

STATE OF UTAH  
DIVISION OF WATER QUALITY  
DEPARTMENT OF ENVIRONMENTAL QUALITY  
SALT LAKE CITY, UTAH

UTAH POLLUTANT DISCHARGE ELIMINATION SYSTEM (UPDES) PERMITS

Minor Industrial Permit No. **UT0025283**

In compliance with provisions of the Utah *Water Quality Act, Title 19, Chapter 5, Utah Code Annotated ("UCA") 1953, as amended* (the "Act"),

**THE ENSIGN-BICKFORD COMPANY**

is hereby authorized to discharge from its wastewater treatment facility to receiving waters named Hobble Creek and the Spanish Fork River,

<u>Outfall</u>	<u>Latitude</u>	<u>Longitude</u>	<u>To receiving waters named</u>
001 (Mapleton GAC + Orton GAC)	40° 08' 52'	111° 34' 40"	Hobble Creek
002 (Spanish Fork GAC)	40° 05' 06'	111° 35' 21"	Spanish Fork River

in accordance with specific limitations, outfalls, and other conditions set forth herein.

This permit shall become effective on October 1, 2019

This permit expires at midnight on September 30, 2024

Signed this 16<sup>th</sup> day of October, 2019.

  
James Harris  
Acting Director

DWQ-2019-002891



## Table of Contents

Outline	Page Number
I. DISCHARGE LIMITATIONS AND REPORTING REQUIREMENTS.....	1
A. Description of Discharge Points .....	1
B. Narrative Standard .....	1
C. Specific Limitations and Self-Monitoring Requirements .....	1
D. Reporting of Monitoring Results .....	4
II. INDUSTRIAL PRETREATMENT PROGRAM.....	5
III. BIOSOLIDS REQUIREMENTS.....	6
IV. STORM WATER REQUIREMENTS.....	7
A. Coverage of This Section.....	7
V. MONITORING, RECORDING & GENERAL REPORTING REQUIREMENTS.....	8
A. Representative Sampling .....	8
B. Monitoring Procedures.....	8
C. Penalties for Tampering.....	8
D. Compliance Schedules.....	8
E. Additional Monitoring by the Permittee .....	8
F. Records Contents.....	8
G. Retention of Records .....	8
H. Twenty-four Hour Notice of Noncompliance Reporting.....	8
I. Other Noncompliance Reporting.....	9
J. Inspection and Entry .....	9
VI. COMPLIANCE RESPONSIBILITIES .....	11
A. Duty to Comply .....	11
B. Penalties for Violations of Permit Conditions .....	11
C. Need to Halt or Reduce Activity not a Defense.....	11
D. Duty to Mitigate.....	11
E. Proper Operation and Maintenance.....	11
F. Removed Substances.....	11
G. Bypass of Treatment Facilities .....	11
H. Upset Conditions .....	13
VII. GENERAL REQUIREMENTS.....	14
A. Planned Changes.....	14
B. Anticipated Noncompliance.....	14
C. Permit Actions .....	14
D. Duty to Reapply.....	14
E. Duty to Provide Information .....	14
F. Other Information.....	14
G. Signatory Requirements.....	14
H. Penalties for Falsification of Reports.....	15
I. Availability of Reports .....	15
J. Oil and Hazardous Substance Liability.....	15
K. Property Rights .....	15
L. Severability .....	15
M. Transfers.....	15
N. State or Federal Laws .....	16
O. Water Quality - Reopener Provision.....	16
P. Biosolids – Reopener Provision .....	16
Q. Toxicity Limitation - Reopener Provision .....	16
R. Storm Water-Reopener Provision .....	16
VIII. DEFINITIONS.....	18
A. Wastewater .....	18

**I. DISCHARGE LIMITATIONS AND REPORTING REQUIREMENTS**

A. Description of Discharge Points. The authorization to discharge wastewater provided under this part is limited to those outfalls specifically designated below as discharge locations. Discharges at any location not authorized under a UPDES permit are violations of the *Act* and may be subject to penalties under the *Act*. Knowingly discharging from an unauthorized location or failing to report an unauthorized discharge may be subject to criminal penalties as provided under the *Act*.

<u>Outfall Number</u>	<u>Location of Discharge Outfall</u>
001	Discharge to Hobble Creek. The final discharge is located at a latitude of 40° 08' 52" and a longitude of 111° 34' 40". Compliance samples to be taken in the Mapleton GAC and Orton GAC buildings before discharge to Hobble Creek or Mapleton City pressurized irrigation system.
002	Discharge to the Spanish Fork River. This discharge is located at a latitude of 111° 35' 21" and a longitude of 40° 05' 06". Compliance samples to be taken in the GAC building before discharge to the Spanish Fork River or Spanish Fork pressurized irrigation system.

B. Narrative Standard. It shall be unlawful, and a violation of this permit, for the permittee to discharge or place any waste or other substance in such a way as will be or may become offensive such as unnatural deposits, floating debris, oil, scum, or other nuisances such as color, odor or taste, or cause conditions which produce undesirable aquatic life or which produce objectionable tastes in edible aquatic organisms; or result in concentrations or combinations of substances which produce undesirable physiological responses in desirable resident fish, or other desirable aquatic life, or undesirable human health effects, as determined by a bioassay or other tests performed in accordance with standard procedures.

C. Specific Limitations and Self-Monitoring Requirements.

Effective immediately and lasting the duration of this permit, the permittee is authorized to discharge from Outfall 001 and Outfall 002. Such discharges shall be limited and monitored by the permittee as specified below:

<b>Table 1: Effluent Limitations Outfall 001</b>				
Parameter, Units	30-Day Average	7-Day Average	Daily Minimum	Daily Maximum
pH, S.U.	NA	NA	6.5	9.0
Nitrate-Nitrogen, mg/L	NA	NA	NA	a/
RDX, ug/L b/	NA	NA	NA	a/
Total Dissolved Solids (TDS) mg/L c/	NA	NA	NA	1200
Ammonia mg/L /c/	NA	NA	NA	3.29
Total Phosphorus mg/L	Report	NA	NA	NA
Flow, cfs	NA	NA	NA	6.13
DO, mg/L d/	NA	NA	4.5	NA

**PART I**  
**DISCHARGE PERMIT NO. UT0025283**

a/ 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. The permittee is not allowed to discharge more than 6.13 cfs at any time.

b/ Analyses of RDX shall be made by the method appended to the fact sheet and statement of basis in Appendix A, or by any other method approved in writing by the Director.

c/ If the facility can show after 10 samples that there is no reasonable potential to exceed water quality standards for these pollutants, they may petition the Director for a reduction in sampling frequency or removal from the permit for the remainder of the permit cycle.

d/ DO limits are only applicable if the discharge is going to surface waters.

<b>Table 2: Effluent Limitations Outfall 002</b>				
Parameter, Units	30-Day Average	7-Day Average	Daily Minimum	Daily Maximum
pH, S.U.	NA	NA	6.5	9.0
Nitrate-Nitrogen, mg/L	NA	NA	NA	a/
RDX, ug/L b/	NA	NA	NA	a/
Total Phosphorus mg/L	Report	NA	NA	NA
Flow, cfs	NA	NA	NA	3.34
DO, mg/L c/	NA	NA	4.5	NA

a/ 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. The permittee is not allowed to discharge more than 3.34 cfs at any time.

b/ Analyses of RDX shall be made by the method appended to the fact sheet and statement of basis in Appendix A, or by any other method approved in writing by the Director.

c/ DO limits are only applicable if the discharge is going to surface waters.

<b>Table 3: RDX And Nitrate-Nitrogen Limits Based for Outfall 001</b>		
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

<b>Table 4: RDX And Nitrate-Nitrogen Limits Based for Outfall 002</b>		
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

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

<b>Table 5: Self-Monitoring and Reporting Requirements a/</b>			
Parameter	Sampling Frequency	Sample Type	Units
pH	Monthly	Immediate	S.U.
Nitrate Nitrogen	Monthly	Grab	mg/L
RDX	Monthly	Grab	mg/L
Flow b/ c/	Continuous	Recorded	cfs
DO	Monthly	Immediate	mg/L
Total Dissolved Solids d/	Monthly	Grab	mg/L
Ammonia d/	Monthly	Grab	mg/L
Total Phosphorous d/	Monthly	Grab	mg/L

- a/ See Definitions, *Part VIII*, for definition of terms.
- b/ If the rate of discharge is controlled, the rate and duration of discharge shall be reported.
- c/ If the flow in the Spanish Fork River immediately upstream of the point where this discharge enters the river drops below 12 cfs (7.8 MGD) the permittee shall cease discharging until the upstream flow again exceeds 12 cfs.
- d/ After 1 year of sampling, the facility can ask for a reduction in sampling frequency.

D. Reporting of Monitoring Results.

1. Reporting of Wastewater Monitoring Results Monitoring results obtained during the previous month shall be summarized for each month and reported on a Discharge Monitoring Report Form (EPA No. 3320-1) \* or by NetDMR, post-marked or entered into NetDMR no later than the 28<sup>th</sup> day of the month following the completed reporting period. If no discharge occurs during the reporting period, “no discharge” shall be reported. Legible copies of these, and all other reports including whole effluent toxicity (WET) test reports required herein, shall be signed and certified in accordance with the requirements of *Signatory Requirements (see Part VII.G)*, and submitted by NetDMR, or to the Division of Water Quality at the following address:

Department of Environmental Quality  
Division of Water Quality  
PO Box 144870  
Salt Lake City, Utah 84114-4870

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\* Starting January 1, 2017 monitoring results must be submitted using NetDMR unless the permittee has successfully petitioned for an exception.

**PART II**  
**DISCHARGE PERMIT NO. UT00**  
**PRETREATMENT**

**II. INDUSTRIAL PRETREATMENT PROGRAM**

A. Definitions.

1. POTW or publicly owned treatment works means a treatment works as defined by section 212 of the Act, which is owned by a State or municipality (as defined by section 502(4) of the Act). This definition includes any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage or industrial wastes of a liquid nature. It also includes sewers, pipes and other conveyances only if they convey wastewater to a POTW Treatment Plant. The term also means the municipality as defined in section 502(4) of the Act, which has jurisdiction over the Indirect Discharges to and the discharges from such a treatment works.
- B. Discharges to a POTW. Any process wastewater that the facility may discharge to the sanitary sewer, either as 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 Part 403*, the State Pretreatment Requirements found in *UAC R317-8-8*, and any specific local discharge limitations developed by the Publicly Owned Treatment Works (POTW) accepting the waste.
- C. Hazardous Waste Requirements. In accordance with *40 CFR Part 403.12(p)(1)*, 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 which if otherwise disposed of would be considered a hazardous waste under *40 CFR Part 261*. This notification must include the name of the hazardous waste, the EPA hazardous waste number, and the type of discharge (continuous or batch).
- D. Hauled Hazardous Waste. Hauled hazardous waste shall not be discharged to a POTW without notification to the Division of Water Quality.

**III. BIOSOLIDS REQUIREMENTS**

- A. 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.

**PART IV**  
**STORM WATER PERMIT NO. UT000000**

**IV. STORM WATER REQUIREMENTS.**

A. Coverage of This Section. The *Utah Administrative Code (UAC) R-317-8-3.9* requires storm water permit provisions to include the development of a storm water pollution prevention plan for waste water treatment facilities if the facility meets one or both of the following criteria.

1. waste water treatment facilities with a design flow of 1.0 MGD or greater, and/or,
2. waste water treatment facilities with an approved pretreatment program as described in *40CFR Part 403*,

Ensign Bickford does not meet either of the above criteria; therefore this permit does not include storm water provisions. The permit does however include a storm water re-opener provision.

**V. MONITORING, RECORDING & GENERAL REPORTING REQUIREMENTS**

- A. Representative Sampling. Samples taken in compliance with the monitoring requirements established under *Part I* shall be collected from the effluent stream prior to discharge into the receiving waters. Samples and measurements shall be representative of the volume and nature of the monitored discharge. Samples of biosolids shall be collected at a location representative of the quality of biosolids immediately prior to the use-disposal practice.
- B. Monitoring Procedures. Monitoring must be conducted according to test procedures approved under *Utah Administrative Code ("UAC") R317-2-10 and 40CFR Part 503*, unless other test procedures have been specified in this permit.
- C. Penalties for Tampering. The *Act* provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than six months per violation, or by both.
- D. Compliance Schedules. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any Compliance Schedule of this permit shall be submitted no later than 14 days following each schedule date.
- E. Additional Monitoring by the Permittee. If the permittee monitors any parameter more frequently than required by this permit, using test procedures approved under *UAC R317-2-10 and 40 CFR 503* or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR or the Biosolids Report Form. Such increased frequency shall also be indicated. Only those parameters required by the permit need to be reported.
- F. Records Contents. Records of monitoring information shall include:
1. The date, exact place, and time of sampling or measurements;
  2. The individual(s) who performed the sampling or measurements;
  3. The date(s) and time(s) analyses were performed;
  4. The individual(s) who performed the analyses;
  5. The analytical techniques or methods used; and,
  6. The results of such analyses.
- G. Retention of Records. The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least five years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time. A copy of this UPDES permit must be maintained on site during the duration of activity at the permitted location
- H. Twenty-four Hour Notice of Noncompliance Reporting.
1. The permittee shall (orally) report any noncompliance including transportation accidents, spills, and uncontrolled runoff from biosolids transfer or land application sites which may seriously endanger health or environment, as soon as possible, but no later than twenty-four (24) hours from the time the permittee first became aware of circumstances. The report shall be made to the Division of Water Quality, (801) 536-4300, or 24-hour answering service (801) 536-4123.

**PART V**  
**DISCHARGE PERMIT NO. UT0025283**

2. The following occurrences of noncompliance shall be reported by telephone (801) 536-4300 as soon as possible but no later than 24 hours from the time the permittee becomes aware of the circumstances:
  - a. Any noncompliance which may endanger health or the environment;
  - b. Any unanticipated bypass, which exceeds any effluent limitation in the permit (See *Part VI.G, Bypass of Treatment Facilities.*);
  - c. Any upset which exceeds any effluent limitation in the permit (See *Part VI.H, Upset Conditions.*);
  - d. Violation of a daily discharge limitation for any of the pollutants listed in the permit; or,
  - e. Violation of any of the Table 3 metals limits, the pathogen limits, the vector attraction reduction limits or the management practices for biosolids that have been sold or given away.
3. A written submission shall also be provided within five days of the time that the permittee becomes aware of the circumstances. The written submission shall contain:
  - a. A description of the noncompliance and its cause;
  - b. The period of noncompliance, including exact dates and times;
  - c. The estimated time noncompliance is expected to continue if it has not been corrected;
  - d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance; and,
  - e. Steps taken, if any, to mitigate the adverse impacts on the environment and human health during the noncompliance period.
4. The Director may waive the written report on a case-by-case basis if the oral report has been received within 24 hours by the Division of Water Quality, (801) 536-4300.
5. Reports shall be submitted to the addresses in *Part I.D, Reporting of Monitoring Results.*
- I. Other Noncompliance Reporting. Instances of noncompliance not required to be reported within 24 hours shall be reported at the time that monitoring reports for *Part I.D* are submitted. The reports shall contain the information listed in *Part II.H.3*
- J. Inspection and Entry The permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:
  1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of the permit;
  2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

**PART V**  
**DISCHARGE PERMIT NO. UT0025283**

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit, including but not limited to, biosolids treatment, collection, storage facilities or area, transport vehicles and containers, and land application sites;
4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the *Act*, any substances or parameters at any location, including, but not limited to, digested biosolids before dewatering, dewatered biosolids, biosolids transfer or staging areas, any ground or surface waters at the land application sites or biosolids, soils, or vegetation on the land application sites; and,
5. The permittee shall make the necessary arrangements with the landowner or leaseholder to obtain permission or clearance, the Director, or authorized representative, upon the presentation of credentials and other documents as may be required by law will be permitted to enter without delay for the purposes of performing their responsibilities.

**VI. COMPLIANCE RESPONSIBILITIES**

- A. Duty to Comply. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity, which may result in noncompliance with permit requirements.
- B. Penalties for Violations of Permit Conditions. The Act provides that any person who violates a permit condition implementing provisions of the Act is subject to a civil penalty not to exceed \$10,000 per day of such violation. Any person who willfully or negligently violates permit conditions or the Act is subject to a fine not exceeding \$25,000 per day of violation. Any person convicted under UCA 19-5-115(2) a second time shall be punished by a fine not exceeding \$50,000 per day. Except as provided at Part VI.G, *Bypass of Treatment Facilities* and Part VI.H, *Upset Conditions*, nothing in this permit shall be construed to relieve the permittee of the civil or criminal penalties for noncompliance.
- C. Need to Halt or Reduce Activity not a Defense. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.
- D. Duty to Mitigate. The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit, which has a reasonable likelihood of adversely affecting human health or the environment. The permittee shall also take all reasonable steps to minimize or prevent any land application in violation of this permit.
- E. Proper Operation and Maintenance. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems, which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.
- F. Removed Substances. Collected screening, grit, solids, sludge, 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. Sludge/digester supernatant and filter backwash shall not directly enter either the final effluent or waters of the state by any other direct route.
- G. Bypass of Treatment Facilities.
  - 1. Bypass Not Exceeding Limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to paragraph 2 and 3 of this section.
  - 2. Prohibition of Bypass.
    - a. Bypass is prohibited, and the Director may take enforcement action against a permittee for bypass, unless:

**PART III**  
**DISCHARGE PERMIT NO. UT0025283**

- (1) Bypass was unavoidable to prevent loss of human life, personal injury, or severe property damage;
  - (2) There were no feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance, and
  - (3) The permittee submitted notices as required under *section III.G.3*.
- b. The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed in *sections III.G.2.a (1), (2) and (3)*.
3. Notice.
- a. *Anticipated bypass*. Except as provided above in *section III.G.2* and below in *section III.G.3.b*, if the permittee knows in advance of the need for a bypass, it shall submit prior notice, at least ninety days before the date of bypass. The prior notice shall include the following unless otherwise waived by the Director:
    - (1) Evaluation of alternative to bypass, including cost-benefit analysis containing an assessment of anticipated resource damages;
    - (2) A specific bypass plan describing the work to be performed including scheduled dates and times. The permittee must notify the Director in advance of any changes to the bypass schedule;
    - (3) Description of specific measures to be taken to minimize environmental and public health impacts;
    - (4) A notification plan sufficient to alert all downstream users, the public and others reasonably expected to be impacted by the bypass;
    - (5) A water quality assessment plan to include sufficient monitoring of the receiving water before, during and following the bypass to enable evaluation of public health risks and environmental impacts; and,
    - (6) Any additional information requested by the Director.
  - b. *Emergency Bypass*. Where ninety days advance notice is not possible, the permittee must notify the Director, and the Director of the Department of Natural Resources, as soon as it becomes aware of the need to bypass and provide to the Director the information in *section III.G.3.a.(1) through (6)* to the extent practicable.
  - c. *Unanticipated bypass*. The permittee shall submit notice of an unanticipated bypass to the Director as required under *Part VI.H*, Twenty Four Hour Reporting. The permittee shall also immediately notify the Director of the Department of Natural

**PART III**  
**DISCHARGE PERMIT NO. UT0025283**

Resources, the public and downstream users and shall implement measures to minimize impacts to public health and environment to the extent practicable.

