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

UTAH POLLUTANT DISCHARGE ELIMINATION SYSTEM (UPDES) PERMITS

Major Municipal Permit No. **UT0020915**
Biosolids Permit No. **UTL020915**

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

CITY OF OREM

is hereby authorized to discharge from its wastewater treatment facility to receiving waters named **POWELL SLOUGH**,

to dispose of biosolids,

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

This permit shall become effective on April 19, 2021.

This permit expires at midnight on April 18, 2026.

Signed this 19th day of April, 2021.

Erica Brown Gaddis, PhD
Director

DWQ-2021-000396

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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*.

Outfall Number	Location of Discharge Outfall
001	A 36 inch diameter pipe located between a ground water drain pipe and the outlet from Clegg's pond into Powell Slough at latitude 40º 16' 39" and longitude 111º 44' 19".

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.

1. Effective immediately, and lasting through the life of this permit, there shall be no acute or chronic toxicity in Outfall 001 as defined in *Part VIII*, and determined by test procedures described in *Part I. C.4.a* of this permit.

2.

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

Parameter	Effluent Limitations *a				
	Maximum Monthly Avg	Maximum Weekly Avg	Yearly Average	Daily Minimum	Daily Maximum
Total Flow	13.5	--	--	--	--
BOD_5, mg/L	25	35	--	--	--
BOD_5 Min. % Removal	85	--	--	--	--
TSS, mg/L	25	35	--	--	--
TSS Min. % Removal	85	--	--	--	--
Dissolved Oxygen, mg/L	--	--	--	5.5	--
Total Ammonia (as N), mg/L					
Summer (Jul-Sep)	3.0	--	--	--	11.0
Fall (Oct-Dec)	4.0	--	--	--	15.0
Winter (Jan-Mar)	5.0	--	--	--	19.0
Spring (Apr-Jun)	4.0	--	--	--	14.0

E. coli, No./100mL	126	157	--	--	--
Total Phosphorus, mg/L *h Interim Final (Effective Jan 1, 2023)	 -- --	 -- --	 2.5 1.0	 -- --	 -- --
WET, Chronic Biomonitoring	--	--	--	--	IC_{25} > 92% effluent
Oil & Grease, mg/L	--	--	--	--	10.0
pH, Standard Units	--	--	--	6.5	9

Self-Monitoring and Reporting Requirements *a			
Parameter	Frequency	Sample Type	Units
Total Flow *b, *c	Continuous	Recorder	MGD
BOD_5, Influent *d Effluent	3 x Weekly 3 x Weekly	Composite Composite	mg/L mg/L
TSS, Influent *d Effluent	3 x Weekly 3 x Weekly	Composite Composite	mg/L mg/L
E. coli	3 x Weekly	Grab	No./100mL
pH	3 x Weekly	Grab	SU
Total Ammonia (as N)	3 x Weekly	Grab	mg/L
DO	3 x Weekly	Grab	mg/L
WET – Biomonitoring *f Ceriodaphnia - Chronic Fathead Minnows - Chronic	Quarterly 2nd & 4th Quarter 1st & 3rd Quarter	 Composite Composite	 Pass/Fail Pass/Fail
Oil & Grease *e	When Sheen Observed	Grab	mg/L
Total Dissolved Solids	Monthly	Composite	mg/L
Total Ammonia	Monthly	Composite	mg/L
Orthophosphate (as P), *h Effluent	 Monthly	 Composite	 mg/L
Total Phosphorus (as P), *h, *i Influent Effluent	 Monthly Monthly	 Composite Composite	 mg/L mg/L
Total Kjeldahl Nitrogen TKN (as N), *h, *i Influent Effluent	 Monthly Monthly	 Composite Composite	 mg/L mg/L
Nitrate, NO3 *h, *i	Monthly	Composite	mg/L
Nitrite, NO2 *h, *i	Monthly	Composite	mg/L
Metals, Influent *g Effluent	Quarterly Quarterly	Composite Composite	mg/L mg/L
Organic Toxics	Yearly	Grab	mg/L

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

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

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

*d In addition to monitoring the final discharge, influent samples shall be taken and analyzed for this constituent at the same frequency as required for this constituent in the discharge.

*e Oil & Grease sampled when sheen is present or visible. If no sheen is present or visible, report NA.

*f Chronic Ceriodaphnia will be tested during the 2nd and 4th quarters, and the chronic fathead minnows will be tested during the 1st and 3rd quarters.

