/L) x 8.34]}$$

If a municipality has seen an increase in either their average design flow or monthly average concentration limit for either BOD<sub>5</sub> or TSS since 1993, resulting in increase in their calculated monthly average load, the more stringent average monthly load will be maintained.

#### *D. Proposed TBELs*

TBELs are required to be met after treatment, prior to any dilution with groundwater or surface water. Compliance monitoring must be conducted at the end-of-pipe, prior to release into any channel or receiving water.

DEQ will assign one of the following TBEL subcategories to each facility as part of their renewal confirmation letter, based on the information provided as part of the renewal:

**Group A – Total Suspended Solids (TSS) -National Secondary Standards (see Table 3)**

**5-Day Biochemical Oxygen Demand (BOD<sub>5</sub>)**

A.1. National Secondary Standards

A.2. Treatment Equivalent to Secondary

**Group B – Total Suspended Solids (TSS) - Treatment Equivalent to Secondary (see Table 4)**

**5-Day Biochemical Oxygen Demand (BOD<sub>5</sub>)**

B.1. National Secondary Standards

B.2. Treatment Equivalent to Secondary

**Group C – Total Suspended Solids (TSS) - Alternate State Requirements (see Table 5)**

**5-Day Biochemical Oxygen Demand (BOD<sub>5</sub>)**

C.1. National Secondary Standards

C.2. Treatment Equivalent to Secondary

<b>Table 3. Proposed TBEL Group A- Total Suspended Solids – National Secondary Standards <sup>(1)</sup></b>				
Parameter	Units	Average Monthly Limit	Average Weekly Limit	Rationale
<b>Choices for 5-day Biochemical Oxygen Demand (BOD<sub>5</sub>) <sup>(2)</sup></b>				
A.1. BOD <sub>5</sub> - National Secondary Standards	mg/L	30	45	40 CFR 133.102(a)
	lbs/day	<sup>(3)</sup>	<sup>(3)</sup>	
	% removal	85 <sup>(4)</sup>	NA	
A.2. BOD <sub>5</sub> - Treatment Equivalent to Secondary	mg/L	45	65	40 CFR 133.105(a)
	lbs/day	<sup>(3)</sup>	<sup>(3)</sup>	
	% removal	65 <sup>(4)</sup>	NA	
<b>Total Suspended Solids</b>				
Total Suspended Solids	mg/L	30	45	40 CFR 133.102(b)
	lbs/day	<sup>(3)</sup>	<sup>(3)</sup>	
	% removal	85 <sup>(4)</sup>	NA	
pH <sup>(5)</sup>	s.u.	6.0 - 9.0 (instantaneous)		40 CFR 133.102(c)
Footnotes:				
1. See Definitions section at end of permit for explanation of terms.				
2. CBOD <sub>5</sub> limits contained in 40 CFR 133.102(a)(4) may replace BOD <sub>5</sub> limits if requested by the permittee as part of the renewal application process or a modification request and approved by DEQ.				
3. Mass-based limits calculation shown below in Part IV.E.				
4. Percent removal calculation shown below in Part IV.E.				
5. Effluent pH shall remain between 6.0 and 9.0 s.u. For compliance purposes, any single analysis and/or measurement beyond this limitation shall be considered a violation of the conditions of this permit.				

<b>Table 4. Proposed TBEL Group B - Total Suspended Solids Treatment Equivalent to Secondary <sup>(1)</sup></b>				
Parameter	Units	Average Monthly Limit	Average Weekly Limit	Rationale
<b>Choices for 5-day Biochemical Oxygen Demand (BOD<sub>5</sub>) <sup>(2)</sup></b>				
B.1. BOD <sub>5</sub> - National Secondary Standards	mg/L	30	45	40 CFR 133.102(a)
	lbs/day	<sup>(3)</sup>	<sup>(3)</sup>	
	% removal	85 <sup>(4)</sup>	NA	
B.2. BOD <sub>5</sub> - Treatment Equivalent to Secondary	mg/L	45	65	40 CFR 133.105(a)
	lbs/day	<sup>(3)</sup>	<sup>(3)</sup>	
	% removal	65 <sup>(4)</sup>	NA	
<b>Total Suspended Solids (TSS)</b>				
Total Suspended Solids	mg/L	45	65	40 CFR 133.105(b)
	lbs/day	<sup>(3)</sup>	<sup>(3)</sup>	
	% removal	65 <sup>(4)</sup>	NA	
pH <sup>(5)</sup>	s.u.	6.0 - 9.0 (instantaneous)		40 CFR 133.102(c)
Footnotes: 1. See Definitions section at end of permit for explanation of terms. 2. CBOD <sub>5</sub> limits contained in 40 CFR 133.102(a)(4) may replace BOD <sub>5</sub> limits if requested by the permittee as part of the renewal application process or a modification request and approved by DEQ. 3. Mass-based limits calculations shown below in Part IV.E. 4. Percent removal calculation shown below in Part IV.E. 5. Effluent pH shall remain between 6.0 and 9.0 s.u. For compliance purposes, any single analysis and/or measurement beyond this limitation shall be considered a violation of the conditions of this permit.				

