DEPARTMENT OF ENVIRONMENTAL QUALITY

WATER QUALITY DIVISION

MONTANA POLLUTANT DISCHARGE ELIMINATION SYSTEM (MPDES)

Fact Sheet

Permittee:	BNSF Railway Company
Permit No.:	MT0000019
Receiving Water:	Whitefish River
Facility Information:	
Name	BNSF Railway Company Whitefish Yard Wastewater Treatment Facility
Location	500 Depot Street Whitefish, MT 59937 Flathead County 48°24’43.7” N, 114°20’40.2” W
Facility Contact:	Edward Pettit Manager Environmental Operations 2902 Montana Ave. Billings, MT 59101
Fee Information:	
Number of Outfalls	1
Outfall – Type	001 – Minor Private Wastewater Treatment Facility

I. Permit Status

This Fact Sheet is issued by the Montana Department of Environmental Quality (DEQ) for the renewal of Montana Pollutant Discharge Elimination System (MPDES) permit no. MT0000019 for the BNSF Railway Company (BNSF) Whitefish Rail Yard Wastewater Treatment Facility (Rail Yard WWTF).

The first National Pollution Discharge Elimination System (NPDES) permit for the Whitefish facility (MT0000019) became effective on April 30, 1974 and expired on December 31, 1976. Subsequently, DEQ has had regulatory authority for MT0000019 and renewed their MPDES permit several times including the most recent renewal which became effective November 1, 2009 (2009-issued permit).

There were two minor modifications made during the 2009-issued permit cycle:

- October 9, 2009 – modified to extend compliance dates
- August 30, 2010 – modified location for Outfall 001

The 2009-issued permit was scheduled to expire as of October 31, 2014. BNSF submitted a timely renewal application consisting of Forms 1, 2C, and the $3,000 renewal fee on April 25, 2014. The renewal application was deemed complete and the permit was administratively extended by DEQ as of April 30, 2014.

DEQ published a tentative determination to renew this permit in a public notice dated December 4, 2015 (PN MT-15-56). DEQ received three sets of comments. As there were substantive comments, DEQ determined that revisions needed to be made and did not issue a Final Permit. In addition, communication with the current Manager of Environmental Operations, and a site visit conducted on October 2, 2017, indicated there were enough changes to warrant updated information. Ned Pettit, Manager Environmental Operations, submitted this information on November 1, 2017 with further clarification submitted on November 7, 2017.

This Fact Sheet (2018-issued Fact Sheet) and draft permit replace those proposed in the 2015 public notice. DEQ will only respond to comments made on this 2018-issued Fact Sheet and draft permit as part of this public notice.

II. Facility Information

A. Facility Description

The BNSF Whitefish Rail Yard is a crew terminal and car-switching yard with light duty maintenance of locomotives, railcar repair, and locomotive fueling. Maintenance and repair are conducted in the roundhouse, and fueling takes place at the yard fueling platform. The facility is classified as Standard Industrial Classification number 4011 – "Railroads, Line-Haul Operating."

The BNSF Whitefish Railyard is a State Superfund facility, described by that program as a 78-acre locomotive fueling and repair facility located both sides of the Wisconsin/Baker Avenue Bridge. The facility has been in operation since 1903. Releases have resulted in soil and groundwater contamination by petroleum products (mainly diesel), polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), and heavy metals.

The State Superfund Program recognizes three historic fueling areas at the BNSF-Whitefish Railyard: the freight fueling area west of the highway overpass that is currently in use, and two Amtrak fueling areas east of the overpass ("east" and "west" passenger fueling areas) that ceased operation in the mid-1980's. Site contamination information documents indicate the site has been slated for cleanup under the Comprehensive Environmental Clean Up and Responsibility Act (CECRA). It was added to the list in 1989 and the BNSF Railway Company entered into the CECRA program on May 1, 1994. Currently, DEQ's CECRA program is reviewing the Risk Assessment; after it is finalized the site will enter the remediation phase (conversations with Jessica Smith, DEQ, 8/15/17 and 1/3/18).

Summary of MPDES Permitting

DEQ issues MPDES permits to point sources discharging pollutants into state waters. The entire BNSF Whitefish Rail Yard site comprises approximately 92.2 acres (see **Figure 1**). Any point source discharges from BNSF-Whitefish Railyard will be covered by the following MPDES permits:

- *MT0000019 Outfall 001 - Industrial Activities Area*: 6.5 acres of industrial activity currently contribute to the discharge from Outfall 001, including wastewater from industrial processes and storm water that is commingled with the industrial process wastewater (see **Figure 2**). Collected industrial wastewater and storm water from this area is treated in the Rail Yard WWTF and discharged through Outfall 001, as further described below.
- *Multi-Sector General Permit for Storm Water Discharges Associated with Industrial Activity*: For any other for regulated storm water discharged from the site, which is not covered under MT0000019, BNSF-Whitefish has committed to submitting a notice of intent (NOI) to request coverage under the 2018 *Multi-Sector General Permit for Storm Water Associated with Industrial Activity* (MTR000000). DEQ will determine the adequacy of the BNSF-Whitefish storm water MPDES coverage at that time.

  History: Thirteen storm water discharge points from BNSF-Whitefish (that potentially are storm water discharges associated with industrial activity) were identified to DEQ in correspondence on March 23, 2015. DEQ conducted a site visit on May 1, 2015 and noted several of these discharge points that appear to originate within the BNSF-Whitefish property in areas that have been impacted by previous or current industrial activity.

  MPDES permitting is required for storm water that meets the definition of 'industrial activity,' or DEQ finds are significant contributors of pollutants to state waters. The BNSF Whitefish railyard is considered a category of facility engaging in 'industrial activity' because they are a transportation facility classified under SIC 4011 - Railroads, Line-Haul Operating. The definition for engaging in 'industrial activity' for transportation facilities states: "Only those portions of a facility that are involved in vehicle maintenance (…), equipment cleaning operations, **or that are otherwise identified under this definition** are associated with industrial activity. The definition of 'storm water discharge associated with industrial activity' also includes those facilities determined to be significant contributors of pollutants to state waters.

  MPDES permit MT0000019 will include a special condition for BNSF-Whitefish to supply supporting documentation for their evaluation of whether different areas of their site do or do not require storm water coverage, as discussed in this Fact Sheet Part VII.B.

There is no domestic sewage component to site wastewaters; sewage wastewaters are discharged to the City of Whitefish sanitary sewer system.

Outfall 001 - Industrial Activities Area:

Permitted sources of industrial wastewater and storm water are treated by the BNSF Rail Yard WWTF prior to discharge into the Whitefish River through Outfall 001 at latitude 48°24'43"N and longitude 114°20'38"W. The sources are:

- *Roundhouse* - wash down water which averages 200 to 250 gallons per day (gpd) when in operation twice each month for a total of 400 to 500 gallons per month;

- *Oil recovery trench* – precipitation events and elevated groundwater levels contribute to this system, which has been used for collection and treatment of oil contaminated groundwater seepage since the late 1970s and was upgraded in the fall of 2008. The system, comprised of a vapor barrier with a perforated pipe laid underground along the Whitefish River north bank, collects subsurface oil-contaminated groundwater. Since 2000, the 30-day average flow has been approximately 3,000 gpd; and
- *Railyard areas* contributing storm water runoff:
  - turntable,
  - fueling platform,
  - tank farm containment, and
  - tank car offload pads.

  The railyard areas consist of contained, surfaced (primarily concrete) industrial areas of the site. Flow is solely from precipitation.

Figure 3 shows the Outfall 001 process diagram for the above wastewater sources and the treatment system. The Rail Yard WWTF system includes the following treatment processes:

- *Grit Removal* – as of 2017, all industrial wastewater and commingled storm water is first channeled through the grit chamber. Any large debris that was captured in these flows is removed at this step. The contributing flows have historically included the following wastewater sources: gravity-fed storm water collected from the tank car offload pads (after containment in 60,000-gallon concrete vault), gravity-fed storm water from the fueling platform, pumped storm water from the tank farm containment area, and pumped oil recovery trench wastewater. In addition, as of 2017 the grit chamber receives the roadhouse washdown water and turntable storm water.
- *Oil/Water Separator* – after treatment by the grit removal chamber, the wastewater gravity flows to the oil/water separator, where oil is skimmed off and removed from the system.
- *Lagoons* – After the oil/water separator, the partially treated wastewater is pumped into the lagoon system via a lift station with a capacity of 0.187 million gallons per day (mgd). This three-cell, high density polyethylene-lined lagoon system replaced an older two-cell lagoon system in 1998 and has a total volume of 3.0 million gallons (2009-issued permit Response to Comments). BNSF plans to install a carbon dioxide (CO_2) pH modification system in 2018 that will be used, as necessary, to ensure the effluent pH remains between 6.0 – 9.0 s.u.

  From the lagoons, the wastewater either evaporates or is discharged directly to the Whitefish River via Outfall 001. BNSF controls when discharges occur – either when lagoon levels or operational activities onsite require discharge, such as when the lagoons are completely filled due to storm events and during annual lagoon cleaning and sludge removal (usually during August of each year).

In Spring 2011, BNSF installed a concrete “sample shack” to house a new ISCO 4210 ultrasonic flow meter with totalizer; ISCO 4700 automatic composite sampler; continuous pH meter, hand held pH meter, and v-notch weir with staff gauge. Therefore, any flow and pollutant concentration data for this period of record are more reliable than previous records.

B. Effluent Characteristics

DEQ characterized the BNSF Rail Yard WWTF effluent using information from the application submitted in 2014, Discharge Monitoring Reports (DMRs) for the Period of Record of April 2012 through April 2017 (POR) (there was no flow May – November 2017), and extra permit-required laboratory analysis submitted 2010-2017. **Table 1** summarizes the available data for the discharge through Outfall 001 for the months with discharge.