*g Metals results were reviewed for the last 36 months. No limits are required at this time.

*h These reflect changes required with the adoption of UCA R317-1-3.3, Technology-based Phosphorus Effluent Limits rule. Orem Water Reclamation Facility (OWTF) was granted a variance in regards to the 1.0 mg/L total phosphorus annual average limit. This variance does not to extend beyond January 1, 2023 and has an interim total phosphorus annual average limit of 2.5 mg/L. Frequency of sample collection listed in table represents the minimum requirement.

*i Pollutants are being sampled in support of the work being done for the TMDL currently underway for Utah Lake. The Pollutants Of Concern (POC) will be monitored and reported (on a monthly basis by the facility on Discharge Monitoring Report). If the City of Orem decides to sample more frequently for these POC's, the additional data will be welcome.

3. Compliance Schedule for Total Phosphorus Effluent Limit

   a. Total Phosphorus Compliance Schedule:

Parameter	Annual Average
Interim Total Phosphorus, mg/L (Effective Jan 1, 2020 – Dec 31, 2022)	2.5
Final Total Phosphorus, mg/L, (Effective Jan 1, 2023)	1.0

4. Chronic Whole Effluent Toxicity (WET) Testing.

   a. *Whole Effluent Testing – Chronic Toxicity*.
   Starting immediately, the permittee shall quarterly conduct chronic toxicity tests on a composite sample of the final effluent at Outfall 001. The sample shall be collected at the point of compliance before mixing with the receiving water.

   Three samples are required and samples shall be collected on Monday, Wednesday and Friday of each sampling period or collected on a two day progression for each sampling period. This may be changed with Director approval.

   The chronic toxicity tests shall be conducted in general accordance with the procedures set out in the latest revision of *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms, Fourth Edition*, October 2002, *EPA—821-R-02-013* as per *40 CFR 136.3(a)* TABLE IA-LIST OF APPROVED BIOLOGICAL METHODS. Test species shall consist of *Ceriodaphnia dubia* and *Pimephales promelas* (fathead minnow).

A multi dilution test consisting of at least five concentrations and a control is required at two dilutions below and two above the RWC, if possible. If test acceptability criteria are not met for control survival, growth, or reproduction, the test shall be considered invalid. A valid replacement test is required within the specified sampling period to remain in compliance with this permit. Chronic toxicity occurs when, during a chronic toxicity test, the 25% inhibition concentration (IC25) calculated on the basis of test organism survival and growth or survival and reproduction, is less than or equal to 92% effluent concentration (equivalent to the RWC). If a sample is found to be chronically toxic during a routine test, the monitoring frequency shall become biweekly (see Part I. C.4.b Accelerated Testing). (the Director may enter acceptable variations in the test procedure here as documented in the Fact Sheet Statement of Basis and based on the test acceptability criteria as contained in Utah Pollutant Discharge Elimination System (UPDES) Permitting and Enforcement Guidance Document for Whole Effluent Toxicity Control February, 2018). If possible, dilution water should be obtained from the receiving stream.

Quarterly test results shall be reported along with the Discharge Monitoring Report (DMR) submitted for the end of the required reporting period (e.g., biomonitoring results for the calendar quarter ending March 31 shall be reported with the DMR due April 28, with the remaining biomonitoring reports submitted with DMRs due each July 28, October 28, and January 28). Monthly test results shall be reported along with the DMR submitted for that month. The format for the report shall be consistent with Appendix C of "Utah Pollutant Discharge Elimination System (UPDES) Permitting and Enforcement Guidance Document for Whole Effluent Toxicity, Utah Division of Water Quality, February, 2018.

b. *Accelerated Testing*. When whole effluent toxicity is indicated during routine WET testing as specified in this permit, the permittee shall notify the Director in writing within 5 days after becoming aware of the test result. The permittee shall perform an accelerated schedule of WET testing to establish whether a pattern of toxicity exists unless the permittee notifies the Director and commences a PTI, TIE, or a TRE. Accelerated testing or the PTI, TIE, or TRE will begin within fourteen days after the permittee becomes aware of the test result. Accelerated testing shall be conducted as specified under Part I. Pattern of Toxicity. If the accelerated testing demonstrates no pattern of toxicity, routine monitoring shall be resumed.

c. *Pattern of Toxicity*. A pattern of toxicity is defined by the results of a series of up to five biomonitoring tests pursuant to the accelerated testing requirements using a full set of dilutions for acute (five plus the control) and five effluent dilutions for chronic (five plus the control), on the species found to be more sensitive, once every week for up to five consecutive weeks for acute and once every two weeks up to ten consecutive weeks for chronic.