Table 5. Proposed TBEL Group C - Total Suspended Solids Alternate State Requirements <sup>(1)</sup>				
Parameter	Units	Average Monthly Limit	Average Weekly Limit	Rationale
<b>Choices for 5-day Biochemical Oxygen Demand (BOD<sub>5</sub>) <sup>(2)</sup></b>				
C.1. BOD <sub>5</sub> - National Secondary Standards	mg/L	30	45	40 CFR 133.102(a)
	lbs/day	<sup>(3)</sup>	<sup>(3)</sup>	
	% removal	85 <sup>(4)</sup>	NA	
C.2. BOD <sub>5</sub> - Treatment Equivalent to Secondary	mg/L	45	65	40 CFR 133.105(a)
	lbs/day	<sup>(3)</sup>	<sup>(3)</sup>	
	% removal	65 <sup>(4)</sup>	NA	
<b>Total Suspended Solids (TSS)</b>				
Total Suspended Solids	mg/L	100	135	40 CFR 133.103(c)
	lbs/day	<sup>(3)</sup>	<sup>(3)</sup>	
	% removal	NA <sup>(4)</sup>	NA	
pH <sup>(5)</sup>	s.u.	6.0 - 9.0 (instantaneous)		40 CFR 133.102(c)
Footnotes: 1. See Definitions section at end of permit for explanation of terms. 2. CBOD <sub>5</sub> limits contained in 40 CFR 133.102(a)(4) may replace BOD <sub>5</sub> limits if requested by the permittee as part of the renewal application process or a modification request and approved by DEQ. 3. Mass-based limits calculation shown below in Part IV.E. 4. Percent BOD <sub>5</sub> percent removal calculation shown below in Part IV.E. TSS mass limits are a substitute for TSS percent removal. 5. Effluent pH shall remain between 6.0 and 9.0 s.u. For compliance purposes, any single analysis and/or measurement beyond this limitation shall be considered a violation of the conditions of this permit.				

### E. TBEL Equations

The following two equations – mass-based load and percent removal calculations -- will be included as part of the 2017-issued GP to clarify how authorized facilities must demonstrate compliance.

#### 1. Mass-based Load Limits Equation

The following equations are used by DEQ to develop a facility's mass-based load limits:

##### Monthly average load limit (lb/day) <sup>(1)</sup>

= avg daily design flow (mgd) x monthly avg concentration limit (mg/L) x 8.34 conversion

##### Weekly average load limit (lb/day)

= avg daily design flow (mgd) x weekly avg concentration limit (mg/L) x 8.34 conversion

**Footnote:** (1) If a facility's nondegradation allocated load is more restrictive (for instance the average design flow for the facility anytime since 1993 was lower than the current design flow), then the nondegradation allocated load for that facility will supersede the mass-based monthly average load limit. Limiting each facility to the nondegradation monthly load allocation will ensure nonsignificance.

The same basic equations are used by the facility to calculate their actual loads for a given period of time, typically for monthly DMRs:

**Monthly load (lb/day)** – *average of all loading values calculated within the month:*

= Monthly average [actual daily discharge (mgd) x actual daily concentration (mg/L) x 8.34]

**Weekly load (lb/day)** – *highest average weekly loading value calculated within the month:*

= Highest (average weekly [actual daily discharge (mgd) x actual daily concentration (mg/L) x 8.34])

## 2. Percent Removal Equation

The following equation is used for a facility to determine their percent removal for a given month (or other time period):

$$\% \text{ Removal} = \frac{[\text{Influent Concentration}] - [\text{Effluent Concentration}]}{[\text{Influent Concentration}]} \times 100$$

Where:

*Influent Concentration* = Corresponding monthly average influent concentration based on the analytical results of the reporting period.

*Effluent Concentration* = Corresponding monthly average effluent concentration based on the analytical results of the reporting period.

V. Water Quality-Based Effluent Limitations

A. *Scope and Authority*

No permit may be issued when the imposition of conditions cannot ensure compliance with the applicable water quality requirements. In addition, Montana water quality standards 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. DEQ develops Water Quality-based Effluent Limits (WQBELs) when a discharge has the reasonable potential to exceed any state water quality standard and TBELs are not adequate to achieve water quality standards.

B. *Receiving Waters*

The 2017-issued GP covers facility discharges outside the boundaries of Indian Lands to any *state surface waters* except for Outstanding Resource Waters or those classified as A-1 or A-Closed waters (see Fact Sheet Part III.D.2).

‘State waters’ are defined as any body of water, irrigation system or drainage system either on the surface or underground. State waters do not include ponds or lagoons used solely for treating, transporting, or impounding pollutants; or irrigation waters or land application disposal waters when the waters are used up within the irrigation or land application disposal system and the waters are not returned to state waters [75-5-103, MCA]. Channels used solely for conveyance of wastewater discharges are considered part of the domestic lagoon system and are not regulated as state surface waters; therefore, compliance monitoring for any water-quality based effluent limits may be conducted at any location after treatment but prior to mixing with state surface water.

C. *Applicable Water Quality Standards*

Applicable discharges to state surface waters are subject to the specific water quality standards in ARM 17.30.623 - .629, Department Circulars DEQ-7 (Numeric Water Quality Standards) and -12A (Base Numeric Nutrient Standards), and the general provisions of ARM 17.30.635 through 637. All dischargers must ensure that state waters are free from substances which will:

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

#### *Total Maximum Daily Load*

For this renewal, the 2016 Integrated Report listed 16 currently authorized facilities' receiving waterbodies as impaired (this included five of the six continuous dischargers). Specifically, the receiving waters for Montana State Hospital, Townsend, Eureka, Thompson Falls, and Troy were listed as impaired for various parameters. The 2016 Integrated Report list of impaired waterbodies includes both those waterbodies where beneficial uses are impaired by a pollutant (e.g., sediment, nutrients, metals, temperature) and waterbodies impaired by a non-pollutant (e.g., alteration in stream-side or littoral vegetative covers, low flow alterations). DEQ develops Total Maximum Daily Loads (TMDLs) for waterbodies with pollutant impairments. Two of the five waterbodies for continuous dischargers that were listed as impaired had TMDLs (Montana State Hospital and Eureka).

