

**FACT SHEET AND STATEMENT OF BASIS
ENSIGN-BICKFORD COMPANY
RENEWAL PERMIT: DISCHARGE
UPDES PERMIT NUMBER: UT0025283
MINOR INDUSTRIAL**

FACILITY CONTACTS

Operator Name: The Ensign-Bickford Company
Contact: Mr. Haldon R. Jaussi
Position: Director of Environmental Remediation
Phone Number: (801) 794 -4538

Permittee Name: The Ensign-Bickford Company
Facility Name: The Ensign-Bickford Company Facility
Mailing and Facility Address: 8305 South Highway 6 & 89
Spanish Fork, Utah 84660
Telephone: (801) 794 -4538

DESCRIPTION OF FACILITY

An explosives manufacturing plant has been operated at the present Ensign-Bickford Company (EBCo) site since prior to World War II. Around June of 1986, a large quantity of dilute nitric acid was released at this facility as the result of liner failure in a storage pond. Prior to 1988, the wastewater disposal practices at the EBCo site may have included the disposal of industrial waste from explosives production into unlined ditches, pits, and ponds. Elevated concentrations of nitrates and low concentrations of constituents of energetic materials (CEMs) have been detected in a municipal water supply well owned and operated by Mapleton City. This prompted Mapleton City to remove this well from service in November of 1994. EBCo, in cooperation with Mapleton City and the Utah Department of Environmental Quality (DEQ), has developed a plan to reactivate the well for use in either the municipal water system or in a municipal pressurized irrigation system. The following compounds have been detected in the Mapleton No. 1 well:

Nitrate	
RDX	Cyclotrimethylenetrinitramine
EGDN	Ethylene Glycol Dinitrate; Nitroglycol; Glycol Dinitrate
DEGDN	Diethylene Glycol Dinitrate; Dinitrodiglycol

In addition to the compounds identified above, the following compounds have been detected in ground water between the EBCo site and the Mapleton No. 1 well:

HMX	Cyclotetramethylenetetranitramine
PETN	Pentaerythritol Tetranitrate
TEGDN	Triethylene Glycol Dinitrate

TMETN	Metriol Trinitrate; 1,3-Propanediol; 2-Methylnitrate
BTTN	Butanetriol Trinitrate
TNT	Trinitrotoluene

DEQ has required that the Mapleton No. 1 well be pumped to serve as a hydraulic barrier to impede further northward migration of nitrate and other CEM's. To comply with this condition, the Mapleton City No. 1 well reactivation alternative has been designed to include surface water discharge that enables pumping of the well when municipal demand requirements do not warrant the well's use. The reactivation plan includes the utilization of a granular activated carbon (GAC) treatment system that will remove CEM's from the ground water prior to use in the culinary and/or pressurized irrigation systems. There are no plans to use the water for culinary use at this time. No reduction of nitrate concentration was contemplated for water discharged to surface water, nor will any be required to meet the permit effluent limitations contained in this permit.

The Ensign-Bickford Company Facility is comprised of two facilities: Hobble Creek and Spanish Fork. The Hobble Creek portion of the Facility consists of flow from the Mapleton GAC and the Orton GAC facilities, with a discharge to either the Mapleton pressurized Irrigation System or directly to Hobble Creek. The flow from the Mapleton GAC makes up roughly 2/3 of the flow, and the flow from the Orton GAC makes up roughly 1/3 of the flow to the system.

The Spanish Fork Treatment Facility is located at 3710 East Hwy. 6 in Spanish Fork. This discharge is mostly, if not completely, discharged to the City of Spanish Fork's pressurized irrigation system. It only makes the Spanish Fork River when irrigation activities do not warrant its use (approximately November through March). Effluent is piped via a conveyance pipeline (approximately 4.5 miles of 12-inch diameter PVC) from the treatment facility to a vault (located approximately 500 feet from the river), where it blends with other waters not associated with this groundwater recovery process before reaching the river.

In 2014, the Utah Division of Water Quality adopted Utah Administrative Code (UAC) R317-1-3.3, Technology-Based Phosphorus Effluent Limit (TBPEL) Rule. Since phosphorus is not a constituent of concern and is not expected to be in the effluent, the facility is exempt from the TBPEL rule, and phosphorus limits are not included in this Permit.

SUMMARY OF CHANGES FROM PREVIOUS PERMIT

There have been no updates to the Facility or process since the last permit renewal.

DISCHARGE

DESCRIPTION OF DISCHARGE

The Permittee has been reporting self-monitoring results on Discharge Monitoring Reports on a monthly basis. There have been no violations in the previous permit cycle.

<u>Outfall Number</u>	<u>Location of Discharge Outfall</u>
001	Discharge to Hobble Creek, located at a latitude of 40° 08' 53" and longitude of 111° 34' 45". Compliance samples are to be taken in the Mapleton GAC (latitude 40° 7' 44" N, longitude of 111° 34' 42"W) and Orton GAC building (latitude 40° 6' 50" N, longitude of 111° 34' 20"W) before discharge to Hobble Creek

- 002a or Mapleton City pressurized irrigation system.
Discharge to the Spanish Fork River, located at a latitude of 40° 05' 52" and a longitude 111° 39' 48". Compliance samples are to be taken in the Spanish Fork GAC building (latitude 40° 05' 6" N, longitude 111° 35' 30") before discharge to the Spanish Fork River or Spanish Fork pressurized irrigation system.
- 002b Discharge to the Spanish Fork River, located at a latitude of 40° 05' 16" N and longitude 111° 35' 57" W. Compliance samples to be taken in the Spanish Fork GAC building (latitude 40° 05' 6" N, longitude 111° 35' 30" W) before discharge to the Spanish Fork River or Spanish Fork pressurized irrigation system.

RECEIVING WATERS AND STREAM CLASSIFICATION

If a discharge were to occur from the Hobble Creek Facility, it would be discharged into Hobble Creek, which is a Class 2B, 3A, and 4 according to UAC R317-2-13:

- Class 2B -- Protected for infrequent primary contact recreation. Also protected for secondary contact recreation where there is a low likelihood of ingestion of water or a low degree of bodily contact with the water. Examples include, but are not limited to, wading, hunting, and fishing.
- Class 3A -- Protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in their food chain.
- Class 4 -- Protected for agricultural uses including irrigation of crops and stock watering.

If a discharge were to occur from the Spanish Fork Facility, it would be discharged into Spanish Fork River, which is a Class 2B, 3B, 3D, and 4 according to UAC R317-2-13:

- Class 2B -- Protected for infrequent primary contact recreation. Also protected for secondary contact recreation where there is a low likelihood of ingestion of water or a low degree of bodily contact with the water. Examples include, but are not limited to, wading, hunting, and fishing.
- Class 3B -- Protected for warm water species of game fish and other warm water aquatic life, including the necessary aquatic organisms in their food chain.
- Class 3D -- Protected for waterfowl, shore birds and other water-oriented wildlife not included in Classes 3A, 3B, or 3C, including the necessary aquatic organisms in their food chain.
- Class 4 -- Protected for agricultural uses including irrigation of crops and stock watering.

TOTAL MAXIMUM DAILY LOAD (TMDL) REQUIREMENTS

This facility ultimately discharges to Utah Lake which is listed on Utah's 303(d) list of impaired waterbodies as defined in the Clean Water Act. As required under federal regulations, a total maximum daily load (TMDL) will be developed for all 303(d) listed waters. Specifically, Utah Lake has been identified as impaired for total phosphorous and Total Dissolved Solids (TDS). Currently, a TMDL evaluation is underway for the lake. The TMDL process may result in pollutant load reductions and wasteload allocations for either of these constituents in the future. Wasteload allocations would then be translated to effluent limits in UPDES permits.

WATER RIGHTS STATE ENGINEER APPROVAL

Spanish Fork and Mapleton own the water rights for the water discharged into the irrigation systems. On

June 25, 2024, the Division of Water Quality (DWQ) contacted the Utah Division of Water Rights, which confirmed these rights and that Ensign Bickford does not need to hold a water right.

BASIS FOR EFFLUENT LIMITATIONS

Limitations on pH are based on current Utah Secondary Treatment Standards, UAC R317-1-3.2. Facilities are not allowed to exceed water quality standards for pollutants on the 303d list where a TMDL has not been completed. The dissolved oxygen (DO) limit has been maintained from the previous permit. Based on data provided in the original permit application, and because the effluent is composed only of ground water, biochemical oxygen demand, total suspended solids, and *E. coli* limitations are not necessary, thus will not be included in this permit. TDS has been removed from the permit during a previous cycle due to the lack of reasonable potential to exceed the water quality standard.