If two (2) consecutive tests (not including the scheduled test which triggered the search for a pattern of toxicity) do not result in an exceedance of the acute or chronic toxicity criteria, no further accelerated testing will be required and no pattern of toxicity will be found to exist. The permittee will provide written verification to the Director within 5 days of determining no pattern of toxicity exists, and resume routine monitoring.

A pattern of toxicity may or may not be established based on the following:

WET tests should be run at least weekly (acute) or every two weeks (chronic) (note that only one test should be run at a time), for up to 5 tests, until either:

1) 2 consecutive tests fail, or 3 out of 5 tests fail, at which point a pattern of toxicity will have been identified, or

2) 2 consecutive tests pass, or 3 out of 5 tests pass, in which case no pattern of toxicity is identified.

d. *Preliminary Toxicity Investigation*.

(1) When a pattern of toxicity is detected the permittee will notify the Director in writing within 5 days and begin an evaluation of the possible causes of the toxicity. The permittee will have 15 working days from demonstration of the pattern of toxicity to complete an optional Preliminary Toxicity Investigation (PTI) and submit a written report of the results to the Director. The PTI may include, but is not limited to: additional chemical and biological monitoring, examination of pretreatment program records, examination of discharge monitoring reports, a thorough review of the testing protocol, evaluation of treatment processes and chemical use, inspection of material storage and transfer areas to determine if any spill may have occurred.

(2) If the PTI identifies a probable toxicant and/or a probable source of toxicity, the permittee shall submit, as part of its final results, written notification of that effect to the Director. Within thirty days of completing the PTI the permittee shall submit to the Director for approval a control program to control effluent toxicity and shall proceed to implement such plan in accordance with the Director's approval. The control program, as submitted to or revised by the Director, will be incorporated into the permit. After final implementation, the permittee must demonstrate successful removal of toxicity by passing a two species WET test as outlined in this permit. With adequate justification, the Director may extend these deadlines.

(3) If no probable explanation for toxicity is identified in the PTI, the permittee shall notify the Director as part of its final report, along with a schedule for conducting a Phase I Toxicity Reduction Evaluation (TRE) (see Part ___ Toxicity Reduction Evaluation

(4) If toxicity spontaneously disappears during the PTI, the permittee shall submit written notification to that effect to the Director, with supporting testing evidence.

e. *Toxicity Reduction Evaluation (TRE)*. If a pattern of toxicity is detected the permittee shall initiate a TIE/TRE within 7 days unless the Director has accepted the decision to complete a PTI. With adequate justification, the Director may extend the 7-day deadline. The purpose of the TIE portion of a TRE will be to establish the cause of the toxicity, locate the source(s) of the toxicity, and the TRE will control or provide treatment for the toxicity.

A TRE may include but is not limited to one, all, or a combination of the following:

(1) Phase I – Toxicity Characterization

(2) Phase II – Toxicity Identification Procedures

(3) Phase III – Toxicity Control Procedures

(4) Any other appropriate procedures for toxicity source elimination and control.

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

If toxicity spontaneously disappears during the TIE/TRE, the permittee shall submit written notification to that effect to the Director.

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

(a) An alternative control program for compliance with the numerical requirements.

(b) If necessary, as determined by the Director, provide a modified biomonitoring protocol which compensates for the pollutant(s) being controlled numerically.

This permit may be reopened and modified to incorporate any additional numerical limitations, a modified compliance schedule if judged necessary by the Director, and/or modified WET testing requirements without public notice.

Failure to conduct an adequate TIE/TRE plan or program as described above, or the submittal of a plan or program judged inadequate by the Director, shall be considered a violation of this permit. After implementation of TIE/TRE plan, the permittee must demonstrate successful removal of toxicity by passing a two species WET test as outlined in this permit.

