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

Fact Sheet

Permittee:	Sweet Grass Community County Water/Sewer District
Permit No.:	MT0031437
Receiving Water:	Unnamed ephemeral lake
Facility Information:	Sweet Grass Community Wastewater Treatment Facility
Mailing Address:	P.O. Box 91 Sweet Grass, MT 59484
County:	Toole
Contact:	Brian Roark, Water and Wastewater Supervisor
Telephone:	(406) 937-2142

Fee Information:

Type:	Minor Publicly Owned Treatment Works
Number of Outfalls:	1 (for fee determination purposes)
Type of Outfall:	001 – Facility Discharge

I. Permit Status

The Montana Pollutant Discharge Elimination System (MPDES) permit for the Sweet Grass Community (Sweet Grass) Wastewater Treatment Facility (WWTF) was issued on October 15, 2010, became effective on November 1, 2010, and had an expiration date of October 31, 2015. The Department of Environmental Quality (DEQ) received a complete permit renewal application from Sweet Grass on December 3, 2014, and administratively extended the permit by letter dated January 15, 2015. The administratively extended permit is referenced in this Fact Sheet (FS) as the 2010-issued permit.

II. Facility Information

Current Facilities:

The Sweet Grass WWTF serves the unincorporated community of Sweet Grass, with a current population of approximately 100 people. The existing WWTF consists of a two cell facultative lagoon system with ultraviolet light (UV) disinfection of the effluent. The design flow of the WWTF is 0.0205 million gallons per day (mgd), with approximately 187 days (effective) detention time. Cell 1 has a surface area of 2.0 acres and operating capacity of 1.99 million gallons (MG). Cell 2 has a surface area of 1.7 acres and operating capacity of 1.77 MG. The lagoon system is capable of either series or parallel operation.

The lagoon system is designed to discharge continuously to an unnamed ephemeral lake following disinfection. However, from completion of construction in 2004 through May of 2017, the WWTF has reportedly never discharged. A discharge from Outfall 001 would consist of effluent discharged from a pipe to the unnamed ephemeral lake, at approximately 48°59'44" N latitude, 111°57'12" W longitude.

Table 1: Current Design Criteria Summary* – Sweet Grass WWTF	
Facility Description: Two cell facultative lagoon with effluent disinfection.	
Construction Date: 2004	Modification Date: NA
Design Population: 150	Current Population Served: 100
Design Flow, Average: 0.0205 mgd	Design Flow, Maximum Day: NA
Cell 1: 1.99 MG**	Cell 2: 1.77 MG**
Detention Time @ Design Flow (Total): 187days**	Collection System: Separate
Design BOD Load: 34 lb/day	Design TSS Load: Unknown
Disinfection: Yes	Type: Ultraviolet Light
Discharge Method: Continuous, although no discharge has been reported since completion of construction in 2004.	

*Information from "As-Built Drawings" dated 7/8/2004 by Stelling Engineers, Inc.
**Volume and detention times are "effective", i.e. above the 1 foot depth.

Effluent data are not available since the WWTF has not reported a discharge from 2004 through May of 2017.

A DEQ compliance inspection was completed on the WWTF on February 6, 2013 which found no violations of permit conditions. A violation letter was sent to the permittee on February 4, 2014 regarding late submittal of DMRs. The permittee has submitted subsequent DMRs on time.

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 five-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), percent removal of BOD_5 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 BOD_5 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 technology-based effluent limits (TBELs) in the 2010-issued permit and the previous permit were based on the national secondary treatment standards (NSS) for BOD_5, TSS and pH. The 2010-issued permit limits for BOD_5 and TSS are effluent concentrations plus 85% removal. Both BOD_5 and TSS also have mass limits.

Since the WWTF has not discharged, it is unknown if compliance with the NSS is possible with the existing facilities. The design criteria on the As-Built Drawings indicate that the facultative lagoon system is designed for an effluent BOD_5 of 30 mg/L and TSS of 100 mg/L. The design effluent BOD_5 level compares favorably with the permit limit, which is NSS. However, the design TSS level is ASR, not the permit limit which is NSS. It is certainly questionable that the existing facultative lagoon system could meet the NSS for TSS, should a discharge be necessary.

Proposed TBEL-based effluent limits are shown on Table 2. The BOD_5 and TSS limits will remain NSS with a requirement for 85% removal. The pH limit is NSS. Mass limits for both BOD_5 and TSS are included in accordance with ARM 17.30.1345(8)(a) and are based on design flow.

Should the WWTF discharge during the term of the renewed permit and show an inability to meet the NSS limits for TSS, relaxation of the TSS limits to either TES or ASR in the subsequent permit renewal may be warranted.