Wasteload Allocations (WLAs) that are assigned to point sources in the TMDL are incorporated into MPDES permits, consistent with the assumptions and requirements in the TMDL document. DEQ reviewed the two TMDLs related to the continuous dischargers and found there was one with a narrative WLA (TSS for Eureka). The TMDLs conclude that lagoons are small contributors when properly designed and operated. Therefore, proper operation and maintenance meets the WLAs of the applicable facilities. The 2017-issued GP includes conditions requiring the proper operation and maintenance of domestic lagoon facilities.

#### *D. Mixing Zones*

A mixing zone is an area where the effluent mixes with the receiving water and certain water quality standards may be exceeded [ARM 17.30 Subchapter 5 *et seq.*]. No mixing zone will be granted that will impair beneficial uses. DEQ must determine the applicability of a mixing zone; mixing zones are granted on a parameter-by-parameter basis.

No mixing zones were granted for any of the authorized facilities as part of the 2013-issued GP; instead, monitoring was required for parameters of concern. For this renewal cycle, DEQ evaluated the dischargers eligible for coverage under the 2017-issued GP (MTG581000). Any mixing zones given to facilities under this General Permit will be discussed further in Part V.E.2 of this Fact Sheet.

When appropriate, DEQ will grant dilution on a parameter-parameter basis for each facility requesting authorization under this General Permit. Dilution is granted per parameter as the appropriate portion of the low flow: either the 7-day, 10-year low flow (7Q10) or for nutrients the seasonal 14-day, 5-year low flow conditions (seasonal 14Q5). The dilution will be granted as follows:

1. *No available dilution* – if the receiving water's low flow is 0 cubic feet per second (cfs) or if DEQ requires the parameter's standard to be met at the end of pipe under this General Permit (*E. coli* bacteria and Total Residual Chlorine (TRC)).
2. *Alternative mixing zone dilution* – DEQ will grant up to 10% of the 7Q10 as dilution for meeting chronic ammonia and 1% of the 7Q10 as dilution for meeting acute ammonia standards without further evaluation.
3. *Standard mixing zone dilution* – This is based on the dilution ratio (ratio of the 7Q10: facility's mean annual discharge rate) and submittal of water quality information in

conformance with the requirements under ARM 17.30.506 (including optional 'Form 506, Water Quality Assessment (ARM 17.30.506)'):

- Greater than a 100:1 dilution ratio – DEQ will grant up to 100% dilution for chronic and human health standards. In addition, DEQ will grant up to 10% acute dilution for ammonia based on consideration of the first order rate of decay.
  - Less than a 100:1 dilution ratio - DEQ will grant up to 25% dilution for chronic and human health standards. In addition, DEQ will grant up to 2.5% acute dilution for ammonia based on consideration of the first order rate of decay.
4. *Nutrient Mixing Zone* (Total Nitrogen and Total Phosphorus) – dilution is based on 100% of the seasonal 14Q5 (typically the summer season of July 1<sup>st</sup> – September 30<sup>th</sup>, but other seasons may apply).

DEQ determines the low flow through either publically-available information or certified information provided by the applicant.

A facility must apply for coverage under an individual permit for any other mixing zone evaluation.

#### *E. Basis for WQBELs*

DEQ develops WQBELs for any pollutant of concern (POC) for which there is reasonable potential (RP) to cause or contribute to exceedances of instream numeric or narrative water quality standards. Pollutants and parameters are identified as POC for one or more of the following reasons:

- listed TBELs;
- identified as needing limits in the previous permit;
- identified as present in the effluent through monitoring or otherwise expected present in the discharge; or
- associated with impairment which may or may not have a WLA in a TMDL.

DEQ evaluated pollutants for the domestic sewage lagoon category in **Table 6**.

<b>Table 6. Identification of Pollutants of Concern</b>	
<b>Parameter</b>	<b>Basis for POC Identification</b>
5-day Biochemical Oxygen Demand <sup>(1)</sup>	Technology-based Effluent Limits, previous permit
Total Suspended Solids	Technology-based Effluent Limits, previous permit
pH	Technology-based Effluent Limits, previous permit
Oil & Grease	Known present
Dissolved Oxygen	Known present
<i>E.coli</i> bacteria	Previous permit, known present
Total Residual Chlorine	Previous permit, known present
Ammonia, as N	Known present
Nitrate+Nitrite, as N	Known present
Total Nitrogen, Total Phosphorus <sup>(2)</sup>	Known present, impairments
Other Parameters (WLA and other previous permit limits)	Previous permit, impairments
Footnotes:	
(1) Permittees may request 5-day carbonaceous biochemical oxygen demand (CBOD <sub>5</sub> ) in lieu of BOD <sub>5</sub> .	
(2) Numeric nutrient standards have been implemented for wadeable streams and two (2) downstream segments of the Yellowstone River, as of April 2017.	

**1. Numeric Reasonable Potential for Intermittent and Perennial Receiving Waterbodies**

When DEQ conducts a numeric analysis, a mass balance equation is used to determine RP and develop WQBELs, based on EPA's *Technical Support Document for Water Quality-based Toxics Control, March 1991* (TSD), EPA/505/2-90-001.

$$C_r = \frac{Q_d C_d + Q_s C_s}{Q_d + Q_s} \quad (\text{Equation 1})$$

Given:

$C_r$  = the resulting receiving water concentration for a given period

$Q_d$  = critical discharge rate (average daily design flow)

$Q_s$  = critical receiving water low flow [available portion of the 7Q10 (see Part V.D of this Fact Sheet)]

$C_d$  = critical effluent pollutant concentration (maximum discharge concentration x TSD multiplier)

$C_s$  = critical ambient pollutant concentration (75<sup>th</sup> percentile concentration)

The critical effluent concentration  $C_d$  is obtained following the method recommended by the TSD, which is multiplying the maximum effluent concentration observed during the three to five year period of record by the TSD Table 3-2 multiplier. For this GP, DEQ will develop the maximum effluent concentration for each facility based on the data provided as part of the renewal application and DMRs. If  $C_r >$  water quality standard based on *Equation 1*, then there is RP to exceed a water quality standard, and the facility will be required to apply for individual permit coverage.