Concentration and types of organic constituents in the effluent are also addressed in this permit. As discussed above, a number of organic compounds are found to be present in the effluent. Most of these organic compounds are at very low concentrations, and the major confined component of all the organics is RDX. Therefore, if RDX concentrations are sufficiently controlled, then other organic parameters should likewise remain below concentrations of concern. There is no State numeric water quality standard for RDX. However, there is a published EPA Lifetime Drinking Water Health Advisory (Office of Drinking Water, U.S. EPA, Washington D.C., November 1988) for RDX of 0.002 mg/L. The lifetime health advisory will serve as the basis for establishing the effluent limits (e.g., the concentration of RDX, after mixing in the receiving stream, shall not exceed 0.002 mg/L). See Attachment 4 for more details on limitation development.

Nitrate nitrogen is also a parameter of concern. It is included in the State Drinking Water Standards at a concentration of 10 mg/L and is included in the State Water Quality Standards as a pollution indicator (4 mg/L to protect against eutrophication). If it appears that the in-stream mix may exceed 4 mg/L, either that limit must be met, or an appropriate stream assessment must be completed to determine what in-stream mix is appropriate.

The wasteload allocation indicates that there are six flow ranges needed to determine specific RDX and nitrate nitrogen effluent limit concentrations at Outfall 001 and Outfall 002a. These flow ranges, and the corresponding effluent limit concentrations for RDX and nitrate nitrogen are shown in the tables below. EBCo will be required to meet the RDX and nitrate nitrogen concentrations of the flow range associated with the highest flow rate of the month. When calculating these effluent limits, the maximum flow rate for each flow range was used as the effluent flow in the mass balance equation. Additionally, an additional 20% margin of safety factor was included when determining the final effluent limitation. The results of these calculations can be found in Table 1 and 2.

In 2020, the Permittee requested a new discharge location, Outfall 002b. There was no reliable flow data for the section of the Spanish Fork River where Outfall 002b is located. Therefore, a 7/Q10 minimum flow was assumed to be zero; assuming no dilution and no mixing zone is the conservative approach. The Facility will only discharge to this reach during the non-irrigation season. See Table 3 for limitations.

There is no published standard analytical method in the literature (which has been certified by EPA) as an approved method for the detection of such low concentrations of RDX and other CEM compounds. Therefore, it was up to the State and the permittee to develop an appropriate analytical method for RDX and other CEM compounds. EPA Method SW8330 has been modified to facilitate low-concentration quantification of RDX and other CEM compounds. Future advances in analytical technology may warrant appropriate modifications to this method.

It has been determined that this discharge will not cause a violation of water quality standards. An Antidegradation Level II review is not required since the Level I review shows that water quality impacts are minimal. The permittee is expected to be able to comply with these limitations.

Reasonable Potential Analysis

Since January 1, 2016, DWQ has conducted reasonable potential analysis (RP) on all new and renewal applications received after that date. RP for this permit renewal was conducted following DWQ's September 10, 2015 Reasonable Potential Analysis Guidance (RP Guidance). There are four outcomes defined in the RP Guidance: Outcome A, B, C, or D. These Outcomes provide a frame work for what routine monitoring or effluent limitations are required.

A qualitative RP check was performed on metals to determine if there was enough data to perform a reasonable potential analysis on the outfall. Because of their process of treating ground water with nitrogenous compounds by means of GAC, the Permittee was not required to sample metals during the previous permit cycle, and as a result, there is no metal data to analyze for RP.

The permit limitations are:

Parameter	Outfall 001 Effluent Limitations *a				
	Maximum Monthly Avg	Maximum Weekly Avg	Yearly Average	Daily Minimum	Daily Maximum
Total Flow, cfs	--	--	--	--	6.13
Dissolved Oxygen, mg/L *d	--	--	--	4.5	--
pH, Standard Units	--	--	--	6.5	9
Nitrate-Nitrogen, mg/L	--	--	--	--	*f
RDX, ug/L	--	--	--	--	*f

Parameter	Outfall 002a and 002b Effluent Limitations *a				
	Maximum Monthly Avg	Maximum Weekly Avg	Yearly Average	Daily Minimum	Daily Maximum
Total Flow, cfs	--	--	--	--	3.34
Dissolved Oxygen, mg/L *d	--	--	--	4.5	--
pH, Standard Units	--	--	--	6.5	9
Nitrate-Nitrogen, mg/L	--	--	--	--	*f
RDX, ug/L	--	--	--	--	*f

SELF-MONITORING AND REPORTING REQUIREMENTS

The following self-monitoring requirements are the same as in the previous permit. The permit will require reports to be submitted monthly and annually, as applicable, on Discharge Monitoring Report (DMR) forms due 28 days after the end of the monitoring period. Effective January 1, 2017, monitoring results must be submitted using NetDMR unless the permittee has successfully petitioned for an exception. Lab sheets for biomonitoring must be attached to the biomonitoring DMR. Lab sheets for metals and toxic organics must be attached to the DMRs.

Self-Monitoring and Reporting Requirements *a

Parameter	Frequency	Sample Type	Units
Total Flow *b, *c	Continuous	Recorder	cfs
Dissolved Oxygen *d	Monthly	Grab	mg/L
pH, Standard Units	Monthly	Grab	S.U.
Nitrate-Nitrogen *e	Monthly	Grab	mg/L
RDX*e	Monthly	Grab	ug/L

*a See Definitions, *Part VIII*, for definition of terms.

*b Flow measurements of influent/effluent volume shall be made in such a manner that the permittee can affirmatively demonstrate that representative values are being obtained.

*c If the rate of discharge is controlled, the rate and duration of discharge shall be reported.

*d Dissolved oxygen limits are only applicable if the discharge goes to surface waters.

*e Limitation development method found in Attachment 4 of the FSSOB. Analyses shall be made in accordance with these methods, or by any other method approved in writing by the Director.

*f Nitrate nitrogen and RDX limitations are based upon effluent flow ranges as indicated in the tables below. The permittee is required to meet the RDX and nitrate-nitrogen concentrations of the flow range associated with the highest flow rate of the month.

Table 1: RDX And Nitrate-Nitrogen Limits for Outfall 001

Effluent Flow Range (cfs)	Daily Maximum RDX Concentration (mg/L)	Daily Maximum Nitrate- Nitrogen Concentration (mg/L)*
0.00 - 0.56	0.0274	124.1
0.57 - 1.11	0.0148	67.6
1.12 - 1.67	0.0105	48.3
1.68 - 2.79	0.0071	32.9
2.80 - 4.46	0.0052	24.3
4.47 - 6.13	0.0043	20.4

Table 2: RDX And Nitrate-Nitrogen Limits for Outfall 002a

Effluent Flow Range (cfs)	Daily Maximum RDX Concentration (mg/L)	Daily Maximum Nitrate- Nitrogen Concentration (mg/L)*
0.00 - 0.56	0.0449	124.1
0.57 - 1.11	0.0236	67.6
1.12 - 1.67	0.0164	48.3
1.68 - 2.23	0.0128	38.7
2.34 - 2.79	0.0106	32.9
		29.1

2.80 - 3.34	0.0092	
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Table 3: RDX And Nitrate-Nitrogen Limits for Outfall 002b		
Effluent Flow Range (cfs)	Daily Maximum RDX Concentration (mg/L)	Daily Maximum Nitrate- Nitrogen Concentration (mg/L)*
0.00 – 3.34	0.002	10

*Assumes an upstream (background) nitrate-nitrogen concentration of 1 mg/L.

BIOSOLIDS

The State of Utah has adopted the 40 CFR 503 federal regulations for the disposal of sewage sludge (biosolids) by reference. However, this facility does not receive, generate, treat or dispose of biosolids. Therefore 40 CFR 503 does not apply.

STORM WATER

Separate storm water permits may be required based on the types of activities occurring on site.

Permit coverage under the Multi Sector General Permit (MSGP) for Storm Water Discharges from Industrial Activities is required based on the Standard Industrial Classification (SIC) code for the facility and the types of industrial activities occurring. If the facility is not already covered, it has 30 days from when this permit is issued to submit the appropriate Notice of Intent (NOI) for the MSGP or exclusion documentation.

Permit coverage under the Construction General Storm Water Permit (CGP) is required for any construction at the facility which disturb an acre or more, or is part of a common plan of development or sale that is an acre or greater. A Notice of Intent (NOI) is required to obtain a construction storm water permit prior to the period of construction.

Information on storm water permit requirements can be found at <http://stormwater.utah.gov>.

PRETREATMENT REQUIREMENTS

Any process wastewater that the permittee discharges to a POTW, either as a direct discharge or as a hauled waste, is subject to federal, state, and local pretreatment regulations. Pursuant to section 307 of the Clean Water Act, the permittee shall comply with all applicable federal general pretreatment regulations promulgated, found in 40 CFR 403, the pretreatment requirements found in UAC R317-8-8, and any specific local discharge limitations developed by the POTW accepting the waste.

In addition, in accordance with 40 CFR 403.12(p), the permittee must notify the POTW, the EPA Regional Waste Management Director, and the State hazardous waste authorities in writing if they discharge any substance into a POTW that, if otherwise disposed of, would be considered hazardous

waste under 40 CFR 261. This notification must include the name of the hazardous waste, the EPA hazardous waste number, and the type of discharge (continuous or batch).