H. Upset Conditions.

1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with technology based permit effluent limitations if the requirements of paragraph 2 of this section are met. Director's administrative determination regarding a claim of upset cannot be judiciously challenged by the permittee until such time as an action is initiated for noncompliance.
2. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
  - a. An upset occurred and that the permittee can identify the cause(s) of the upset;
  - b. The permitted facility was at the time being properly operated;
  - c. The permittee submitted notice of the upset as required under *Part V.H, Twenty-four Hour Notice of Noncompliance Reporting*; and,
  - d. The permittee complied with any remedial measures required under *Part VI.D, Duty to Mitigate*.
3. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

**VII. GENERAL REQUIREMENTS**

- A. Planned Changes. The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when the alteration or addition could significantly change the nature or increase the quantity of parameters discharged or pollutant sold or given away. This notification applies to pollutants, which are not subject to effluent limitations in the permit. In addition, if there are any planned substantial changes to the permittee's existing sludge facilities or their manner of operation or to current sludge management practices of storage and disposal, the permittee shall give notice to the Director of any planned changes at least 30 days prior to their implementation.
- B. Anticipated Noncompliance. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity, which may result in noncompliance with permit requirements.
- C. Permit Actions. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.
- D. Duty to Reapply. If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee shall apply for and obtain a new permit. The application shall be submitted at least 180 days before the expiration date of this permit.
- E. Duty to Provide Information. The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.
- F. Other Information. When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Director, it shall promptly submit such facts or information.
- G. Signatory Requirements. All applications, reports or information submitted to the Director shall be signed and certified.
  - 1. All permit applications shall be signed by either a principal executive officer or ranking elected official.
  - 2. All reports required by the permit and other information requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
    - a. The authorization is made in writing by a person described above and submitted to the Director, and,
    - b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position

**PART VII**  
**DISCHARGE PERMIT NO. UT0025283**

having overall responsibility for environmental matters. A duly authorized representative may thus be either a named individual or any individual occupying a named position.

3. Changes to authorization. If an authorization under *paragraph IV.G.2* is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of *paragraph IV.G.2* must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative.
4. Certification. Any person signing a document under this section shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

- H. Penalties for Falsification of Reports. The *Act* provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction be punished by a fine of not more than \$10,000.00 per violation, or by imprisonment for not more than six months per violation, or by both.
- I. Availability of Reports. Except for data determined to be confidential under *UAC R317-8-3.2*, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the office of Director. As required by the *Act*, permit applications, permits and effluent data shall not be considered confidential.
- J. Oil and Hazardous Substance Liability. Nothing in this permit shall be construed to preclude the permittee of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under the *Act*.
- K. Property Rights. The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.
- L. Severability. The provisions of this permit are severable, and if any provisions of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.
- M. Transfers. This permit may be automatically transferred to a new permittee if:
  1. The current permittee notifies the Director at least 20 days in advance of the proposed transfer date;

**PART VII**  
**DISCHARGE PERMIT NO. UT0025283**

2. The notice includes a written agreement between the existing and new permittee's containing a specific date for transfer of permit responsibility, coverage, and liability between them; and,
  3. The Director does not notify the existing permittee and the proposed new permittee of his or her intent to modify, or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in paragraph 2 above.
- N. State or Federal Laws. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by *UCA 19-5-117* and *Section 510* of the *Act* or any applicable Federal or State transportation regulations, such as but not limited to the Department of Transportation regulations.
- O. Water Quality - Reopener Provision. This permit may be reopened and modified (following proper administrative procedures) to include the appropriate effluent limitations and compliance schedule, if necessary, if one or more of the following events occurs:
1. Water Quality Standards for the receiving water(s) to which the permittee discharges are modified in such a manner as to require different effluent limits than contained in this permit.
  2. A final wasteload allocation is developed and approved by the State and/or EPA for incorporation in this permit.
  3. Revisions to the current CWA § 208 area wide treatment management plans or promulgations/revisions to TMDLs (40 CFR 130.7) approved by the EPA and adopted by DWQ which calls for different effluent limitations than contained in this permit.
- P. Biosolids – Reopener Provision. This permit may be reopened and modified (following proper administrative procedures) to include the appropriate biosolids limitations (and compliance schedule, if necessary), management practices, other appropriate requirements to protect public health and the environment, or if there have been substantial changes (or such changes are planned) in biosolids use or disposal practices; applicable management practices or numerical limitations for pollutants in biosolids have been promulgated which are more stringent than the requirements in this permit; and/or it has been determined that the permittees biosolids use or land application practices do not comply with existing applicable state of federal regulations.
- Q. Toxicity Limitation - Reopener Provision. This permit may be reopened and modified (following proper administrative procedures) to include WET testing, a WET limitation, a compliance schedule, a compliance date, additional or modified numerical limitations, or any other conditions related to the control of toxicants if toxicity is detected during the life of this permit.
- R. Storm Water-Reopener Provision. At any time during the duration (life) of this permit, this permit may be reopened and modified (following proper administrative procedures) as per *UAC R317.8*, to include, any applicable storm water provisions and requirements, a storm

**PART VII**  
**DISCHARGE PERMIT NO. UT0025283**

water pollution prevention plan, a compliance schedule, a compliance date, monitoring and/or reporting requirements, or any other conditions related to the control of storm water discharges to "waters-of-State".

**VIII. DEFINITIONS**

A. Wastewater.

1. The "7-day (and weekly) average", other than for *E. coli* bacteria, fecal coliform bacteria, and total coliform bacteria, is the arithmetic average of all samples collected during a consecutive 7-day period or calendar week, whichever is applicable. Geometric means shall be calculated for *E. coli* bacteria, fecal coliform bacteria, and total coliform bacteria. The 7-day and weekly averages are applicable only to those effluent characteristics for which there are 7-day average effluent limitations. The calendar week, which begins on Sunday and ends on Saturday, shall be used for purposes of reporting self-monitoring data on discharge monitoring report forms. Weekly averages shall be calculated for all calendar weeks with Saturdays in the month. If a calendar week overlaps two months (i.e., the Sunday is in one month and the Saturday in the following month), the weekly average calculated for that calendar week shall be included in the data for the month that contains Saturday.
2. The "30-day (and monthly) average," other than for *E. coli* bacteria, fecal coliform bacteria and total coliform bacteria, is the arithmetic average of all samples collected during a consecutive 30-day period or calendar month, whichever is applicable. Geometric means shall be calculated for *E. coli* bacteria, fecal coliform bacteria and total coliform bacteria. The calendar month shall be used for purposes of reporting self-monitoring data on discharge monitoring report forms.
3. "Act," means the *Utah Water Quality Act*.
4. "Acute toxicity" occurs when 50 percent or more mortality is observed for either test species at any effluent concentration (lethal concentration or "LC<sub>50</sub>").
5. "Annual Loading Cap" is the highest allowable phosphorus loading discharged over a calendar year, calculated as the sum of all the monthly loading discharges measured during a calendar year divided by the number of monthly discharges measured during that year.
6. "Bypass," means the diversion of waste streams from any portion of a treatment facility.
7. "Chronic toxicity" occurs when the IC<sub>25</sub> < XX% effluent. The XX% effluent is the concentration of the effluent in the receiving water, at the end of the mixing zone expressed as per cent effluent.
8. "IC<sub>25</sub>" is the concentration of toxicant (given in % effluent) that would cause a 25% reduction in mean young per female, or a 25% reduction in overall growth for the test population.
9. "Composite Samples" shall be flow proportioned. The composite sample shall, as a minimum, contain at least four (4) samples collected over the compositing period. Unless otherwise specified, the time between the collection of the first sample and the last sample shall not be less than six (6) hours nor more than 24 hours. Acceptable methods for preparation of composite samples are as follows:

**PART VIII**  
**DISCHARGE PERMIT NO. UT0025283**

- a. Constant time interval between samples, sample volume proportional to flow rate at time of sampling;
  - b. Constant time interval between samples, sample volume proportional to total flow (volume) since last sample. For the first sample, the flow rate at the time the sample was collected may be used;
  - c. Constant sample volume, time interval between samples proportional to flow (i.e., sample taken every “X” gallons of flow); and,
  - d. Continuous sample volume, with sample collection rate proportional to flow rate.
10. “CWA,” means *The Federal Water Pollution Control Act*, as amended, by *The Clean Water Act of 1987*.
  11. “Daily Maximum” (Daily Max.) is the maximum value allowable in any single sample or instantaneous measurement.
  12. “EPA,” means the United States Environmental Protection Agency.
  13. “Director,” means Director of the Division of Water Quality.
  14. A “grab” sample, for monitoring requirements, is defined as a single “dip and take” sample collected at a representative point in the discharge stream.
  15. An “instantaneous” measurement, for monitoring requirements, is defined as a single reading, observation, or measurement.
  16. “Severe Property Damage,” means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
  17. “Upset,” means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventative maintenance, or careless or improper operation.

**FACT SHEET AND STATEMENT OF BASIS  
ENSIGN-BICKFORD COMPANY  
UPDES PERMIT # UT0025283  
RENEWAL PERMIT FOR MINOR INDUSTRIAL FACILITY**

**FACILITY CONTACT:** Mr. Haldon R. Jaussi  
Director of Environmental Remediation  
The Ensign-Bickford Company  
8305 South Highway 6 & 89  
Spanish Fork, Utah 84660  
Phone: (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 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 (CEM's) 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 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. No reduction of nitrate concentration is contemplated for water discharged to surface water, nor will any be required to meet the permit effluent limitations contained in this permit.

The Hobble Creek portion of the Facility consists of flow from the Mapleton GAC facility and the Orton GAC facility 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 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 and 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 *UAC R317-1-3.3*, Technology-Based Phosphorus Effluent Limit (TBPEL) Rule. The TBPEL rule as it relates to "non-lagoon" wastewater treatment plants establishes new regulations for the discharge of phosphorus to surface waters and is self-implementing. The TBPEL rule requires that all non-lagoon wastewater treatment works discharging wastewater to surface waters of the state shall provide treatment processes which will produce effluent less than or equal to an annual mean of 1.0 mg/L for total phosphorus. This TBPEL shall be achieved by January 1, 2020. However, since phosphorus is not a constituent of concern and 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**

In February of 2018, the Utah Division of Water Quality adopted a new Permit and Enforcement Guidance Document for Whole Effluent Toxicity. In that guidance document it states, that if no toxicity is observed for 10 consecutive tests, testing frequency may be reduced if approved by the Director in accordance with administrative procedures for modifying the permit. The justification for the change in testing frequency should include an evaluation of the applicable factors used for evaluating reasonable potential. The facility has never failed a WET test going back to 1998. During the renewal process, the facility has requested that their WET testing be eliminated. Reviewing their prior history, and lack of WET failures, WET testing has been eliminated from the permit.

## **DISCHARGE**

### **DESCRIPTION OF DISCHARGES:**

#### **Outfall 001**

Final discharge from Outfall 001 is directly to Hobble Creek where it passes under Main Street. This discharge point is located at latitude 40° 08' 52" and longitude 111° 34' 40" with STORET No. 499559. During the irrigation season, the facility discharges to the Mapleton

City pressurized irrigation system with the flow being direct to a storage impoundment located east of the city. There is no public access to this storage impoundment. Outfall 001 is located at latitude 111° 34' 40" and longitude 40° 08' 52".

**Outfall 002**

Discharge from Outfall 002 will be to the pressurized irrigation system or discharge to the Spanish Fork River depending on the season. Discharges to the Spanish Fork River will only be allowed when the background flow of the Spanish Fork River is 12 cfs or greater. If background falls below 12 cfs, discharge in the Spanish Fork River shall cease until such time the upstream flow in the Spanish Fork River equals or exceeds 12 cfs. Outfall 002 is located at latitude of 111° 35' 21" and longitude of 40° 05' 06".

**STREAM CLASSIFICATION:** According to the Utah Water Quality Standards as contained in R317-2, the Hobble Creek is classified as indicated below:

- 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.
- 3A - Protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in their food chain.
- 4 - Protected for agricultural uses including irrigation of crops and stock watering.

According to Utah Water Quality Standards contained in Utah Administrative Code (UAC) R317-2, the Spanish Fork River is classified as:

- 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.
- 3B - Protected for warm water species of game fish and other warm water aquatic life, including the necessary aquatic organisms in their food chain.
- 3D - Protected for water fowl, shore birds, and other water-oriented wildlife not included in classes 3A, 3B or 3C, including the necessary aquatic organisms in their food chain.
- 4 - Protected for agricultural uses including irrigation of crops and stock watering.

**BASIS FOR EFFLUENT LIMITATIONS:** Utah Administrative Code (UAC) R317-1-3 lists State secondary treatment standards for five-day biochemical oxygen demand (BOD<sub>5</sub>), total suspended solids (TSS), fecal coliforms, total coliforms, and pH. Based on data provided in the original permit application, and because the effluent is composed only of ground water, BOD<sub>5</sub>, TSS, and E. coli limitations are not necessary, thus will not be included in this permit. However, pH is applicable to this discharge permit and will be limited to between 6.5 and 9.0 at Outfall 001.

Total dissolved solids and ammonia limits are included in this permit because Utah Lake for these parameters is impaired for these pollutants and is listed on the 303d list. Facilities are not allowed to exceed water quality standards for pollutants on the 303d list where a TMDL is not been completed.

Additional concerns addressed in this permit are the concentration and types of organic constituents in the effluent. 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 confirmed 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 methodology for deriving the 0.002 mg/L health advisory for RDX has been challenged by EBCo, and will continue to be the subject of further evaluation by EBCo and the Department of Environmental Quality. Until an alternate resolution is determined, 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).

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 in order 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 002. 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. For example, if EBCo's discharges varied in any particular month, but reached no higher than 2.0 cfs at any time, then the flow range would be considered in the 1.68-2.23 cfs range in the table, and the corresponding effluent limitation would be 0.007 mg/L for RDX, and 32.5 mg/L for nitrate nitrogen. EBCo's maximum effluent flow rate is limited to 6.13 cfs by this permit. 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 2.

There is no published standard analytical method in the literature (which has been certified by EPA) as an approved method for 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.

**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, treating ground water with nitrogenous compounds by means of granular activated carbon (GAC), Ensign-Bickford was not required to sample metals during the previous permit cycle, and as a result there is no metals data to analyze for RP.

**NUMERIC PERMIT LIMITATIONS:**

Below are the numeric permit limitations in the permit.

<b>Table 1: Effluent Limitations Outfall 001</b>				
<b>Parameter, Units</b>	<b>30-Day Average</b>	<b>7-Day Average</b>	<b>Daily Minimum</b>	<b>Daily Maximum</b>
pH, S.U.	NA	NA	6.5	9.0
Nitrate-Nitrogen, mg/L	NA	NA	NA	a/
RDX, ug/L b/	NA	NA	NA	a/
Total Dissolved Solids (TDS) mg/L c/	NA	NA	NA	1200
Ammonia mg/L /c/	NA	NA	NA	3.29
Total Phosphorus mg/L	Report	NA	NA	NA
Flow, cfs	NA	NA	NA	6.13
DO, mg/L d/	NA	NA	4.5	NA

a/ 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. The permittee is not allowed to discharge more than 6.13 cfs at any time.

b/ Analyses of RDX shall be made by the method appended to the fact sheet and statement of basis in Appendix A, or by any other method approved in writing by the Director.

c/ If the facility can show after 10 samples that there is no reasonable potential to exceed water quality standards for these pollutants, they may petition the Director for a reduction in sampling frequency or removal from the permit for the remainder of the permit cycle.

d/ DO limits are only applicable if the discharge is going to surface waters.

<b>Table 2: Effluent Limitations Outfall 002</b>				
Parameter, Units	30-Day Average	7-Day Average	Daily Minimum	Daily Maximum
pH, S.U.	NA	NA	6.5	9.0
Nitrate-Nitrogen, mg/L	NA	NA	NA	a/
RDX, ug/L b/	NA	NA	NA	a/
Total Phosphorus mg/L	Report	NA	NA	NA
Flow, cfs	NA	NA	NA	3.34
DO, mg/L	NA	NA	4.5	NA

a/ 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. The permittee is not allowed to discharge more than 3.34 cfs at any time.

b/ Analyses of RDX shall be made by the method appended to the fact sheet and statement of basis in Appendix A, or by any other method approved in writing by the Director.

e/ DO limits are only applicable if the discharge is going to surface waters.

<b>Table 3: RDX And Nitrate-Nitrogen Limits Based for Outfall 001</b>		
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

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

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

**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.

Parameter	Sampling Frequency	Sample Type	Units
pH	Monthly	Immediate	S.U.
Nitrate Nitrogen	Monthly	Grab	mg/L
RDX	Monthly	Grab	mg/L
Flow b/ c/	Continuous	Recorded	cfs
DO	Monthly	Immediate	mg/L
Total Dissolved Solids d/	Monthly	Grab	mg/L
Ammonia d/	Monthly	Grab	mg/L
Total Phosphorous d/	Monthly	Grab	mg/L

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

b/ If the rate of discharge is controlled, the rate and duration of discharge shall be reported.

- c/ If the flow in the Spanish Fork River immediately upstream of the point where this discharge enters the river drops below 12 cfs (7.8 MGD) the permittee shall cease discharging until the upstream flow again exceeds 12 cfs.
- d/ After 1 year of sampling, the facility can ask for a reduction in sampling frequency.

**STORM WATER REQUIREMENTS:** EBCo will not need to apply for an industrial storm water permit at this time. However, if it is known that one acre or more of ground will be disturbed during future construction activities, a storm water construction permit will be required. The Company has expressed their preference for such coverage under the Utah General Permit as opposed to including applicable requirements in this permit. Any such permit must be obtained before construction activities begin.