Table 1. Outfall 001 Effluent Characteristics for the POR (April 2012 through April 2017)

Parameter	Units	2009 Permit Limit	Minimum Value	Maximum Value	Average Value	Number of Samples (1)
Average Monthly Flow for Months w/ Discharge	mgd	(2)	0.017	0.23	0.11	23
Maximum Daily Flow for Months w/Discharge	mgd	(2)	0.017	0.39	0.21	23
No. of Days w/ Discharge	#days/mo	(2)	0.4	31	15.6	23
Total Suspended Solids	mg/L	30	< 2.5	23	< 8.4	23
	lb/day	16	< 1.2	< 27.9	< 8.3	23
5-Day Biochemical Oxygen Demand	mg/L	30	< 2.0	6.0	< 3.9	23
	lb/day	16	< 0.6	8.7	< 3.6	23
pH	s.u.	6.0 - 9.0	6.6	9.3	--	23
Oil and Grease	mg/L	10	1.0	5.3	2.3	23
Ammonia, as N	mg/L	NA	--	0.13	--	22
Nitrate and Nitrite	mg/L	(2)	0.01	1.3	0.2	23
Nitrogen, Total	mg/L	(2)	0.02	2.7	< 0.7	23
	lb/day	20	0.01	1.7	< 0.6	23
Phosphorus, Total	mg/L	1.0	0.005	< 0.10	< 0.04	23
	lb/day	0.6	0.002	< 0.16	< 0.04	23
Aluminum, Dissolved	µg/L	(2)	22	200	72	23
Antimony, Total Recoverable	µg/L	(2)	0.9	3.0	2.5	23
Arsenic, Total Recoverable	µg/L	(2)	2.0	3.6	3.0	23
Barium, Total Recoverable	µg/L	(2)	159	513	315	23
Beryllium, Total Recoverable	µg/L	(2)	0.8	2.0	1.2	23
Cadmium, Total Recoverable	µg/L	1.8	0.03	1.0	0.4	23
Chromium, Total Recoverable	µg/L	(2)	1.0	5.0	1.7	23
Copper, Total Recoverable	µg/L	(2)	1.4	5.0	2.6	23
Iron, Total Recoverable	µg/L	(2)	10	501	147	23
Lead, Total Recoverable	µg/L	(2)	0.3	2.0	0.9	23
Manganese, Total Recoverable	µg/L	(2)	23	419	148	23
Mercury, Total Recoverable	µg/L	(2)	0.01	0.2	0.07	23
Nickel, Total Recoverable	µg/L	(2)	1.0	10	6.8	23
Selenium, Total Recoverable	µg/L	(2)	1.0	3.0	2.1	23
Silver, Total Recoverable	µg/L	(2)	0.2	2.0	0.8	23
Thallium, Total Recoverable	µg/L	(2)	0.2	2.0	0.7	23
Zinc, Total Recoverable	µg/L	(2)	10	25	14	23

Table 1. Outfall 001 Effluent Characteristics for the POR (April 2012 through April 2017)						
Parameter	Units	2009 Permit Limit	Minimum Value	Maximum Value	Average Value	Number of Samples (1)
Benzene	µg/L	(2)	< 0.08	2	--	12
Toluene	µg/L	(2)	0.18	1.2	--	12
Xylene	µg/L	(2)	< 0.5	11	--	8
Bis(2-ethylhexyl)phthalate	µg/L	(2)	< 3	9.3	--	12

Footnotes:
(1) Number of samples is number of reports in DMRs, other than ammonia which is based on data from Form 2C Section V.
(2) Monitoring requirement in the 2009-issued permit.

Based on review of the DMRs for the POR, the facility discharged for a total of 23 months. The duration of the discharge from Outfall 001 ranged from half a day to a full month, for two to five months per year. According to the discharge rates reported for the POR, the *maximum daily* discharge rate was 0.39 mgd and the *maximum average monthly* discharge rate was 0.23 mgd.

C. Whole Effluent Test (WET) Testing History

The facility was required to conduct quarterly acute WET tests for two species: *Pimephales promelas*, and *Ceriodaphnia dubia*, which was reduced to one species per quarter on an alternating basis. There were no test failures for any WET tests conducted during the POR.

D. Compliance History

DEQ inspected the BNSF facility on January 29, 2014. There were two minor violations, which BNSF-Whitefish addressed by March 13, 2014.

III. Rationale for Proposed Technology-Based Effluent Limits

A. Applicability

Permits include, at a minimum, effluent limits based on applicable technology-based standards. Technology-based effluent limits (TBELs) may be national standards established by the EPA, or, in some cases, standards established by the permit writer on a case-by-case basis.

EPA promulgates national technology-based standards of performance ["effluent limit guidelines (ELGs)"] for dischargers other than publicly-owned treatment works. There are no federal ELGs for rail yards.

When EPA has not promulgated a standard for a specific industry, permit limits may be based on best professional judgment (BPJ). Development of a limit through BPJ considers the same statutory factors EPA staff would use to promulgate a national effluent guideline, and apply particular circumstances relating to the applicant. In past permit cycles, discharges from the BNSF Rail Yard WWTF have had TBELs for 5-day Biochemical Oxygen Demand (BOD_5), Total Suspended Solids (TSS), and pH reflective of a combination of the national secondary treatment standards and BPJ, although slight modifications have been made in each permit renewal.

Most recently, the 2009-issued permit removed the average monthly concentration and percent removal limits for both BOD_5 and TSS, as these limits were determined to be not appropriate for an

intermittent industrial discharger with a typical discharge lasting two or three days. BNSF was required to meet the maximum daily limits of 30 mg/L for BOD_5 and TSS, and maintain the pH between 6.0 – 9.0 s.u. at all times.

With the 2018-issued permit renewal, DEQ is proposing to re-instate the average monthly BOD_5 and TSS limits. The pattern of discharge between 2014 and 2017 has been documented by the ISCO Flow Sampler to range from 10 to 52 days per batch, with an average duration of 26 days per batch. This is significantly longer than the two to three-day batches observed during the 2009-issued permit renewal evaluation. Therefore, the 1999-issued permit's average monthly concentration limits of 20 mg/L will be re-instated and the 2009-issued permit's concentration-based maximum daily limits for BOD_5 and TSS of 30 mg/L and pH between 6.0 – 9.0 s.u. will be maintained (see **Table 3** for a summary of the proposed TBELs).

B. Mass-Based Limits

All effluent limits must be expressed in terms of mass except for applicable standards and limits are expressed in terms of other units of measurement.

As this is an industrial discharge, DEQ uses a reasonable measure of actual production for calculating mass-based limits. The mass-based load limits for BNSF-Whitefish will be derived as follows:

- the average monthly mass-based load limit is calculated using the highest average monthly discharge flow observed in the past five years. For the POR April 2012 to April 2017 this was 0.23 mgd.
- the maximum daily load limit is calculated using the maximum flow observed in the past five years. For the POR April 2012 to April 2017 this was 0.39 mgd.

DEQ calculated the mass-based load allocations using these reasonable measures of actual production:

Load (lbs/day) = Flow (mgd) x Concentration (mg/L) x Conversion Factor (8.34)

BOD_5:

Monthly Average	Load = 0.23 mgd x 20 mg/L x 8.34	=	38 lbs/day
Maximum Daily	Load = 0.39 mgd x 30 mg/L x 8.34	=	98 lbs/day

TSS:

Monthly Average	Load = 0.23 mgd x 20 mg/L x 8.34	=	38 lbs/day
Maximum Daily	Load = 0.39 mgd x 30 mg/L x 8.34	=	98 lbs/day

C. Nondegradation Load Limits

Any sources that are in compliance with permit conditions and do not exceed the established limits determined from a permit issued by DEQ prior to April 29, 1993 are not considered new or increased sources. During the development of the proposed 2018-issued permit, DEQ reviewed the history for the nondegradation parameters and proposes the following changes from the 2009-issued permit:

- **BOD_5 and TSS**: A monthly load allocation of 16 lb/day was developed in the 1999-issued permit by using the maximum average monthly flow of 0.096 mgd and average monthly concentration limits of 20 mg/L for both BOD_5 and TSS. These load allocations were changed to maximum daily limits in the 2009-issued permit. In this 2018-issued permit renewal, DEQ finds

the load limits are appropriately expressed as average monthly limits and will revert to the 1999-issued monthly load allocations. The maximum daily BOD_5 and TSS load limits are not appropriate for nondegradation, and are developed above in Part III.B.

- **Total Nitrogen (TN)**: DEQ has determined that the TN nondegradation load of 27 lb/day developed as part of the 1999-issued permit, and modified to 20 lb/day in the 2009-issued permit, used engineering assumptions that are not in conformance with the methods DEQ uses to develop limits within a discharge permit. Furthermore, the Flathead Basin Commission document *Flathead Lake Voluntary Nutrient Reduction Strategy*, 1997 included calculated TN wasteload allocations for five municipal wastewater treatment plants, but did not review a TN allocation for BNSF-Whitefish. Therefore, the TN nondegradation load allocation will be removed. DEQ adopted numeric water quality standards for nutrients in 2014; this will be addressed in Section IV.D.
- **Total Phosphorus (TP)**: DEQ added a limit of 1.0 mg/L TP and an allocated annual average load of 0.80 lb/day TP in the 1999-issued permit, based on the *Strategy for Limiting Phosphorus in Flathead Lake*, Department of Health and Environmental Science, 1984.

  In the 2009-issued permit, this concentration limit was maintained, but the load allocation was reduced from 0.8 lb/day to 0.6 lb/day to reflect the 25% reductions required under the December 2001 *Nutrient Management Plan and Total Maximum Daily Load for Flathead Lake, Montana*. In addition, the 2009-issued permit modified the TP limit from an annual average load to a maximum daily limit. In this 2017 renewal, DEQ finds the load limit of 0.6 lb/day is appropriately expressed as an average monthly limit (and will remove the maximum daily limit implemented in the 2009-issued permit). DEQ adopted numeric water quality standards for nutrients in 2014; this will be addressed in Section IV.D.

The actual loads for the nondegradation pollutants of concern were obtained from the facility DMRs for the POR April 2012 through April 2017 (see **Table 2**, below). Due to the laboratory's high TSS detection levels, DEQ was not able to determine whether the TSS average load in 2014 was below the annual load allocation; however, the other five years did meet the TSS annual load allocation. In addition, these data demonstrate that the discharge did not exceed the nondegradation load values for BOD_5 or TP. Therefore, the facility is not considered to be a new or increased source.

Table 2: Outfall 001 Nondegradation and Actual Loads for the POR

Parameter	Units	Nondegradation Average Annual Load Allocations	Actual 30-Day Average Loads (1)					
			2012	2013	2014	2015	2016	2017
5-Day Biochemical Oxygen Demand	lb/day	16	3.9	2.0	< 6.9	< 2.5	< 3.0	< 1.5
Total Suspended Solids	lb/day	16	8.8	4.9	< 17.8	< 1.2	< 2.4	< 13.5
Phosphorus, Total	lb/day	0.6	0.02	0.01	0.05	< 0.05	< 0.09	0.02

Footnotes:
(1) DEQ assumed the analyte concentration was equivalent to the detection level for any parameter analysis indicating nondetect. The corresponding load is represented as "less than" the calculated load.