BIOMONITORING REQUIREMENTS

A nationwide effort to control toxic discharges where effluent toxicity is an existing or potential concern is regulated in accordance with the Utah Pollutant Discharge Elimination System Permit and Enforcement Guidance Document for Whole Effluent Toxicity Control (biomonitoring), dated February 2018. Authority to require effluent biomonitoring is provided in Permit Conditions, UAC R317-8-4.2, Permit Provisions, UAC R317-8-5.3 and Water Quality Standards, UAC R317-2-5 and R317 -2-7.2.

The permittee is a minor municipal facility that will be discharging an infrequent amount of effluent, in which toxicity is neither an existing concern, nor likely to be present. Based on these considerations there is no reasonable potential for toxicity in the permittee's discharge (per State of Utah Permitting and Enforcement Guidance Document for WET Control). As such, there will be no numerical WET limitations or WET monitoring requirements in this permit. However, the permit will contain a toxicity limitation re-opener provision that allows for modification of the permit should additional information indicate the presence of toxicity in the discharge.

PERMIT DURATION

It is recommended that this permit be effective for a duration of five (5) years.

Drafted and Reviewed by
Lonnie Shull, Discharge Permit Writer, Biomonitoring, Reasonable Potential Analysis
Daniel Griffin, Biosolids
Jennifer Robinson, Pretreatment
Lonnie Shull, Biomonitoring
Carl Adams, Storm Water
Amy Dickey, TMDL/Watershed
Chris Shope, Wasteload Analysis
Utah Division of Water Quality, (801) 536-4300

PUBLIC NOTICE

Began: November 26, 2024
Ended: December 26, 2024

Comments will be received at: 195 North 1950 West
PO Box 144870
Salt Lake City, UT 84114-4870

The Public Notice of the draft permit was published on the DWQ webpage.

During the public comment period provided under R317-8-6.5, any interested person may submit written comments on the draft permit and may request a public hearing, if no hearing has already been scheduled.

A request for a public hearing shall be in writing and shall state the nature of the issues proposed to be raised in the hearing. All comments will be considered in making the final decision and shall be answered as provided in R317-8-6.12.

ADDENDUM TO FSSOB

During finalization of the Permit certain dates, spelling edits and minor language corrections were completed. Due to the nature of these changes they were not considered Major and the permit is not required to be re Public Noticed.

Responsiveness Summary

The public notice period began on November 26, 2024 and ended on December 26, 2024. No public comments were received during the public notice period.

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ATTACHMENT 1

Effluent Monitoring Data

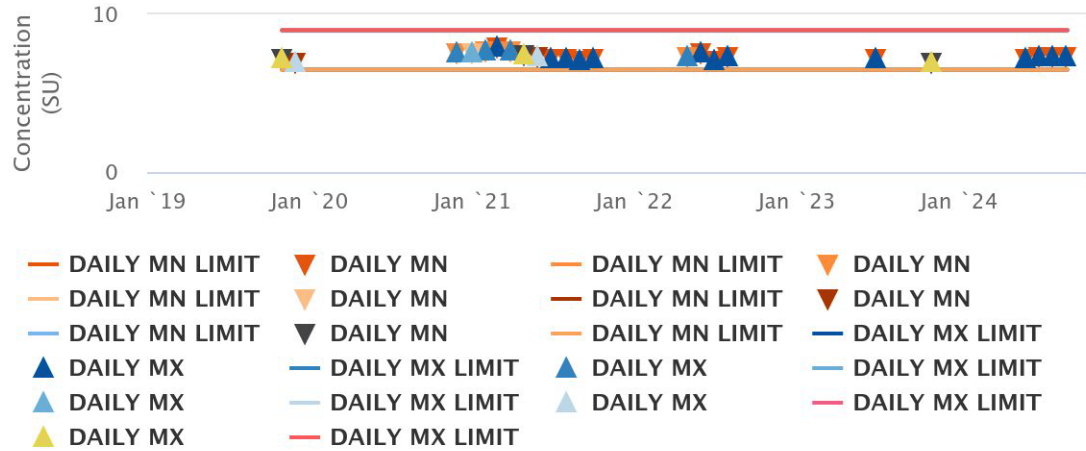
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Effluent Monitoring Data.

ENSIGN BICKFORD – HOBBLE CREEK (UT0025283) 001 – pH – Effluent Gross – Concentration

Late/Missing Reports Timeline

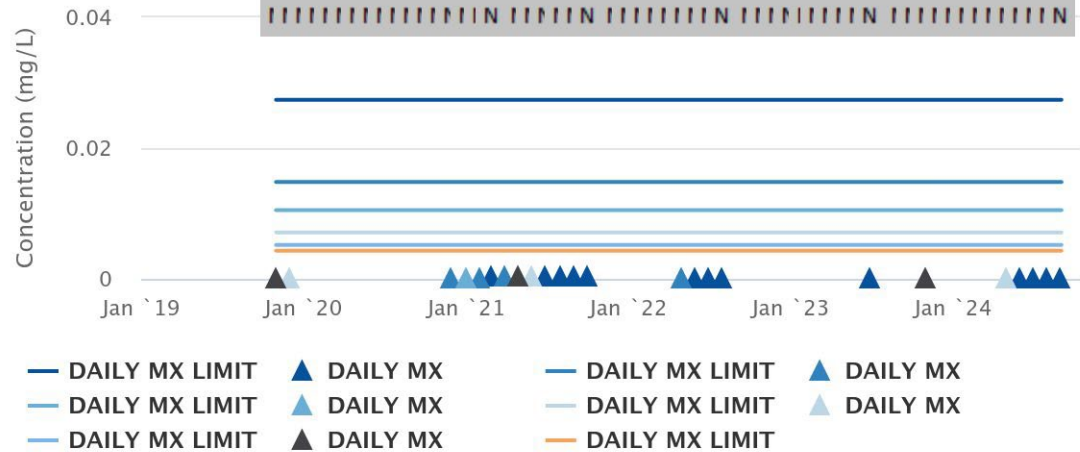
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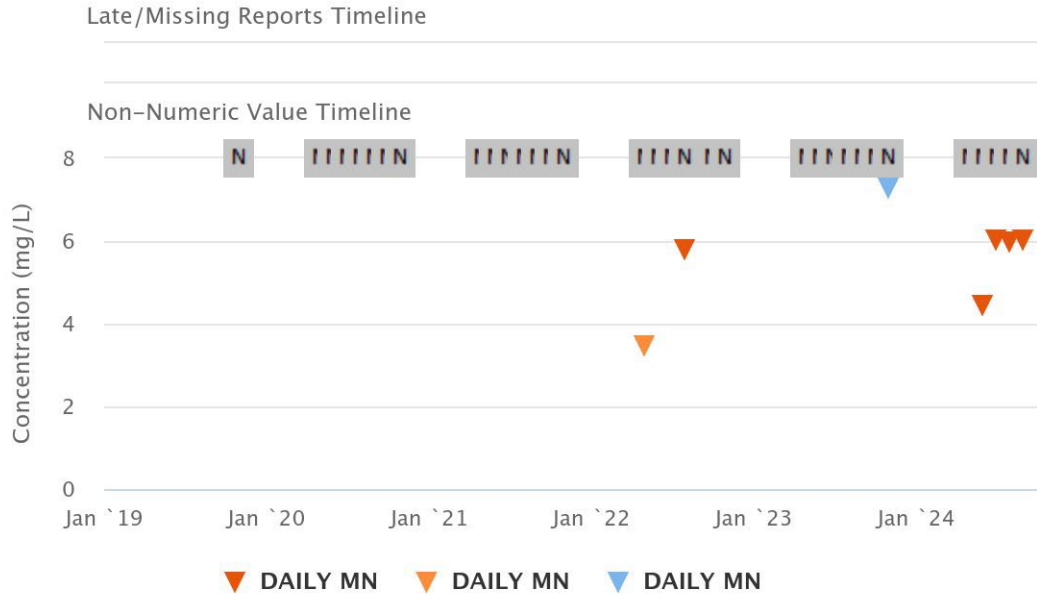
ENSIGN BICKFORD – HOBBLE CREEK (UT0025283) 001 – RDX, total – Effluent Gross – Concentration