**PRETREATMENT REQUIREMENTS:** It is not contemplated that discharges covered under this permit will be discharged directly to the sanitary sewer; however, water from back wash of GAC treatment units and/or carbon transfer slurry water could be discharged to the sanitary sewer. Any wastewater, discharged to a public sanitary sewer is subject to Federal, State, and local pretreatment regulations. Pursuant to Section 307 of the Clean Water Act, EBCo shall comply with all applicable Federal pretreatment regulations promulgated in *40 CFR Section 403*, the State pretreatment requirements found in *UAC R317-8-8*, and any specific local discharge limitations developed by the wastewater treatment plant accepting any process wastewater from EBCo.

If EBCo discharges any waste to a wastewater treatment system which is considered a hazardous waste, then EBCo must notify the publicly owned treatment works (POTW), the EPA Regional Waste Management Director and the State hazardous waste authorizes.

**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, and the absence of receiving stream water quality monitoring data, 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.

**TMDL REQUIREMENTS:**

According to the Utah's 2016 303(d) Water Quality Assessment Report, the receiving water for the discharge from Outfall 001 is Hobble Creek. Hobble Creek from Utah Lake to confluence of Left Fork Hobble Creek and Right Fork Hobble Creek (AU UT16020202-003\_00) is listed as impaired

for pH for its class 2B and 3A beneficial uses. A TMDL has not been completed addressing the pH impairment. Secondary standards for pH are implemented as end of pipe criteria and are protective of downstream uses.

The downstream waterbody, the Provo Bay portion of Utah Lake (AU UT-L-1602020I-004\_02), is listed as impaired for PCB in fish tissue, pH, ammonia, and total phosphorus (38 Use Class). Utah Lake proper is also listed as impaired for total dissolved solids. Although the WLA may show higher allowed effluent limits for these impaired constituents should be evaluated in the effluent against the end of pipe Water Quality Standards in Table 1 to determine whether or not they have reasonable potential to cause or contribute to the existing impairments.

According to the Utah's 2016 303(d) Water Quality Assessment Report, the receiving water for the discharge Outfall 002 is the Spanish Fork River from Utah Lake to Moark Diversion (AU UT-L-16020202-001\_00) is not listed as impaired for any of its beneficial uses.

The downstream waterbody, Utah Lake other than Provo Bay (AU UT-L-1602020I-004\_01), is listed as impaired for harmful algal blooms (Class 2B); PCB in fish tissue and total phosphorus (Class 38) and total dissolved solids (Class 4). Although the V/LA may show higher allowed effluent limits for these impaired constituents should be evaluated in the effluent against the end of pipe Water Quality Standards in Table 1 of the wasteload analysis to determine whether or not they have reasonable potential to cause or contribute to the existing impairments.

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 (TP) 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. Wasteload allocations would then be translated to effluent limits in UPDES permits. It is therefore strongly recommended that the facilities' staff participate in the TMDL process. Based on the above it is recommended that the facility self-monitor TP on a monthly basis in order to better quantify their contribution of phosphorus to the lake. The TMDL staff at the Division of Water Quality will be responsible for scheduling and notifying appropriate facilities personnel regarding TMDL meetings. In addition, please contact your UPDES permit writer for information on scheduled TMDL meetings.

### **PERMIT DURATION**

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

Drafted by  
Lonnie Shull, Discharge, Biomonitoring  
Jennifer Robinson/Mathew Garn, Pretreatment  
Dave Wham, Wasteload Analysis  
Utah Division of Water Quality, (801) 536-4300

**PUBLIC NOTICE**

Began: August 23, 2019  
Ended: September 23, 2019

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

The Public Noticed of the draft permit was published in the Provo Herald Journal and also on the Division of Water Quality’s website from August 23, 2019 – September 23, 2019. No comments were received during the public comment period.

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.

DWQ-2019-002894

**ATTACHMENT 1**

*Wasteload Analysis*

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

**Date:** March 6, 2019

**Prepared by:** Dave Wham   
Standards and Technical Services

**Facility:** Ensign-Bickford 001, UPDES Permit No. UT0025283  
**Receiving water:** Hobble Creek (2B, 3A, 4)

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

001 Discharge from Mapleton and Orton granular activated carbon treatment system.  
Design flow 3.96 mgd (6.14 cfs).

Receiving Water

Per UAC R317-2-13.5(c), the designated beneficial uses of the Hobble Creek and tributaries, from Utah Lake to headwaters are 2B, 3A, 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 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.*

**Flow**

Typically, the critical flow for the receiving water in the wasteload analysis is considered the lowest stream flow for seven consecutive days with a ten year return frequency (7Q10). Due to the lack of available and representative flow data on Hobble Creek, the 7Q10 flow was estimated

based on best professional judgement.

USGS stream gage #10153100, *Hobble Creek at 1650 West at Springville, Utah* has flow records from 2008 to present. However this site is located approximately 4 miles below the discharge point and is influenced by 3 irrigation diversions between the discharge and the gage. Additionally, since 2013, as part of June Sucker rehabilitation program carried out under the Central Utah Project, the hydrology of the lower Hobble Creek had been modified by providing minimum replacement flows during dry conditions (CUP Mitigation Commission 2013). Recent (2013-2018) annual minimum 7 day mean low flows at the USGS gage range from 4.9 – 15.7 cfs, with a mean value of 6.5 cfs. The proposed change in hydrology was acknowledged in the previous permit and WLA and a critical low flow of 7.1 cfs was identified based on mitigation flow projection at that time. Based on review of the current flow data in lower Hobble Creek and the location of the discharge relative to downstream diversions, the critical low flow value of 7.1 cfs remains a reasonable estimate of the 7Q10 for the current permit.

Receiving water quality was characterized by data obtained from DWQ monitoring site #4996100, *HOBBLE CK AT I-15 BDG 3MIS OF PROVO* for the period 2005-2018.

#### TMDL

According to the Utah's 2016 303(d) Water Quality Assessment Report, the receiving water for the discharge; Hobble Creek from Utah Lake to confluence of Left Fork Hobble Creek and Right Fork Hobble Creek (AU UT16020202-003\_00) is listed as impaired for pH for its class 2B and 3A beneficial uses. A TMDL has not been completed addressing the pH impairment. Secondary standards for pH are implemented as end of pipe criteria and are protective of downstream uses.

The downstream waterbody, the Provo Bay portion of Utah Lake (AU UT-L-16020201-004\_02), is listed as impaired for PCB in fish tissue, pH, ammonia, and total phosphorus (3B Use Class). Utah Lake proper is also listed as impaired for total dissolved solids. Although the WLA may show higher allowed effluent limits for these impaired constituents should be evaluated in the effluent against the end of pipe Water Quality Standards in Table 1 to determine whether or not they have reasonable potential to cause or contribute to the existing impairments.

**Table 1. End of pipe Criteria**

Constituent	Criteria
TDS	1200 mg/l
Ammonia	3.29 mg/l (chronic)
pH	Secondary standards
PCB in fish tissue	N/A
Total phosphorous	N/A

#### 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. Water quality standards must be met at the end of the mixing zone.

As per DEQ's mixing zone policy, the effluent was consider to be totally mixed as the ratio of

Utah Division of Water Quality  
Wasteload Analysis  
Ensign-Bickford 001  
UPDES Permit No. UT0025283

river flow (7Q10) to discharge flow was 1.16 ( $\leq 2$ ). Both acute and chronic effluent limits were calculated using 100% of the critical low flow value in the receiving water.

Parameters of Concern

The potential parameters of concern identified for the discharge were pH, ammonia, TDS, RDX and nitrate as determined by the impairment status of the receiving water and review of the previous permit.

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 LC<sub>50</sub> (lethal concentration, 50%) percent effluent for acute toxicity and the IC<sub>25</sub> (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 LC<sub>50</sub> is typically 100% effluent and does not need to be determined by the WLA.

IC<sub>25</sub> WET limits for Outfall 001 should be based on 46.3 % effluent.

Wasteload Allocation Methods

Effluent limits were determined for conservative constituents using a simple mass balance mixing analysis (UDWQ 2012). The mass balance analysis is summarized in the Wasteload Addendums.

The water quality standard for chronic ammonia toxicity is dependent on temperature and pH, and the water quality standard for acute ammonia toxicity is dependent on pH. The AMMTOX Model developed by University of Colorado and adapted by Utah DWQ and EPA Region VIII was used to determine ammonia effluent limits (Lewis et al. 2002). The 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. The proposed permit is a simple renewal of an existing UPDES permit. No increase in flow or concentration of pollutants over those authorized in the the existing permit is being requested.

Documents:

WLA Document: Ensign\_Bickford\_001-WLADoc\_3-4-19.docx

Wasteload Analysis and Addendums: Ensign\_Bickford\_001-WLA\_3-4-19.xlsm

**Utah Division of Water Quality  
Wasteload Analysis  
Ensign-Bickford 001  
UPDES Permit No. UT0025283**

**References:**

Utah Division of Water Quality. 2012. *Utah Wasteload Analysis Procedures Version 1.0*.

U.S. Department of the Interior. 2013. *Hobble Creek Restoration Project Final Environmental Assessment*.  
Central Utah Project Completion Act Office.

**Utah Division of Water Quality  
Salt Lake City, Utah**

**WASTELOAD ANALYSIS [WLA]  
Addendum: Statement of Basis**

25-Feb-19

**Facilities: Ensign Bickford 001**  
**Discharging to: Hobble Creek**  
**Design Flow: 3.96 MGD**

**UPDES No: UT-0025283**

**I. Introduction**

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 [R317-2-8, UAC]. Projected concentrations are compared to numeric water quality standards to determine acceptability. The anti-degradation policy and procedures are also considered. The primary in-stream parameters of concern may include metals (as a function of hardness), total dissolved solids (TDS), total residual chlorine (TRC), un-ionized ammonia (as a function of pH and temperature, measured and evaluated in terms of total ammonia), and dissolved oxygen.

Mathematical water quality modeling is employed to determine stream quality response to point source discharges. Models aid in the effort of anticipating stream quality at future effluent flows at critical environmental conditions (e.g., low stream flow, high temperature, high pH, etc).

The numeric criteria in this wasteload analysis may always be modified by narrative criteria and other conditions determined by staff of the Division of Water Quality.

**II. Receiving Water and Stream Classification**

Hobble Creek:	2B, 3A, 4
Antidegradation Review:	Level I review completed. Level II review not required.

**III. Numeric Stream Standards for Protection of Aquatic Wildlife**

Total Ammonia (TNH <sub>3</sub> )	Varies as a function of Temperature and pH Rebound. See Water Quality Standards
Chronic Total Residual Chlorine (TRC)	0.011 mg/l (4 Day Average) 0.019 mg/l (1 Hour Average)
Chronic Dissolved Oxygen (DO)	6.50 mg/l (30 Day Average) 5.00 mg/l (7Day Average) 4.00 mg/l (1 Day Average)
Maximum Total Dissolved Solids	1200.0 mg/l

**Utah Division of Water Quality  
Salt Lake City, Utah**

**Acute and Chronic Heavy Metals (Dissolved)**

Parameter	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard		
	Concentration	Load*	Concentration		Load*
Aluminum	87.00 ug/l**	2.878 lbs/day	750.00	ug/l	24.813 lbs/day
Arsenic	190.00 ug/l	6.286 lbs/day	340.00	ug/l	11.248 lbs/day
Cadmium	1.78 ug/l	0.059 lbs/day	4.66	ug/l	0.154 lbs/day
Chromium III	190.24 ug/l	6.294 lbs/day	3980.10	ug/l	131.677 lbs/day
ChromiumVI	11.00 ug/l	0.364 lbs/day	16.00	ug/l	0.529 lbs/day
Copper	21.31 ug/l	0.705 lbs/day	34.81	ug/l	1.152 lbs/day
Iron			1000.00	ug/l	33.084 lbs/day
Lead	10.89 ug/l	0.360 lbs/day	279.54	ug/l	9.248 lbs/day
Mercury	0.0120 ug/l	0.000 lbs/day	2.40	ug/l	0.079 lbs/day
Nickel	118.19 ug/l	3.910 lbs/day	1063.06	ug/l	35.170 lbs/day
Selenium	4.60 ug/l	0.152 lbs/day	20.00	ug/l	0.662 lbs/day
Silver	N/A ug/l	N/A lbs/day	19.96	ug/l	0.660 lbs/day
Zinc	271.82 ug/l	8.993 lbs/day	271.82	ug/l	8.993 lbs/day

\* Allowed below discharge

\*\*Chronic Aluminum standard applies only to waters with a pH < 7.0 and a Hardness < 50 mg/l as CaCO3

Metals Standards Based upon a Hardness of 262.96 mg/l as CaCO3

**Organics [Pesticides]**

Parameter	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard		
	Concentration	Load*	Concentration		Load*
Aldrin			1.500	ug/l	0.050 lbs/day
Chlordane	0.004 ug/l	0.307 lbs/day	1.200	ug/l	0.040 lbs/day
DDT, DDE	0.001 ug/l	0.071 lbs/day	0.550	ug/l	0.018 lbs/day
Dieldrin	0.002 ug/l	0.135 lbs/day	1.250	ug/l	0.041 lbs/day
Endosulfan	0.056 ug/l	3.992 lbs/day	0.110	ug/l	0.004 lbs/day
Endrin	0.002 ug/l	0.164 lbs/day	0.090	ug/l	0.003 lbs/day
Guthion			0.010	ug/l	0.000 lbs/day
Heptachlor	0.004 ug/l	0.271 lbs/day	0.260	ug/l	0.009 lbs/day
Lindane	0.080 ug/l	5.703 lbs/day	1.000	ug/l	0.033 lbs/day
Methoxychlor			0.030	ug/l	0.001 lbs/day
Mirex			0.010	ug/l	0.000 lbs/day
Parathion			0.040	ug/l	0.001 lbs/day
PCB's	0.014 ug/l	0.998 lbs/day	2.000	ug/l	0.066 lbs/day
Pentachlorophenol	13.00 ug/l	926.754 lbs/day	20.000	ug/l	0.662 lbs/day
Toxephene	0.0002 ug/l	0.014 lbs/day	0.7300	ug/l	0.024 lbs/day

**Utah Division of Water Quality  
Salt Lake City, Utah**

**IV. Numeric Stream Standards for Protection of Agriculture**

	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard	
	Concentration	Load*	Concentration	Load*
Arsenic			100.0 ug/l	lbs/day
Boron			750.0 ug/l	lbs/day
Cadmium			10.0 ug/l	0.17 lbs/day
Chromium			100.0 ug/l	lbs/day
Copper			200.0 ug/l	lbs/day
Lead			100.0 ug/l	lbs/day
Selenium			50.0 ug/l	lbs/day
TDS, Summer			1200.0 mg/l	19.85 tons/day

**V. Numeric Stream Standards for Protection of Human Health (Class 1C Waters)**

Metals	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard	
	Concentration	Load*	Concentration	Load*
Arsenic			ug/l	lbs/day
Barium			ug/l	lbs/day
Cadmium			ug/l	lbs/day
Chromium			ug/l	lbs/day
Lead			ug/l	lbs/day
Mercury			ug/l	lbs/day
Selenium			ug/l	lbs/day
Silver			ug/l	lbs/day
Fluoride (3)			ug/l	lbs/day
to			ug/l	lbs/day
Nitrates as N			ug/l	lbs/day
<b>Chlorophenoxy Herbicides</b>				
2,4-D			ug/l	lbs/day
2,4,5-TP			ug/l	lbs/day
Endrin			ug/l	lbs/day
cyclohexane (Lindane)			ug/l	lbs/day
Methoxychlor			ug/l	lbs/day
Toxaphene			ug/l	lbs/day

**VI. Numeric Stream Standards the Protection of Human Health from Water & Fish Consumption [Toxics]**

Toxic Organics	Maximum Conc., ug/l - Acute Standards			
	Class 1C [2 Liters/Day for 70 Kg Person over 70 Yr.]		Class 3A, 3B [6.5 g for 70 Kg Person over 70 Yr.]	
Acenaphthene	ug/l	lbs/day	2700.0 ug/l	192.48 lbs/day
Acrolein	ug/l	lbs/day	780.0 ug/l	55.61 lbs/day
Acrylonitrile	ug/l	lbs/day	0.7 ug/l	0.05 lbs/day
Benzene	ug/l	lbs/day	71.0 ug/l	5.06 lbs/day
Benzidine	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Carbon tetrachloride	ug/l	lbs/day	4.4 ug/l	0.31 lbs/day
Chlorobenzene	ug/l	lbs/day	21000.0 ug/l	1497.06 lbs/day
1,2,4-Trichlorobenzene				
Hexachlorobenzene	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
1,2-Dichloroethane	ug/l	lbs/day	99.0 ug/l	7.06 lbs/day