## 2. Parameter-specific RP and WQBEL development

The following subsections discuss the basis for the RP analyses and WQBELs in this permit.

### a. TSS, CBOD<sub>5</sub>/BOD<sub>5</sub>, and pH –

Each facility regulated under this GP will be required to meet TBELs which provide a significant reduction in solids and biological material through the TSS and CBOD<sub>5</sub>/BOD<sub>5</sub> effluent limits (see Section IV). In addition, the TBEL effluent limitation for pH of 6.0 – 9.0 s.u. is protective of any receiving water quality. No additional WQBELs are required for these parameters.

### b. Oil and Grease –

Discharges are prohibited from creating floating debris, scum, a visible oil sheen (or creates oil present in concentrations at or in excess of 10 mg/L), or globules of grease or other floating material in the receiving stream. Sewage treatment lagoons covered under this GP include minor facilities with no significant industrial contribution. However, oil & grease (O&G) is a parameter that could be present at a relatively low level in the wastewater from miscellaneous commercial sources.

Each authorized facility was required to analyze oil and grease concentrations annually during the current period of record. The oil & grease concentrations observed for the four years (2013 through 2016) for the six continuous dischargers ranged from nondetect to 2.0 mg/L oil & grease. Based on this data, it appears that continuous-discharging facilities authorized under the 2013-GP do *not* have RP to exceed 10 mg/L oil. DEQ has determined narratively that the domestic lagoon facilities could, however, cause or contribute to an oil sheen and will include this as an effluent limit.

Each facility authorized under this GP will be required to visually monitor their discharge a minimum of three times per week during periods of discharge. If there is a visual sign of an oil sheen or presence of oil, the facility must immediately take an oil & grease sample for analysis. The facility must also take all necessary steps to prevent the discharge of oil and grease. In addition, if the analysis results indicate the oil & grease concentration is greater than 10 mg/L, the facility must report the measures taken to eliminate the source with the next DMR submittal.

### c. *Escherichia coli* Bacteria –

State surface water must be free from substances attributable to discharges that will create conditions harmful to human health. This includes pathogens. Pathogen limits are defined in terms of *Escherichia coli* (*E. coli*) bacteria.

*E.coli* standards are a surrogate for all human pathogens including bacteria and viruses. In 2017, the *E.coli* standards for all waterbodies were updated to read “Water quality criteria for *Escherichia coli* are expressed in colony forming units per 100 milliliters of water or as most probable number, which is a statistical representation of the number of organisms in a sample, as incorporated by reference in 40 CFR 136.3(b).”

The standards in ARM 17.30 Subchapter 6 read:

- April 1 through October 31 of each year - the geometric mean number of *E. coli* must not exceed 126 colony forming units (cfu) per 100 milliliters (mL) and 10% of the total samples may not exceed 252 cfu per 100 mL during any monthly period; and
- November 1 through March 31 of each year - the geometric mean number of *E. coli* must not exceed 630 cfu per 100 mL and 10% of the total samples may not exceed 1,260 cfu per 100 mL during any monthly period.

DEQ required all discharges covered by the 2013-issued GP to meet the *E. coli* effluent limits at the last point of control as of January 1, 2017. DEQ is proposing to retain these limits for the 2017-issued GP, but will change the associated units to read “number of organisms/100 mL,” which will incorporate both cfu and MPN.

DEQ has determined that in order to protect human health, *all* discharges must meet the *E. coli* bacteria limit after all treatment but prior to discharge into state waters (i.e. the receiving waterbody) with no mixing zone. **Table 7** provides the *E. coli* bacteria effluent limits that will be included in each authorization:

Parameter	Units	Average Monthly Limit	Average Weekly Limit
<i>E. coli</i> Bacteria - summer <sup>(2,3)</sup>	# organisms/100 mL	126	252
<i>E. coli</i> Bacteria - winter <sup>(3,4)</sup>	# organisms /100 mL	630	1,260

Footnote:  
 1. See Definitions section at end of permit for explanation of terms.  
 2. This limit applies during the period April 1 through October 31, annually.  
 3. Report the geometric mean if more than one sample collected during the reporting period.  
 4. This limit applies during the period November 1 through March 31, annually.

**d. Total Residual Chlorine –**

The total residual chlorine (TRC) chronic aquatic life standard is 0.011 mg/L (11 µg/L) and the acute aquatic life standard is 0.019 mg/L (19 µg/L) [Department Circular DEQ-7]. The TRC standards were included as end-of-pipe TRC effluent limits in the 2013-issued GP and will be maintained for dischargers authorized under the 2017-issued GP. None of the continuous dischargers reported any detection of chlorine during the period of record.

Monitoring for TRC will be required whenever a facility uses chlorine to disinfect; the samples may be taken at any discharge location after treatment, prior to reaching the initial receiving waterbody. Approved analytical methods require that the TRC samples are analyzed within 15 minutes (40 CFR 136). An authorized facility’s discharge is considered to be in compliance with the TRC limits of 11 µg/L average monthly and 19 µg/L maximum daily as long as analytical results show less than the Required Reporting Value (RRV) of 0.1 mg/L (100 µg/L).