Late/Missing Reports Timeline

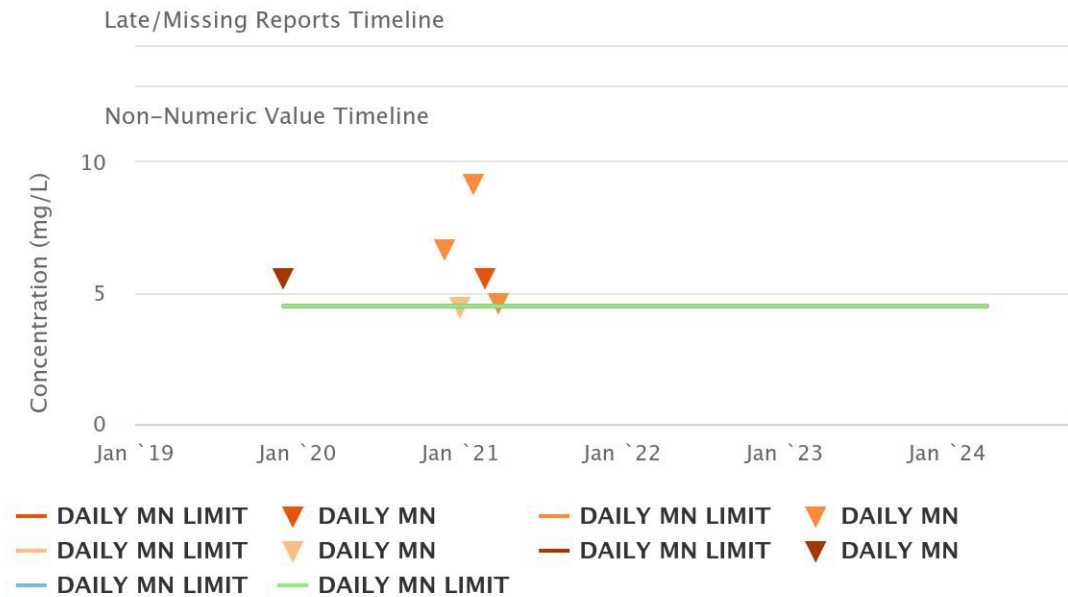
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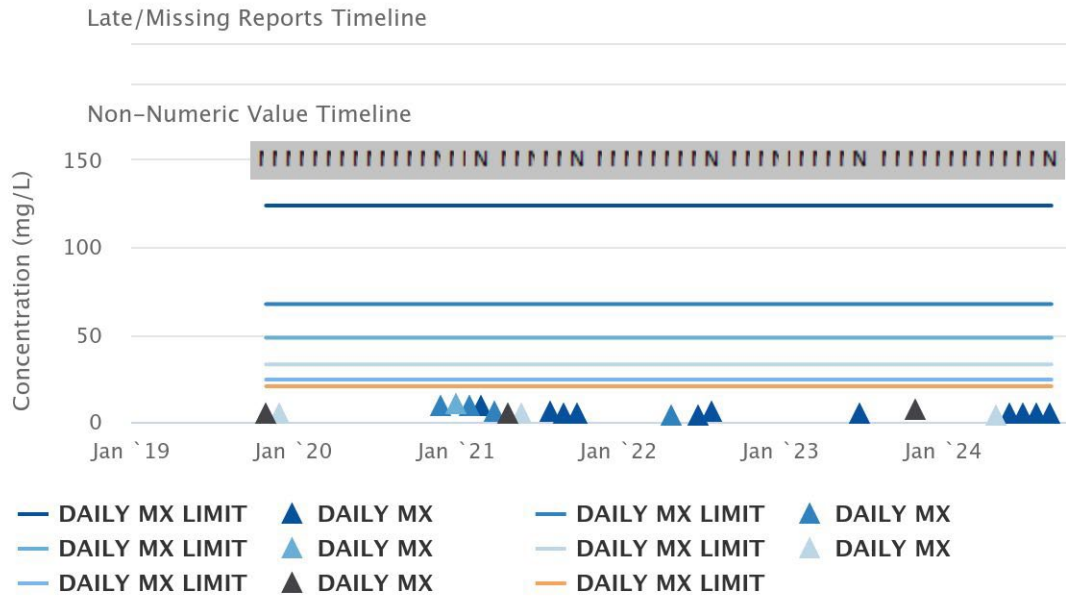
ENSIGN BICKFORD – HOBBLE CREEK (UT0025283) 001 – Oxygen, dissolved [DO] – Effluent Gross –
Concentration



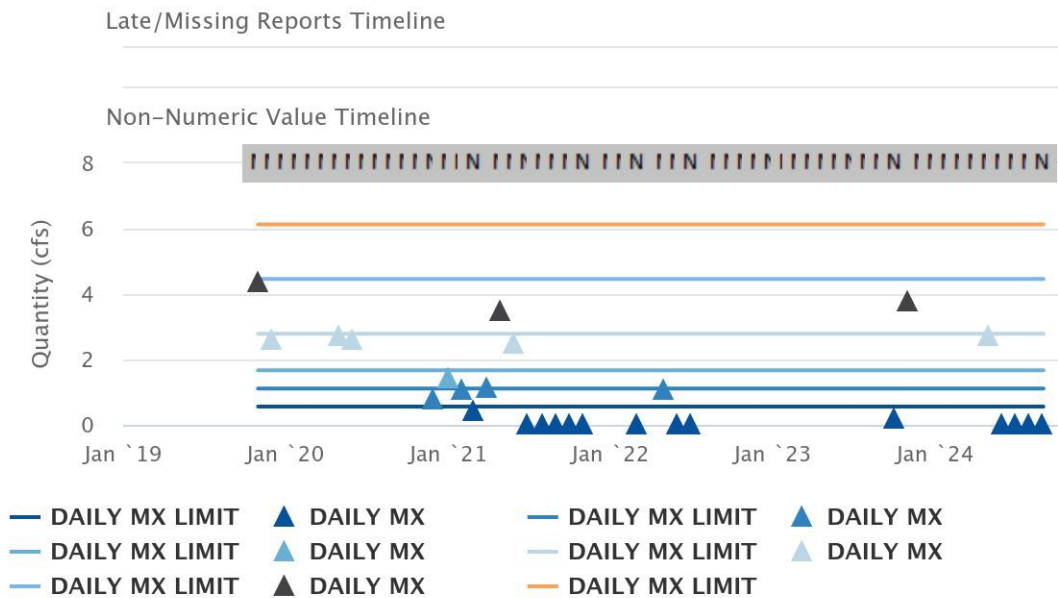
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Concentration



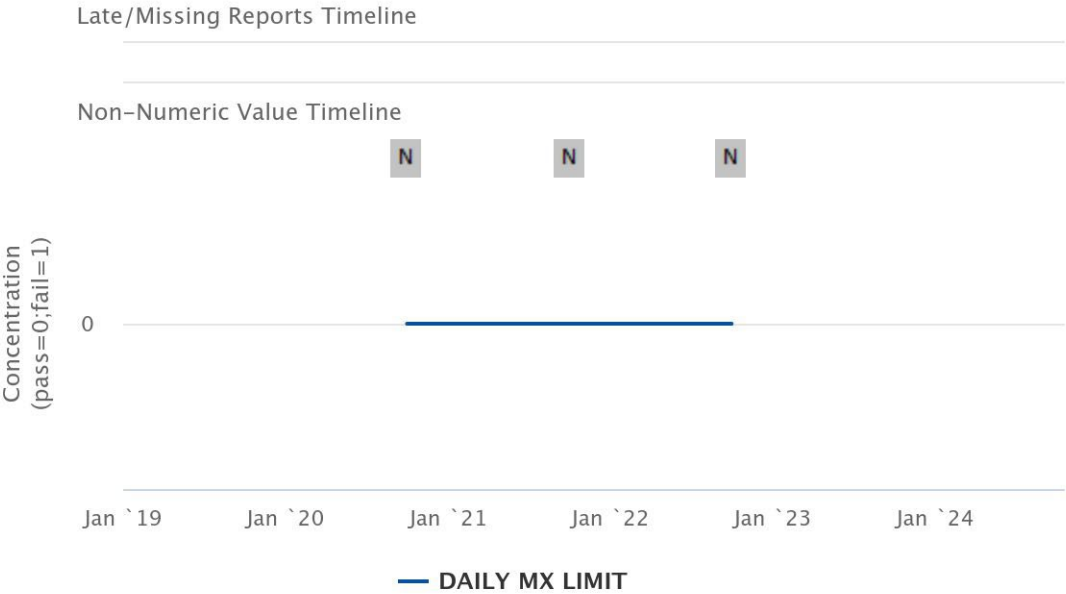
ENSIGN BICKFORD – HOBBLE CREEK (UT0025283) 001 – Nitrogen, nitrate total [as N] – Effluent Gross – Concentration