**Utah Division of Water Quality  
Salt Lake City, Utah**

1,1,1-Trichloroethane				
Hexachloroethane	ug/l	lbs/day	8.9 ug/l	0.63 lbs/day
1,1-Dichloroethane				
1,1,2-Trichloroethane	ug/l	lbs/day	42.0 ug/l	2.99 lbs/day
1,1,2,2-Tetrachloroethane	ug/l	lbs/day	11.0 ug/l	0.78 lbs/day
Chloroethane			0.0 ug/l	0.00 lbs/day
Bis(2-chloroethyl) ether	ug/l	lbs/day	1.4 ug/l	0.10 lbs/day
2-Chloroethyl vinyl ether	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
2-Chloronaphthalene	ug/l	lbs/day	4300.0 ug/l	306.54 lbs/day
2,4,6-Trichlorophenol	ug/l	lbs/day	6.5 ug/l	0.46 lbs/day
p-Chloro-m-cresol			0.0 ug/l	0.00 lbs/day
Chloroform (HM)	ug/l	lbs/day	470.0 ug/l	33.51 lbs/day
2-Chlorophenol	ug/l	lbs/day	400.0 ug/l	28.52 lbs/day
1,2-Dichlorobenzene	ug/l	lbs/day	17000.0 ug/l	1211.91 lbs/day
1,3-Dichlorobenzene	ug/l	lbs/day	2600.0 ug/l	185.35 lbs/day
1,4-Dichlorobenzene	ug/l	lbs/day	2600.0 ug/l	185.35 lbs/day
3,3'-Dichlorobenzidine	ug/l	lbs/day	0.1 ug/l	0.01 lbs/day
1,1-Dichloroethylene	ug/l	lbs/day	3.2 ug/l	0.23 lbs/day
1,2-trans-Dichloroethylene	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
2,4-Dichlorophenol	ug/l	lbs/day	790.0 ug/l	56.32 lbs/day
1,2-Dichloropropane	ug/l	lbs/day	39.0 ug/l	2.78 lbs/day
1,3-Dichloropropylene	ug/l	lbs/day	1700.0 ug/l	121.19 lbs/day
2,4-Dimethylphenol	ug/l	lbs/day	2300.0 ug/l	163.96 lbs/day
2,4-Dinitrotoluene	ug/l	lbs/day	9.1 ug/l	0.65 lbs/day
2,6-Dinitrotoluene	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
1,2-Diphenylhydrazine	ug/l	lbs/day	0.5 ug/l	0.04 lbs/day
Ethylbenzene	ug/l	lbs/day	29000.0 ug/l	2067.37 lbs/day
Fluoranthene	ug/l	lbs/day	370.0 ug/l	26.38 lbs/day
4-Chlorophenyl phenyl ether				
4-Bromophenyl phenyl ether				
Bis(2-chloroisopropyl) ether	ug/l	lbs/day	170000.0 ug/l	12119.09 lbs/day
Bis(2-chloroethoxy) methane	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Methylene chloride (HM)	ug/l	lbs/day	1600.0 ug/l	114.06 lbs/day
Methyl chloride (HM)	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Methyl bromide (HM)	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Bromoform (HM)	ug/l	lbs/day	360.0 ug/l	25.66 lbs/day
Dichlorobromomethane	ug/l	lbs/day	22.0 ug/l	1.57 lbs/day
Chlorodibromomethane	ug/l	lbs/day	34.0 ug/l	2.42 lbs/day
Hexachlorobutadiene(c)	ug/l	lbs/day	50.0 ug/l	3.56 lbs/day
Hexachlorocyclopentadiene	ug/l	lbs/day	17000.0 ug/l	1211.91 lbs/day
Isophorone	ug/l	lbs/day	600.0 ug/l	42.77 lbs/day
Naphthalene				
Nitrobenzene	ug/l	lbs/day	1900.0 ug/l	135.45 lbs/day
2-Nitrophenol	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
4-Nitrophenol	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
2,4-Dinitrophenol	ug/l	lbs/day	14000.0 ug/l	998.04 lbs/day
4,6-Dinitro-o-cresol	ug/l	lbs/day	765.0 ug/l	54.54 lbs/day
N-Nitrosodimethylamine	ug/l	lbs/day	8.1 ug/l	0.58 lbs/day
N-Nitrosodiphenylamine	ug/l	lbs/day	16.0 ug/l	1.14 lbs/day
N-Nitrosodi-n-propylamine	ug/l	lbs/day	1.4 ug/l	0.10 lbs/day
Pentachlorophenol	ug/l	lbs/day	8.2 ug/l	0.58 lbs/day

**Utah Division of Water Quality  
Salt Lake City, Utah**

Phenol	ug/l	lbs/day	4.6E+06 ug/l	3.28E+05 lbs/day
Bis(2-ethylhexyl)phthala	ug/l	lbs/day	5.9 ug/l	0.42 lbs/day
Butyl benzyl phthalate	ug/l	lbs/day	5200.0 ug/l	370.70 lbs/day
Di-n-butyl phthalate	ug/l	lbs/day	12000.0 ug/l	855.47 lbs/day
Di-n-octyl phthlate				
Diethyl phthalate	ug/l	lbs/day	120000.0 ug/l	8554.65 lbs/day
Dimethyl phthlate	ug/l	lbs/day	2.9E+06 ug/l	2.07E+05 lbs/day
Benzo(a)anthracene (P/	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Benzo(a)pyrene (PAH)	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Benzo(b)fluoranthene (F	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Benzo(k)fluoranthene (F	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Chrysene (PAH)	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Acenaphthylene (PAH)				
Anthracene (PAH)	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Dibenzo(a,h)anthracene	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Indeno(1,2,3-cd)pyrene	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Pyrene (PAH)	ug/l	lbs/day	11000.0 ug/l	784.18 lbs/day
Tetrachloroethylene	ug/l	lbs/day	8.9 ug/l	0.63 lbs/day
Toluene	ug/l	lbs/day	200000 ug/l	14257.76 lbs/day
Trichloroethylene	ug/l	lbs/day	81.0 ug/l	5.77 lbs/day
Vinyl chloride	ug/l	lbs/day	525.0 ug/l	37.43 lbs/day
				lbs/day
				lbs/day
<b>Pesticides</b>				
Aldrin	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Dieldrin	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Chlordane	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
4,4'-DDT	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
4,4'-DDE	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
4,4'-DDD	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
alpha-Endosulfan	ug/l	lbs/day	2.0 ug/l	0.14 lbs/day
beta-Endosulfan	ug/l	lbs/day	2.0 ug/l	0.14 lbs/day
Endosulfan sulfate	ug/l	lbs/day	2.0 ug/l	0.14 lbs/day
Endrin	ug/l	lbs/day	0.8 ug/l	0.06 lbs/day
Endrin aldehyde	ug/l	lbs/day	0.8 ug/l	0.06 lbs/day
Heptachlor	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Heptachlor epoxide				
<b>PCB's</b>				
PCB 1242 (Arochlor 124	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1254 (Arochlor 124	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1221 (Arochlor 122	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1232 (Arochlor 123	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1248 (Arochlor 124	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1260 (Arochlor 126	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1016 (Arochlor 101	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
<b>Pesticide</b>				
Toxaphene	ug/l		0.0 ug/l	0.00 lbs/day
<b>Dioxin</b>				
Dioxin (2,3,7,8-TCDD)	ug/l	lbs/day		

**Utah Division of Water Quality  
Salt Lake City, Utah**

**Metals**

Antimony	ug/l	lbs/day		
Arsenic	ug/l	lbs/day	4300.00 ug/l	306.54 lbs/day
Asbestos	ug/l	lbs/day		
Beryllium				
Cadmium				
Chromium (III)				
Chromium (VI)				
Copper				
Cyanide	ug/l	lbs/day	2.2E+05 ug/l	15683.53 lbs/day
Lead	ug/l	lbs/day		
Mercury			0.15 ug/l	0.01 lbs/day
Nickel			4600.00 ug/l	327.93 lbs/day
Selenium	ug/l	lbs/day		
Silver	ug/l	lbs/day		
Thallium			6.30 ug/l	0.45 lbs/day
Zinc				

**There are additional standards that apply to this receiving water, but were not considered in this modeling/waste load allocation analysis.**

**VII. Mathematical Modeling of Stream Quality**

Model configuration was accomplished utilizing standard modeling procedures. Data points were plotted and coefficients adjusted as required to match observed data as closely as possible.

The modeling approach used in this analysis included one or a combination of the following models.

- (1) The Utah River Model, Utah Division of Water Quality, 1992. Based upon STREAMDO IV (Region VIII) and Supplemental Ammonia Toxicity Models; EPA Region VIII, Sept. 1990 and QUAL2E (EPA, Athens, GA).
- (2) Utah Ammonia/Chlorine Model, Utah Division of Water Quality, 1992.
- (3) AMMTOX Model, University of Colorado, Center of Limnology, and EPA Region 8
- (4) Principles of Surface Water Quality Modeling and Control. Robert V. Thomann, et.al. Harper Collins Publisher, Inc. 1987, pp. 644.

Coefficients used in the model were based, in part, upon the following references:

- (1) Rates, Constants, and Kinetics Formulations in Surface Water Quality Modeling. Environmental Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Athens Georgia. EPA/600/3-85/040 June 1985.

**Utah Division of Water Quality  
Salt Lake City, Utah**

(2) Principles of Surface Water Quality Modeling and Control. Robert V. Thomann, et.al.  
Harper Collins Publisher, Inc. 1987, pp. 644.

**VIII. Modeling Information**

The required information for the model may include the following information for both the upstream conditions at low flow and the effluent conditions:

Flow, Q, (cfs or MGD)	D.O. mg/l
Temperature, Deg. C.	Total Residual Chlorine (TRC), mg/l
pH	Total NH3-N, mg/l
BOD5, mg/l	Total Dissolved Solids (TDS), mg/l
Metals, ug/l	Toxic Organics of Concern, ug/l

**Other Conditions**

In addition to the upstream and effluent conditions, the models require a variety of physical and biological coefficients and other technical information. In the process of actually establishing the permit limits for an effluent, values are used based upon the available data, model calibration, literature values, site visits and best professional judgement.

**Model Inputs**

The following is upstream and discharge information that was utilized as inputs for the analysis.

**Current Upstream Information**

	Stream								
	Critical Low								
	Flow	Temp.	pH	T-NH3	BOD5	DO	TRC	TDS	
	cfs	Deg. C		mg/l as N	mg/l	mg/l	mg/l	mg/l	
Summer (Irrig. Season)	7.10	21.0	8.1	0.04	1.00	6.76	0.00	270.9	
Fall	7.10	8.4	8.4	0.04	1.00	---	0.00	302.2	
Winter	7.10	6.8	8.4	0.04	1.00	---	0.00	291.7	
Spring	7.10	10.4	8.5	0.04	1.00	---	0.00	217.7	
Dissolved Metals	Al	As	Cd	CrIII	CrVI	Copper	Fe	Pb	
All Seasons	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	
	5.00	0.50	0.05	2.50	3.975*	2.20	10.0	0.14	
Dissolved Metals	Hg	Ni	Se	Ag	Zn	Boron			
All Seasons	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l			
	0.0000	2.50	0.50	0.25	13.70	15.0	* ~80% MDL		

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**Projected Discharge Information**

<b>Season</b>	<b>Flow, MGD</b>	<b>Temp.</b>
Summer	3.96000	13.8
Fall	3.96000	12.7
Winter	3.96000	12.6
Spring	3.96000	13.1

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

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 coincide with the environmental conditions expected at low stream flows.

**Effluent Limitation for Flow based upon Water Quality Standards**

In-stream criteria of downstream segments will be met with an effluent flow maximum value as follows:

<b>Season</b>	<b>Daily Average</b>	
Summer	3.960 MGD	6.126 cfs
Fall	3.960 MGD	6.126 cfs
Winter	3.960 MGD	6.126 cfs
Spring	3.960 MGD	6.126 cfs

**Flow Requirement or Loading Requirement**

The calculations in this wasteload analysis utilize the maximum effluent discharge flow of 3.96 MGD. If the discharger is allowed to have a flow greater than 3.96 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.

**Effluent Limitation for Whole Effluent Toxicity (WET) based upon WET Policy**

Effluent Toxicity will not occur in downstream segments if the values below are met.

<b>WET Requirements</b>	LC50 >	100.0% Effluent	[Acute]
	IC25 >	46.3% Effluent	[Chronic]

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Salt Lake City, Utah**

**Effluent Limitation for Biological Oxygen Demand (BOD) based upon Water Quality Standards or Regulations**

In-stream criteria of downstream segments for Dissolved Oxygen will be met with an effluent BOD limitation as follows:

Season	Concentration	
Summer	25.0 mg/l as BOD5	825.5 lbs/day
Fall	25.0 mg/l as BOD5	825.5 lbs/day
Winter	25.0 mg/l as BOD5	825.5 lbs/day
Spring	25.0 mg/l as BOD5	825.5 lbs/day

**Effluent Limitation for Dissolved Oxygen (DO) based upon Water Quality Standards**

In-stream criteria of downstream segments for Dissolved Oxygen will be met with an effluent

Season	Concentration
Summer	4.50
Fall	4.50
Winter	4.50
Spring	4.50

In-stream criteria of downstream segments for Total Ammonia will be met with an effluent limitation (expressed as Total Ammonia as N) as follows:

Season		Concentration	Load
Summer	4 Day Avg. - Chronic	6.92 mg/l as N	228.5 lbs/day
	1 Hour Avg. - Acute	17.2 mg/l as N	567.7 lbs/day
Fall	4 Day Avg. - Chronic	4.3 mg/l as N	141.8 lbs/day
	1 Hour Avg. - Acute	7.0 mg/l as N	231.0 lbs/day
Winter	4 Day Avg. - Chronic	4.3 mg/l as N	143.5 lbs/day
	1 Hour Avg. - Acute	7.4 mg/l as N	243.9 lbs/day
Spring	4 Day Avg. - Chronic	4.5 mg/l as N	148.6 lbs/day
	1 Hour Avg. - Acute	7.6 mg/l as N	251.0 lbs/day

Acute limit calculated with an Acute Zone of Initial Dilution (ZID) to be equal to 100.%.

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Salt Lake City, Utah**

**Effluent Limitation for Total Residual Chlorine based upon Water Quality Standards**

In-stream criteria of downstream segments for Total Residual Chlorine will be met with an effluent limitation as follows:

Season		Concentration	Load
Summer	4 Day Avg. - Chronic	0.023 mg/l	0.75 lbs/day
	1 Hour Avg. - Acute	0.040 mg/l	1.31 lbs/day
Fall	4 Day Avg. - Chronic	0.023 mg/l	0.75 lbs/day
	1 Hour Avg. - Acute	0.040 mg/l	1.31 lbs/day
Winter	4 Day Avg. - Chronic	0.023 mg/l	0.75 lbs/day
	1 Hour Avg. - Acute	0.040 mg/l	1.31 lbs/day
Spring	4 Day Avg. - Chronic	0.023 mg/l	0.75 lbs/day
	1 Hour Avg. - Acute	0.040 mg/l	1.31 lbs/day

**Effluent Limitations for Total Dissolved Solids based upon Water Quality Standards**

Season		Concentration	Load
Summer	Maximum, Acute	2276.8 mg/l	37.59 tons/day
Fall	Maximum, Acute	2240.5 mg/l	36.99 tons/day
Winter	Maximum, Acute	2252.7 mg/l	37.19 tons/day
Spring	Maximum, Acute	2338.5 mg/l	38.61 tons/day

Colorado Salinity Forum Limits                      Determined by Permitting Section

**Effluent Limitations for Total Recoverable Metals based upon Water Quality Standards**

In-stream criteria of downstream segments for Dissolved Metals will be met with an effluent limitation as follows (based upon a hardness of 262.96 mg/l):

	4 Day Average		1 Hour Average		Load
	Concentration	Load	Concentration	Load	
Aluminum*	N/A	N/A	1,181.7	ug/l	39.1 lbs/day
Arsenic*	409.63 ug/l	8.7 lbs/day	536.7	ug/l	17.8 lbs/day
Cadmium	3.79 ug/l	0.1 lbs/day	7.3	ug/l	0.2 lbs/day
Chromium III	407.82 ug/l	8.7 lbs/day	6,285.1	ug/l	207.9 lbs/day
Chromium VI*	19.14 ug/l	0.4 lbs/day	23.0	ug/l	0.8 lbs/day
Copper	43.46 ug/l	0.9 lbs/day	53.7	ug/l	1.8 lbs/day
Iron*	N/A	N/A	1,573.7	ug/l	52.1 lbs/day
Lead	23.36 ug/l	0.5 lbs/day	441.5	ug/l	14.6 lbs/day
Mercury*	0.03 ug/l	0.0 lbs/day	3.8	ug/l	0.1 lbs/day
Nickel	252.28 ug/l	5.4 lbs/day	1,677.6	ug/l	55.5 lbs/day
Selenium*	9.35 ug/l	0.2 lbs/day	31.3	ug/l	1.0 lbs/day
Silver	N/A ug/l	N/A lbs/day	31.4	ug/l	1.0 lbs/day

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Salt Lake City, Utah**

Zinc	570.98 ug/l	12.2 lbs/day	421.4	ug/l	13.9 lbs/day
Cyanide*	11.23 ug/l	0.2 lbs/day	34.7	ug/l	1.1 lbs/day

\*Limits for these metals are based on the dissolved standard.

**Effluent Limitations for Heat/Temperature based upon  
Water Quality Standards**

Summer	25.3 Deg. C.	77.6 Deg. F
Fall	12.7 Deg. C.	54.9 Deg. F
Winter	11.1 Deg. C.	52.0 Deg. F
Spring	14.7 Deg. C.	58.5 Deg. F

**Effluent Limitations for Organics [Pesticides]  
Based upon Water Quality Standards**

In-stream criteria of downstream segments for Organics [Pesticides] will be met with an effluent limit as follows:

	4 Day Average		1 Hour Average		
	Concentration	Load	Concentration		Load
Aldrin			1.5E+00	ug/l	7.68E-02 lbs/day
Chlordane	4.30E-03 ug/l	1.42E-01 lbs/day	1.2E+00	ug/l	6.14E-02 lbs/day
DDT, DDE	1.00E-03 ug/l	3.30E-02 lbs/day	5.5E-01	ug/l	2.81E-02 lbs/day
Dieldrin	1.90E-03 ug/l	6.27E-02 lbs/day	1.3E+00	ug/l	6.40E-02 lbs/day
Endosulfan	5.60E-02 ug/l	1.85E+00 lbs/day	1.1E-01	ug/l	5.63E-03 lbs/day
Endrin	2.30E-03 ug/l	7.59E-02 lbs/day	9.0E-02	ug/l	4.61E-03 lbs/day
Guthion	0.00E+00 ug/l	0.00E+00 lbs/day	1.0E-02	ug/l	5.12E-04 lbs/day
Heptachlor	3.80E-03 ug/l	1.25E-01 lbs/day	2.6E-01	ug/l	1.33E-02 lbs/day
Lindane	8.00E-02 ug/l	2.64E+00 lbs/day	1.0E+00	ug/l	5.12E-02 lbs/day
Methoxychlor	0.00E+00 ug/l	0.00E+00 lbs/day	3.0E-02	ug/l	1.54E-03 lbs/day
Mirex	0.00E+00 ug/l	0.00E+00 lbs/day	1.0E-02	ug/l	5.12E-04 lbs/day
Parathion	0.00E+00 ug/l	0.00E+00 lbs/day	4.0E-02	ug/l	2.05E-03 lbs/day
PCB's	1.40E-02 ug/l	4.62E-01 lbs/day	2.0E+00	ug/l	1.02E-01 lbs/day
Pentachlorophenol	1.30E+01 ug/l	4.29E+02 lbs/day	2.0E+01	ug/l	1.02E+00 lbs/day
Toxephene	2.00E-04 ug/l	6.60E-03 lbs/day	7.3E-01	ug/l	3.74E-02 lbs/day

**Utah Division of Water Quality  
Salt Lake City, Utah**

**Effluent Targets for Pollution Indicators  
Based upon Water Quality Standards**

In-stream criteria of downstream segments for Pollution Indicators will be met with an effluent limit as follows:

	<b>1 Hour Average</b>	
	<b>Concentration</b>	<b>Loading</b>
Gross Beta (pCi/l)	50.0 pCi/L	
BOD (mg/l)	5.0 mg/l	165.4 lbs/day
Nitrates as N	4.0 mg/l	132.3 lbs/day
Total Phosphorus as P	0.05 mg/l	1.7 lbs/day
Total Suspended Solids	90.0 mg/l	2977.5 lbs/day

Note: Pollution indicator targets are for information purposes only.