D. Proposed TBELs

The proposed TBELs for the BNSF facility Outfall 001 are shown in **Table 3**. DEQ noted that the discharge flow rates in recent datasets were much higher than the 1999-issued permit and would result in higher mass-based limits. DEQ will maintain the most stringent TBELs.

Table 3: Proposed TBELs for Outfall 001 (1)

Parameter	Units	Maximum Daily Limit	Average Monthly Limit
5-Day Biochemical Oxygen Demand	mg/L	30	20
	lb/day	98	16 (2)
Total Suspended Solids	mg/L	30	20
	lb/day	98	16 (2)
pH	s.u.	6.0 - 9.0 (instantaneous)	

Footnote:
(1) See Permit for definition of terms.
(2) Average Monthly Limit is based on nondegradation load allocation.

IV. Water Quality-Based Effluent Limits

Permits are required to include water quality-based effluent limits (WQBELs) when TBELs are not adequate to protect state water quality standards. Montana water quality standards define both water use classifications for all state waters and numeric and narrative standards that protect their designated uses. No wastes may be discharged that can reasonably be expected to violate any state water quality standards. New or increased sources are subject to Montana Nondegradation Policy and regulations.

A. Receiving Water

The BNSF Rail Yard WWTF discharges to the Whitefish River in the Stillwater River watershed. The watershed is identified by the United States Geological Survey (USGS) as hydrologic unit code number 17010210, and the segment where the discharge occurs is identified as Montana stream assessment unit MT76P003_010.

This stream assessment unit of the Whitefish River is classified B-2 under Montana state water quality standards. Waters classified as B-2 are to be maintained suitable for drinking, culinary and food processing purposes, after conventional treatment; bathing, swimming and recreation; growth and marginal propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply. Degradation that will impact established beneficial uses is not allowed.

This stream assessment unit of the Whitefish River was listed as impaired for aquatic life in the 2016 and draft 2018 Integrated Reports. The 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. 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.

Based on the 2016 and draft 2018 Integrated Reports, the probable causes of impairment for the Whitefish River are Oil & Grease (O&G), PCBs, and water temperature. Whitefish River impairments from O&G and PCBs are not addressed by a TMDL, but DEQ completed a TMDL for the water temperature impairment (*Flathead – Stillwater Planning Area Nutrient, Sediment, and Temperature TMDLs and Water Quality Improvement Plan*, Montana DEQ, 2014). In Section 7.6.2.1.3 of the TMDL, DEQ measured and modeled the thermal load from BNSF-Whitefish and determined that the facility causes an unsubstantial increase in temperature and has a negligible effect on instream temperatures.

In addition, the following are TMDL documents for nutrients relevant to the BNSF-Whitefish facility:

- *Strategy for Limiting Phosphorus in Flathead Lake*, Department of Health and Environmental Science, 1984. Recommendation: 'immediately impose a 1.0 mg/L effluent limit for phosphorus on all MPDES permits for point sources in the Flathead Lake drainage basin.' The document stated that an effluent limit of 1.0 mg/L TP was selected as an economically and technically achievable value.
- *Nutrient Management Plan and Total Maximum Daily Load for Flathead Lake, Montana*, DEQ, December 28, 2001. Recommendation: 'A 15 percent reduction in nitrogen and phosphorus loads, plus an additional 10 percent load reduction for a margin of safety, is proposed as the TMDL. The TMDL applies to the entire basin and all anthropogenic sources, as appropriate.'

The TP concentration limit of 1.0 mg/L and resulting load allocation of 0.6 lb/day [= 0.8 lb/day x 25% load reduction)] is derived from these TMDL documents.

In addition, as discussed in Part III.C of this Fact Sheet, the 1999-issued permit included a TN load allocation based on 'equivalent design population' that is being removed as part of this permit renewal.

Receiving Water Data

Ambient data collected from the Whitefish River upstream from BNSF-Whitefish are summarized in **Table 4** from the following sources:

- DEQ1 = MTWTRSHD_WQX [site WFROUTLET] from 2003 and 2004
- DEQ2 = MDEQ_WQ_WQX [site C09WHTFR08] in 2012
- WFI = Whitefish Institute [site Whitefish River at Lat 48.415072, Long -114.351655] from 2009 – 2017 (pH, temperature, ammonia, nitrate+nitrite, TN, and TP)

Table 4: Relevant receiving water quality data for the Whitefish River (2003 - 2017)

Parameter	Units	75th Percentile (1)	Maximum Value	Minimum Value	Number of Samples	Data Source (2)
Aluminum, Total	µg/L	**< 20**	< 20	< 20	2	DEQ1
Antimony, Total	µg/L	**< 76**	< 100	< 5	2	DEQ1
Arsenic, Total	µg/L	**< 7.5**	< 10	< 5	3	DEQ1
Barium, Total	µg/L	**60**	60	54	3	DEQ1
Beryllium, Total	µg/L	**< 6**	< 10	< 2	3	DEQ1
Cadmium, Total	µg/L	**< 6**	< 10	< 2	3	DEQ1
Chromium, Total	µg/L	**< 6**	< 10	< 2	3	DEQ1
Copper, Total	µg/L	**< 6**	< 10	< 2	3	DEQ1
Iron, Total	µg/L	**15**	20	10	3	DEQ1
Lead	µg/L	**< 9.5**	< 10	< 5	3	DEQ1
Mercury, Total	µg/L	**< 0.2**	< 0.2	< 0.2	2	DEQ1
Nickel	µg/L	**< 15**	< 20	< 10	3	DEQ1
Selenium	µg/L	**< 50**	< 50	< 50	3	DEQ1
Zinc	µg/L	**< 7.5**	< 10	< 5	3	DEQ1
Hardness	mg/L	**86.5** (3)	90.4	85.0	3	DEQ1
pH	s.u.	**8.3**	8.7	5.6	75	DEQ1, DEQ2, WFI
Temperature	degrees C	**18.9**	23.6	1.8	79	DEQ1, DEQ2, WFI
Total Ammonia	mg/L	**< 0.005**	<0.05	0.002	27	DEQ2, WFI
Nitrate and Nitrite	mg/L	**< 0.003**	0.04	< 0.002	15	DEQ2, WFI
Nitrogen, Total	mg/L	**0.11**	0.64	0.06	71	DEQ1, DEQ2, WFI
Phosphorus, Total	mg/L	**0.007**	0.013	0.001	68	DEQ1, DEQ2, WFI

Footnotes:
(1) If all results were nondetect, DEQ calculated the 75th percentile of the detection limits.
(2) Data sources for the Whitefish River ambient quality are:
DEQ1 = MTWTRSHD_WQX-WFROUTLET
DEQ2 = MDEQ_WQ_WQX
WFI = Whitefish Institute
(3) This value is the 25th percentile of the dataset

B. Applicable Water Quality Standards

Table 5 provides a summary of the relevant water quality standards.

Table 5: Water Quality Standards [(1)] for the Pollutants of Concern

Parameter	Units	Pollutant Category	Acute Aquatic Life Standard	Chronic Aquatic Life Standard	Human Health Standard
Aluminum, Dissolved	µg/L	Toxic	750	87	--
Antimony, TR	µg/L	Toxic	--	--	5.6
Arsenic, TR	µg/L	Carcinogen	340	150	10
Barium, TR	µg/L	Toxic	--	--	1,000
Beryllium, TR	µg/L	Carcinogen	--	--	4
Cadmium, TR	µg/L	Toxic	1.6 [(2)]	0.7 [(2)]	5
Chromium, TR	µg/L	Toxic	--	--	100
Copper, TR	µg/L	Toxic	12.2 [(2)]	8.2 [(2)]	1,300
Iron, TR	µg/L	Harmful (aquatic)	--	1,000	--
Lead, TR	µg/L	Toxic	68 [(2)]	2.6 [(2)]	15
Mercury, TR	µg/L	Toxic	1.7	0.91	0.05
Nickel, TR	µg/L	Toxic	415 [(2)]	46 [(2)]	100
Selenium, TR	µg/L	Toxic	20	5	50
Silver, TR	µg/L	Toxic	3.2 [(2)]	--	100
Thallium, TR	µg/L	Toxic	--	--	0.24
Zinc, TR	µg/L	Toxic	106 [(2)]	106 [(2)]	7,400
Benzene	µg/L	Carcinogen	--	--	5
Toluene	µg/L	Toxic	--	--	57
Xylene	µg/L	Toxic	--	--	10,000
Bis(2-ethylhexyl)phthalate[(3)]	µg/L	Carcinogen	--	--	3.2
Ammonia as N, Total	mg/L	Toxic	3.15 [(4)]	1.15 [(4)]	--
Nitrate and Nitrite	mg/L	Toxic	--	--	10
Nitrogen, Total	mg/L	Nutrient	--	--	0.275 [(5)]
Phosphorus, Total	mg/L	Nutrient	--	--	0.025 [(5)]
Oil and Grease	mg/L	Harmful	10	--	--
Temperature	°F	Harmful	1°F increase when receiving water between 32°F and 66°F		

Footnotes: "--" means no water quality standard is listed for the pollutant

(1) As listed or calculated based upon the provisions within Circular DEQ-7, May 2017. TR = Total Recoverable, in accordance with DEQ-7 Footnote 9.

(2) Hardness-based metals standards developed using 25th percentile of ambient hardness (86.5 mg/L).

(3) Bis(2-ethylhexyl)phthalate synonyms include di(2-ethylhexyl)phthalate and DEHP.

(4) Ammonia Standard calculated per Circular DEQ-7 based on 75th percentile ambient temperature (18.9 °C) and pH (8.3 s.u.).

(5) Nutrient standard listed in Table 12A-1 of Circular DEQ-12A. Whitefish River is in the Northern Rockies ecoregion, which specifies that the nutrient criteria apply July 1st to September 30th.

C. Mixing Zone

Mixing zones are granted by DEQ only when a mixing zone is needed (where a discharger cannot meet the applicable numeric water quality standard at the point of discharge), and when it is appropriate (based on the criteria specified in the regulations).

DEQ calculated the low flow statistics for the Whitefish River immediately upstream of BNSF as part of this evaluation. These calculations were based on the drainage area ratio method using USGS site 12366000 data (1972 – 2006), confirmed by comparing paired data. The calculated seven-day, ten-year low flow (7Q10) of the Whitefish River is 26.7 cubic feet per second (cfs) or 17.3 mgd. The calculated seasonal fourteen-day, five-year low flow (14Q5) is 42.1 cfs or 27.2 mgd.