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 28th day of the month following the completed reporting period. The first report is due on **May 28, 2021**. 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

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

PO Box 144870
Salt Lake City, Utah 84114-4870

II. INDUSTRIAL PRETREATMENT PROGRAM

A. Pretreatment Program Delegation. The permittee has been delegated primary responsibility for enforcing against discharges prohibited by *40 CFR 403.5* and applying and enforcing any national Pretreatment Standards established by the United States Environmental Protection Agency in accordance with Section 307 (b) and (c) of *The Clean Water Act (CWA)*, as amended by *The Water Quality Act (WQA), of 1987*.

The permittee shall implement the Industrial Pretreatment Program in accordance with the legal authorities, policies, and procedures described in the permittee's approved Pretreatment Program submission. Such program commits the permittee to do the following:

1. Carry out inspection, surveillance, and monitoring procedures, which will determine, independent of information supplied by the industrial user, whether the industrial user is in compliance with the pretreatment standards. At a minimum, all significant industrial users shall be inspected and sampled by the permittee at least once per year;

2. Control through permit, order, or similar means, the contribution to the POTW by each industrial user to ensure compliance with applicable pretreatment standards and requirements;

3. Require development, as necessary, of compliance schedules by each industrial user for the installation of control technologies to meet applicable pretreatment standards;

4. Maintain and update industrial user information as necessary, to ensure that all IUs are properly permitted and/or controlled at all times;

5. Enforce all applicable pretreatment standards and requirements and obtain appropriate remedies for noncompliance by any industrial user;

6. Annually publish a list of industrial users that were determined to be in significant noncompliance during the previous year. The notice must be published before March 28 of the following year;

7. Maintain an adequate revenue structure and staffing level for continued implementation of the Pretreatment Program.

8. Evaluate all significant industrial users at least once every two years to determine if they need to develop a slug prevention plan. If a slug prevention plan is required, the permittee shall insure that the plan contains at least the minimum elements required in *40 CFR 403.8(f)(2)(v);*

9. Notify all significant industrial users of their obligation to comply with applicable requirements under *Subtitles C and D* of the *Resource* Conservation and Recovery Act (RCRA); and

10. Develop, implement, and maintain an enforcement response plan as required by *40 CFR 403.8(f)(5)* which shall, at a minimum,

    a. Describe how the POTW will investigate instances of noncompliance;

b. Describe the types of escalating enforcement responses the POTW will take in response to all anticipated type of industrial user violations; and
c. Describe the time periods within which such responses will be taken and identify the POTW staff position(s) responsible for pursuing these actions.

11. Establish and enforce specific local limits as necessary to implement the provisions of the *40 CFR Parts 403.5(a)* and *(b)*, and as required by *40 CFR Part 403.5(c)*.

B. Program Updates. The permittee is required to modify its pretreatment program, as necessary, to reflect changes in the regulations of *40 CFR 403*. Such modifications shall be completed within the time frame set forth by the applicable regulations. Modification of the approved pretreatment program must be done in accordance with the requirements of *40 CFR 403.18*. Modifications of the approved program which result in less stringent industrial user requirements shall not be effective until after approval has been granted by the Director.

C. Annual Report. The permittee shall provide the Division of Water Quality and EPA with an annual report briefly describing the permittee's pretreatment program activities over the previous calendar year. Reports shall be submitted no later than March 28 of each year. These annual reports shall, at a minimum, include:

1. An updated listing of the permittee's industrial users.

2. A descriptive summary of the compliance activities including numbers of any major enforcement actions, i.e., administrative orders, penalties, civil actions, etc.

3. An assessment of the compliance status of the permittee's industrial users and the effectiveness of the permittee's Pretreatment Program in meeting its needs and objectives.

4. A summary of all sampling data taken of the influent and effluent for those pollutants listed in *Part II.H.*

5. A description of all substantive changes made to the permittee's pretreatment program referenced in *Section B* of this section. Substantive changes include, but are not limited to, any change in any ordinance, major modification in the program's administrative structure or operating agreement(s), a significant reduction in monitoring, or a change in the method of funding the program.