**Effluent Limitations for Protection of Human Health [Toxics Rule]  
Based upon Water Quality Standards (Most stringent of 1C or 3A & 3B as appropriate.)**

In-stream criteria of downstream segments for Protection of Human Health [Toxics] will be met with an effluent limit as follows:

<b>Toxic Organics</b>	<b>Maximum Concentration</b>	
	<b>Concentration</b>	<b>Load</b>
Acenaphthene	5.83E+03 ug/l	1.92E+02 lbs/day
Acrolein	1.68E+03 ug/l	5.56E+01 lbs/day
Acrylonitrile	1.42E+00 ug/l	4.71E-02 lbs/day
Benzene	1.53E+02 ug/l	5.06E+00 lbs/day
Benzidine	ug/l	lbs/day
Carbon tetrachloride	9.50E+00 ug/l	3.14E-01 lbs/day
Chlorobenzene	4.53E+04 ug/l	1.50E+03 lbs/day
1,2,4-Trichlorobenzene		
Hexachlorobenzene	1.66E-03 ug/l	5.49E-05 lbs/day
1,2-Dichloroethane	2.14E+02 ug/l	7.06E+00 lbs/day
1,1,1-Trichloroethane		
Hexachloroethane	1.92E+01 ug/l	6.34E-01 lbs/day
1,1-Dichloroethane		
1,1,2-Trichloroethane	9.07E+01 ug/l	2.99E+00 lbs/day
1,1,2,2-Tetrachloroethane	2.37E+01 ug/l	7.84E-01 lbs/day
Chloroethane		
Bis(2-chloroethyl) ether	3.02E+00 ug/l	9.98E-02 lbs/day
2-Chloroethyl vinyl ether		
2-Chloronaphthalene	9.28E+03 ug/l	3.07E+02 lbs/day
2,4,6-Trichlorophenol	1.40E+01 ug/l	4.63E-01 lbs/day
p-Chloro-m-cresol		
Chloroform (HM)	1.01E+03 ug/l	3.35E+01 lbs/day
2-Chlorophenol	8.64E+02 ug/l	2.85E+01 lbs/day
1,2-Dichlorobenzene	3.67E+04 ug/l	1.21E+03 lbs/day
1,3-Dichlorobenzene	5.61E+03 ug/l	1.85E+02 lbs/day

**Utah Division of Water Quality  
Salt Lake City, Utah**

1,4-Dichlorobenzene	5.61E+03 ug/l	1.85E+02 lbs/day
3,3'-Dichlorobenzidine	1.66E-01 ug/l	5.49E-03 lbs/day
1,1-Dichloroethylene	6.91E+00 ug/l	2.28E-01 lbs/day
1,2-trans-Dichloroethylene1		
2,4-Dichlorophenol	1.71E+03 ug/l	5.63E+01 lbs/day
1,2-Dichloropropane	8.42E+01 ug/l	2.78E+00 lbs/day
1,3-Dichloropropylene	3.67E+03 ug/l	1.21E+02 lbs/day
2,4-Dimethylphenol	4.97E+03 ug/l	1.64E+02 lbs/day
2,4-Dinitrotoluene	1.96E+01 ug/l	6.49E-01 lbs/day
2,6-Dinitrotoluene		
1,2-Diphenylhydrazine	1.17E+00 ug/l	3.85E-02 lbs/day
Ethylbenzene	6.26E+04 ug/l	2.07E+03 lbs/day
Fluoranthene	7.99E+02 ug/l	2.64E+01 lbs/day
4-Chlorophenyl phenyl ether		
4-Bromophenyl phenyl ether		
Bis(2-chloroisopropyl) ether	3.67E+05 ug/l	1.21E+04 lbs/day
Bis(2-chloroethoxy) methane		
Methylene chloride (HM)	3.45E+03 ug/l	1.14E+02 lbs/day
Methyl chloride (HM)		
Methyl bromide (HM)		
Bromoform (HM)	7.77E+02 ug/l	2.57E+01 lbs/day
Dichlorobromomethane(HM)	4.75E+01 ug/l	1.57E+00 lbs/day
Chlorodibromomethane (HM)	7.34E+01 ug/l	2.42E+00 lbs/day
Hexachlorocyclopentadiene	3.67E+04 ug/l	1.21E+03 lbs/day
Isophorone	1.30E+03 ug/l	4.28E+01 lbs/day
Naphthalene		
Nitrobenzene	4.10E+03 ug/l	1.35E+02 lbs/day
2-Nitrophenol		
4-Nitrophenol		
2,4-Dinitrophenol	3.02E+04 ug/l	9.98E+02 lbs/day
4,6-Dinitro-o-cresol	1.65E+03 ug/l	5.45E+01 lbs/day
N-Nitrosodimethylamine	1.75E+01 ug/l	5.77E-01 lbs/day
N-Nitrosodiphenylamine	3.45E+01 ug/l	1.14E+00 lbs/day
N-Nitrosodi-n-propylamine	3.02E+00 ug/l	9.98E-02 lbs/day
Pentachlorophenol	1.77E+01 ug/l	5.85E-01 lbs/day
Phenol	9.93E+06 ug/l	3.28E+05 lbs/day
Bis(2-ethylhexyl)phthalate	1.27E+01 ug/l	4.21E-01 lbs/day
Butyl benzyl phthalate	1.12E+04 ug/l	3.71E+02 lbs/day
Di-n-butyl phthalate	2.59E+04 ug/l	8.55E+02 lbs/day
Di-n-octyl phthlate		
Diethyl phthalate	2.59E+05 ug/l	8.55E+03 lbs/day
Dimethyl phthlate	6.26E+06 ug/l	2.07E+05 lbs/day
Benzo(a)anthracene (PAH)	6.69E-02 ug/l	2.21E-03 lbs/day
Benzo(a)pyrene (PAH)	6.69E-02 ug/l	2.21E-03 lbs/day
Benzo(b)fluoranthene (PAH)	6.69E-02 ug/l	2.21E-03 lbs/day
Benzo(k)fluoranthene (PAH)	6.69E-02 ug/l	2.21E-03 lbs/day
Chrysene (PAH)	6.69E-02 ug/l	2.21E-03 lbs/day
Acenaphthylene (PAH)		
Anthracene (PAH)		
Dibenzo(a,h)anthracene (PAH)	6.69E-02 ug/l	2.21E-03 lbs/day
Indeno(1,2,3-cd)pyrene (PAH)	6.69E-02 ug/l	2.21E-03 lbs/day

**Utah Division of Water Quality  
Salt Lake City, Utah**

Pyrene (PAH)	2.37E+04 ug/l	7.84E+02 lbs/day
Tetrachloroethylene	1.92E+01 ug/l	6.34E-01 lbs/day
Toluene	4.32E+05 ug/l	1.43E+04 lbs/day
Trichloroethylene	1.75E+02 ug/l	5.77E+00 lbs/day
Vinyl chloride	1.13E+03 ug/l	3.74E+01 lbs/day

**Pesticides**

Aldrin	3.02E-04 ug/l	9.98E-06 lbs/day
Dieldrin	3.02E-04 ug/l	9.98E-06 lbs/day
Chlordane	1.27E-03 ug/l	4.21E-05 lbs/day
4,4'-DDT	1.27E-03 ug/l	4.21E-05 lbs/day
4,4'-DDE	1.27E-03 ug/l	4.21E-05 lbs/day
4,4'-DDD	1.81E-03 ug/l	5.99E-05 lbs/day
alpha-Endosulfan	4.32E+00 ug/l	1.43E-01 lbs/day
beta-Endosulfan	4.32E+00 ug/l	1.43E-01 lbs/day
Endosulfan sulfate	4.32E+00 ug/l	1.43E-01 lbs/day
Endrin	1.75E+00 ug/l	5.77E-02 lbs/day
Endrin aldehyde	1.75E+00 ug/l	5.77E-02 lbs/day
Heptachlor	4.53E-04 ug/l	1.50E-05 lbs/day
Heptachlor epoxide		

**PCB's**

PCB 1242 (Arochlor 1242)	9.72E-05 ug/l	3.21E-06 lbs/day
PCB-1254 (Arochlor 1254)	9.72E-05 ug/l	3.21E-06 lbs/day
PCB-1221 (Arochlor 1221)	9.72E-05 ug/l	3.21E-06 lbs/day
PCB-1232 (Arochlor 1232)	9.72E-05 ug/l	3.21E-06 lbs/day
PCB-1248 (Arochlor 1248)	9.72E-05 ug/l	3.21E-06 lbs/day
PCB-1260 (Arochlor 1260)	9.72E-05 ug/l	3.21E-06 lbs/day
PCB-1016 (Arochlor 1016)	9.72E-05 ug/l	3.21E-06 lbs/day

**Pesticide**

Toxaphene	1.62E-03 ug/l	5.35E-05 lbs/day
-----------	---------------	------------------

**Metals**

Antimony	ug/l	lbs/day
Arsenic	ug/l	lbs/day
Asbestos	ug/l	lbs/day
Beryllium		
Cadmium		
Chromium (III)		
Chromium (VI)		
Copper	ug/l	lbs/day
Cyanide	ug/l	lbs/day
Lead		
Mercury	ug/l	lbs/day
Nickel	ug/l	lbs/day
Selenium		
Silver		
Thallium	ug/l	lbs/day
Zinc		



**Utah Division of Water Quality  
Salt Lake City, Utah**

Cyanide	34.7	11.2	
Iron	1573.7		
Lead	215.7	23.4	
Mercury	0.324	0.026	
Nickel	1677.6	252	
Selenium	31.3	9.4	
Silver	31.4	N/A	
Thallium	13.6		
Zinc	421.4	571.0	Acute Controls
Boron	1601.84		
Sulfate	4317.9		N/A at this Waterbody

Other Effluent Limitations are based upon R317-1.

E. coli                      126.0 organisms per 100 ml

**X. Antidegradation Considerations**

The Utah Antidegradation Policy allows for degradation of existing quality where it is determined that such lowering of water quality is necessary to accommodate important economic or social development in the area in which the waters are protected [R317-2-3]. It has been determined that certain chemical parameters introduced by this discharge will cause an increase of the concentration of said parameters in the receiving waters. Under no conditions will the increase in concentration be allowed to interfere with existing instream water uses.

An Antidegradation Level I Review was conducted on this discharge and its effect on the receiving water. Based upon that review, it has been determined that an Antidegradation Level II Review is not required. The proposed permit is a simple renewal, with no increase in flow or concentration over that which was approved in the existing permit.

**XI. Colorado River Salinity Forum Considerations**

Discharges in the Colorado River Basin are required to have their discharge at a TDS loading of less than 1.00 tons/day unless certain exemptions apply. Refer to the Forum's Guidelines for additional information allowing for an exceedence of this value.

**XII. Summary Comments**

The mathematical modeling and best professional judgement indicate that violations of receiving water beneficial uses with their associated water quality standards, including important down-stream segments, will not occur for the evaluated parameters of concern as discussed above if the effluent limitations indicated above are met.

Prepared by:  
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Utah Division of Water Quality  
801-538-6052  
EB\_HobbleWLA\_2-27-19.xls

**ALLOWABLE EFFLUENT CONCENTRATION/LOADING FOR CONSERVATIVE SUBSTANCES**

Date of Analysis: 3/7/2019

This Calculates the Allowable Effluent Concentration/Loading for Conservative Substances in a Receiving Water

Discharge 001

Conservative Substance:  
Acute or Chronic Standard  
Discharger:  
Receiving Water:  
Classification:  
For the Season / Year

RDX
Chronic
Ensign Bickford
Hobble Creek
2B, 3A, 4
Yearly Average

**Assumptions:**

- 1) Conservative Substance
- 2) Complete mixing
- 3) Background Flow 7Q10=7.1 mg/l
- 4) Background Concentration 0.00001 mg/l
- 5) Calculation utilizes 100% of mixed assimilative capacity

**Receiving Water Information - Hobble Creek**

Flow, cfs	7.100
Flow, cfs (Acute)	3.550
RDX, mg/l	0.00001
RDX Load, lbs/day	0.00

**Stream Standard**

RDX, mg/l	0.0020
Allowable Loading Before Mix:	0.08 lbs/day
Acute / Chronic Standard [Toxics]	Chronic

**Combined Effluent/Receiving Water Information**

Flow, cfs	13.230 cfs
RDX, mg/l	0.00200 mg/l
Concentration Delta Increase, mg/l	0.00199 mg/l [Delta]
Percent Increase:	199.00

**Summary**

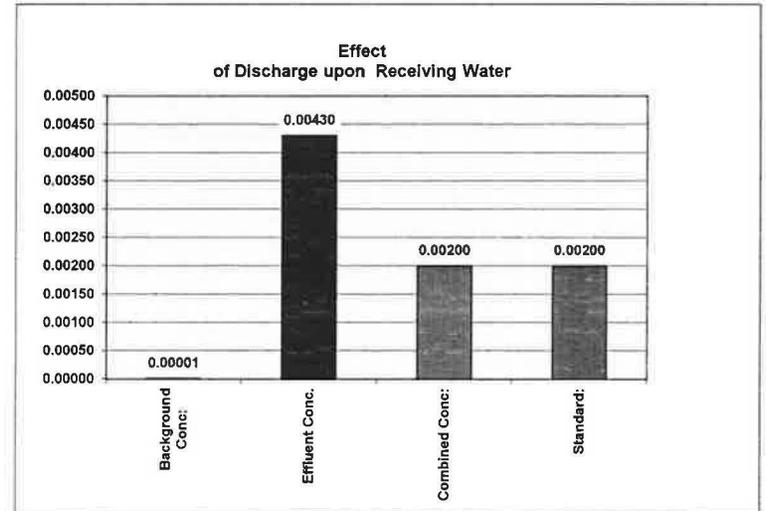
Background Conc:	0.00001 mg/l
Effluent Conc.	0.00430 mg/l
Combined Conc:	0.00200 mg/l
Standard:	0.00200 mg/l
Percent Change	199.00

**Effluent Information [Proposed] Ensign Bickford**

Flow, cfs	6.1300
Flow, MGD	
Flow, cfs	6.130
RDX, mg/l	0.00430
RDX Load, lbs/day	0.14
RDX Load, kg/day	0.06
RDX Load, lbs/year	51.92
RDX Load, kg/year	23.55
RDX Load, tons/day	0.0001
RDX Load, tons/year	0.0
Dilution Ratio: (background:discharge)	1.16
Percent of Stream Flow Used in Calc.	100%

**Flow Range Dependent RDX Effluent Limits**

Flow (cfs)	RDX Daily Max (mg/l)
0.00 -0.56	0.0272
0.57 -1.11	0.0147
1.12-1.67	0.0107
1.68-2.79	0.0071
2.80-4.46	0.0052
4.47-6.13	0.0043



**ALLOWABLE EFFLUENT CONCENTRATION/LOADING FOR CONSERVATIVE SUBSTANCES**

Date of Analysis: 3/7/2019

This Calculates the Allowable Effluent Concentration/Loading for Conservative Substances in a Receiving Water

Discharge 001

Conservative Substance:  
Acute or Chronic Standard  
Discharger:  
Receiving Water:  
Classification:  
For the Season / Year

Nitrate Nitrogen
Chronic
Ensign Bickford
Hobble Creek
2B, 3A, 4
Yearly Average

**Assumptions:**

- 1) Conservative Substance
- 2) Complete mixing
- 3) Background Flow 7Q10 = 7.1 mg/l
- 4) Background Concentration 1 mg/l
- 5) Calculation utilizes 100% of mixed assimilative capacity

**Receiving Water Information - Hobble Creek**

Flow, cfs	7.100
Flow, cfs (Acute)	3.550
Nitrate Nitrogen, mg/l	1.00000
Nitrate Nitrogen Load, lbs/day	38.27

**Stream Standard**

Nitrate Nitrogen, mg/l	10.0000
Allowable Loading Before Mix:	382.69 lbs/day
Acute / Chronic Standard [Toxics]	Chronic

**Combined Effluent/Receiving Water Information**

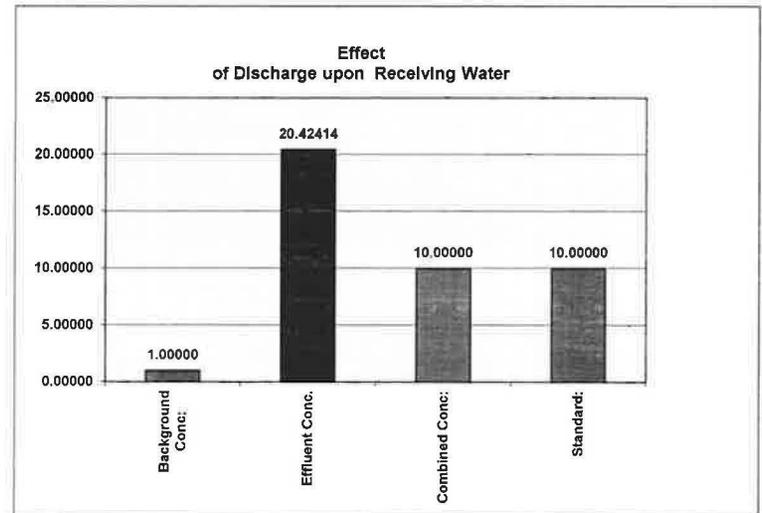
Flow, cfs	13.230 cfs
Nitrate Nitrogen, mg/l	10.00000 mg/l
Concentration Delta Increase, mg/l	9.00000 mg/l [Delta]
Percent Increase:	9.00

**Summary**

Background Conc:	1.00000 mg/l
Effluent Conc.	20.42414 mg/l
Combined Conc:	10.00000 mg/l
Standard:	10.00000 mg/l
Percent Change	9.00

**Effluent Information [Proposed] Ensign Bickford**

Flow, cfs	6.1300
Flow, MGD	
Flow, cfs	6.130
Nitrate Nitrogen, mg/l	20.42414
Nitrate Nitrogen Load, lbs/day	674.83
Nitrate Nitrogen Load, kg/day	306.10
Nitrate Nitrogen Load, lbs/year	246,312.22
Nitrate Nitrogen Load, kg/year	111,727.22
Nitrate Nitrogen Load, tons/day	0.3374
Nitrate Nitrogen Load, tons/year	123.2
Dilution Ratio: (background:discharge)	1.16
Percent of Stream Flow Used in Calc.	100%



**Flow Range Dependent Nitrate Nitrogen Effluent Limits**

Flow (cfs)	Nitrate N
0.00 -0.56	124.1071
0.57 -1.11	67.5676
1.12 -1.67	48.2635
1.68 -2.79	32.9032
2.80 -4.46	24.3274
4.47 -6.13	20.4241

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

**Date:** March 6, 2019  
**Prepared by:** Dave Wham   
Standards and Technical Services  
**Facility:** Ensign-Bickford 002, UPDES Permit No. UT0025283  
**Receiving water:** Spanish Fork River (2B, 3B, 3D, 4)

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

002 Discharge from the Spanish Fork granular activated carbon groundwater treatment system. Design flow 2.16 mgd (3.35 cfs).