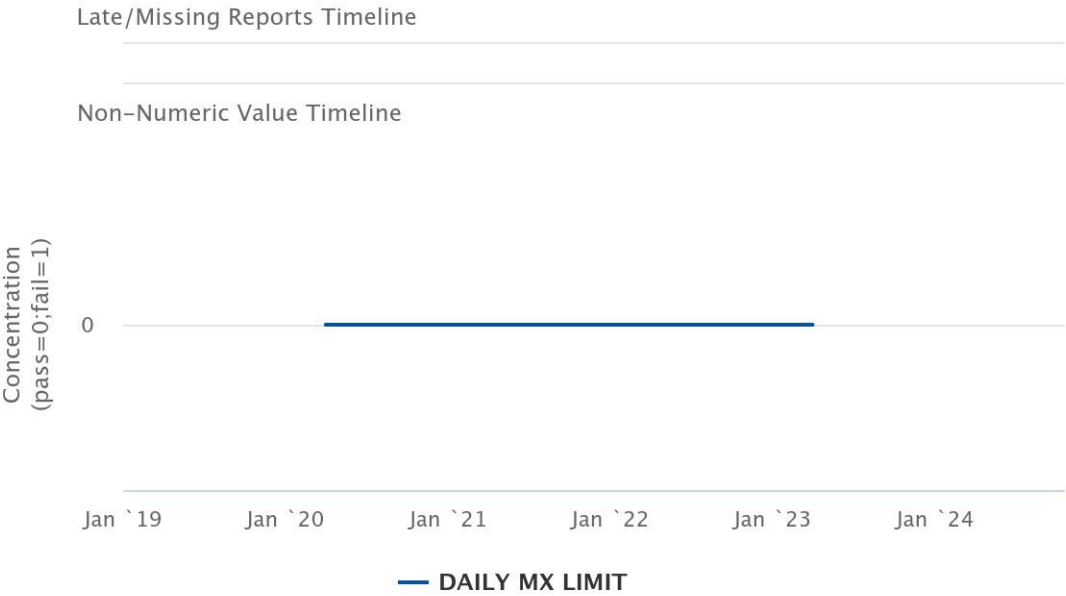
ENSIGN BICKFORD – HOBBLE CREEK (UT0025283) 001 – Flow rate – Effluent Gross – Quantity



ENSIGN BICKFORD – HOBBLE CREEK (UT0025283) 001 – Pass/Fail Static Renewal 7Day Chronic Pimephales
promelas – Effluent Gross – Concentration



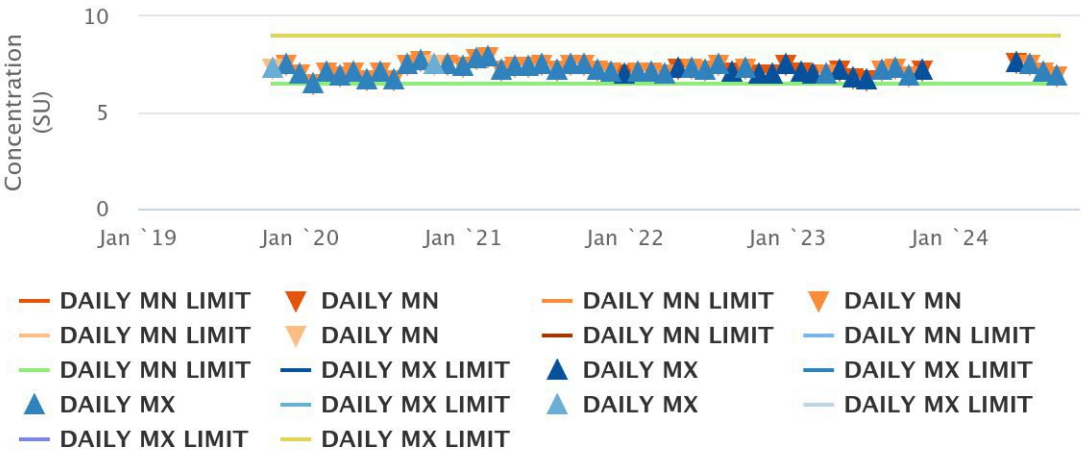
ENSIGN BICKFORD – HOBBLE CREEK (UT0025283) 001 – Pass/Fail Static Renewal 7 Day Chronic Ceriodaphnia
dubia – Effluent Gross – Concentration



ENSIGN BICKFORD – HOBBLE CREEK (UT0025283) 002 – pH – Effluent Gross – Concentration

Late/Missing Reports Timeline

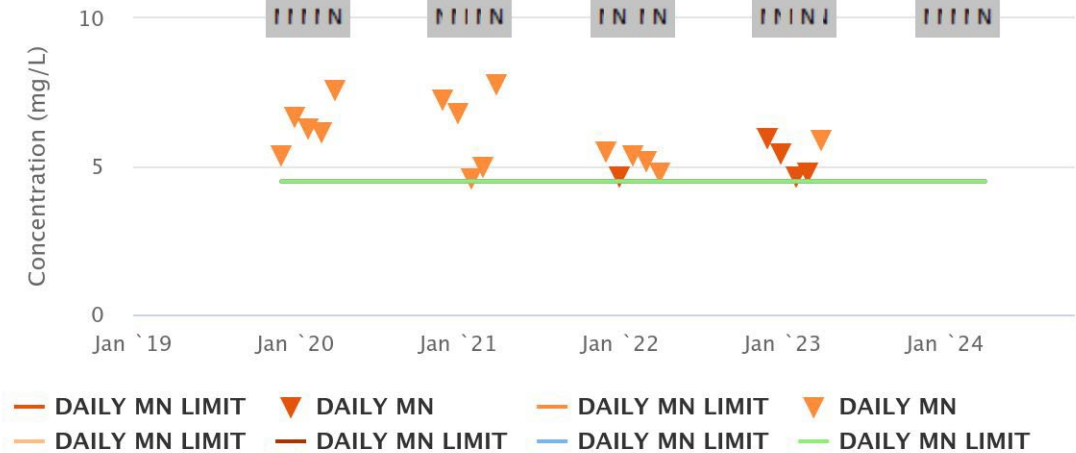
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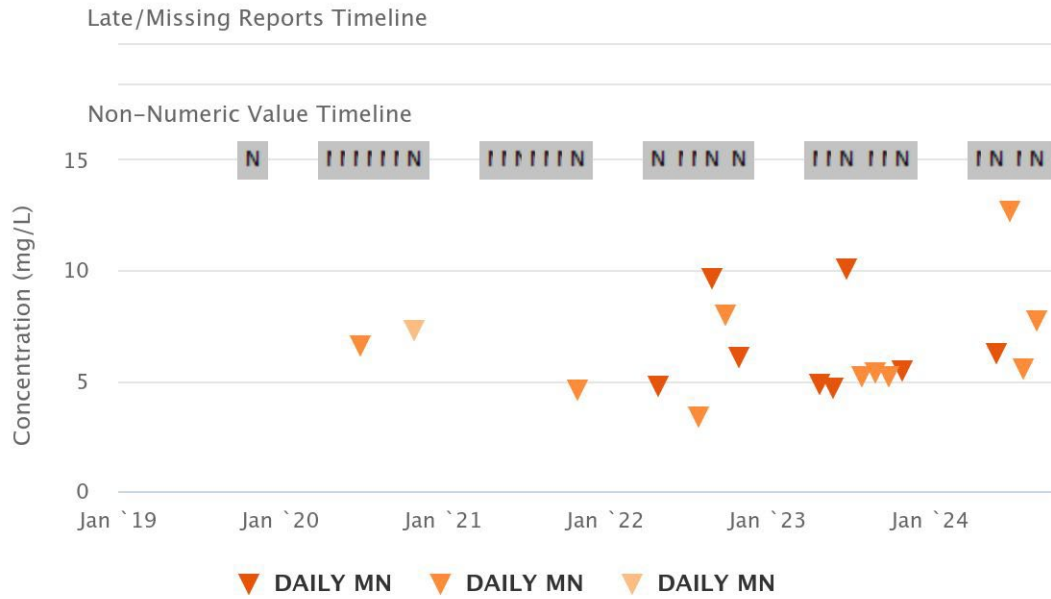
ENSIGN BICKFORD – HOBBLE CREEK (UT0025283) 002 – Oxygen, dissolved [DO] – See Comments – Concentration