The resulting dilution ratio for the BNSF Rail Yard WWTF is 44:1, which is based on the calculated low flow for the Whitefish River divided by the maximum discharge from the facility measured during the POR (17.3 mgd/0.39 mgd).

DEQ used 10% of the 7Q10 (chronic) and 1% of the 7Q10 (acute) as dilution for evaluating the potential impact from ammonia in the discharge on Whitefish River. In addition, DEQ used 100% of the seasonal 14Q5 for evaluating the potential impact from total nitrogen and total phosphorus in the discharge, following the provisions outlined in Circular DEQ-12A. For metals and other toxics, no dilution was used in the RP analysis.

The permittee will not be granted a mixing zone for any metals or other toxics in this renewal because there is insufficient information to determine whether there is assimilative capacity in the receiving water. In addition, the permittee will not be granted a mixing zone for ammonia or total nitrogen since there is no RP to exceed these standards. Therefore, the only mixing zone granted in this permit renewal is for total phosphorus. The mixing zone is limited to 10 times the stream width, or 1,000 feet downstream of the outfall.

D. Basis and Calculations for Reasonable Potential Analysis and WQBELs

DEQ assesses the need for a WQBEL for each pollutant of concern (POC). Pollutants and parameters are identified as POC for one or more of the following reasons: because they have listed TBELs; were identified as needing limits in the previous permit; are identified as present in the effluent through monitoring or otherwise expected present in the discharge; or are pollutants associated with impairment which may or may not have a Wasteload Allocation (WLA) in a TMDL. **Table 6** lists the basis for listing each POC.

Table 6: Identification of Parameters of Concern	
Parameter	**Basis for Identifying as POC**
BOD_5, TSS, pH	TBELs, Previous Permit Limits
Oil & Grease	Previous Permit Limit, Known Present
Total Nitrogen, Total Phosphorus	Previous Permit Limits, TMDL
Cadmium, total recoverable	Previous Permit Limit, Known Present
Nitrate+Nitrite; aluminum, dissolved; and total recoverable barium and iron	Application Form 2C, Known Present
Total recoverable beryllium, chromium, manganese, mercury, nickel, selenium, silver, and thallium.	Known Present (1)
Total recoverable antimony, arsenic, copper, lead, and zinc, Also benzene, toluene, xylene, and bis(2-ethylhexyl)phthalate.	Known Present (1, 2)
Benzo(a)anthracene; benzo(b)fluoranthene; benzo(a)pyrene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene; 1-methylnaphthalene, and methylene chloride.	Known Present (2)
Footnotes: (1) Known present through MPDES monitoring. (2) Knowledge that present on-site due to State Superfund Unit (SSU) evaluation.	

MPDES permit limits must control all pollutants which will cause, or have Reasonable Potential (RP) to cause or contribute to an excursion above any water quality standard, including narrative criteria. DEQ uses a mass balance equation (see **Equation 1**) to determine RP and develop WQBELs:

$$Q_rC_r = Q_sC_s + Q_dC_d \quad (\textbf{Equation 1})$$

Where:

Q_s = critical stream flow available dilution (mgd)
C_s = critical receiving water pollutant concentration (75^{th} percentile, mg/L or µg/L)
Q_d = critical discharge rate (mgd)
C_d = critical discharge pollutant concentration (same units as C_s)
Q_r = receiving water flow rate after discharge ($Q_r = Q_s + Q_d$)
C_r = receiving water pollutant concentration (after available dilution; same units)

The parameters used to establish the maximum allowable changes in surface water quality are based on the design conditions specified in the *EPA's Technical Support Document for Water Quality-based Toxics Control, March 1991* (TSD), EPA/505/2-90-001. These conditions are referred to as critical conditions. The critical conditions that determine the values for the variables (Q_s, C_s, Q_d, and C_d) used in **Equation 1** are further discussed below.

1. Critical Stream Flow (Q_s)

   Critical stream flow is based on the available part of the low flow (7Q10 or 14Q5) considering allowable dilution. As described under Part IV.C of this fact sheet, the DEQ determined the low flows are a 7Q10 for the Whitefish River of 17.3 mgd and a 14Q5 flow of 27.2 mgd. Dilution is granted for ammonia, TN, and TP.

2. Critical Background Receiving Water Pollutant Concentration (C_s)

   The critical pollutant concentration is the 75th percentile concentration in the receiving water during the critical stream flow. All of the data collected from the Whitefish River are summarized in **Table 4**.

3. Critical Discharge Flow (Q_d)

   The critical discharge flow for a non-POTW is based on the maximum 30-day (monthly) average over the previous permit cycle for review of the chronic condition, and the maximum daily flow for review of the acute condition.

   For this facility, Q_d value is 0.23 mgd for chronic review and 0.39 mgd for acute review, based on the observed discharge flow rate for the POR.

4. Critical Discharge Pollutant Concentrations (C_d)

   The critical discharge concentration is based on the 95th percentile of the expected effluent concentration observed or predicted in the discharge. Due to the low frequency of samples and the non-normal distribution of most effluents, DEQ follows the estimation procedures described in TSD to estimate the 95th percentile of the daily values. The values for C_d are summarized in **Appendix A**.

Reasonable Potential Analysis

RP for the discharge to cause exceedances of a water quality standard was evaluated using the following mass-balance equation **(Equation 2)**:

$$C_r = \frac{Q_d C_d + Q_s C_s}{Q_d + Q_s} \qquad \textbf{(Equation 2)}$$

The water quality standards used to compare against the effluent levels are reported in **Table 5**. A summary of the RP analysis for the discharge from the facility is presented in **Appendix B**.

Calculation of WQBELs

The amount of pollutant in the discharge that the receiving water may assimilate without exceeding the applicable water quality standard is referred to as the wasteload allocation (WLA). The acute and chronic WLAs for each parameter are calculated by setting the receiving water pollutant concentration (C_r) equal to the applicable water quality standard (see **Table 5)** and re-arranging the mass-balance equation to solve for the allowable effluent concentration (WLA).

$$C_d = C_{WLA} = \frac{Q_r C_r - Q_s C_s}{Q_d} \qquad \textbf{(Equation 3)}$$

If there is no assimilative capacity, the C_{WLA} is equivalent to the water quality standard. The WLAs are then translated, as applicable, into average monthly limitations (AMLs) and maximum daily limitations (MDLs) using TSD multipliers.

The following subsections summarize the RP analyses and WQBEL development for specific parameters.

1. Conventional Pollutants

BOD_5, TSS, and pH – These parameters are typical effluent quality indicators for municipal wastewater treatment facilities and are regulated as TBELs for BNSF Rail Yard WWTF (see Part III of this Fact Sheet). The facility provides a significant amount of control for biological material, solids, and pH through primary and secondary treatment and no additional limits are necessary.

Oil and Grease – The 2009-issued permit included an oil and grease instantaneous maximum limit of 10 mg/L. During the POR, the average oil & grease concentration was 2.3 mg/L and the maximum was 5.3 mg/L. Based on the presence of oil & grease at the facility and to meet anti-backsliding requirements, the oil & grease limit and monitoring will be retained in the proposed permit.

2. Non-conventional Pollutants

Total Nitrogen – Total nitrogen (TN) is a nutrient which can lead to excessive algal and aquatic vegetation growth. Based on Department Circular DEQ-12A, the TN standard for Whitefish River is 0.275 mg/L for July 1 – September 30th. DEQ conducted a RP analysis based on the following:

- C_d –The maximum reported TN effluent concentration for the 23 samples taken during the POR was 2.7 mg/L. Using EPA TSD methods, the appropriate multiplier is 1.4 resulting in a critical effluent concentration of 3.8 mg/L.
- C_s – the 75th percentile TN concentration upstream was 0.11 mg/L.
- Q_d – the critical discharge flow is 0.23 mgd
- Q_s – the seasonal 14Q5 is 27.2 mgd.

Using **Equation 2**, the resulting critical downstream concentration is calculated to be 0.14 mg/L, which is less than the TN standard of 0.275 mg/L and signifies that BNSF-Whitefish does not have RP to exceed the TN standard.

As discussed in Part III.C, during the 1999-issued permit renewal DEQ developed a nondegradation allocated annual average for TN based on engineering assumptions. Based on this load, DEQ identified BNSF Rail Yard WWTF as a point source of nutrient discharges in the *Nutrient Management Plan and Total Maximum Daily Load for Flathead Lake, Montana* in 2001. However, since BNSF Rail Yard WWTF does not have RP to exceed the TN standard that became effective in 2014, DEQ is removing the previous TN effluent load limit. DEQ will include monitoring of the effluent to conduct RP analysis for the next renewal.

Total Phosphorus - Total phosphorus (TP) is a nutrient which can lead to excessive algal and aquatic vegetation growth. Based on Department Circular DEQ-12A, the TP standard for Whitefish River is 0.025 mg/L for July 1 – September 30th. DEQ conducted a RP analysis based on the following:

- C_d –The maximum reported TP effluent concentration for the 23 samples taken during the POR was < 0.1 mg/L. Using EPA TSD methods, the appropriate multiplier is 1.4 resulting in a critical effluent concentration of < 0.14 mg/L.
- C_s – the 75th percentile TP concentration upstream was 0.007 mg/L.
- Q_d – the critical discharge flow is 0.23 mgd
- Q_s – the seasonal 14Q5 is 27.2 mgd.

Using **Equation 2**, the resulting critical downstream concentration is calculated to be 0.008 mg/L, which is less than the TP standard of 0.025 mg/L and signifies that BNSF Rail Yard WWTF does not have RP to exceed the TP standard.

However, as discussed in Part III.C of this Fact Sheet, DEQ incorporated the 1.0 mg/L and 0.8 lb/day TP limits based on the Flathead Lake Nutrient Strategy during the 1999-issued permit renewal. Subsequently, the TP load allocation was reduced to 0.6 lb/day in the 2009-issued permit to account for the 25% reduction required by the DEQ's 2001 TMDL. TP limits of 1.0 mg/L and 0.6 lb/day average monthly limits will be maintained in this permit. Year-round monitoring will be maintained.