Mass Limit Calculations:

Load (lb/day) = Design Flow (mgd) x Concentration Limit (mg/L) x 8.34 lb/gal

BOD_5: 30-day Ave: Load = (0.0205)(30)(8.34) = 5.1 lb/day
7-day Ave: Load = (0.0205)(45)(8.34) = 7.7 lb/day

TSS: 30-day Ave: Load = (0.0205)(30)(8.34) = 5.1 lb/day
7-day Ave: Load = (0.0205)(45)(8.34) = 7.7 lb/day

Table 2: 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	5.1	7.7	
	% removal	85%	-	
TSS	mg/L	30	45	40 CFR 133.105(b)
	lb/day	5.1	7.7	
	% removal	85%	-	
pH	s.u.	6.0-9.0 (instantaneous)		40 CFR 133.102 (c)

b. Nondegradation Allocated Loads

Nondegradation allocated loads for the Sweet Grass WWTF were determined for BOD_5 and TSS under previous permitting actions and documented in Statement of Bases (SOBs) dated July 2005 and August 2010.

Table 3 summarizes the nondegradation allocated loads and the actual calculated average loads discharged from the facility for calendar years 2014, 2015 and 2016. The data indicate that the facility did not exceed the nondegradation allocated loads for effluent BOD_5 and TSS.

Table 3: Comparison of Allocated Nondegradation Loads & Actual Loads

Parameter	Allocated Load	Actual Load* (lb/day)		
	(lb/day)	2014	2015	2016
BOD_5	5.1	0	0	0
TSS	5.1	0	0	0

*Actual loads of zero are based on no discharge during any of the calendar years listed.

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

Any discharge from the Sweet Grass WWTF through Outfall 001 is to an unnamed ephemeral lake that is in the Upper Milk River watershed. The Upper Milk River watershed is classified as B-1 according to Montana Water Use Classifications [ARM 17.30.610(1)(g)]. 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)].

The Upper Milk River watershed identified as United States Geological Survey (USGS) Hydrological Unit Code (HUC) 10050002. The USGS water resources database does not contain any data for the lake. No flow or water stage data for the lake are available to DEQ. Water levels in the lake have been reported as intermittent (PRC Environmental Management, 1997). Intermittent wastewater discharge from the Canadian Village of Couttes, Alberta also flows into the lake (personal communication, Brian Roark, September 2004). An aerial photo from Google Earth taken on April 29, 2014 shows water in the lake bed. The lake is not listed on Montana's 1996 or subsequent 303(d) lists of impaired waterbodies.

c. Water Quality Standards

Discharges to surface waters classified B-1 are subject to the specific water quality standards of ARM 17.30.623, 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)].

Discharges 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 the 2010-issued permit or earlier permits 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.

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

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 BOD_5), TSS, oil & grease (O & G), *Escherichia coli* (*E. coli*) and pH; non-conventional pollutants such as total residual chlorine (TRC), ammonia, nitrate/nitrite, and total nitrogen (TN) and total phosphorus (TP).

Since the receiving water is an unnamed ephemeral lake, fishes are presumed to be absent during periods when the lake bed is dry as well as during periods when some water is present.

1. Conventional Pollutants

TSS, BOD_5, and pH – The WWTF will provide a significant reduction in biological material and solids through NSS for BOD_5, TSS and pH, as addressed in Section III. No additional WQBELs will be necessary for these parameters. Monthly monitoring will be required for effluent BOD_5, TSS and pH, as well as influent BOD_5 and TSS, with any discharge lasting less than 30 days required to be sampled at least once.

O & G – The 2010-issued permit did not have an effluent limit for O & G or a monitoring requirement. There is no basis upon which to determine if RP exists with respect to O & G and no reason to require monitoring in this renewal.

E. coli – The 2010-issued permit had effluent limits for *E. coli* that are the water quality standards for a B-1 waterbody, applied at the end of the pipe.

The water quality standards for a B-1 waterbody 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 2010-issued permit will be retained in the renewed permit. The monitoring frequency for *E. coli* will be continued at once per month, with any discharge lasting less than 30 days required to be sampled at least once.

2. Non-conventional Pollutants

TRC – Chlorination is not currently utilized to disinfect the Sweet Grass WWTF effluent. If a discharge occurs, disinfection will be accomplished by ultraviolet light (UV) treatment. Effluent limits for TRC are not needed in the renewed permit.

Total Ammonia-N – The 2010-issued permit does not contain total ammonia-N (ammonia) limits. 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.

No receiving water data for pH, temperature or background ammonia exist and no ammonia data exist for the discharge from the WWTF. The lack of data makes calculation of RP for ammonia impossible. The ammonia monitoring requirements of the 2010-issued permit will be retained in the renewed permit.

Nitrate plus Nitrite Nitrogen (NO_3/NO_2) – There are no NO_3/NO_2 limits in the 2010-issued permit. The human health water quality standard for NO_3/NO_2 in waters to be maintained suitable for drinking is 10 mg/L.