Receiving Water

Per UAC R317-2-13.5(c), the designated beneficial uses of 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.*
- *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 the wasteload analysis is considered the lowest stream flow for seven consecutive days with a ten year return frequency (7Q10). Due to the lack of available and representative flow data on the Spanish Fork River at the discharge location, the 7Q10 flow was estimated using the 20<sup>th</sup> percentile of flow data from DWQ monitoring station # 4995580, *SPANISH FORK R AB UTAH L (LAKESHORE)* for the period 2007-2013. This station is located below the discharge location, but was the only representative data available. The upstream station used to characterize the receiving water quality (DWQ station #4995600, *SPANISH FORK RIVER AT MOARK DIVERSION*) has a good long term flow record, but is located immediately above a major water diversion.

### TMDL

According to the Utah's 2016 303(d) Water Quality Assessment Report, the receiving water for the discharge; Spanish Fork River from Utah Lake to Moark Diversion (AU# UT16020202-001\_00) is not listed as impaired for any of its beneficial uses.

The downstream waterbody, Utah Lake other than Provo Bay (AU UT-L-16020201-004\_01), is listed as impaired for harmful algal blooms (Class 2B); PCB in fish tissue and total phosphorus (Class 3B) and total dissolved solids (Class 4). Although the WLA may show higher allowed effluent limits for these impaired constituents should be evaluated in the effluent against the end of pipe Water Quality Standards in Table 1 to determine whether or not they have reasonable potential to cause or contribute to the existing impairments.

**Table 1. End of pipe Criteria**

<b>Constituent</b>	<b>Criteria</b>
TDS	1200 mg/l
Harmful algal blooms	N/A
PCB in fish tissue	N/A
Total phosphorous	N/A

### 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. Water quality standards must be met at the end of the mixing zone. The mixing zone model showed complete mixing within 2,500 feet for chronic conditions. Acute effluent limits were calculated using 50% of the critical low flow value in the receiving water.

### Parameters of Concern

The potential parameters of concern identified for the discharge were TDS, RDX and nitrate as determined by the impairment status of the receiving water and review of the previous permit.

### 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 LC<sub>50</sub> (lethal concentration, 50%) percent effluent for acute toxicity and the IC<sub>25</sub> (inhibition concentration, 25%) percent effluent for chronic toxicity, as determined by the WET

**Utah Division of Water Quality  
Wasteload Analysis  
Ensign-Bickford 002  
UPDES Permit No. UT0025283**

test, needs to be below the WET limits, as determined by the WLA. The WET limit for LC<sub>50</sub> is typically 100% effluent and does not need to be determined by the WLA.

IC25 WET limits for Outfall 002 should be based on 10.0 % effluent.

Wasteload Allocation Methods

Effluent limits were determined for conservative constituents using a simple mass balance mixing analysis (UDWQ 2012). The mass balance analysis is summarized in the Wasteload Addendums.

The water quality standard for chronic ammonia toxicity is dependent on temperature and pH, and the water quality standard for acute ammonia toxicity is dependent on pH. The AMMTOX Model developed by University of Colorado and adapted by Utah DWQ and EPA Region VIII was used to determine ammonia effluent limits (Lewis et al. 2002). The 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. The proposed permit is a simple renewal of an existing UPDES permit. No increase in flow or concentration of pollutants over those authorized in the the existing permit is being requested.

Documents:

WLA Document: Ensign\_Bickford\_002-WLADoc\_3-7-19.docx

Wasteload Analysis and Addendums: Ensign\_Bickford\_002-WLA\_3-7-19.xlsm

References:

Utah Division of Water Quality. 2012. *Utah Wasteload Analysis Procedures Version 1.0.*

**Utah Division of Water Quality  
Salt Lake City, Utah**

**WASTELOAD ANALYSIS [WLA]  
Addendum: Statement of Basis**

7-Mar-19

**Facilities: Ensign Bickford 002**  
**Discharging to: Spanish Fork River**  
**Design Flow: 2.16 MGD**

**UPDES No: UT-0025283**

**I. Introduction**

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 [R317-2-8, UAC]. Projected concentrations are compared to numeric water quality standards to determine acceptability. The anti-degradation policy and procedures are also considered. The primary in-stream parameters of concern may include metals (as a function of hardness), total dissolved solids (TDS), total residual chlorine (TRC), un-ionized ammonia (as a function of pH and temperature, measured and evaluated in terms of total ammonia), and dissolved oxygen.

Mathematical water quality modeling is employed to determine stream quality response to point source discharges. Models aid in the effort of anticipating stream quality at future effluent flows at critical environmental conditions (e.g., low stream flow, high temperature, high pH, etc).

The numeric criteria in this wasteload analysis may always be modified by narrative criteria and other conditions determined by staff of the Division of Water Quality.

**II. Receiving Water and Stream Classification**

Spanish Fork River:	2B, 3B, 3D, 4
Antidegradation Review:	Level I review completed. Level II review not required.

**III. Numeric Stream Standards for Protection of Aquatic Wildlife**

Total Ammonia (TNH3)	Varies as a function of Temperature and pH Rebound. See Water Quality Standards
Chronic Total Residual Chlorine (TRC)	0.011 mg/l (4 Day Average) 0.019 mg/l (1 Hour Average)
Chronic Dissolved Oxygen (DO)	5.50 mg/l (30 Day Average) 4.00 mg/l (7Day Average) 3.00 mg/l (1 Day Average)
Maximum Total Dissolved Solids	1200.0 mg/l

**Utah Division of Water Quality  
Salt Lake City, Utah**

**Acute and Chronic Heavy Metals (Dissolved)**

Parameter	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard		
	Concentration	Load*	Concentration		Load*
Aluminum	87.00 ug/l**	1.570 lbs/day	750.00	ug/l	13.534 lbs/day
Arsenic	190.00 ug/l	3.429 lbs/day	340.00	ug/l	6.136 lbs/day
Cadmium	0.32 ug/l	0.006 lbs/day	0.57	ug/l	0.010 lbs/day
Chromium III	32.21 ug/l	0.581 lbs/day	673.83	ug/l	12.160 lbs/day
ChromiumVI	11.00 ug/l	0.199 lbs/day	16.00	ug/l	0.289 lbs/day
Copper	3.34 ug/l	0.060 lbs/day	4.51	ug/l	0.081 lbs/day
Iron			1000.00	ug/l	18.046 lbs/day
Lead	0.69 ug/l	0.012 lbs/day	17.68	ug/l	0.319 lbs/day
Mercury	0.0120 ug/l	0.000 lbs/day	2.40	ug/l	0.043 lbs/day
Nickel	18.87 ug/l	0.341 lbs/day	169.74	ug/l	3.063 lbs/day
Selenium	4.60 ug/l	0.083 lbs/day	20.00	ug/l	0.361 lbs/day
Silver	N/A ug/l	N/A lbs/day	0.48	ug/l	0.009 lbs/day
Zinc	43.28 ug/l	0.781 lbs/day	43.28	ug/l	0.781 lbs/day

\* Allowed below discharge

\*\*Chronic Aluminum standard applies only to waters with a pH < 7.0 and a Hardness < 50 mg/l as CaCO<sub>3</sub>

Metals Standards Based upon a Hardness of 30.07 mg/l as CaCO<sub>3</sub>

**Organics [Pesticides]**

Parameter	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard		
	Concentration	Load*	Concentration		Load*
Aldrin			1.500	ug/l	0.027 lbs/day
Chlordane	0.004 ug/l	0.773 lbs/day	1.200	ug/l	0.022 lbs/day
DDT, DDE	0.001 ug/l	0.180 lbs/day	0.550	ug/l	0.010 lbs/day
Dieldrin	0.002 ug/l	0.341 lbs/day	1.250	ug/l	0.023 lbs/day
Endosulfan	0.056 ug/l	10.064 lbs/day	0.110	ug/l	0.002 lbs/day
Endrin	0.002 ug/l	0.413 lbs/day	0.090	ug/l	0.002 lbs/day
Guthion			0.010	ug/l	0.000 lbs/day
Heptachlor	0.004 ug/l	0.683 lbs/day	0.260	ug/l	0.005 lbs/day
Lindane	0.080 ug/l	14.377 lbs/day	1.000	ug/l	0.018 lbs/day
Methoxychlor			0.030	ug/l	0.001 lbs/day
Mirex			0.010	ug/l	0.000 lbs/day
Parathion			0.040	ug/l	0.001 lbs/day
PCB's	0.014 ug/l	2.516 lbs/day	2.000	ug/l	0.036 lbs/day
Pentachlorophenol	13.00 ug/l	2336.240 lbs/day	20.000	ug/l	0.361 lbs/day
Toxephene	0.0002 ug/l	0.036 lbs/day	0.7300	ug/l	0.013 lbs/day

**Utah Division of Water Quality  
Salt Lake City, Utah**

**IV. Numeric Stream Standards for Protection of Agriculture**

	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard	
	Concentration	Load*	Concentration	Load*
Arsenic			100.0 ug/l	lbs/day
Boron			750.0 ug/l	lbs/day
Cadmium			10.0 ug/l	0.09 lbs/day
Chromium			100.0 ug/l	lbs/day
Copper			200.0 ug/l	lbs/day
Lead			100.0 ug/l	lbs/day
Selenium			50.0 ug/l	lbs/day
TDS, Summer			1200.0 mg/l	10.83 tons/day

**V. Numeric Stream Standards for Protection of Human Health (Class 1C Waters)**

Metals	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard	
	Concentration	Load*	Concentration	Load*
Arsenic			ug/l	lbs/day
Barium			ug/l	lbs/day
Cadmium			ug/l	lbs/day
Chromium			ug/l	lbs/day
Lead			ug/l	lbs/day
Mercury			ug/l	lbs/day
Selenium			ug/l	lbs/day
Silver			ug/l	lbs/day
Fluoride (3) to			ug/l	lbs/day
Nitrates as N			ug/l	lbs/day

**Chlorophenoxy Herbicides**

2,4-D	ug/l	lbs/day
2,4,5-TP	ug/l	lbs/day
Endrin	ug/l	lbs/day
ocyclohexane (Lindane)	ug/l	lbs/day
Methoxychlor	ug/l	lbs/day
Toxaphene	ug/l	lbs/day

**VI. Numeric Stream Standards the Protection of Human Health from Water & Fish Consumption [Toxics]**

Toxic Organics	Maximum Conc., ug/l - Acute Standards			
	Class 1C [2 Liters/Day for 70 Kg Person over 70 Yr.]		Class 3A, 3B [6.5 g for 70 Kg Person over 70 Yr.]	
	ug/l	lbs/day	ug/l	lbs/day
Acenaphthene	ug/l	lbs/day	2700.0 ug/l	485.22 lbs/day
Acrolein	ug/l	lbs/day	780.0 ug/l	140.17 lbs/day
Acrylonitrile	ug/l	lbs/day	0.7 ug/l	0.12 lbs/day
Benzene	ug/l	lbs/day	71.0 ug/l	12.76 lbs/day
Benzidine	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Carbon tetrachloride	ug/l	lbs/day	4.4 ug/l	0.79 lbs/day
Chlorobenzene	ug/l	lbs/day	21000.0 ug/l	3773.93 lbs/day
1,2,4-Trichlorobenzene				
Hexachlorobenzene	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
1,2-Dichloroethane	ug/l	lbs/day	99.0 ug/l	17.79 lbs/day

**Utah Division of Water Quality  
Salt Lake City, Utah**

1,1,1-Trichloroethane				
Hexachloroethane	ug/l	lbs/day	8.9 ug/l	1.60 lbs/day
1,1-Dichloroethane				
1,1,2-Trichloroethane	ug/l	lbs/day	42.0 ug/l	7.55 lbs/day
1,1,2,2-Tetrachloroethane	ug/l	lbs/day	11.0 ug/l	1.98 lbs/day
Chloroethane			0.0 ug/l	0.00 lbs/day
Bis(2-chloroethyl) ether	ug/l	lbs/day	1.4 ug/l	0.25 lbs/day
2-Chloroethyl vinyl ether	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
2-Chloronaphthalene	ug/l	lbs/day	4300.0 ug/l	772.76 lbs/day
2,4,6-Trichlorophenol	ug/l	lbs/day	6.5 ug/l	1.17 lbs/day
p-Chloro-m-cresol			0.0 ug/l	0.00 lbs/day
Chloroform (HM)	ug/l	lbs/day	470.0 ug/l	84.46 lbs/day
2-Chlorophenol	ug/l	lbs/day	400.0 ug/l	71.88 lbs/day
1,2-Dichlorobenzene	ug/l	lbs/day	17000.0 ug/l	3055.08 lbs/day
1,3-Dichlorobenzene	ug/l	lbs/day	2600.0 ug/l	467.25 lbs/day
1,4-Dichlorobenzene	ug/l	lbs/day	2600.0 ug/l	467.25 lbs/day
3,3'-Dichlorobenzidine	ug/l	lbs/day	0.1 ug/l	0.01 lbs/day
1,1-Dichloroethylene	ug/l	lbs/day	3.2 ug/l	0.58 lbs/day
1,2-trans-Dichloroethylene	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
2,4-Dichlorophenol	ug/l	lbs/day	790.0 ug/l	141.97 lbs/day
1,2-Dichloropropane	ug/l	lbs/day	39.0 ug/l	7.01 lbs/day
1,3-Dichloropropylene	ug/l	lbs/day	1700.0 ug/l	305.51 lbs/day
2,4-Dimethylphenol	ug/l	lbs/day	2300.0 ug/l	413.33 lbs/day
2,4-Dinitrotoluene	ug/l	lbs/day	9.1 ug/l	1.64 lbs/day
2,6-Dinitrotoluene	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
1,2-Diphenylhydrazine	ug/l	lbs/day	0.5 ug/l	0.10 lbs/day
Ethylbenzene	ug/l	lbs/day	29000.0 ug/l	5211.61 lbs/day
Fluoranthene	ug/l	lbs/day	370.0 ug/l	66.49 lbs/day
4-Chlorophenyl phenyl ether				
4-Bromophenyl phenyl ether				
Bis(2-chloroisopropyl) ether	ug/l	lbs/day	170000.0 ug/l	30550.83 lbs/day
Bis(2-chloroethoxy) methane	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Methylene chloride (HM)	ug/l	lbs/day	1600.0 ug/l	287.54 lbs/day
Methyl chloride (HM)	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Methyl bromide (HM)	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Bromoform (HM)	ug/l	lbs/day	360.0 ug/l	64.70 lbs/day
Dichlorobromomethane	ug/l	lbs/day	22.0 ug/l	3.95 lbs/day
Chlorodibromomethane	ug/l	lbs/day	34.0 ug/l	6.11 lbs/day
Hexachlorobutadiene(c)	ug/l	lbs/day	50.0 ug/l	8.99 lbs/day
Hexachlorocyclopentadiene	ug/l	lbs/day	17000.0 ug/l	3055.08 lbs/day
Isophorone	ug/l	lbs/day	600.0 ug/l	107.83 lbs/day
Naphthalene				
Nitrobenzene	ug/l	lbs/day	1900.0 ug/l	341.45 lbs/day
2-Nitrophenol	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
4-Nitrophenol	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
2,4-Dinitrophenol	ug/l	lbs/day	14000.0 ug/l	2515.95 lbs/day
4,6-Dinitro-o-cresol	ug/l	lbs/day	765.0 ug/l	137.48 lbs/day
N-Nitrosodimethylamine	ug/l	lbs/day	8.1 ug/l	1.46 lbs/day
N-Nitrosodiphenylamine	ug/l	lbs/day	16.0 ug/l	2.88 lbs/day
N-Nitrosodi-n-propylamine	ug/l	lbs/day	1.4 ug/l	0.25 lbs/day
Pentachlorophenol	ug/l	lbs/day	8.2 ug/l	1.47 lbs/day

**Utah Division of Water Quality  
Salt Lake City, Utah**

Phenol	ug/l	lbs/day	4.6E+06 ug/l	8.27E+05 lbs/day
Bis(2-ethylhexyl)phthala	ug/l	lbs/day	5.9 ug/l	1.06 lbs/day
Butyl benzyl phthalate	ug/l	lbs/day	5200.0 ug/l	934.50 lbs/day
Di-n-butyl phthalate	ug/l	lbs/day	12000.0 ug/l	2156.53 lbs/day
Di-n-octyl phthlate				
Diethyl phthalate	ug/l	lbs/day	120000.0 ug/l	21565.30 lbs/day
Dimethyl phthlate	ug/l	lbs/day	2.9E+06 ug/l	5.21E+05 lbs/day
Benzo(a)anthracene (P/	ug/l	lbs/day	0.0 ug/l	0.01 lbs/day
Benzo(a)pyrene (PAH)	ug/l	lbs/day	0.0 ug/l	0.01 lbs/day
Benzo(b)fluoranthene (F	ug/l	lbs/day	0.0 ug/l	0.01 lbs/day
Benzo(k)fluoranthene (F	ug/l	lbs/day	0.0 ug/l	0.01 lbs/day
Chrysene (PAH)	ug/l	lbs/day	0.0 ug/l	0.01 lbs/day
Acenaphthylene (PAH)				
Anthracene (PAH)	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Dibenzo(a,h)anthracene	ug/l	lbs/day	0.0 ug/l	0.01 lbs/day
Indeno(1,2,3-cd)pyrene	ug/l	lbs/day	0.0 ug/l	0.01 lbs/day
Pyrene (PAH)	ug/l	lbs/day	11000.0 ug/l	1976.82 lbs/day
Tetrachloroethylene	ug/l	lbs/day	8.9 ug/l	1.60 lbs/day
Toluene	ug/l	lbs/day	200000 ug/l	35942.16 lbs/day
Trichloroethylene	ug/l	lbs/day	81.0 ug/l	14.56 lbs/day
Vinyl chloride	ug/l	lbs/day	525.0 ug/l	94.35 lbs/day
				lbs/day
<b>Pesticides</b>				lbs/day
Aldrin	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Dieldrin	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Chlordane	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
4,4'-DDT	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
4,4'-DDE	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
4,4'-DDD	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
alpha-Endosulfan	ug/l	lbs/day	2.0 ug/l	0.36 lbs/day
beta-Endosulfan	ug/l	lbs/day	2.0 ug/l	0.36 lbs/day
Endosulfan sulfate	ug/l	lbs/day	2.0 ug/l	0.36 lbs/day
Endrin	ug/l	lbs/day	0.8 ug/l	0.15 lbs/day
Endrin aldehyde	ug/l	lbs/day	0.8 ug/l	0.15 lbs/day
Heptachlor	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
Heptachlor epoxide				
<b>PCB's</b>				
PCB 1242 (Arochlor 124	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1254 (Arochlor 125	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1221 (Arochlor 122	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1232 (Arochlor 123	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1248 (Arochlor 124	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1260 (Arochlor 126	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1016 (Arochlor 101	ug/l	lbs/day	0.0 ug/l	0.00 lbs/day
<b>Pesticide</b>				
Toxaphene	ug/l		0.0 ug/l	0.00 lbs/day
<b>Dioxin</b>				
Dioxin (2,3,7,8-TCDD)	ug/l	lbs/day		

**Utah Division of Water Quality  
Salt Lake City, Utah**

**Metals**

	ug/l	lbs/day		
Antimony				
Arsenic	ug/l	lbs/day	4300.00 ug/l	772.76 lbs/day
Asbestos	ug/l	lbs/day		
Beryllium				
Cadmium				
Chromium (III)				
Chromium (VI)				
Copper				
Cyanide	ug/l	lbs/day	2.2E+05 ug/l	39536.37 lbs/day
Lead	ug/l	lbs/day		
Mercury			0.15 ug/l	0.03 lbs/day
Nickel			4600.00 ug/l	826.67 lbs/day
Selenium	ug/l	lbs/day		
Silver	ug/l	lbs/day		
Thallium			6.30 ug/l	1.13 lbs/day
Zinc				

**There are additional standards that apply to this receiving water, but were not considered in this modeling/waste load allocation analysis.**

**VII. Mathematical Modeling of Stream Quality**

Model configuration was accomplished utilizing standard modeling procedures. Data points were plotted and coefficients adjusted as required to match observed data as closely as possible.