Total Ammonia as N – Circular DEQ-7 includes ammonia aquatic life standards developed based on a combination of pH and temperature of the receiving stream, the presence of salmonid fish species, and the presence of fish in early life stages. DEQ reviewed upstream data in order to evaluate the ambient pH and temperature of the river (see **Table 4**). **Table 7** summarizes the development of the ammonia water quality standards for the Whitefish River in this area:

Table 7: Total Ammonia-Nitrogen Water Quality Standards for Whitefish River

Condition	Period	Salmonids Present	Early Life Stages	Ambient Conditions (1)		Water Quality Standard (mg/L) (2)
				pH (s.u.)	Temperature (°C)	
Acute Criterion	Annual	Yes	NA	8.3	NA	3.15
Chronic Criterion	Annual	NA	Yes	8.3	18.9	1.15

Footnotes: NA – Not Applicable
(1) Based on 75th percentile of data. Acute and chronic standards based on Department Circular DEQ-7

- C_d –The maximum reported ammonia effluent concentration for the 22 samples taken during the POR was 0.13 mg/L. Using EPA TSD methods, the appropriate multiplier is 1.3, resulting in a critical effluent concentration of 0.17 mg/L.
- C_s – the 75th percentile ammonia concentration upstream was < 0.005 mg/L.
- Q_d – the critical discharge flow is 0.39 mgd acute and 0.23 mgd chronic.
- Q_s – the 7Q10 is 17.3 mgd with 1% acute and 10% chronic dilution granted.

Using **Equation 2**, the resulting critical acute downstream concentration is calculated to be 0.12 mg/L which is less than acute ammonia standard of 3.15 mg/L. In addition, the resulting critical chronic downstream concentration is calculated to be 0.02 mg/L, which is less than the chronic ammonia standard of 1.15 mg/L. This signifies that BNSF Rail Yard WWTF does not have RP to exceed the ammonia standards. No ammonia limits or monitoring is necessary.

Nitrate plus Nitrite (N+N) - Nitrate and nitrite are toxic components of total nitrogen. The human health standard for N+N is 10 mg/L. Given the maximum observed N+N concentration of 1.3 mg/L and calculated multiplier of 1.8, the critical discharge concentration is 2.4 mg/L. Using **Equation 2**, the resulting critical pollutant concentration of 2.4 mg/L is less than the standard of 10 mg/L. BNSF-Whitefish does not have RP to exceed the N+N standard and no limit is required. Periodic monitoring of N+N in the effluent will be required.

3. Toxic Pollutants

Cadmium, total recoverable – BNSF Rail Yard WWTF has had a cadmium effluent limit since 1993. The cadmium limit has been 1.8 µg/L since 2013. The highest effluent concentration observed during the POR was 1.0 µg/L out of 23 samples. However, DEQ did not have adequate ambient information to conduct an RP analysis for cadmium for this permit renewal due to the following:

- There were only three ambient hardness data points from 2004. Using this data in accordance with Department Circular DEQ-7 provides an approximate total recoverable cadmium acute standard of 1.6 µg/L and chronic standard of 0.7 µg/L. However, due to the age and limited amount of hardness data, DEQ finds this inadequate to calculate accurate standards; and
- There were only three ambient cadmium samples taken in 2004. All were nondetect with a 75th percentile detection limit of < 6 µg/L which is far above both the approximate standards and the Circular DEQ-7 Required Reporting Value (RRV) for cadmium (the RRV is 0.03 µg/L). Due to the age of the data, limited number of samples, and a detection level that was too high, DEQ finds the ambient cadmium concentration data inadequate.

Due to the lack of ambient data, DEQ will maintain the current total recoverable cadmium effluent limit and monitoring and will impose ambient monitoring.

Aluminum, dissolved – BNSF Rail Yard discontinued the use of alum as a precipitation/flocculation treatment chemical for their WWTF in the late 1980's. There is currently no known source of aluminum; however, out of 23 discharge samples there were five samples with results of 200 µg/L, resulting in a critical discharge concentration (C_d) of 298 µg/L.

The dissolved aluminum aquatic life standards in Circular DEQ-7 are 750 µg/L acute, and 87 µg/L chronic. The RRV is 9 µg/L. Without dilution, BNSF Rail Yard would have RP to exceed the chronic standard (298 > 87 µg/L). However, there is inadequate ambient data to consider granting dilution. The only available ambient data provides a concentration < 20 µg/L *total* aluminum based on two samples from 2004.

Due to the lack of recent ambient data, DEQ will require effluent and ambient monitoring during this permit cycle.

Total recoverable (TR) lead, mercury, and thallium – DEQ evaluated whether BNSF Rail Yard WWTF had RP to exceed the water quality standards for these three metals:

- *Lead, TR* - The critical discharge concentration C_d of 2.7 µg/L is greater than the Circular DEQ-7 chronic standard of 2.6 µg/L. To evaluate RP, DEQ needs ambient total recoverable lead data from Whitefish River. (The ambient lead concentration results from 2004 were nondetect; however, the detection levels for these three samples were too high and DEQ cannot determine whether there is assimilative capacity in Whitefish River.) The RRV is 0.3 µg/L.
- *Mercury, TR* – The critical discharge concentration C_d of 0.3 µg/L is greater than the Circular DEQ-7 human health standard of 0.05 µg/L. To evaluate RP, DEQ needs ambient total recoverable mercury data from Whitefish River. (The ambient mercury concentrations from 2004 were nondetect; however, the detection level for the two samples were too high and DEQ cannot determine whether there is assimilative capacity in Whitefish River.) The RRV is 0.005 µg/L.
- *Thallium, TR* - The critical discharge concentration C_d of 3.1 µg/L is greater than the Circular DEQ-7 human health standard of 0.24 µg/L. To evaluate RP, DEQ needs ambient total

recoverable thallium data from Whitefish River. (There was no ambient thallium data). The RRV is 0.2 µg/L.

In addition to effluent monitoring, quarterly upstream monitoring for three years will be required at levels sufficient to detect the parameter or meet the RRV.

Other Metals – The 2009-issued permit required monitoring for 12 metals in addition to the above (they are: antimony, arsenic, barium, beryllium, chromium, copper, iron, manganese, nickel, selenium, silver, and zinc). Manganese does not have a water quality standard and is not of concern. None of the other 11 metals had RP to exceed any water quality standard, even assuming no dilution; however, DEQ reviewed the parameter list in the state Superfund Risk Assessment evaluation and the majority of the 11 metals are listed.

Semi-annual effluent testing of these 11 metals will be required. The detection limit must be sufficient to either detect the parameter or reach the RRV listed in Circular DEQ-7. Additionally, if BNSF Rail Yard intends to request a standard mixing zone for any of the metals, ambient monitoring would also be required for that metal.

Volatile Organic Compounds (VOCs), Semi-volatile Organic Compounds (sVOCs), and PCBs –The 2009-issued permit required analysis of VOCs, sVOCs, and PCBs once per discharge. BNSF submitted 12 sets of effluent analysis between 2010 and 2017. All parameters were found to be nondetect other than the following:

- *Benzene:* Benzene has a human health standard (HHS) of 5 µg/L and a RRV of 0.6 µg/L. Benzene was detected once: 3/20/2017 (2 µg/L). Based on the TSD approach, BNSF-Whitefish has a critical discharge concentration of 3.2 µg/L (based on the maximum of 2 µg/L x 1.6 multiplier) and there is no RP to exceed the HHS (3.2 µg/L < 5 µg/L).
- *Toluene*: Toluene has a HHS of 57 µg/L and a RRV of 1 µg/L. Toluene was detected three times: 3/20/2017 (3.2 µg/L); 7/16/13 (0.2 µg/L – j-flagged); and 8/9/2010 (1.2 µg/L). Based on the TSD approach, BNSF-Whitefish has a critical discharge concentration of 5.1 µg/L (based on the maximum of 3.2 µg/L x 1.6 multiplier) and there is no RP to exceed the HHS (5.1 µg/L < 57 µg/L).
- *Xylene*: Xylene has a HHS of 10,000 µg/L and a RRV of 3 µg/L. Xylene was detected once out of eight analyses: 3/20/2017 (11 µg/L). (Four of the 12 analyses did not include xylene results). Based on the TSD approach, BNSF-Whitefish has a critical discharge concentration of 21 µg/L (based on the maximum of 11 µg/L x 1.9 multiplier) and there is no RP to exceed the HHS (21 µg/L < 10,000 µg/L).
- *Bis(2-ethylhexyl)phthalate (or Di(2-ethylhexyl)phthalate, DEHP):* DEHP has a HHS of 3.2 µg/L and an RRV of 2 µg/L. DEHP was detected in the effluent three times: 11/8/2016 (3.1 µg/L), 2/17/2016 (9.3 µg/L), and 2/3/2015 (5.9 µg/L). Based on the TSD approach, BNSF Rail Yard WWTF has a critical discharge concentration of 15 µg/L (based on the maximum of 9.3 µg/L x 1.6 multiplier). Without dilution, BNSF Rail Yard would have RP to exceed the DEHP HHS (15 > 3.2 µg/L). However, there is inadequate ambient data to consider granting dilution. Due to the lack of ambient data, DEQ will require effluent and ambient monitoring during this permit cycle.

Several VOCs and sVOCs are listed on the state Superfund Risk Assessment evaluation as present (including benzene, toluene, xylene, and DEHP, as well as other VOC/sVOCs). In addition, Aroclor 1260 is identified as present.

Review of the laboratory analysis indicates that one or more of the analyses for a number of pollutants did not achieve the RRVs; including, but not limited to: acrolein, 1,2-dibromomethane, azobenzene, benzene, benzidine, benzo(a)pyrene, 2,4-dinitrotoluene, 4,6-dinitrotoluene, bis(2-ethylhexyl)phthalate (DEHP), hexachlorobenzene, hexachlorobutadiene, hexachloroethane, indeno(1,2,3-cd)pyrene, pentachlorophenol, toluene, and all of the aroclor pesticides. Annual effluent testing will be required for all VOCs, sVOCs, and PCBs identified on Form 2C Part V with the results submitted annually. Based on the sufficiently sensitive methods rule, the detection limit must be sufficient to either detect the parameter or reach the RRV listed in Circular DEQ-7.

V. Effluent Limits

Effluent limitations or conditions in reissued permits must be at least as stringent as those in the existing permit, with certain exceptions. Federal regulations require permits to contain the more stringent TBEL or WQBEL limitation applicable to an individual pollutant. 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 permit, the discharge from Outfall 001 shall, at a minimum, meet the effluent limits presented in **Table 8**:

Table 8: Proposed Final Limits for Outfall 001 (1)

Parameter	Units	Maximum Daily Limit	Average Monthly Limit
5-Day Biochemical Oxygen Demand	mg/L	30	20
	lb/day	98	16 (2)
Total Suspended Solids	mg/L	30	20
	lb/day	98	16 (2)
pH	s.u.	6.0 - 9.0 (instantaneous)	
Oil & Grease	mg/L	10	--
Total Phosphorus	mg/L	--	1.0 (3)
	lb/day	--	0.6 (2)
Cadmium, Total Recoverable	µg/L	1.8	--

Footnote:
(1) See Permit for definition of terms.
(2) Average Monthly Limit is based on nondegradation load allocation.
(3) Total Phosphorus concentration limit based on the Flathead Lake Phosphorus Strategy.