No WWTF discharge data exist for NO_3/NO_2 and no background NO_3/NO_2 data exist for the receiving water. The lack of data makes calculation of RP for NO_3/NO_2 impossible. The NO_3/NO_2 monitoring requirements of the 2010-issued permit will be retained in the renewed permit.

Nutrients (TN and TP) – Numeric water quality standards for TN and TP have been adopted in Circular DEQ-12A (DEQ-12A) for the Upper Milk River drainage in the Sweet Grass area, which is in the Level III Northwestern Glaciated Plains and Level IV Milk River Pothole Upland Ecoregions. The numeric water quality standards for TN and TP are 560 µg/L and 80 µg/L, respectively, both effective July 1 to September 30. Critical stream-flow for application of the standards and for determining RP is the seasonal (July-October) 14Q5 low flow. However, the base numeric nutrient standards adopted in DEQ-12A apply to flowing waters only, and do not apply to the ephemeral lake that is the receiving water for a discharge from the Sweet Grass WWTF.

3. Toxic Pollutants

Whole Effluent Toxicity (WET) Testing – ARM 17.30.637(1)(d) requires that state water be free from substances attributable to municipal waste that create 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 Sweet Grass WWTF is a small discharger of less than 0.0205 mgd with no identified industrial contributions. In addition, there has been no discharge of WWTF effluent to state waters since 2004. 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 001 shall, as a minimum, meet the limits as set forth below:

Table 4: 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	5.1	7.7	--
BOD_5, Removal	%	85	--	--
Total Suspended Solids (TSS)	mg/L	30	45	--
	lbs/day	5.1	7.7	--
TSS, Removal	%	85	--	--
Escherichia coli (E. coli) [2, 4]	#/100ml	126	252	--
Escherichia coli (E. coli) [3, 4]	#/100ml	630	1,260	--
pH	s.u.	6.0-9.0 (instantaneous) [5]		

Footnotes:
1. See Part I.C of permit and Definition section at end of permit for explanation of terms.
2. This limit applies from April 1 through October 31.
3. This limit applies from November 1 through March 31.
4. Report Geometric Mean if more than one sample is collected in the reporting period.
5. For compliance purposes, any single analysis and/or measurement beyond this limit shall be considered a violation of the conditions of this permit.

There shall be no discharge of floating solids or visible foam in other than trace amounts and there shall be no discharge which causes visible oil sheen in the receiving stream.

VI. Self-Monitoring & Other Requirements

a. Self-Monitoring

Effluent samples are to be taken at the discharge structure downstream of the UV unit at the broad-crested rectangular weir.

Influent samples for BOD_5 and TSS are to be taken at the influent manhole, located on the south end of the WWTF. Influent samples for BOD_5 and TSS need not be taken during months where no discharge occurs. Influent samples must be taken and reported in any calendar month where a discharge through Outfall 001 occurs.

Table 5: Monitoring and Reporting Requirements						
Parameter	Unit	Sample Location	Sample Frequency	Sample Type[1]	Reporting Requirements	ML[4]
Flow	mgd	Effluent	1/Day	Instantaneous	Ave Day & Max Month	0.001
Biochemical Oxygen Demand (BOD_5)	mg/L	Influent	1/Month	Composite	Ave Month	10
	mg/L	Effluent	1/Month	Grab	Ave Month	2
	% Removal[2]	NA	1/Month	Calculated	Ave Month	0.1
	lbs/day	Effluent	1/Month	Calculated	Ave Month	0.1
Total Suspended Solids (TSS)	mg/L	Influent	1/Month	Composite	Ave Month	10
	mg/L	Effluent	1/Month	Grab	Ave Month	10
	% Removal[2]	NA	1/Month	Calculated	Ave Month	0.1
	lbs/day	Effluent	1/Month	Calculated	Ave Month	1
pH	s.u.	Effluent	1/Month	Instantaneous	Min & Max	0.1
Escherichia coli[3]	#/100ml	Effluent	1/Month	Grab	Geo Mean & Max Month	1
Total Ammonia as N	mg/L	Effluent	1/Month	Grab	Ave Month & Max Day	0.07

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. ML is the minimum detection level. Analyses for all parameters must be to the ML listed in the permit for the parameter.

b. Sludge Requirements

This permit will contain standard conditions requiring compliance with 40 CFR 503 for any use or disposal of sewage sludge.

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 Sweet Grass 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 2010-issued permit limits for BOD_5, TSS, pH and *E.coli*. 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

None

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 MT0031437:
   1. Administrative Record.
   2. Renewal Application NPDES Form 2A, December 2014.

m. Montana DEQ Circular DEQ-12A, Montana Base Nutrient Standards, July 2014.

n. Montana DEQ Circular DEQ-12B, Nutrient Standards Variances, June 2017.

FS Prepared By: James F. Brown, July 2017