Late/Missing Reports Timeline

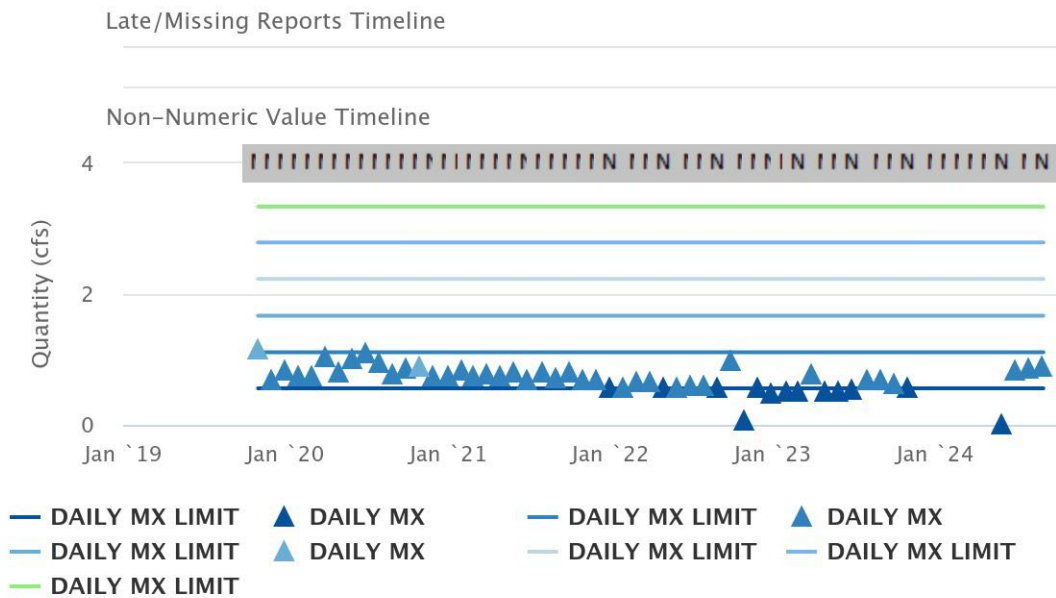
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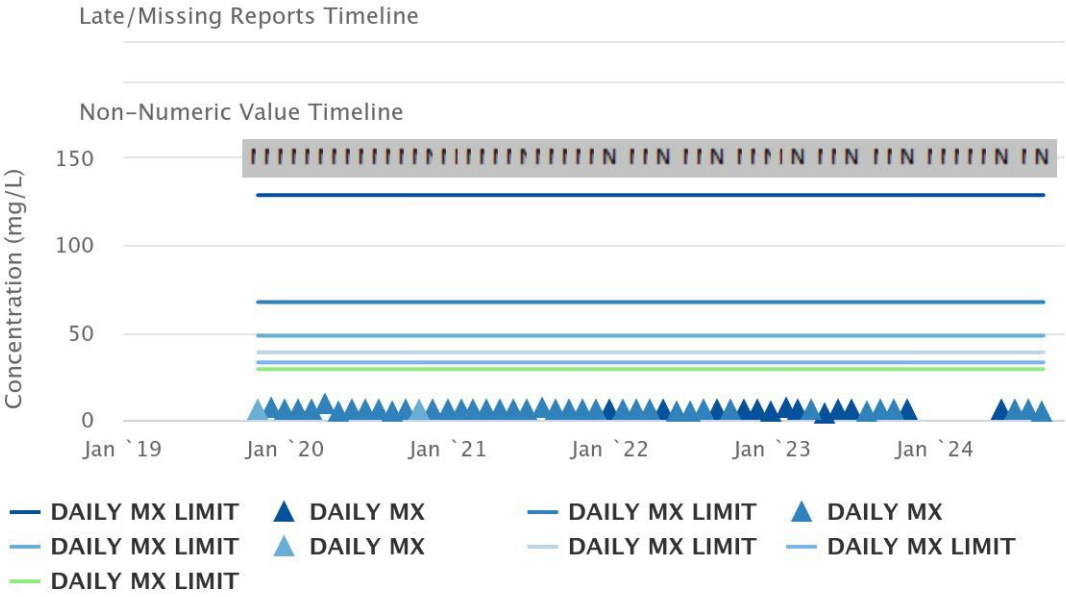
ENSIGN BICKFORD – HOBBLE CREEK (UT0025283) 002 – Oxygen, dissolved [DO] – Effluent Gross – Concentration



ENSIGN BICKFORD – HOBBLE CREEK (UT0025283) 002 – Flow rate – Effluent Gross – Quantity



ENSIGN BICKFORD – HOBBLE CREEK (UT0025283) 002 – Nitrogen, nitrate total [as N] – Effluent Gross – Concentration



ATTACHMENT 2

Wasteload Analysis

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**Utah Division of Water Quality
Statement of Basis
ADDENDUM
Wasteload Analysis and Antidegradation Level I Review**

Date: September 26, 2024

Prepared by: Christopher L. Shope
Standards and Technical Services

Facility: The Ensign-Bickford Company
UPDES Permit No. UT-0025283

This addendum summarizes the wasteload analysis that was performed to determine water quality based effluent limits (WQBEL) for this discharge. Wasteload analyses are performed to determine point source effluent limitations necessary to maintain designated beneficial uses by evaluating projected effects of discharge concentrations on in-stream water quality. The wasteload analysis also takes into account downstream designated uses (UAC R317-2-8). Projected concentrations are compared to numeric water quality standards to determine acceptability. The numeric criteria in this wasteload analysis may be modified by narrative criteria and other conditions determined by staff of the Division of Water Quality.

Discharge

There are three effluent discharge points, associated with volumetric flow, listed in the permit renewal application. Outfall 001 purportedly discharges to Hobble Creek, Outfall 002a discharges to a dry channel on the project site, and Outfall 002b discharges to the Spanish Fork River. In discussion with the permit writer and consistent with the 2020 wasteload, only Outfall 002b is discharging from the Spanish Fork granular activated carbon absorption groundwater treatment system. The design flow for the discharge is 2.14 MGD.

Receiving Water

The effluent is piped and discharges directly into Spanish Fork River. Spanish Fork River lacks upstream flow data, which indicates ephemeral and intermittent surface waters at this location.

Per UAC R317-2-13.5©, the designated beneficial uses *Spanish Fork River and tributaries from Utah Lake to diversion at Moark Junction* are: 2B, 3B, 3D, 4.

- *Class 2B - Protected for infrequent primary contact recreation. Also protected for secondary contact recreation where there is a low likelihood of ingestion of water or a low degree of bodily contact with the water. Examples include, but are not limited to, wading, hunting, and fishing.*
- *Class 3B - Protected for warm water species of game fish and other warm water aquatic life, including the necessary aquatic organisms in their food chain.*

Utah Division of Water Quality

Wasteload Analysis

The Ensign-Bickford Company, UPDES Permit No. UT-0025283

- *Class 3D - Protected for waterfowl, shore birds and other water-oriented wildlife not included in Classes 3A, 3B, or 3C, including the necessary aquatic organisms in their food chain.*
- *Class 4 - Protected for agricultural uses including irrigation of crops and stock watering.*

Flow

Typically, the critical flow for the receiving water in a wasteload analysis is considered the lowest stream flow for seven consecutive days with a ten-year return frequency (7Q10). However, due to the lack of available and representative flow data on the Spanish Fork River at the discharge location, the 7Q10 flow was conservatively assumed to be zero. Therefore, no background flow or water quality was considered in this analysis. Because there is zero or intermittent flow in study area, no-flow conditions exist and in-stream water quality standards revert to end of pipe (EOP) conditions.

Total Maximum Daily Load (TMDL)

According to the Utah's [Final 2024 Integrated Report on Water Quality](#) dated April 30, 2024, the receiving water for the discharge, "Spanish Fork River and tributaries, from Utah Lake to diversion at Moark Junction (Assessment Unit Spanish Fork River-1, UT16020202-001_00)" was listed as "Not Supporting" for E. coli with "TMDL Needed" but at a "Low Priority".

The downstream waterbody, Utah Lake other than Provo Bay (Assessment Unit Utah Lake-Lower Provo River, UT-L-16020201-004_01), is listed as "Not Supporting" for E. coli, Eutrophication, Harmful Algal Blooms, PCBs in Fish Tissue, Total Phosphorus as P, and Total Dissolved Solids.

Per UAC R317-8-2.2, "*No permit may be issued by the Director: (7) To a new source or a new discharger, if the discharge from its construction or operation will cause or contribute to the violation of water quality standards.*" Therefore, the TDS limit is set at the water quality criteria of 1200 mg/L.

Mixing Zone

The maximum allowable mixing zone is 15 minutes of travel time for acute conditions, not to exceed 50% of stream width, and for chronic conditions, per UAC R317-2-5. Typically, water quality standards must be met at the end of the mixing zone.

Since no background flow in the receiving water was assumed during critical conditions, no mixing zone is granted for this effluent discharge point source. In-stream water quality standards revert to end of pipe (EOP) conditions.

Parameters of Concern

The potential parameters of concern identified for the discharge/receiving water were determined in consultation with the UPDES Permit Writer, the Utah Water Quality Assessment Reports, and the industry SIC codes from <https://www.osha.gov/data/sic-search>. The potential parameters of concern for this facility include: Total Dissolved Solids, RDX, Nitrate, and Total Phosphorous.

Utah Division of Water Quality
Wasteload Analysis
The Ensign-Bickford Company, UPDES Permit No. UT-0025283
WET Limits

The percent of effluent in the receiving water in a fully mixed condition, and acute and chronic dilution in a not fully mixed condition are calculated in the WLA in order to generate WET limits. The LC₅₀ (lethal concentration, 50%) percent effluent for acute toxicity and the IC₂₅ (inhibition concentration, 25%) percent effluent for chronic toxicity, as determined by the WET test, needs to be below the WET limits, as determined by the WLA. The WET limit for LC₅₀ is typically 100% effluent and does not need to be determined by the WLA.