The modeling approach used in this analysis included one or a combination of the following models.

- (1) The Utah River Model, Utah Division of Water Quality, 1992. Based upon STREAMDO IV (Region VIII) and Supplemental Ammonia Toxicity Models; EPA Region VIII, Sept. 1990 and QUAL2E (EPA, Athens, GA).
- (2) Utah Ammonia/Chlorine Model, Utah Division of Water Quality, 1992.
- (3) AMMTOX Model, University of Colorado, Center of Limnology, and EPA Region 8
- (4) Principles of Surface Water Quality Modeling and Control. Robert V. Thomann, et.al. Harper Collins Publisher, Inc. 1987, pp. 644.

Coefficients used in the model were based, in part, upon the following references:

- (1) Rates, Constants, and Kinetics Formulations in Surface Water Quality Modeling. Environmental Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Athens Georgia. EPA/600/3-85/040 June 1985.

**Utah Division of Water Quality  
Salt Lake City, Utah**

(2) Principles of Surface Water Quality Modeling and Control. Robert V. Thomann, et.al.  
Harper Collins Publisher, Inc. 1987, pp. 644.

**VIII. Modeling Information**

The required information for the model may include the following information for both the upstream conditions at low flow and the effluent conditions:

Flow, Q, (cfs or MGD)	D.O. mg/l
Temperature, Deg. C.	Total Residual Chlorine (TRC), mg/l
pH	Total NH3-N, mg/l
BOD5, mg/l	Total Dissolved Solids (TDS), mg/l
Metals, ug/l	Toxic Organics of Concern, ug/l

**Other Conditions**

In addition to the upstream and effluent conditions, the models require a variety of physical and biological coefficients and other technical information. In the process of actually establishing the permit limits for an effluent, values are used based upon the available data, model calibration, literature values, site visits and best professional judgement.

**Model Inputs**

The following is upstream and discharge information that was utilized as inputs for the analysis.

**Current Upstream Information**

	Stream								
	Critical Low								
	Flow	Temp.	pH	T-NH3	BOD5	DO	TRC	TDS	
	cfs	Deg. C		mg/l as N	mg/l	mg/l	mg/l	mg/l	
Summer (Irrig. Season)	30.00	13.0	7.9	0.05	1.00	7.94	0.00	227.0	
Fall	30.00	6.9	7.7	0.05	1.00	---	0.00	378.0	
Winter	30.00	3.1	7.5	0.07	1.00	---	0.00	419.0	
Spring	30.00	9.7	7.9	0.06	1.00	---	0.00	273.0	
Dissolved Metals	Al ug/l	As ug/l	Cd ug/l	CrIII ug/l	CrVI ug/l	Copper ug/l	Fe ug/l	Pb ug/l	
All Seasons	54.20	1.32	0.05	3.00	3.975*	1.32	53.1	0.05	
Dissolved Metals	Hg ug/l	Ni ug/l	Se ug/l	Ag ug/l	Zn ug/l	Boron ug/l			
All Seasons	0.0000	2.50	1.18	0.25	10.94	57.8	* ~80% MDL		

**Utah Division of Water Quality  
Salt Lake City, Utah**

**Projected Discharge Information**

Season	Flow, MGD	Temp.
Summer	2.16000	13.8
Fall	2.16000	12.7
Winter	2.16000	12.6
Spring	2.16000	13.1

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

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 coincide with the environmental conditions expected at low stream flows.

**Effluent Limitation for Flow based upon Water Quality Standards**

In-stream criteria of downstream segments will be met with an effluent flow maximum value as follows:

Season	Daily Average	
Summer	2.160 MGD	3.342 cfs
Fall	2.160 MGD	3.342 cfs
Winter	2.160 MGD	3.342 cfs
Spring	2.160 MGD	3.342 cfs

**Flow Requirement or Loading Requirement**

The calculations in this wasteload analysis utilize the maximum effluent discharge flow of 2.16 MGD. If the discharger is allowed to have a flow greater than 2.16 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.

**Effluent Limitation for Whole Effluent Toxicity (WET) based upon WET Policy**

Effluent Toxicity will not occur in downstream segments if the values below are met.

WET Requirements	LC50 >	100.0% Effluent	[Acute]
	IC25 >	10.0% Effluent	[Chronic]

**Utah Division of Water Quality  
Salt Lake City, Utah**

**Effluent Limitation for Biological Oxygen Demand (BOD) based upon Water Quality Standards or Regulations**

In-stream criteria of downstream segments for Dissolved Oxygen will be met with an effluent BOD limitation as follows:

Season	Concentration	Load
Summer	25.0 mg/l as BOD5	450.3 lbs/day
Fall	25.0 mg/l as BOD5	450.3 lbs/day
Winter	25.0 mg/l as BOD5	450.3 lbs/day
Spring	25.0 mg/l as BOD5	450.3 lbs/day

**Effluent Limitation for Dissolved Oxygen (DO) based upon Water Quality Standards**

In-stream criteria of downstream segments for Dissolved Oxygen will be met with an effluent

Season	Concentration
Summer	4.50
Fall	4.50
Winter	4.50
Spring	4.50

In-stream criteria of downstream segments for Total Ammonia will be met with an effluent limitation (expressed as Total Ammonia as N) as follows:

Season		Concentration	Load
Summer	4 Day Avg. - Chronic	30.30 mg/l as N	545.8 lbs/day
	1 Hour Avg. - Acute	51.0 mg/l as N	917.7 lbs/day
Fall	4 Day Avg. - Chronic	29.7 mg/l as N	534.7 lbs/day
	1 Hour Avg. - Acute	47.5 mg/l as N	856.3 lbs/day
Winter	4 Day Avg. - Chronic	41.7 mg/l as N	750.3 lbs/day
	1 Hour Avg. - Acute	75.8 mg/l as N	1,364.4 lbs/day
Spring	4 Day Avg. - Chronic	35.6 mg/l as N	640.7 lbs/day
	1 Hour Avg. - Acute	59.6 mg/l as N	1,074.3 lbs/day

Acute limit calculated with an Acute Zone of Initial Dilution (ZID) to be equal to 50.%.

**Utah Division of Water Quality  
Salt Lake City, Utah**

**Effluent Limitation for Total Residual Chlorine based upon Water Quality Standards**

In-stream criteria of downstream segments for Total Residual Chlorine will be met with an effluent limitation as follows:

Season		Concentration		Load	
Summer	4 Day Avg. - Chronic	0.101	mg/l	1.81	lbs/day
	1 Hour Avg. - Acute	0.100	mg/l	1.79	lbs/day
Fall	4 Day Avg. - Chronic	0.101	mg/l	1.81	lbs/day
	1 Hour Avg. - Acute	0.100	mg/l	1.79	lbs/day
Winter	4 Day Avg. - Chronic	0.101	mg/l	1.81	lbs/day
	1 Hour Avg. - Acute	0.100	mg/l	1.79	lbs/day
Spring	4 Day Avg. - Chronic	0.101	mg/l	1.81	lbs/day
	1 Hour Avg. - Acute	0.100	mg/l	1.79	lbs/day

**Effluent Limitations for Total Dissolved Solids based upon Water Quality Standards**

Season		Concentration		Load	
Summer	Maximum, Acute	9935.5	mg/l	89.47	tons/day
Fall	Maximum, Acute	8579.9	mg/l	77.27	tons/day
Winter	Maximum, Acute	8211.8	mg/l	73.95	tons/day
Spring	Maximum, Acute	9522.6	mg/l	85.75	tons/day

Colorado Salinity Forum Limits                      Determined by Permitting Section

**Effluent Limitations for Total Recoverable Metals based upon Water Quality Standards**

In-stream criteria of downstream segments for Dissolved Metals will be met with an effluent limitation as follows (based upon a hardness of 30.07 mg/l):

	4 Day Average		1 Hour Average		Load
	Concentration	Load	Concentration	Load	
Aluminum*	N/A	N/A	3,873.4	ug/l	69.9 lbs/day
Arsenic*	1,883.96 ug/l	21.9 lbs/day	1,860.3	ug/l	33.6 lbs/day
Cadmium	2.71 ug/l	0.0 lbs/day	2.9	ug/l	0.1 lbs/day
Chromium III	294.43 ug/l	3.4 lbs/day	3,685.2	ug/l	66.5 lbs/day
Chromium VI*	74.07 ug/l	0.9 lbs/day	70.0	ug/l	1.3 lbs/day
Copper	21.48 ug/l	0.3 lbs/day	18.8	ug/l	0.3 lbs/day
Iron*	N/A	N/A	5,250.6	ug/l	94.8 lbs/day
Lead	6.43 ug/l	0.1 lbs/day	96.8	ug/l	1.7 lbs/day
Mercury*	0.12 ug/l	0.0 lbs/day	13.2	ug/l	0.2 lbs/day
Nickel	165.86 ug/l	1.9 lbs/day	920.5	ug/l	16.6 lbs/day
Selenium*	35.30 ug/l	0.4 lbs/day	104.5	ug/l	1.9 lbs/day
Silver	N/A ug/l	N/A lbs/day	1.5	ug/l	0.0 lbs/day

**Utah Division of Water Quality  
Salt Lake City, Utah**

Zinc	333.63 ug/l	3.9 lbs/day	188.5	ug/l	3.4 lbs/day
Cyanide*	51.89 ug/l	0.6 lbs/day	120.8	ug/l	2.2 lbs/day

\*Limits for these metals are based on the dissolved standard.

**Effluent Limitations for Heat/Temperature based upon  
Water Quality Standards**

Summer	52.9 Deg. C.	127.2 Deg. F
Fall	46.8 Deg. C.	116.2 Deg. F
Winter	43.0 Deg. C.	109.4 Deg. F
Spring	49.6 Deg. C.	121.2 Deg. F

**Effluent Limitations for Organics [Pesticides]  
Based upon Water Quality Standards**

In-stream criteria of downstream segments for Organics [Pesticides] will be met with an effluent limit as follows:

	4 Day Average		1 Hour Average		
	Concentration	Load	Concentration		Load
Aldrin			1.5E+00	ug/l	4.19E-02 lbs/day
Chlordane	4.30E-03 ug/l	7.74E-02 lbs/day	1.2E+00	ug/l	3.35E-02 lbs/day
DDT, DDE	1.00E-03 ug/l	1.80E-02 lbs/day	5.5E-01	ug/l	1.54E-02 lbs/day
Dieldrin	1.90E-03 ug/l	3.42E-02 lbs/day	1.3E+00	ug/l	3.49E-02 lbs/day
Endosulfan	5.60E-02 ug/l	1.01E+00 lbs/day	1.1E-01	ug/l	3.07E-03 lbs/day
Endrin	2.30E-03 ug/l	4.14E-02 lbs/day	9.0E-02	ug/l	2.51E-03 lbs/day
Guthion	0.00E+00 ug/l	0.00E+00 lbs/day	1.0E-02	ug/l	2.79E-04 lbs/day
Heptachlor	3.80E-03 ug/l	6.84E-02 lbs/day	2.6E-01	ug/l	7.26E-03 lbs/day
Lindane	8.00E-02 ug/l	1.44E+00 lbs/day	1.0E+00	ug/l	2.79E-02 lbs/day
Methoxychlor	0.00E+00 ug/l	0.00E+00 lbs/day	3.0E-02	ug/l	8.38E-04 lbs/day
Mirex	0.00E+00 ug/l	0.00E+00 lbs/day	1.0E-02	ug/l	2.79E-04 lbs/day
Parathion	0.00E+00 ug/l	0.00E+00 lbs/day	4.0E-02	ug/l	1.12E-03 lbs/day
PCB's	1.40E-02 ug/l	2.52E-01 lbs/day	2.0E+00	ug/l	5.58E-02 lbs/day
Pentachlorophenol	1.30E+01 ug/l	2.34E+02 lbs/day	2.0E+01	ug/l	5.58E-01 lbs/day
Toxephene	2.00E-04 ug/l	3.60E-03 lbs/day	7.3E-01	ug/l	2.04E-02 lbs/day

**Utah Division of Water Quality  
Salt Lake City, Utah**

**Effluent Targets for Pollution Indicators  
Based upon Water Quality Standards**

In-stream criteria of downstream segments for Pollution Indicators will be met with an effluent limit as follows:

	<b>1 Hour Average</b>	
	<b>Concentration</b>	<b>Loading</b>
Gross Beta (pCi/l)	50.0 pCi/L	
BOD (mg/l)	5.0 mg/l	90.2 lbs/day
Nitrates as N	4.0 mg/l	72.2 lbs/day
Total Phosphorus as P	0.05 mg/l	0.9 lbs/day
Total Suspended Solids	90.0 mg/l	1624.1 lbs/day

Note: Pollution indicator targets are for information purposes only.

**Effluent Limitations for Protection of Human Health [Toxics Rule]  
Based upon Water Quality Standards (Most stringent of 1C or 3A & 3B as appropriate.)**

In-stream criteria of downstream segments for Protection of Human Health [Toxics] will be met with an effluent limit as follows:

<b>Toxic Organics</b>	<b>Maximum Concentration</b>	
	<b>Concentration</b>	<b>Load</b>
Acenaphthene	2.69E+04 ug/l	4.85E+02 lbs/day
Acrolein	7.78E+03 ug/l	1.40E+02 lbs/day
Acrylonitrile	6.59E+00 ug/l	1.19E-01 lbs/day
Benzene	7.08E+02 ug/l	1.28E+01 lbs/day
Benzidine	ug/l	lbs/day
Carbon tetrachloride	4.39E+01 ug/l	7.91E-01 lbs/day
Chlorobenzene	2.10E+05 ug/l	3.77E+03 lbs/day
1,2,4-Trichlorobenzene		
Hexachlorobenzene	7.68E-03 ug/l	1.38E-04 lbs/day
1,2-Dichloroethane	9.88E+02 ug/l	1.78E+01 lbs/day
1,1,1-Trichloroethane		
Hexachloroethane	8.88E+01 ug/l	1.60E+00 lbs/day
1,1-Dichloroethane		
1,1,2-Trichloroethane	4.19E+02 ug/l	7.55E+00 lbs/day
1,1,2,2-Tetrachloroethane	1.10E+02 ug/l	1.98E+00 lbs/day
Chloroethane		
Bis(2-chloroethyl) ether	1.40E+01 ug/l	2.52E-01 lbs/day
2-Chloroethyl vinyl ether		
2-Chloronaphthalene	4.29E+04 ug/l	7.73E+02 lbs/day
2,4,6-Trichlorophenol	6.49E+01 ug/l	1.17E+00 lbs/day
p-Chloro-m-cresol		
Chloroform (HM)	4.69E+03 ug/l	8.45E+01 lbs/day
2-Chlorophenol	3.99E+03 ug/l	7.19E+01 lbs/day
1,2-Dichlorobenzene	1.70E+05 ug/l	3.06E+03 lbs/day
1,3-Dichlorobenzene	2.59E+04 ug/l	4.67E+02 lbs/day