- There shall be no discharge that causes a visible oil sheen in the receiving water body.
- There shall be no discharge of floating solids or visible foam in other than trace amounts.
- There shall be no discharge of wastewater which reacts or settles to form an objectionable sludge deposit or emulsion beneath the surface of the receiving water body or upon adjoining shorelines.

VI. Monitoring Requirements

A. Effluent Monitoring

Self-monitoring and reporting of the quality of the effluent discharged is required by the permit. The samples collected and analyzed must be representative of the volume and nature of the effluent discharged from the facility. All analytical methods used to determine the effluent quality must be an approved method as listed in 40 CFR Part 136 and sufficient to either have a detection or meet the required reporting levels specified. The monitored parameters and the reporting requirements are presented below in **Table 9**.

Table 9: Outfall 001 Effluent Monitoring and Reporting Requirements (1)

Parameter	Units	Sample Type	Minimum Sampling Frequency (2)	Reporting Requirements (2)	Reporting Frequency	Reporting Level
Flow Rate	mgd	Instantaneous	Continuous	Maximum Daily and Average Monthly	Monthly	± 10% of actual Flow
Duration of Discharge	days	Calculated	Daily	Monthly	Monthly	0.5 days
5-Day Biochemical Oxygen Demand	mg/L	Composite	1/Month	Maximum Daily and Monthly Average	Monthly	2
	lb/day	Calculated				
Total Suspended Solids	mg/L	Composite	1/Month	Maximum Daily and Monthly Average	Monthly	4
	lb/day	Calculated				
pH	s.u.	Instantaneous	1/Day	Maximum Daily and Minimum Daily	Monthly	0.1
Oil and Grease	mg/L	Grab	1/Month	Maximum Daily	Monthly	1
Nitrate + Nitrite (as N)	mg/L	Composite	1/Month (3)	Average Monthly	Monthly	0.02
Total Kjeldahl Nitrogen (as N)	mg/L	Composite	1/Month (3)	Average Monthly	Monthly	0.225
Total Nitrogen (as N)	mg/L	Calculated	1/Month (3)	Average Monthly	Monthly	0.25
	lb/day	Calculated	1/Month (3)	Average Monthly	Monthly	0.1
Total Phosphorus (as P)	mg/L	Composite	1/Month	Average Monthly	Monthly	0.003
	lb/day	Calculated	1/Month	Average Monthly	Monthly	0.01
Aluminum, Dissolved	µg/L	Composite	Semi-annual	Value	Annual	9
Antimony, TR	µg/L	Composite	Semi-annual	Value	Annual	0.5
Arsenic, TR	µg/L	Composite	Semi-annual	Value	Annual	1
Barium, TR	µg/L	Composite	Semi-annual	Value	Annual	3
Beryllium, TR	µg/L	Composite	Semi-annual	Value	Annual	0.8
Cadmium, TR	µg/L	Composite	1/Month	Maximum Daily and Average Monthly	Monthly	0.03
Chromium, TR	µg/L	Composite	Semi-annual	Value	Annual	10
Copper, TR	µg/L	Composite	Semi-annual	Value	Annual	2
Iron, TR	µg/L	Composite	Semi-annual	Value	Annual	20
Lead, TR	µg/L	Composite	Semi-annual	Value	Annual	0.3
Mercury, TR	µg/L	Composite	Semi-annual	Value	Annual	0.005
Nickel, TR	µg/L	Composite	Semi-annual	Value	Annual	2
Selenium, TR	µg/L	Composite	Semi-annual	Value	Annual	1
Silver, TR	µg/L	Composite	Semi-annual	Value	Annual	0.2
Thallium, TR	µg/L	Composite	Semi-annual	Value	Annual	0.2

Table 9: Outfall 001 Effluent Monitoring and Reporting Requirements (1)

Parameter	Units	Sample Type	Minimum Sampling Frequency (2)	Reporting Requirements (2)	Reporting Frequency	Reporting Level
Zinc, TR	µg/L	Composite	Semi-annual	Value	Annual	8
Phenols, Total	µg/L	Composite	Annual	Report (4)	Annual	10
Cyanide, Total	µg/L	Composite	Annual	Report (4)	Annual	3
Volatile Organic Compounds (VOCs) (4)	µg/L	Grab	Annual	Report (4)	Annual	See footnote (4)
Semi-Volatile, Acid Compounds (4)	µg/L	Grab	Annual	Report (4)	Annual	See footnote (4)
Semi-Volatile, Base Neutral Compounds (4)	µg/L	Grab	Annual	Report (4)	Annual	See footnote (4)
PCBs (4)	µg/L	Grab	Annual	Report (4)	Annual	See footnote (4)
Temperature	°F	Instantaneous	1/Day	Maximum Daily and Minimum Daily	Monthly	0.1
Whole Effluent Toxicity, Acute	% Effluent	Composite	Semi-annual	Pass/Fail	Annual	NA

Footnotes: NA = Not Applicable

(1) See Part V of the permit for definition of terms. TR = Total Recoverable, in accordance with DEQ-7 Footnote 9.

(2) Monitoring only required during periods with discharge. If no discharge occurs during the reporting period then "No Discharge" shall be recorded on the NetDMR Form.

(3) Nitrogen monitoring required monthly during the months of July, August, and September.

(4) Required analysis must be conducted by methods approved under 40 CFR 136 sufficiently sensitive to detect the pollutant or reach the RRV in Circular DEQ-7. The monitoring requirements in this table includes only those compounds listed on EPA Form 3510-2C (Application Form 2C):

- GC/MS Fraction – Volatile Compounds (1V – 31V): Form 2C, Pages V-4 and V-5
- GC/MS Fraction – Acid Compounds (1A – 11A): Form 2C, Page V-5
- GC/MS Fraction – Base/Neutral Compounds (1B – 46B): Form 2C, Pages V-6 through V-8
- GC/MS Fraction – Pesticides (PCBs only, 18P – 24P): Form 2C, Page V-9

Results to be submitted as laboratory analysis by no later than January 28th following the year of data. These monitoring requirements may be used for, but do not supersede, the reporting requirements for "all other cases" that are not "primary industry categories" in Part C of Application Form 2C.

B. Whole Effluent Toxicity (WET) Requirements

The monitoring frequency for acute tests shall be semi-annual unless a sample is found to be acutely toxic during a routine test. Samples shall be collected on a two-day progression; i.e., if the first sample is on a Monday, the second quarterly sample shall be on a Wednesday, etc. If acute toxicity occurs, an additional test shall be conducted within 14 days of the date of the initial test.

The replacement static acute toxicity tests shall be conducted in general accordance with the procedures set out in the latest revision of *Methods of Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms*, EPA-821-R-02-012 (2002) and the latest revision of *Region VIII EPA NPDES Acute Test conditions – Static Renewal Whole Effluent Toxicity*. In case of conflicts, the Region VIII procedures will prevail. The permittee shall conduct the acute 48-hour static toxicity test using *Ceriodaphnia* sp. and the acute 96-hour static toxicity test using fathead minnows (*Pimephales promelas*).

Acute toxicity occurs when 50 percent or more mortality is observed for either species at any effluent concentration. If more than 10 percent control mortality occurs, the test shall be repeated until satisfactory control survival is achieved, unless a specific individual exception is granted by the permit issuing authority. This exception may be granted if less than 10% mortality was observed at the dilutions containing high effluent concentrations.

If acute toxicity occurs in a routine test, an additional test shall be conducted within 30 days of the initial test. DEQ may also modify the permit without additional public notice to increase the frequency of testing or require additional analyses of the effluent.

If the results for four tests in a row indicate no acute toxicity, the permittee may make a request to DEQ to allow a reduction to annual acute toxicity testing on two species. The permittee is to specify which species would be used in the testing. DEQ may approve or deny the request based on the results and other available information without an additional public notice. If the request is approved, the test procedures are to be the same as specified above for the test species.

C. Upstream Monitoring

Instream monitoring will be required in the proposed permit as found in **Table 10**, below. Monitoring must take place at a consistent location upstream and outside the influence of Outfall 001 with the sample type, frequency, and RRVs as identified below. The value shall be reported on the facility's DMRs.

Upstream monitoring will occur quarterly **for the three calendar years 2019, 2020, and 2021**.

Table 10: Upstream Monitoring and Reporting Requirements (1)

Parameter	Units	Sample Type	Minimum Sample Frequency (2)	Required Reporting Value (3)
Cadmium, Total Recoverable	µg/L	Grab	Quarterly	0.03
Lead, Total Recoverable	µg/L	Grab	Quarterly	0.3
Mercury, Total Recoverable	µg/L	Grab	Quarterly	0.005
Thallium, Total Recoverable	µg/L	Grab	Quarterly	0.2
Bis(2-ethylhexyl)phthalate (DEHP)	µg/L	Grab	Quarterly	2
Hardness	mg/L	Grab	Quarterly	NA

Footnotes:
(1) See Definition section at end of permit for explanation of terms.
(2) Monitoring required quarterly for **three (3) full years of permit coverage (2019, 2020, and 2021)**.
(3) See Circular DEQ-7 for more information on RRVs. Analysis must achieve these, or lower, reporting limits.

The permittee may choose to collect ambient data for additional parameters during the permit term. Upstream data will be needed if the permittee will be seeking a mixing zone for that parameter.

D. Removed Substances

Collected screenings, grit, solids, sludges, or other pollutants removed in the course of treatment shall be disposed of in such a manner so as to prevent any pollutant from entering any waters of the state or creating a health hazard.

VII. Special Conditions/Compliance Schedules

A. Toxicity Identification Evaluation/Toxicity Reduction Evaluation (TIE/TRE)

If toxicity is detected in two consecutive discharges, and it is determined by DEQ that a TIE/TRE is necessary, the permittee shall be so notified and shall initiate a TIE/TRE immediately thereafter. The purpose of the TIE/TRE will be to establish the cause(s) of the toxicity, locate the source(s) of the toxicity, and control or provide treatment for the toxicity.