**e. Nutrients –**

Montana adopted Department Circular DEQ-12A “Montana Base Numeric Standards” and the companion Department Circular DEQ-12B “Nutrient Standards Variances” in 2014, which was updated in June 2017. Circular DEQ-12A sets Total Nitrogen (TN) and Total Phosphorus (TP) standards (or criteria) for ecoregions and some individual surface waters in Montana. These TN and TP criteria apply during specific months, generally the summer. At this time there are no nutrient criteria for lakes, reservoirs, and all of Montana’s large river segments except for two in the Yellowstone River. Circular DEQ-12B includes the nutrient variance program for lagoons who cannot meet calculated TN and/or TP limits designed to comply with the nutrient criteria. DEQ is not authorizing a variance under the General Permit; therefore, if a facility cannot meet the specific criteria for their ecoregion (or larger river or lake/reservoir) they will be required to apply for coverage under an individual permit.

When a facility discharges into a waterbody that does not have nutrient criteria but is listed as impaired for TN, TP, or other nutrient impacts such as chlorophyll-a, DEQ routinely includes TN and TP effluent limits for the facility that ‘cap at current performance.’

In order to maintain coverage under this General Permit, one of the following scenarios must be met for a facility’s discharge to state surface water, including both immediate and any immediate downstream waterbodies:

1. Scenario one: No applicable nutrient criteria and waterbodies not listed as impaired for nutrients or related impacts – facility will have nutrient effluent monitoring, only.
2. Scenario two: No applicable nutrient criteria, but waterbodies listed as impaired for nutrients and/or related impacts – facility is capped at current performance on a lb/day monthly average basis and required to comply with the Special Conditions Part VII.B.3 of this GP Fact Sheet (which requires the facility to conduct an Optimization Study).
3. Scenario three: Applicable nutrient criteria – facility must demonstrate no reasonable potential to exceed the criteria to remain under the GP. Facilities demonstrating ‘no RP’ will have nutrient effluent monitoring, only.

Those facilities that do have RP can be covered under the 2017-issued GP as an interim condition, but are required to apply for individual permit coverage within two (2) years and required to comply with the Special Conditions Part VII.B.3 of this GP Fact Sheet (which requires the facility to conduct an Optimization Study).

**Attachment B** presents the specific ecoregions and TN and TP criteria evaluation for each of the six continuous dischargers currently authorized under the Domestic Sewage Lagoon General Permit. Nutrient requirements will be specified in the facility’s authorization letter.

**f. Total Ammonia as Nitrogen (Ammonia) –**

Ammonia aquatic life acute and chronic toxicity are dependent on ambient pH and water temperature data for the receiving water body as well as the type of fishery present as contained within Circular DEQ-7. The 2013-issued GP did not include ammonia limits, but did require upstream and effluent monitoring.

For this General Permit renewal, DEQ will conduct an ammonia RP analysis for any facility requesting authorization as follows:

1. Develop the applicable receiving water acute and chronic ammonia standards, based on the 75<sup>th</sup> percentile of the upstream temperature and pH as well as the presence or absence of salmonid fish as determined by waterbody classifications in ARM 17.30 Subchapter 6;
2. Conduct the RP analysis using *Equation 1*, using available dilution as follows:
  - Dilution of 10% of the 7Q10 for chronic and 1% of the 7Q10 for acute; or
  - If there is RP after granting dilution consistent with an alternative mixing zone as described above, DEQ will grant a Standard Mixing Zone under ARM 17.30.516(3) if the facility has submitted information in conformance with the Water Quality Assessment requirements under ARM 17.30.506 and DEQ finds that the beneficial uses of the receiving water will be protected.

DEQ will continue to permit facilities under the domestic lagoon GP that have no RP to exceed calculated ammonia standards based on the above. Those facilities that do have RP can be covered under the 2017-issued GP as an interim condition, but are required to apply for individual permit coverage within two (2) years.

**Attachment C** presents the ammonia evaluation for each of the current six continuous dischargers. Ammonia requirements will be specified in the facility's authorization letter.

**g. Nitrate + Nitrite –**

The human health standard (HHS) for nitrate + nitrite is 10 mg/L. The 2013-issued GP required each permittee to monitor their effluent and upstream nitrate + nitrite concentrations during this permit cycle. For this General Permit renewal, DEQ will conduct a Nitrate + Nitrite RP analysis using *Equation 1*. If needed, DEQ will grant a Standard Mixing Zone if the facility has submitted information in conformance with the Water Quality Assessment requirements under ARM 17.30.506 and DEQ finds that the beneficial uses of the receiving water will be protected.

DEQ will continue to permit facilities under the domestic lagoon GP that have no RP to exceed calculated Nitrate+Nitrite standards based on the above. Those facilities that do have RP can be covered under the 2017-issued GP as an interim condition, but required to apply for individual permit coverage within two (2) years.

**Attachment C** presents the Nitrate+Nitrite evaluation for each of the six continuous dischargers. Nitrate+Nitrite requirements will be specified in the facility's authorization letter.

**h. Whole Effluent Toxicity (WET) –**

Facilities that maintain authorization to discharge under the 2017-issued GP do not require WET limits or testing based on the following rationale:

- No industrial users and indirect dischargers contributing to the influent;
- The requirement that facilities have flows of less than 1 mgd; and
- Other applicable effluent limits contained in this permit.

## VI. Effluent Limits

Effluent limitations or conditions in reissued permits are required to be at least as stringent as those in the existing permit, with certain exceptions [40 CFR 122.44(1)]. DEQ considered the proposed permit limits to ensure that they were as stringent as previous limits, or met the anti-backsliding requirements.