WET limits for Outfall 001 for IC₂₅ should be based on 100% effluent.

Water Quality Based Effluent Limits

Water quality based effluent limits for selected constituents are summarized in Table 1.

Table 1: Water Quality Based Effluent Limits for Select Constituents

Effluent Constituent	Acute			Chronic		
	Standard	Limit	Averaging Period	Standard	Limit	Averaging Period
Flow (MGD)		2.14	1 day			
Total Dissolved Solids (mg/L)	1,200	1,200	Max			
RDX (mg/L)	0.002	0.002	Max			
Nitrate (mg/L)	4*	4*	Max			
Total Phosphorous (mg/L)	0.05	0.05	Max			

* Nitrate limit based on 2B (*UAC R317-2-14-1*) and 3B (*R317-2-14-2*) indicators for recreation and aquatic life.

Wasteload Allocation Methods

Effluent limits were determined for conservative constituents using a simple mass balance mixing analysis (UDWQ 2021). Since no background flow in the receiving water was assumed during critical conditions, effluent limits were set at the water quality criteria. The mass balance analysis is summarized in the Wasteload Addendum.

Models and supporting documentation are available for review upon request.

Antidegradation Level I Review

The objective of the Level I ADR is to ensure the protection of existing uses, defined as the beneficial uses attained in the receiving water on or after November 28, 1975. No evidence is known that the existing uses deviate from the designated beneficial uses for the receiving water. Therefore, the beneficial uses will be protected if the discharge remains below the WQBELs presented in this wasteload.

A Level II Antidegradation Review (ADR) is not required for this facility. This is a simple permit renewal, without a new discharge or additional flow or concentration of pollutants.

Documents:

WLA Document: 240906-Ensign_Bickford_EOP_WLA_2024.docx

Wasteload Analysis and Addendums: 240906-Ensign_Bickford_EOP_WLA_2024.xlsm

References:

Utah Division of Water Quality

Wasteload Analysis

The Ensign-Bickford Company, UPDES Permit No. UT-0025283

Utah Division of Water Quality. 2024. Final 2024 Integrated Report on Water Quality. <https://lf-public.deq.utah.gov/WebLink/DocView.aspx?id=87957&repo=Public&searchid=fcd9ea4c-51e1-4227-aa29-fb1921c2cc19&cr=1>

Utah Division of Water Quality. 2021. Utah Wasteload Analysis Procedures Version 2.0.

<https://documents.deq.utah.gov/water-quality/standards-technical-services/DWQ-2021-000684.pdf>

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WASTELOAD ANALYSIS [WLA]

Date: 10/25/2024

Appendix A: Mass Balance Mixing Analysis for Conservative Constituents

A Level II Antidegradation Review (ADR) is required for this facility

Discharging Facility: The Ensign Bickford Company
 UPDES No: UT0025283
 0.0

Permit Flow [MGD]: 2.14000 Annual Max. Daily
 1.70000 Annual Max. Monthly

Receiving Water: Spanish Fork River into Utah Lake
 Stream Classification: 2B, 3B, 3D, 4
 Stream Flows [cfs]: 0.00 All Seasons Critical Low Flow DWQ 4950440 7Q10
 - All Seasons Critical Low Flow (20th %) DWQ 4950440 20th percentile

Fully Mixed: YES
 Acute River Width: 100%
 Chronic River Width: 100%

Modeling Information

A mass balance mixing analysis was used to determine the effluent limits.

All model numerical inputs, intermediate calculations, outputs and graphs are available for discussion, inspection and copy at the Division of Water Quality.

Effluent Limitations

Current State water quality standards are required to be met under a variety of conditions including in-stream flows targeted to the 7-day, 10-year low flow (R317-2-9).

Other conditions used in the modeling effort reflect the environmental conditions expected at low stream flows.

The calculations in this wasteload analysis utilize the maximum effluent discharge flow of 1.7 MGD. If the discharger is allowed to have a flow greater than 1.7 MGD during 7Q10 conditions, and effluent limit concentrations as indicated, then water quality standards will be violated. In order to prevent this from occurring, the permit writers must include the discharge flow limitation as indicated above; or, include loading effluent limits in the permit.

Technology Based Effluent Limits	Limit
Total Phosphorus as P	0.05 mg/L

Effluent Limitations for Protection of Recreation (Class 2B Waters) (R317-2-14.1)

Physical Parameter	Concentration	
	Minimum	Maximum
pH	6.5	9.0
Turbidity Increase (NTU)		10.0

Bacteriological (R317-2-14.1)

E. coli (30 Day Geometric Mean)	206 (#/100 mL)
E. coli (Maximum)	668 (#/100 mL)

Effluent Limitations for Protection of Aquatic Wildlife (Class 3B Waters) (R317-2-14.21)

Physical Parameter	Concentration	
	Minimum	Maximum
pH	6.5	9.0
Turbidity Increase (NTU)		10.0
Temperature (deg C)		27
Temperature Change (deg C)		4

Dissolved Oxygen (mg/L)	Minimum Concentration
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	ELS Present	Others Present
Instantaneous	5.0	3.0
30-day Average	5.5	5.5
7-day Average	6.0	4

Inorganics	Chronic (30-day ave)	Acute (1-hour ave)
Parameter		Standard
Phenol (mg/L)		0.010
Hydrogen Sulfide (Undissociated-mg/L)		0.002
Total Residual Chlorine (mg/L)	0.011	0.019

Ammonia-Total (mg/L)

	Chronic (30-day ave)			Acute (1-hour ave)		
	ELS Present					
Season	Standard	Background	Limit	Standard	Background	Limit
Summer	2.1		2.1	6.9		6.9
Fall	2.5		2.5	8.6		8.6
Winter	2.6		2.6	8.9		8.9
Spring	2.0		2.0	6.7		6.7

	ELS Absent					
Season	Standard	Background	Limit	Standard	Background	Limit
Summer	2.2		2.2	6.9		6.9
Fall	4.0		4.0	8.6		8.6
Winter	4.1		4.1	8.9		8.9
Spring	2.7		2.7	6.7		6.7

Metals-Total Recoverable

	Chronic (4-day ave)			Acute (1-hour ave)		
Parameter	Standard¹	Background	Limit	Standard¹	Background	Limit
Aluminum (µg/L)	87.0		87.0	750.0		750.0
Arsenic (µg/L)	150.0		150.0	340.0		340.0
Cadmium (µg/L)	1.5		1.5	4.1		4.1
Chromium VI (µg/L)	11.0		11.0	16.0		16.0
Chromium III (µg/L)	164.4		164.4	3,439		3,439
Copper (µg/L)	18.3		18.3	29.4		29.4
Cyanide (µg/L) ²	5.2		5.2	22.0		22.0
Iron (µg/L)				1,000		1,000
Lead (µg/L)	8.7		8.7	222.8		222.8
Mercury (µg/L) ²	0.012		0.012	2.4		2.4
Nickel (µg/L)	101.6		101.6	914		914
Selenium (µg/L)	4.6		4.6	18.4		18.4
Silver (µg/L)				14.7		14.7
Tributyltin (µg/L) ²	0.072		0.072	0.46		0.46
Zinc (µg/L)	233.7		233.7	233.7		233.7

1: Based upon a Hardness of 220 mg/l as CaCO₃

2: Background concentration assumed 67% of chronic standard

Organics [Pesticides]

	Chronic (4-day ave)		Acute (1-hour ave)	
Parameter	Standard	Limit	Standard	Limit
Aldrin (µg/L)			1.5	1.5
Chlordane (µg/L)	0.0043	0.0043	1.2	1.2
DDT, DDE (µg/L)	0.001	0.001	0.55	0.55
Diazinon (µg/L)	0.17	0.17	0.17	0.17
Dieldrin (µg/L)	0.0056	0.0056	0.24	0.24
Endosulfan, a & b (µg/L)	0.056	0.056	0.11	0.11
Endrin (µg/L)	0.036	0.036	0.086	0.086
Heptachlor & H. epoxide (µg/L)	0.0038	0.0038	0.26	0.26
Lindane (µg/L)	0.08	0.08	1.0	1.0
Methoxychlor (µg/L)			0.03	0.03
Mirex (µg/L)			0.001	0.001
Nonylphenol (µg/L)	6.6	6.6	28.0	28.0
Parathion (µg/L)	0.0130	0.0130	0.066	0.066

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PCB's (µg/L)	0.014	0.014		
Pentachlorophenol (µg/L)	15.0	15.0	19.0	19.0
Toxephene (µg/L)	0.0002	0.0002	0.73	0.73

Radiological	Maximum Concentration
Parameter	Standard
Gross Alpha (pCi/L)	15

Effluent Limitations for Protection of Aquatic Wildlife (Class 3D Waters) (R317-2-14.2)

Physical	Concentration
Parameter	Minimum Maximum
pH	6.5 9.0
Turbidity Increase (NTU)	15.0
Temperature (deg C)	
Temperature Change (deg C)	