**Utah Division of Water Quality**  
**Salt Lake City, Utah**

1,4-Dichlorobenzene	2.59E+04 ug/l	4.67E+02 lbs/day
3,3'-Dichlorobenzidine	7.68E-01 ug/l	1.38E-02 lbs/day
1,1-Dichloroethylene	3.19E+01 ug/l	5.75E-01 lbs/day
1,2-trans-Dichloroethylene1		
2,4-Dichlorophenol	7.88E+03 ug/l	1.42E+02 lbs/day
1,2-Dichloropropane	3.89E+02 ug/l	7.01E+00 lbs/day
1,3-Dichloropropylene	1.70E+04 ug/l	3.06E+02 lbs/day
2,4-Dimethylphenol	2.29E+04 ug/l	4.13E+02 lbs/day
2,4-Dinitrotoluene	9.08E+01 ug/l	1.64E+00 lbs/day
2,6-Dinitrotoluene		
1,2-Diphenylhydrazine	5.39E+00 ug/l	9.70E-02 lbs/day
Ethylbenzene	2.89E+05 ug/l	5.21E+03 lbs/day
Fluoranthene	3.69E+03 ug/l	6.65E+01 lbs/day
4-Chlorophenyl phenyl ether		
4-Bromophenyl phenyl ether		
Bis(2-chloroisopropyl) ether	1.70E+06 ug/l	3.06E+04 lbs/day
Bis(2-chloroethoxy) methane		
Methylene chloride (HM)	1.60E+04 ug/l	2.88E+02 lbs/day
Methyl chloride (HM)		
Methyl bromide (HM)		
Bromoform (HM)	3.59E+03 ug/l	6.47E+01 lbs/day
Dichlorobromomethane(HM)	2.20E+02 ug/l	3.95E+00 lbs/day
Chlorodibromomethane (HM)	3.39E+02 ug/l	6.11E+00 lbs/day
Hexachlorocyclopentadiene	1.70E+05 ug/l	3.06E+03 lbs/day
Isophorone	5.99E+03 ug/l	1.08E+02 lbs/day
Naphthalene		
Nitrobenzene	1.90E+04 ug/l	3.41E+02 lbs/day
2-Nitrophenol		
4-Nitrophenol		
2,4-Dinitrophenol	1.40E+05 ug/l	2.52E+03 lbs/day
4,6-Dinitro-o-cresol	7.63E+03 ug/l	1.37E+02 lbs/day
N-Nitrosodimethylamine	8.08E+01 ug/l	1.46E+00 lbs/day
N-Nitrosodiphenylamine	1.60E+02 ug/l	2.88E+00 lbs/day
N-Nitrosodi-n-propylamine	1.40E+01 ug/l	2.52E-01 lbs/day
Pentachlorophenol	8.18E+01 ug/l	1.47E+00 lbs/day
Phenol	4.59E+07 ug/l	8.27E+05 lbs/day
Bis(2-ethylhexyl)phthalate	5.89E+01 ug/l	1.06E+00 lbs/day
Butyl benzyl phthalate	5.19E+04 ug/l	9.34E+02 lbs/day
Di-n-butyl phthalate	1.20E+05 ug/l	2.16E+03 lbs/day
Di-n-octyl phthlate		
Diethyl phthalate	1.20E+06 ug/l	2.16E+04 lbs/day
Dimethyl phthlate	2.89E+07 ug/l	5.21E+05 lbs/day
Benzo(a)anthracene (PAH)	3.09E-01 ug/l	5.57E-03 lbs/day
Benzo(a)pyrene (PAH)	3.09E-01 ug/l	5.57E-03 lbs/day
Benzo(b)fluoranthene (PAH)	3.09E-01 ug/l	5.57E-03 lbs/day
Benzo(k)fluoranthene (PAH)	3.09E-01 ug/l	5.57E-03 lbs/day
Chrysene (PAH)	3.09E-01 ug/l	5.57E-03 lbs/day
Acenaphthylene (PAH)		
Anthracene (PAH)		
Dibenzo(a,h)anthracene (PAH)	3.09E-01 ug/l	5.57E-03 lbs/day
Indeno(1,2,3-cd)pyrene (PAH)	3.09E-01 ug/l	5.57E-03 lbs/day

**Utah Division of Water Quality  
Salt Lake City, Utah**

Pyrene (PAH)	1.10E+05 ug/l	1.98E+03 lbs/day
Tetrachloroethylene	8.88E+01 ug/l	1.60E+00 lbs/day
Toluene	2.00E+06 ug/l	3.59E+04 lbs/day
Trichloroethylene	8.08E+02 ug/l	1.46E+01 lbs/day
Vinyl chloride	5.24E+03 ug/l	9.43E+01 lbs/day

**Pesticides**

Aldrin	1.40E-03 ug/l	2.52E-05 lbs/day
Dieldrin	1.40E-03 ug/l	2.52E-05 lbs/day
Chlordane	5.89E-03 ug/l	1.06E-04 lbs/day
4,4'-DDT	5.89E-03 ug/l	1.06E-04 lbs/day
4,4'-DDE	5.89E-03 ug/l	1.06E-04 lbs/day
4,4'-DDD	8.38E-03 ug/l	1.51E-04 lbs/day
alpha-Endosulfan	2.00E+01 ug/l	3.59E-01 lbs/day
beta-Endosulfan	2.00E+01 ug/l	3.59E-01 lbs/day
Endosulfan sulfate	2.00E+01 ug/l	3.59E-01 lbs/day
Endrin	8.08E+00 ug/l	1.46E-01 lbs/day
Endrin aldehyde	8.08E+00 ug/l	1.46E-01 lbs/day
Heptachlor	2.10E-03 ug/l	3.77E-05 lbs/day
Heptachlor epoxide		

**PCB's**

PCB 1242 (Arochlor 1242)	4.49E-04 ug/l	8.09E-06 lbs/day
PCB-1254 (Arochlor 1254)	4.49E-04 ug/l	8.09E-06 lbs/day
PCB-1221 (Arochlor 1221)	4.49E-04 ug/l	8.09E-06 lbs/day
PCB-1232 (Arochlor 1232)	4.49E-04 ug/l	8.09E-06 lbs/day
PCB-1248 (Arochlor 1248)	4.49E-04 ug/l	8.09E-06 lbs/day
PCB-1260 (Arochlor 1260)	4.49E-04 ug/l	8.09E-06 lbs/day
PCB-1016 (Arochlor 1016)	4.49E-04 ug/l	8.09E-06 lbs/day

**Pesticide**

Toxaphene	7.48E-03 ug/l	1.35E-04 lbs/day
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**Metals**

Antimony	ug/l	lbs/day
Arsenic	ug/l	lbs/day
Asbestos	ug/l	lbs/day
Beryllium		
Cadmium		
Chromium (III)		
Chromium (VI)		
Copper	ug/l	lbs/day
Cyanide	ug/l	lbs/day
Lead		
Mercury	ug/l	lbs/day
Nickel	ug/l	lbs/day
Selenium		
Silver		
Thallium	ug/l	lbs/day
Zinc		

**Utah Division of Water Quality  
Salt Lake City, Utah**

**Dioxin**  
Dioxin (2,3,7,8-TCDD)                      1.40E-07 ug/l                      2.52E-09 lbs/day

**Metals Effluent Limitations for Protection of All Beneficial Uses  
Based upon Water Quality Standards and Toxics Rule**

	<b>Class 4 Acute Agricultural ug/l</b>	<b>Class 3 Acute Aquatic Wildlife ug/l</b>	<b>Acute Toxics Drinking Water Source ug/l</b>	<b>Acute Toxics Wildlife ug/l</b>	<b>1C Acute Health Criteria ug/l</b>	<b>Acute Most Stringent ug/l</b>	<b>Class 3 Chronic Aquatic Wildlife ug/l</b>
Aluminum		3873.4				3873.4	N/A
Antimony				42905.2		42905.2	
Arsenic	997.8	1860.3				997.8	1884.0
Barium							
Beryllium						0.0	
Cadmium	99.3	2.9				2.9	2.7
Chromium (III)		3685.2				3685.2	294.4
Chromium (VI)	970.9	70.0				69.98	74.07
Copper	1983.7	18.8				18.8	21.5
Cyanide		120.8	2195149.0			120.8	51.9
Iron		5250.6				5250.6	
Lead	997.3	96.8				96.8	6.4
Mercury		13.17		1.50		1.50	0.120
Nickel		920.5		45898.6		920.5	165.9
Selenium	488.3	104.5				104.5	35.3
Silver		1.5				1.5	
Thallium				62.9		62.9	
Zinc		188.5				188.5	333.6
Boron	6964.5					6964.5	
Sulfate	19955.9					19955.9	

**Summary Effluent Limitations for Metals [Wasteload Allocation, TMDL]**

[If Acute is more stringent than Chronic, then the Chronic takes on the Acute value.]

	<b>WLA Acute ug/l</b>	<b>WLA Chronic ug/l</b>	
Aluminum	3873.4	N/A	
Antimony	42905.19		
Arsenic	997.8	1884.0	Acute Controls
Asbestos			
Barium			
Beryllium			
Cadmium	2.9	2.7	
Chromium (III)	3685.2	294	
Chromium (VI)	70.0	74.1	Acute Controls
Copper	18.8	21.5	Acute Controls

**Utah Division of Water Quality  
Salt Lake City, Utah**

Cyanide	120.8	51.9	
Iron	5250.6		
Lead	96.8	6.4	
Mercury	1.497	0.120	
Nickel	920.5	166	
Selenium	104.5	35.3	
Silver	1.5	N/A	
Thallium	62.9		
Zinc	188.5	333.6	Acute Controls
Boron	6964.54		
Sulfate	19955.9		N/A at this Waterbody

Other Effluent Limitations are based upon R317-1.

E. coli 126.0 organisms per 100 ml

**X. Antidegradation Considerations**

The Utah Antidegradation Policy allows for degradation of existing quality where it is determined that such lowering of water quality is necessary to accommodate important economic or social development in the area in which the waters are protected [R317-2-3]. It has been determined that certain chemical parameters introduced by this discharge will cause an increase of the concentration of said parameters in the receiving waters. Under no conditions will the increase in concentration be allowed to interfere with existing instream water uses.

An Antidegradation Level I Review was conducted on this discharge and its effect on the receiving water. Based upon that review, it has been determined that an Antidegradation Level II Review is not required. The proposed permit is a simple renewal, with no increase in flow or concentration over that which was approved in the existing permit.

**XI. Colorado River Salinity Forum Considerations**

Discharges in the Colorado River Basin are required to have their discharge at a TDS loading of less than 1.00 tons/day unless certain exemptions apply. Refer to the Forum's Guidelines for additional information allowing for an exceedence of this value.

**XII. Summary Comments**

The mathematical modeling and best professional judgement indicate that violations of receiving water beneficial uses with their associated water quality standards, including important down-stream segments, will not occur for the evaluated parameters of concern as discussed above if the effluent limitations indicated above are met.

Prepared by:  
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EB\_SpanishForkWLA\_3-7-19.xls

**ALLOWABLE EFFLUENT CONCENTRATION/LOADING FOR CONSERVATIVE SUBSTANCES**

Date of Analysis: 3/7/2019

This Calculates the Allowable Effluent Concentration/Loading for Conservative Substances in a Receiving Water

Discharge 001

Conservative Substance:  
Acute or Chronic Standard  
Discharger:  
Receiving Water:  
Classification:  
For the Season / Year

Nitrate Nitrogen
Chronic
Ensign Bickford
Spanish Fork River
2B, 3B, 3D, 4
Yearly Average

**Assumptions:**

- 1) Conservative Substance
- 2) Complete mixing
- 3) Background Flow 7Q10 =30 mg/l
- 4) Background Concentration 1 mg/l
- 5) Calculation utilizes 100% of mixed assimilative capacity

**Receiving Water Information - Spanish Fork River**

Flow, cfs	30.000
Flow, cfs (Acute)	15.000
Nitrate Nitrogen, mg/l	1.00000
Nitrate Nitrogen Load, lbs/day	161.70

**Stream Standard**

Nitrate Nitrogen, mg/l	10.0000
Allowable Loading Before Mix:	1617.00 lbs/day
Acute / Chronic Standard [Toxics]	Chronic

**Combined Effluent/Receiving Water Information**

Flow, cfs	33.340 cfs
Nitrate Nitrogen, mg/l	10.00000 mg/l
Concentration Delta Increase, mg/l	9.00000 mg/l [Delta]
Percent Increase:	9.00

**Summary**

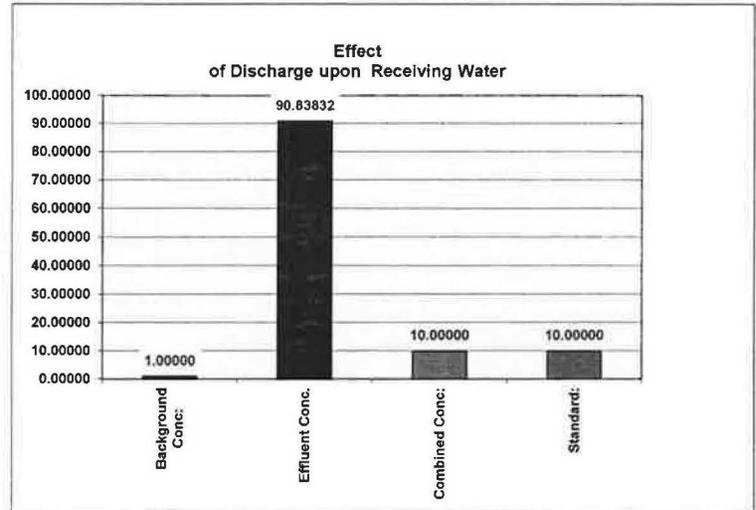
Background Conc:	1.00000 mg/l
Effluent Conc.	90.83832 mg/l
Combined Conc:	10.00000 mg/l
Standard:	10.00000 mg/l
Percent Change	9.00

**Effluent Information [Proposed] Ensign Bickford**

Flow, cfs	3.3400
Flow, MGD	
Flow, cfs	3.340
Nitrate Nitrogen, mg/l	90.83832
Nitrate Nitrogen Load, lbs/day	1635.33
Nitrate Nitrogen Load, kg/day	741.78
Nitrate Nitrogen Load, lbs/year	596,893.99
Nitrate Nitrogen Load, kg/year	270,751.11
Nitrate Nitrogen Load, tons/day	0.8177
Nitrate Nitrogen Load, tons/year	298.4
Dilution Ratio: (background:discharge)	8.98
Percent of Stream Flow Used in Calc.	100%

**Flow Range Dependent Nitrate Nitrogen Effluent Limits**

Flow (cfs)	Nitrate N
0.00 -0.56	492.1429
0.57 -1.11	253.2432
1.12-1.67	171.6766
1.68-2.23	131.0762
2.24-2.79	106.7742
2.8-3.34	90.8383



**ALLOWABLE EFFLUENT CONCENTRATION/LOADING FOR CONSERVATIVE SUBSTANCES**

Date of Analysis: 3/7/2019

This Calculates the Allowable Effluent Concentration/Loading for Conservative Substances in a Receiving Water

Discharge 001

Conservative Substance:  
Acute or Chronic Standard  
Discharger:  
Receiving Water:  
Classification:  
For the Season / Year

RDX
Chronic
Ensign Bickford
Spanish Fork River
2B, 3B, 3D, 4
Yearly Average

**Assumptions:**

- 1) Conservative Substance
- 2) Complete mixing
- 3) Background Flow 7Q10 =30 mg/l
- 4) Background Concentration 0.000001 mg/l
- 5) Calculation utilizes 100% of mixed assimilative capacity

**Receiving Water Information - Spanish Fork River**

Flow, cfs	30.000
Flow, cfs (Acute)	15.000
RDX, mg/l	0.00000
RDX Load, lbs/day	0.00

**Stream Standard**

RDX, mg/l	0.0020
Allowable Loading Before Mix:	0.32 lbs/day
Acute / Chronic Standard [Toxics]	Chronic

**Combined Effluent/Receiving Water Information**

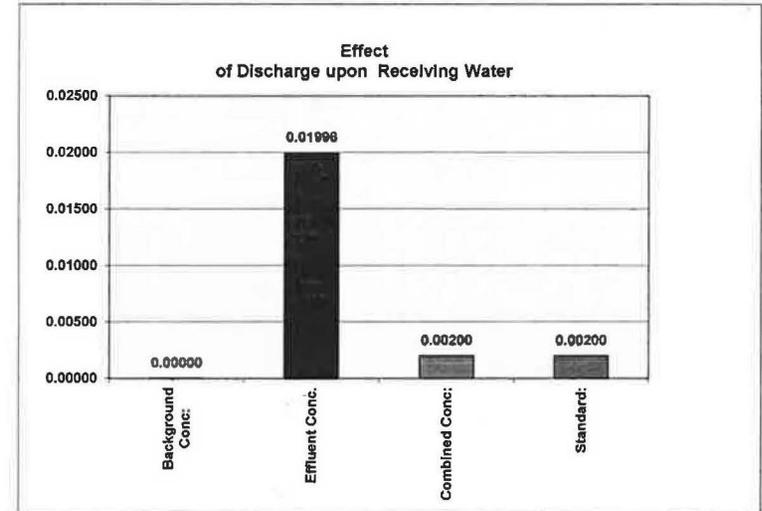
Flow, cfs	33.340 cfs
RDX, mg/l	0.00200 mg/l
Concentration Delta Increase, mg/l	0.00200 mg/l [Delta]
Percent Increase:	1999.00

**Summary**

Background Conc:	0.00000 mg/l
Effluent Conc.	0.01996 mg/l
Combined Conc:	0.00200 mg/l
Standard:	0.00200 mg/l
Percent Change	1999.00

**Effluent Information [Proposed] Ensign Bickford**

Flow, cfs	3.3400
Flow, MGD	
Flow, cfs	3.340
RDX, mg/l	0.01996
RDX Load, lbs/day	0.36
RDX Load, kg/day	0.16
RDX Load, lbs/year	131.12
RDX Load, kg/year	59.48
RDX Load, tons/day	0.0002
RDX Load, tons/year	0.1
Dilution Ratio: (background:discharge)	8.98
Percent of Stream Flow Used in Calc.	100%



**Flow Range Dependent RDX Effluent Limits**

Flow (cfs)	RDX mg/l
0.00 -0.56	0.1091
0.57 -1.11	0.0560
1.12-1.67	0.0379
1.68-2.23	0.0289
2.24-2.79	0.0235
2.8-3.34	0.0200

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**APPENDIX A:**

**DEVELOPMENT OF EFFLUENT LIMITATIONS FOR RDX**

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

$C_{up}$  = 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:

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

$$F_e$$

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.

<b>Table 2: RDX And Nitrate-Nitrogen Limits Based for Outfall 001</b>		
Effluent Flow Range (cfs)	Daily Maximum RDX Concentration (mg/L)	Daily Maximum Nitrate-Nitrogen Concentration (mg/L)*
0.00 - 0.56	0.0285	128.9
0.57 - 1.11	0.0152	69.1
1.12 - 1.67	0.0106	48.8
1.68 - 2.23	0.0070	32.5
2.34 - 2.79	0.0050	23.5
2.80 - 3.34	0.0041	19.3

<b>Table 3: RDX And Nitrate-Nitrogen Limits Based for Outfall 002</b>		
<b>Effluent Flow Range (cfs)</b>	<b>Daily Maximum RDX Concentration (mg/L)</b>	<b>Daily Maximum Nitrate-Nitrogen Concentration (mg/L)*</b>
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

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