Beginning on the effective date and lasting through the term of the 2017-issued GP, the discharge from each facility shall, at a minimum, meet the effluent limits presented below. The limits for each are comprised of the appropriate TBELs and WQBELs. These limits and the outfall location for each facility will be identified in a confirmation letter.

### A. *TBELs:*

Each facility will be assigned BOD<sub>5</sub>, TSS, and pH limits in their authorization letter, based on the appropriate TBEL category (i.e. Group A.1, A.2, B.1, etc.).

#### **Group A – Total Suspended Solids (TSS) -National Secondary Standards (see Table 3)**

##### **5-Day Biochemical Oxygen Demand (BOD<sub>5</sub>)**

- A.1. National Secondary Standards
- A.2. Treatment Equivalent to Secondary

#### **Group B – Total Suspended Solids (TSS) - Treatment Equivalent to Secondary (see Table 4)**

##### **5-Day Biochemical Oxygen Demand (BOD<sub>5</sub>)**

- B.1. National Secondary Standards
- B.2. Treatment Equivalent to Secondary

#### **Group C – Total Suspended Solids (TSS) - Alternate State Requirements (see Table 5)**

##### **5-Day Biochemical Oxygen Demand (BOD<sub>5</sub>)**

- C.1. National Secondary Standards
- C.2. Treatment Equivalent to Secondary

### B. *WQBELs:*

In addition to the TBELs, each facility is also subject to WQBELs. Beginning on the effective date of the permit and ending with the expiration of this permit, each facility will be subject to WQBELs as shown below in **Table 8 and below**.

<b>Table 8. Water Quality-based Effluent Limits for Continuous Dischargers <sup>(1)</sup></b>				
Parameter	Units	Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit
Total Residual Chlorine <sup>(2)</sup>	µg/L	11	--	19
<i>E. coli</i> bacteria - summer <sup>(3)</sup>	# organisms/100 mL	126	252	--
<i>E. coli</i> bacteria - winter <sup>(3)</sup>	# organisms/100 mL	630	1,260	--
Oil & Grease	mg/L	--	--	10
Footnotes:				
(1) See Definitions section at end of permit for explanation of terms. WQBELs are in addition to TBELs.				
(2) TRC limits apply only when a facility uses chlorine to disinfect. Samples must be analyzed within 15 minutes. Analytical results less than 100 µg/L are considered in compliance with the TRC limit.				
(3) All facilities are required to comply with the summertime <i>E.coli</i> bacteria limit from April 1 through October 31 and the wintertime limit from November 1 through March 31st on an annual basis. The geometric mean must be reported if more than one sample is collected during the reporting period.				

In addition to **Table 8**, all facilities must meet the following restriction:

1. There shall be no discharge which causes a visible oil film (or to be present at concentrations at or in excess of 10 mg/L).

VII. Monitoring and Reporting Requirements and Special Conditions

A. *Effluent Monitoring*

Each facility is required to monitor their discharge at the last point of control before the discharge enters the receiving water. All facilities must ensure flow monitoring is representative of the nature and volume of the discharge. DEQ requires monitoring to occur on a calendar basis (i.e., calendar week, calendar month, calendar quarter). When monitoring is required twice per month, the two samples must be taken at least one week apart during the calendar month. When monitoring is required more than once a week, each sample must be taken on a unique calendar day.

Samples must be representative of the volume and quality of the effluent. Samples shall be collected, preserved and analyzed in accordance with approved procedures listed in 40 CFR 136 unless otherwise specified by DEQ. Analytical results reported as less than detection must achieve the required reporting values (RRV) in Department Circular DEQ-7 unless a different reporting level (RL) is specified in the 2017-issued GP.

Reporting frequency shall be monthly, and each facility must submit the results on their DMR for each month by the 28<sup>th</sup> of the following month. If no discharge occurs during the reporting period, “no discharge” shall be reported on the DMR.

**Table 9** presents the influent monitoring requirements:

<b>Table 9: Influent Monitoring and Reporting Requirements <sup>(1)</sup></b>					
Parameter	Units	Sample Type	Minimum Sampling Frequency <sup>(2)</sup>	Reporting Requirements	Reporting Level <sup>(3)</sup>
5-Day Biochemical Oxygen Demand (BOD <sub>5</sub> ) <sup>(4)</sup>	mg/L	Composite	1/Month	None	2
Total Suspended Solids (TSS)	mg/L	Composite	1/Month	None	10

Footnotes:

- (1) See Definitions section in the permit.
- (2) The influent concentration of BOD<sub>5</sub> and TSS are used to calculate the percent removal. Monthly influent samples are required whenever there is a discharge for that month.
- (3) Reporting Level (RL) is the minimum reporting level required for the analysis.
- (4) BOD<sub>5</sub> unless facility has requested to sample for Carbonaceous Biochemical Oxygen Demand (CBOD<sub>5</sub>).