Dissolved Oxygen (mg/L)	Minimum Concentration
	ELS Present Others Present
Instantaneous	3.0 3.0
30-day Average	5.0 5
7-day Average	

Inorganics	Acute Standard (1 Hour Average)
Parameter	Standard
Phenol (mg/L)	0.010
Hydrogen Sulfide (Undissociated) [mg/L]	0.002
Total Residual Chlorine (mg/L)	0.019
	0.011

Ammonia-Total (mg/L)

	Chronic (30-day ave)			Acute (1-hour ave)		
	ELS Present					
Season	Standard	Background	Limit	Standard	Background	Limit
Summer	2.1		2.1	6.9		6.9
Fall	2.5		2.5	8.6		8.6
Winter	2.6		2.6	8.9		8.9
Spring	2.0		2.0	6.7		6.7

	ELS Absent					
Season	Standard	Background	Limit	Standard	Background	Limit
Summer	2.2		2.2	6.9		6.9
Fall	4.0		4.0	8.6		8.6
Winter	4.1		4.1	8.9		8.9
Spring	2.7		2.7	6.7		6.7

Metals-Total Recoverable

	Chronic (4-day ave)			Acute (1-hour ave)		
Parameter	Standard¹	Background	Limit	Standard¹	Background	Limit
Aluminum (µg/L)	87.0		87.0	750.0		750.0
Arsenic (µg/L)	150.0		150.0	340.0		340.0
Cadmium (µg/L)	1.5		1.5	4.1		4.1
Chromium VI (µg/L)	11.0		11.0	16.0		16.0
Chromium III (µg/L)	164.4		164.4	3,439		3,439
Copper (µg/L)	18.3		18.3	29.4		29.4
Cyanide (µg/L) ⁻	5.2			22.0		22.0
Iron (µg/L)				1,000		1,000
Lead (µg/L)	8.7		8.7	222.8		222.8
Mercury (µg/L) ⁻	0.012		0.012	2.4		2.4
Nickel (µg/L)	101.6		101.6	914		914
Selenium (µg/L)	4.6		4.6	18.4		18.4
Silver (µg/L)				14.7		14.7
Tributyltin (µg/L) ⁻	0.072		0.072	0.46		0.46
Zinc (µg/L)	233.7		233.7	233.7		233.7

1: Based upon a Hardness of 220 mg/l as CaCO3

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2: Background concentration assumed 67% of chronic standard

Organics [Pesticides]

Parameter	Chronic (4-day ave)		Acute (1-hour ave)	
	Standard	Limit	Standard	Limit
Aldrin (µg/L)			1.5	1.5
Chlordane (µg/L)	0.0043	0.0043	1.2	1.2
DDT, DDE (µg/L)	0.001	0.001	0.55	0.55
Diazinon (µg/L)	0.17	0.17	0.17	0.17
Dieldrin (µg/L)	0.0056	0.0056	0.24	0.24
Endosulfan, a & b (µg/L)	0.056	0.056	0.11	0.11
Endrin (µg/L)	0.036	0.036	0.086	0.086
Heptachlor & H. epoxide (µg/L)	0.0038	0.0038	0.26	0.26
Lindane (µg/L)	0.08	0.08	1.0	1.0
Methoxychlor (µg/L)			0.03	0.03
Mirex (µg/L)			0.001	0.001
Nonylphenol (µg/L)	6.6	6.6	28.0	28.0
Parathion (µg/L)	0.0130	0.0130	0.066	0.066
PCB's (µg/L)	0.014	0.014		
Pentachlorophenol (µg/L)	15.0	15.0	19.0	19.0
Toxephene (µg/L)	0.0002	0.0002	0.73	0.73

Radiological

Parameter	Maximum Concentration Standard
Gross Alpha (pCi/L)	15

ATTACHMENT 3

Reasonable Potential Analysis

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REASONABLE POTENTIAL ANALYSIS

Water Quality has worked to improve our reasonable potential analysis (RP) for the inclusion of limits for parameters in the permit by using an EPA provided model. As a result of the model, more parameters may be included in the renewal permit. A Copy of the Reasonable Potential Analysis Guidance (RP Guide) is available at water Quality. There are four outcomes for the RP Analysis¹. They are;

- Outcome A: A new effluent limitation will be placed in the permit.
- Outcome B: No new effluent limitation. Routine monitoring requirements will be placed or increased from what they are in the permit,
- Outcome C: No new effluent limitation. Routine monitoring requirements maintained as they are in the permit,
- Outcome D: No limitation or routine monitoring requirements are in the permit.

A qualitative RP check was performed on metals to determine if there was enough data to perform a reasonable potential analysis on the outfall. Because of their process of treating ground water with nitrogenous compounds by means of GAC, the Permittee was not required to sample metals during the previous permit cycle, and as a result, there is no metal data to analyze for RP.

¹ See Reasonable Potential Analysis Guidance for definitions of terms

ATTACHMENT 4

Limitations Development

DEVELOPMENT OF EFFLUENT LIMITATIONS FOR RDX

$C_{up} F_{up} + C_e F_e = C_{ds} F_{ds}$ Normal mass balance equation.

C_{up} = Concentration upstream

F_{up} = Upstream flow in cfs

C_e = Concentration in the effluent

F_e = Effluent flow

C_{ds} = Concentration downstream

F_{ds} = Downstream flow = $F_{up} + F_e$

$$C_e F_e = C_{ds} F_{ds} - C_{up} F_{up}$$

$$C_e = \frac{C_{ds} F_{ds} - C_{up} F_{up}}{F_e}$$

$$F_{ds} = F_{up} + F_e$$

$$C_e = \frac{C_{ds} (F_{up} + F_e) - (C_{up} F_{up})}{F_e}$$

Plug in the real values:

$$C_{ds} = 0.002 \text{ mg/L}$$

$F_{up} = 7.1$ cfs which will be considered as the 7Q10 for this constituent.

C_{up} = Background RDX concentration which must be taken as 0 mg/L.

F_e = Effluent flow 6.13 cfs

$$C_e = \frac{0.002 \text{ mg/L} * (9.0 \text{ cfs} + 6.13 \text{ cfs}) - (0 \text{ mg/L} * 7.1 \text{ cfs})}{6.13 \text{ cfs}}$$

$$C_e = 0.0043 \text{ mg/L}$$

The results of effluent limit calculations for RDX are summarized in tables presented previously in the Statement of Basis.

DEVELOPMENT OF EFFLUENT LIMITATIONS FOR NITRATE-NITROGEN

Using the same equation as for nitrate-nitrogen:

$$C_e = \frac{C_{ds} (F_{up} + F_e) - (C_{up} * F_{up})}{F_e}$$

Plug in the real values:

$$C_{ds} = 10.0 \text{ mg/L.}$$

$F_{up} = 7.1 \text{ cfs}$ which will be considered as the 7Q10 for this constituent.

$C_{up} = \text{Background nitrate-nitrogen concentration} = 1.0 \text{ mg/L.}$

$F_e = \text{Effluent flow } 6.13 \text{ cfs}$

$$C_e = \frac{10.0 \text{ mg/L} * (9.0 \text{ cfs} + 6.13 \text{ cfs}) - (1.0 \text{ mg/L} * 7.1 \text{ cfs})}{6.13 \text{ cfs}}$$

$$C_e = 20.4 \text{ mg/L}$$

The results of effluent limit calculations for nitrate-nitrogen are summarized in tables presented previously in the Statement of basis.

Table 1: RDX And Nitrate-Nitrogen Limits for Outfall 001		
Effluent Flow Range (cfs)	Daily Maximum RDX Concentration (mg/L)	Daily Maximum Nitrate-Nitrogen Concentration (mg/L)*
0.00 - 0.56	0.0274	124.1
0.57 - 1.11	0.0148	67.6
1.12 - 1.67	0.0105	48.3
1.68 - 2.79	0.0071	32.9
2.80 - 4.46	0.0052	24.3
4.47 - 6.13	0.0043	20.4

Table 2: RDX And Nitrate-Nitrogen Limits for Outfall 002a		
Effluent Flow Range (cfs)	Daily Maximum RDX Concentration (mg/L)	Daily Maximum Nitrate-Nitrogen Concentration (mg/L)*
0.00 - 0.56	0.0449	124.1
0.57 - 1.11	0.0236	67.6
1.12 - 1.67	0.0164	48.3
1.68 - 2.23	0.0128	38.7
2.34 - 2.79	0.0106	32.9
2.80 - 3.34	0.0092	29.1

Table 3: RDX And Nitrate-Nitrogen Limits for Outfall 002b		
Effluent Flow Range	Daily Maximum RDX	Daily Maximum Nitrate-

(cfs)	Concentration (mg/L)	Nitrogen Concentration (mg/L)*
0.00 – 3.34	0.002	10

*Assumes an upstream (background) nitrate-nitrogen concentration of 1 mg/L.