If the TIE/TRE establishes that the toxicity cannot be eliminated, the permittee shall submit a proposed compliance plan to DEQ. The plan shall include the proposed approach to control toxicity and a proposed compliance schedule for achieving control. If the approach and schedule are acceptable to DEQ, this permit may be reopened and modified.

If the TIE/TRE shows that the toxicity is caused by a toxicant(s) that may be controlled with specific numerical limitations, the permittee may:

a. Submit an alternative control program for compliance with the numerical requirements;
b. If necessary, provide a modified whole effluent testing protocol which compensates for the pollutant(s) being controlled numerically.

If acceptable to DEQ, this permit may be reopened and modified to incorporate any additional numerical limitations, a modified compliance schedule if judged necessary by DEQ, and/or a whole effluent protocol.

B. Storm water – Industrial Requirements

By no later than [three months from the effective date of the permit], BNSF-Whitefish must submit a Notice of Intent (NOI) and obtain coverage under the *Multi-Sector General Permit for Storm Water Discharges Associated with Industrial Activity.* As part of the submission, BNSF must include:

- An evaluation of all the BNSF-Whitefish facility site that does not have MPDES Permit coverage under MT0000019. The evaluation should provide the conclusion of whether the specific area is included under the NOI submittal for storm water coverage (or not) and what criteria BNSF used for decision-making; and
- Documentation that coverage was requested under the *Multi-Sector General Permit for Storm Water Discharges Associated with Industrial Activity* covers any area that meets the definition of 'storm water discharge associated with industrial activity' **including areas with significant contribution of pollutants to state waters** and **areas used in the past for vehicle maintenance**.

DEQ requires MPDES coverage at BNSF-Whitefish for any area of the property *used now or in the past* for vehicle maintenance (including vehicle rehabilitation, mechanical repairs, painting, fueling, and lubrication), equipment cleaning operations, or that are significant contributors of pollutants to

state waters. Any areas that are or have been involved in the regulated activities, as well as those specified sites *that are adjacent land used in connection with the activities*, requires storm water permit coverage. In addition, DEQ is requiring any remaining areas of the property that may be significant contributors of pollutants to surface waters to comply with storm water permitting requirements. Pollutants from BNSF that may be significant include TSS, oil &grease, metals, and volatiles and semi-volatiles.

The areas that require storm water coverage should encompass:

- industrial plant yards;
- immediate rail lines used by carriers of raw materials and waste material (such as fuel, lubricants, and associated waste);
- material handling sites and sites used for storage and maintenance of material handling equipment (including adjacent land used in connection with such areas);
- refuse sites and sites used for residual treatment, storage and disposal and for disposal of process wastewater (including adjacent land used in connection with such areas);
- areas where industrial activity has taken place and significant materials remain and are exposed to storm water.

VIII. Information Sources

1. Montana Code Annotated Title 75 - Environmental Protection 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 Under the Montana Pollutant Discharge Elimination System (MPDES).*
   f. Subchapter 12 - *MPDES Standards*.
   g. Subchapter 13 - *MPDES Permits*.
3. Federal Water Pollution Control Act (Clean Water Act), 33 U.S.C. §§ 1251-1387, October 18, 1972, as amended.
4. 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.
5. US Code of Federal Regulations, 40 CFR Parts 122-125, 130-133, & 136.
6. Montana Department of Environmental Quality Circular DEQ-7, Montana Numeric Water Quality Standards.
7. Montana Department of Environmental Quality Circular DEQ-12A, Montana Numeric Nutrient Water Quality Standards.

8. Montana Department of Environmental Quality TMDLs:
   a. *Flathead-Stillwater Planning Area Nutrient, Sediment, and Temperature TMDLs and Water Quality Improvement Plan*, December 2014.
   b. *Nutrient Management Plan and Total Maximum Daily Load for Flathead Lake, Montana*, December 28, 2001
   c. *Strategy for Limiting Phosphorus in Flathead Lake*, Department of Health and Environmental Science, 1984.
9. Montana Pollutant Discharge Elimination System (MPDES) Permit Number MT0000019:
   a. Administrative Record.
   b. Renewal Application DEQ Form 1 and EPA Form 2A (2014) and Supplemental Documents
10. BNSF Rail Yard WWTF Design Criteria, Kennedy-Jenks Consultants, 1998
11. US EPA Technical Support Document for Water Quality-Based Toxics Control, EPA/505/2-30- 001, March 1991.
12. US EPA NPDES Permit Writers' Manual, EPA 833-B-96-003, September 2010.
13. US EPA Region VIII NPDES Whole Effluent Toxics Control Program, August 1997.
14. US EPA NPDES Permit Writers' Course Manual.

Completed by Christine Weaver, March 2018

Figure 1: BNSF Whitefish Railyard.