**Table 10** presents the proposed effluent monitoring requirements under the 2017-issued GP.

**Table 10: Effluent Monitoring and Reporting Requirements <sup>(1)</sup>**

Parameter	Units	Sample Type	Min. Sampling Frequency <sup>(2)</sup>	Reporting Requirements	Reporting Level <sup>(3)</sup>
Discharge Flow Rate	mgd	Instantaneous <i>or</i> Continuous	5/Week	Daily Maximum and Monthly Average	± 10% of actual
# Days with Flow	#Days	Calculated	1/Day	Monthly Count	1
5-Day Biochemical Oxygen Demand <sup>(4)</sup>	mg/L	Grab	2/Month	Weekly Maximum and Monthly Average	2
	lb/day	Calculated	1/Month		0.1
	% Removal	Calculated	1/Month	Monthly Minimum	0.1
Total Suspended Solids	mg/L	Grab	2/Month	Weekly Maximum & Monthly Average	10
	lb/day	Calculated	1/Month		0.1
	% Removal	Calculated	1/Month	Monthly Minimum	0.1
pH	s.u.	Instantaneous	1/Week	Daily Minimum and Daily Maximum	0.1
Oil & Grease	Yes / No	Visual <sup>(5)</sup>	3/Week	Monthly	--
	mg/L	Grab	<sup>(5)</sup>	Daily Maximum	1
<i>E. coli</i> Bacteria <sup>(6)</sup>	Number of organisms/ 100 mL	Grab	2/Month	Daily Maximum and Geometric Mean	1
Chlorine, Total Residual <sup>(7)</sup>	µg/L	Grab	3/Week	Daily Maximum and Monthly Average	100
Ammonia, Total as N	mg/L	Grab	1/Month	Daily Maximum and Monthly Average	0.07
Nitrate + Nitrite	mg/L	Grab	1/Month	Daily Maximum and Monthly Average	0.02
Total Kjeldahl Nitrogen	mg/L	Grab	1/Month <sup>(8)</sup>	Monthly Average	0.225
Total Nitrogen	mg/L	Grab	1/Month <sup>(8)</sup>	Monthly Average	0.25
	lb/day	Calculated			0.01
Total Phosphorus	mg/L	Grab	1/Month <sup>(8)</sup>	Monthly Average	0.003
	lb/day	Calculated			0.001

Footnotes:

- (1) See Definitions section in the permit.
- (2) **Monitoring is required only for any calendar period where there is a discharge.** Methods for calculating mass load (lb/day) and % removal are provided in Parts IV.E.1 & 2 of this Fact Sheet. Permittees are allowed to either conduct grab or composite effluent sampling; composite samples are 24-hour composite samples using a minimum of four grab samples. *DEQ will presume the permittees will comply with the monitoring requirement by taking one grab sample unless otherwise indicated in the NOI and specified in the authorization letter.*
- (3) RL = minimum reporting level. Analytical results reported as less than detection must achieve the required reporting values (RRV) in Department Circular DEQ-7 unless a different RL is specified.
- (4) BOD<sub>5</sub> unless the facility is authorized to demonstrate compliance with carbonaceous biochemical oxygen demand (CBOD<sub>5</sub>).
- (5) If visual monitoring indicates the presence of oil & grease, a grab sample must be submitted for analysis and discharge must cease if the concentration is found to be > 10 mg/L.
- (6) *Escherichia coli* (*E. coli*) bacteria. Reporting in #organisms per 100 mL (equivalent to either colony forming units (cfu) per 100 mL or most probable number (mpn) per 100 mL). Report the geometric mean if more than one sample is collected during the reporting period.
- (7) Limits and monitoring required for facilities that use chlorine for disinfection. If no chlorine is used during the reporting period, monitoring is not required and "NODI CODE = 9" must be reported on DMRs. Analytical results less than 100 µg/L (0.1 mg/L) will be considered in compliance with TRC limits.
- (8) DEQ's authorization letter will specify the applicable period of nutrient monitoring (typically July 1 – September 30<sup>th</sup>).

## *B. Compliance Schedule and Special Conditions*

### **1. Requirement to Apply for an Individual Permit**

When DEQ calculates a facility has RP to exceed a water quality standard as discussed in Part V.E.2 of this Fact Sheet, the facility will be required to apply for an individual permit as part of their authorization letter. These facilities will continue to be covered under the 2017-issued GP as long as they submit a complete application for an individual permit by no later than December 31, 2019. DEQ will terminate the facility's authorization under the 2017-issued GP once the individual permit is effective (ARM 17.30.1341).

### **2. Lagoon Operation and Maintenance Requirements**

ARM 17.30.1342(5) states that a permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of the permit. One of the Special Conditions under the 2013-issued GP, as well as the proposed 2017-issued GP, is the requirement for every facility to maintain and operate in accordance with an up-to-date Operations & Management (O & M) Plan. Therefore, DEQ proposes to continue to include the requirement for each permitted facility to:

- a. Maintain an up-to-date O&M manual for the domestic sewage treatment lagoon system;
- b. Follow the procedures in the O&M manual;
- c. **Conduct inspections at least monthly** to ensure the O&M procedures are being followed and are working; and
- d. Maintain records of the routine inspections and any follow-up. Records from the routine inspections must be maintained for at least three (3) years, and available for an inspector upon request. At a minimum, the records shall include:
  - Date and time of inspection;
  - Name of the inspector(s);
  - Weather conditions during inspection;
  - Visual observation of lagoon conditions, including wastewater observations (water level, odor, and visible appearance) and dike condition (signs of leakage, erosion, rodents burrowing, and/or vegetation growth);
  - Discharge flow rate, if occurring;
  - Identification of O&M problems;
  - Recommendations, as appropriate, to rectify identified O&M problems;
  - A brief description of any actions taken with regards to identified problems; and
  - Other information, as appropriate (e.g., effluent sample and measurement location).

### **3. Nutrient Optimization Study**

Facilities that discharge to waterbodies listed as impaired for nutrients (TN, TP, or other eutrophication indicators) and facilities that have RP to exceed TN and/or TP criteria must

complete a nutrient optimization study within four years of coverage under this renewed General Permit (January 1, 2022, unless the facility coverage is after January 1, 2018).

The optimization study must include:

- Evaluation of current facility operations, including advanced operational strategies, reuse, recharge, and land application;
- Selection and planning for facility-specific nutrient minimization activities; and
- Implementation of selected nutrient minimization activities.