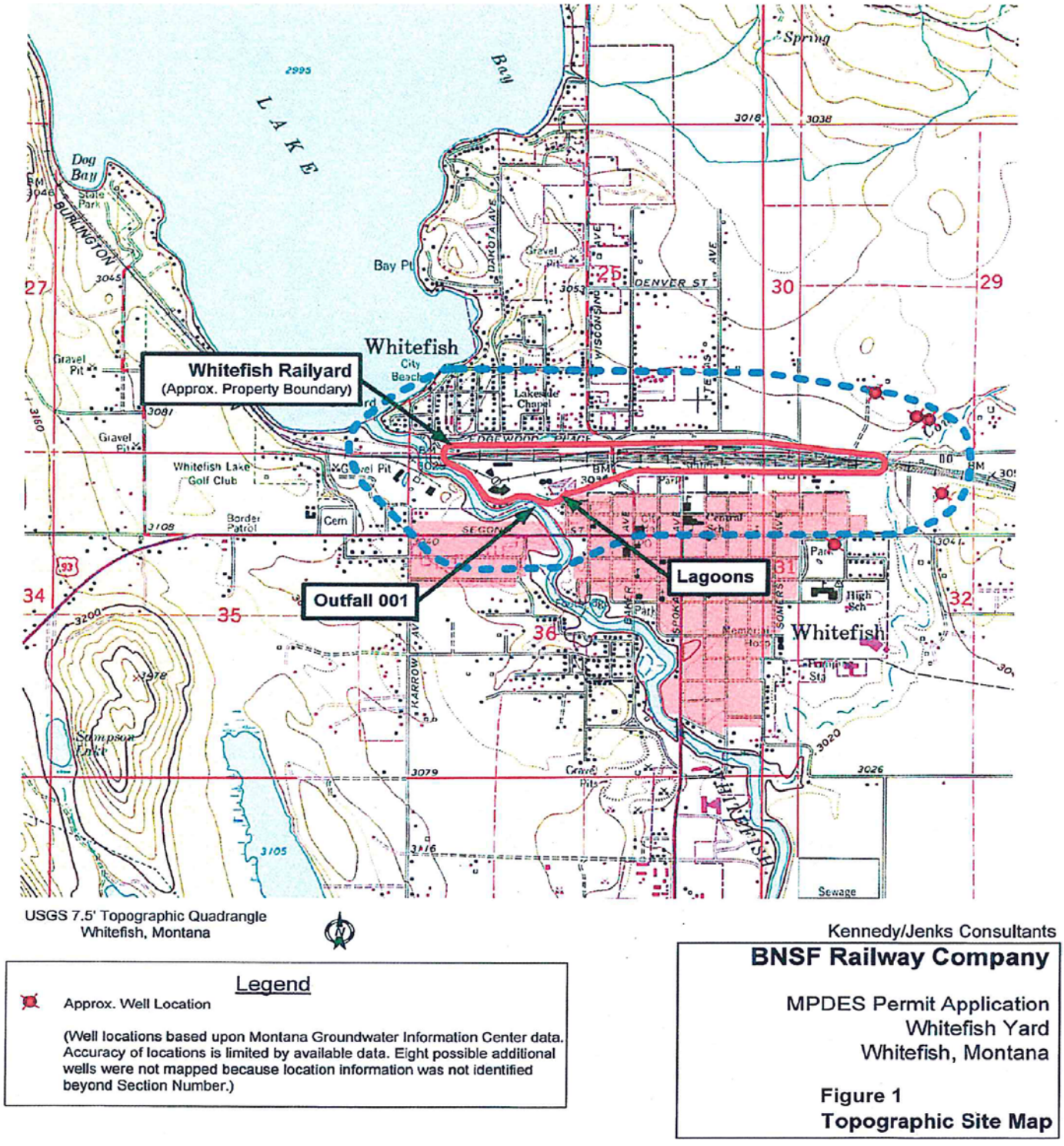


Figure 2: Outfall 001 Industrial Activity

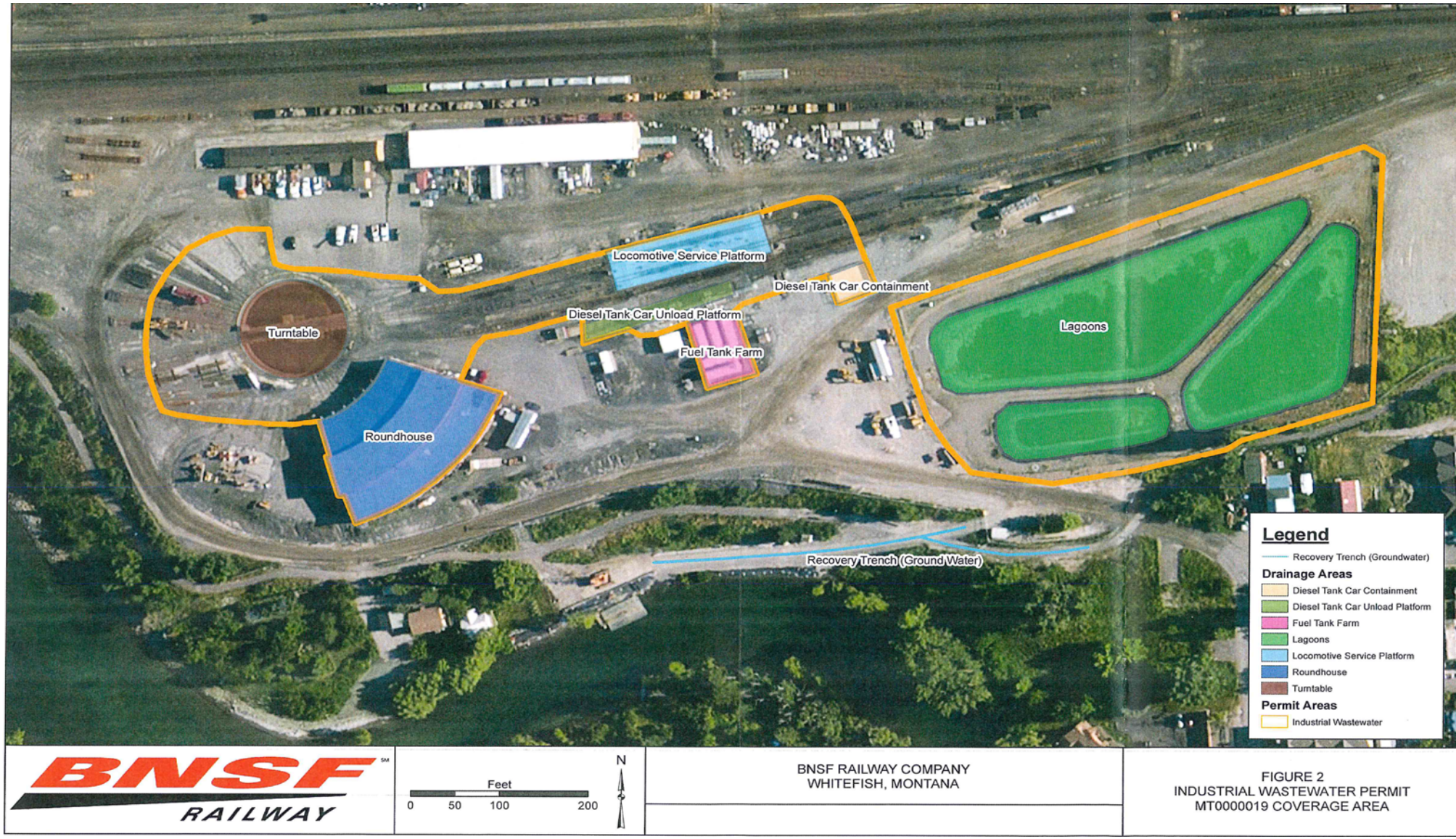
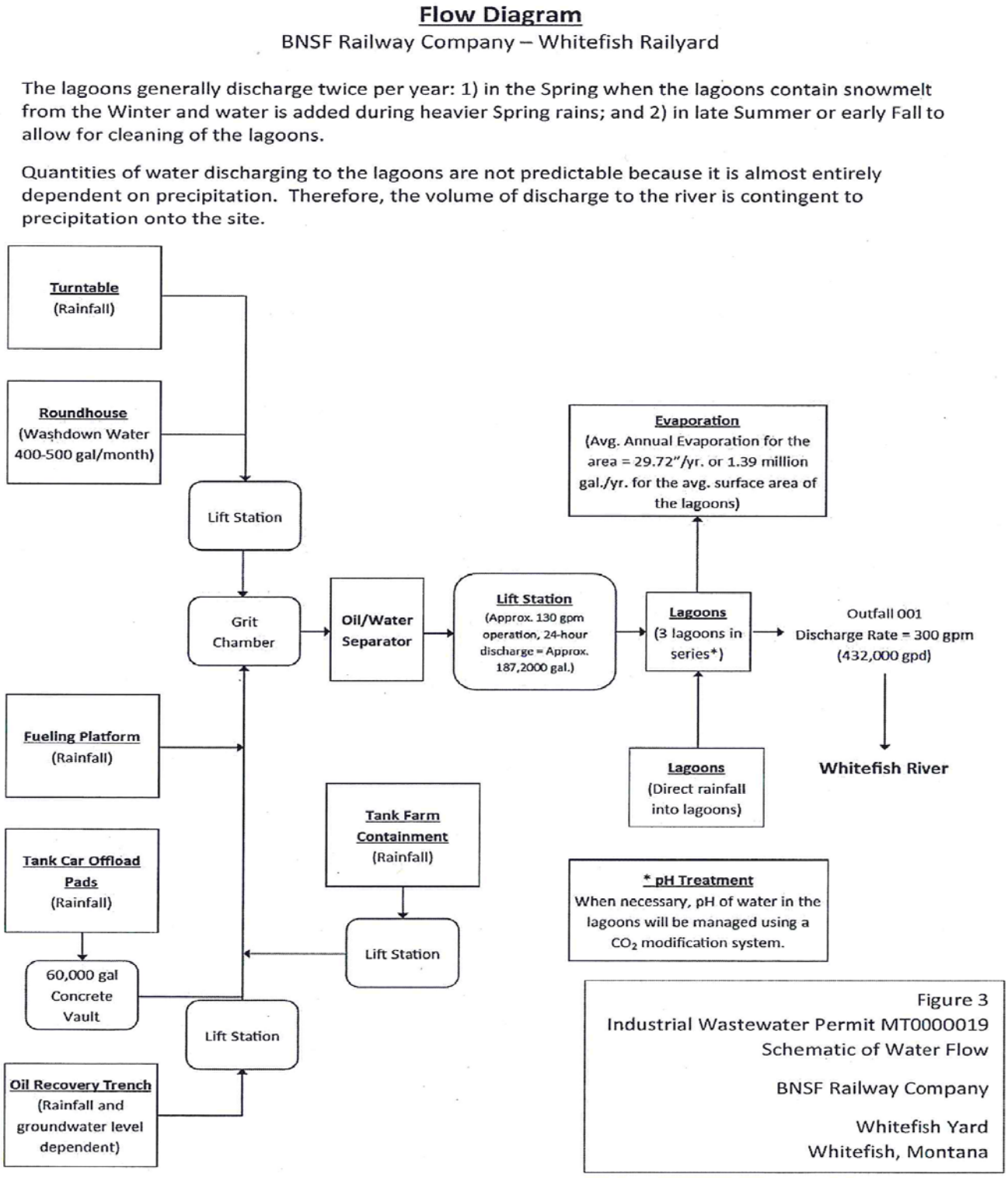


Figure 3: **General Process Flow Diagram** for the BNSF Whitefish WWTF Outfall 001 (Application, November 2017)



Appendix A: Critical Discharge Pollutant Concentrations – Outfall 001 (1)

Parameter (2)	**Units**	**Maximum Observed Concentration**	***Number of samples (n)***	***Coefficient of Variation (CV)***	**Multiplying Factor 95% Confidence Interval**	**Critical Discharge Concentration (C_d)**
Aluminum, Dissolved	µg/L	200	*23*	*1.0*	1.5	298
Antimony, TR	µg/L	3.0	*23*	*0.3*	1.2	3.5
Arsenic, TR	µg/L	3.6	*23*	*0.1*	1.1	3.8
Barium, TR	µg/L	513	*23*	*0.2*	1.1	564
Beryllium, TR	µg/L	2.0	*23*	*0.4*	1.2	2.4
Cadmium, TR	µg/L	1.0	*23*	*1.2*	1.6	1.6
Chromium, TR	µg/L	5.0	*23*	*0.7*	1.4	6.8
Copper, TR	µg/L	5.0	*23*	*0.5*	1.3	6.3
Iron, TR	µg/L	501	*23*	*1.0*	1.5	748
Lead, TR	µg/L	2.0	*23*	*0.7*	1.4	2.7
Mercury, TR	µg/L	0.2	*23*	*1.3*	1.6	0.3
Nickel, TR	µg/L	10	*23*	*0.6*	1.3	13.1
Selenium, TR	µg/L	3.0	*23*	*0.3*	1.2	3.5
Silver, TR	µg/L	2.0	*23*	*0.8*	1.4	2.8
Thallium, TR	µg/L	2.0	*23*	*1.1*	1.5	3.1
Zinc, TR	µg/L	25	*23*	*0.5*	1.3	31.4
Benzene	µg/L	2	*12*	*0.6*	1.6	3.2
Toluene	µg/L	3.2	*12*	*0.6*	1.6	1.9
Xylene	µg/L	11	*8*	*0.6*	1.9	21
Bis(2-ethylhexyl)phthalate	µg/L	9.3	*12*	*0.6*	1.6	15
Ammonia as N, Total	mg/L	0.13	*22*	*0.6*	1.3	0.17
Nitrate and Nitrite	mg/L	1.3	*23*	*1.9*	1.8	2.4
Nitrogen, Total	mg/L	2.7	*23*	*0.9*	1.4	3.8
Phosphorus, Total	mg/L	< 0.1	*23*	*0.9*	1.4	< 0.14

Footnote:
(1) Development of critical discharge concentration in accordance with the EPA's TSD for Water Quality-based Toxics Control, 1991.
(2) TR = Total Recoverable.

Appendix B: Reasonable Potential Summary for Chronic/Human Health Standards – Outfall 001 (1)

Parameter (2)	Units	Critical Receiving Water Concentration (C_r)	Lowest Water Quality Standard	RPA Determination (C_r > WQS?) (Yes/No/UNK)
Aluminum, Dissolved	µg/L	298	87	UNK – see Part IV.D.3
Antimony, TR	µg/L	3.5	5.6	No
Arsenic, TR	µg/L	3.8	10	No
Barium, TR	µg/L	564	1,000	No
Beryllium, TR	µg/L	2.4	4.0	No
Cadmium, TR	µg/L	1.6	0.7	Yes (3)
Chromium, TR	µg/L	6.8	100	No
Copper, TR	µg/L	6.3	8.2	No
Iron, TR	µg/L	747	1,000	No
Lead, TR	µg/L	2.7	2.6	UNK – see Part IV.D.3
Mercury, TR	µg/L	0.32	0.05	UNK – see Part IV.D.3
Nickel, TR	µg/L	13	46	No
Selenium, TR	µg/L	3.5	5.0	No
Silver, TR	µg/L	2.8	100	No
Thallium, TR	µg/L	3.1	0.24	UNK – see Part IV.D.3
Zinc, TR	µg/L	31	106	No
Ammonia, Total	mg/L	0.02	1.2	No
Nitrate and Nitrite	mg/L	2.4	10	No
Nitrogen, Total	mg/L	0.140	0.275	No
Phosphorus, Total	mg/L	0.008	0.025	No

Footnote:
(1) BNSF-Whitefish did not have RP to exceed any acute aquatic life standards, therefore this table includes only a review of chronic aquatic life and human health standards.
(2) TR = Total Recoverable, in accordance with DEQ-7 Footnote 9.
(3) BNSF-Whitefish has had a cadmium effluent limit since 1993. The current acute RP analysis showed that the critical discharge concentration of 1.6 µg/L = the acute aquatic life standard of 1.6 µg/L. Furthermore, the current chronic RP analysis indicates that there is RP to exceed the standard without dilution credit. Therefore, based on anti-backsliding, the cadmium limit will be maintained.