Facilities required to undertake the nutrient optimization study are required to submit an annual progress report by January 28<sup>th</sup> of each year, and a final summary of improvements by no later than January 14, 2022.

#### **4. Seasonal Land Application of Treated Effluent**

Any authorized facilities that employ land application are required to incorporate good operating procedures for the treated effluent land application system into the facility's final O&M manual as a Land Application Nutrient Management Plan (NMP). The NMP shall be designed to minimize the potential for release of pollutants to state waters. The plan shall detail how the facility will control land-applied effluent to optimize nutrient uptake and eliminate the risk of runoff to surface water or ground water infiltration/ percolation. Each facility shall maintain land application records for three (3) years and make them available for inspection by DEQ personnel upon request.

#### **5. Inflow/Infiltration**

The 2017-issued GP will require an Infiltration/Inflow (I/I) status update to be submitted during the last year of the permit cycle for all facilities with an average daily design flow greater than 0.1 mgd. This status update should include the:

- date of the most recent I/I assessment (which may be before this permit cycle),
- work completed since the most recent I/I assessment,
- work planned to reduce I/I over the next five years, and
- best estimate of the current amount and sources of I/I into the collection system.

A summary of the facility's most recent I/I review must be completed by **July 1, 2022** and submitted to DEQ by no later than **July 14, 2022**.

#### **6. Compliance Schedule and Special Conditions Summary**

**Table 11** presents a summary of the Compliance Schedule and Special Conditions due dates.

<b>Table 11: Summary of Compliance Schedule and Special Conditions Due Dates</b>		
<b>Action</b>	<b>Scheduled Completion Date of Action <sup>(1)</sup></b>	<b>Report Due Date <sup>(2)</sup></b>
<b>Compliance Schedule</b>		
Individual Permit Application as Required in Facility Authorization Letter.	December 31, 2019	Annual Progress Reports by January 28 <sup>th</sup> until submitted.
<b>Special Conditions Due Date</b>		
Operation & Maintenance Plan and records	Develop, implement, and maintain onsite	NA
Nutrient Optimization Plan		Progress Reports by January 28 <sup>th</sup> annually until completed. Summary report due January 14, 2022.
Land application – Plan and records <i>if land application is used</i>	Develop and implement and maintain onsite	NA
Review I/I and provide status update	July 1, 2022	July 14, 2022
Footnotes: (1) The actions must be completed on or before the scheduled completion dates. (2) This notification must be received by DEQ on or before the scheduled due date.		

*C. Sludge Requirements*

The use or disposal of sewage sludge must be in conformance with 40 CFR Part 503.

*D. Pretreatment Program*

Facilities that operate under the EPA Pretreatment Program or accept discharge from categorical industrial users, significant industrial users, or other users that may cause pass through or interference, cannot be covered under the 2017-issued GP. The GP will include standard language restricting the introduction of certain pollutants into the authorized facilities and requiring a facility to provide adequate notice to DEQ if a new source, volume, or character of industrial pollutant is introduced into the system.

### VIII. Information Sources

1. Montana Code Annotated Title 75 - Chapter 5 - Water Quality
2. Administrative Rules of Montana Title 17 Chapter 30 - Water Quality
  - a. Subchapter 2 - Water Quality Permit and Application Fees
  - b. Subchapter 5 - Mixing Zones in Surface and Ground Water
  - c. Subchapter 6 - Montana Surface Water Quality Standards and Procedures
  - d. Subchapter 7- Nondegradation of Water Quality
  - e. Subchapter 11 - Storm Water Discharges
  - f. Subchapter 12 - MPDES Standards
  - g. Subchapter 13 - MPDES Permits
3. Montana DEQ Circular DEQ-2, Design Standards for Wastewater Facilities, September 2016.
4. Montana DEQ Circular DEQ-7, Montana Numeric Water Quality Standards, May 2017.
5. Montana DEQ Circular DEQ-12A, Montana Base Numeric Nutrient Standards, July 2014 and Circular DEQ-12B, Nutrient Standards Variances, June 2017
6. Montana Pollutant Discharge Elimination System (MPDES) Permit Number MTG580000: Administrative Record.
7. 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.
8. Federal Water Pollution Control Act (Clean Water Act), § 303(d), 33 USC 1313(d) Montana List of Waterbodies in Need of Total Maximum Daily Load Development, 2016.
9. Federal Register, 49 FR 37005 Alternative State Requirements for Montana, September 20, 1984.
10. US Code of Federal Regulations, 40 CFR Parts 122-125, 130-133, & 136.
11. US Code of Federal Regulations, 40 CFR Part 403 – General Pretreatment Regulations for Existing and New Sources of Pollution.
12. US Code of Federal Regulations, 40 CFR Part 503 – Standards for the Use or Disposal of Sewage Sludge.
13. US Department of the Interior US Geological Survey, Statistical Summaries of Streamflow in Montana and Adjacent Areas, Water Years 1900 through 2002, Scientific Investigations Report 2004-5266, 2004 and final electronic update through 2009, dated 2016.
14. US EPA. Office of Water. Design Manual for Municipal Wastewater Stabilization Ponds, EPA 625-1-83-015. October 1983.
15. US EPA. Principles of Design and Operations of Wastewater Treatment Pond Systems for Plant Operators, Engineers, and Managers, EPA/600/R-11/088, August 2011.
16. US EPA Technical Support Document for Water Quality-Based Toxics Control, EPA/505/2-30-001, March 1991.
17. US EPA NPDES Permit Writers' Manual, EPA 833-K-10-001, September 2010.

Completed: July 2017