6. Other information as may be determined necessary by the Director.

D. General and Specific Prohibitions. Pretreatment standards (*40 CFR 403.5*) specifically prohibit the introduction of the following pollutants into the waste treatment system from any source of non-domestic discharge:

1. Pollutants which create a fire or explosion hazard in the publicly owned treatment works (POTW), including, but not limited to, wastestreams with a closed cup flashpoint of less than 140˚F (60˚C);

2. Pollutants, which will cause corrosive structural damage to the POTW, but in no case, discharges with a pH lower than 5.0;

3. Solid or viscous pollutants in amounts which will cause obstruction to the flow in the POTW resulting in interference;

4. Any pollutant, including oxygen demanding pollutants (BOD, etc.), released in a discharge at such volume or strength as to cause interference in the POTW;
5. Heat in amounts, which will inhibit biological activity in the POTW, resulting in interference, but in no case, heat in such quantities that the influent to the sewage treatment works exceeds 104˚F (40˚C));

6. Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through;

7. Pollutants, which result in the presence of toxic gases, vapor, or fumes within the POTW in a quantity that may cause worker health or safety problems;

8. Any trucked or hauled pollutants, except at discharge points designated by the POTW; or

9. Any pollutant that causes pass through or interference at the POTW.

10. Any specific pollutant which exceeds any local limitation established by the POTW in accordance with the requirement of *40 CFR 403.5(c)* and *40 CFR 403.5(d)*.

E. Categorical Standards. In addition to the general and specific limitations expressed in *Part A and D* of this section, applicable National Categorical Pretreatment Standards must be met by all industrial users of the POTW. These standards are published in the federal regulations at *40 CFR 405* et. seq.

F. Self-Monitoring and Reporting Requirements.

1. Influent and Effluent Monitoring and Reporting Requirements. The permittee shall sample and analyze both the influent and effluent, for the parameters listed in the Monitoring for Pretreatment Program Table.

Monitoring for Pretreatment Program Table				
Parameter	MDL a*	Sample Type	Frequency	Units
Total Aluminum	0.85	Composite	Quarterly	mg/L
Total Arsenic	0.17			
Total Cadmium	0.0006			
Total Chromium	0.011			
Total Copper	0.022			
Total Lead	0.011			
Total Molybdenum	NA			
Total Nickel	0.127			
Total Selenium	0.005			
Total Silver	0.020			
Total Zinc	0.285			
Total Cyanide	0.0054			
Total Mercury	0.000013	Composite/Grab		
TTOs, b*	NA		Yearly	

a* The minimum detection limit (MDL) of the test method used for analysis must be below this limit, if a test method is not available the permittee must submit documentation to the Director regarding the method that will be used.

b* In addition, the permittee shall analyze the treatment facility influent and effluent for the presence of the toxic pollutants listed in 40 CFR 122 Appendix D Table II (Organic Toxic Pollutants). The pesticides fraction of Appendix D, Table II is suspended unless pesticides are expected to be present.

The results of the analyses of metals and cyanide shall be submitted along with the Discharge Monitoring Report (DMR) at the end of each quarter by the 28th of the following month (1st quarter due by April 28). The results of the analysis of toxic organics shall be submitted along with the DMR at the end of the earliest possible reporting period, no later than January 28 for the previous calendar year. Also, the permittee must submit a copy of the toxic organics data to the DWQ's Pretreatment Coordinator via email.

For local limit parameters it is recommended that the most sensitive method be used for analysis. This will determine if the parameter is present and provide removal efficiencies based on actual data rather than literature values. If a parameter load is greater than the allowable head works load, for any pollutant listed in Part II.F.1. or a pollutant of concern listed in the local limit development document, the permittee must report the exceedances to the DWQ's Pretreatment Coordinator. If the loading exceeds the allowable headworks load, increase sampling must occur based on the requirements given by the DWQ's Pretreatment Coordinator. If needed, additional sampling may be required to find the source(s) of the increase. This may include sampling of the collection system. Notification regarding the exceedances of the allowable headworks loading can be provided via email.

2. In accordance with the requirements of 40 CFR Part 403.5(c), the permittee shall determine if there is a need to develop or revise its local limits in order to implement the general and specific prohibitions of 40 CFR Part 403.5 (a) and Part 403.5 (b). A technical evaluation of the need to develop or revise local limits shall be submitted to the Division within 12 months of the effective date of this permit. This evaluation should be conducted in accordance with the latest revision of the EPA Local Limits Development Guidance. If a technical evaluation, reveals that development or revision of local limits is necessary, the permittee shall submit the proposed local limits revision to the Division of Water Quality for approval, and after approval implement the new local limits, within 12 months of the Division's determination that a revision is necessary.

G. Enforcement Notice. *UCA 19-5-104* provides that the State may issue a notice to the POTW stating that a determination has been made that appropriate enforcement action must be taken against an industrial user for noncompliance with any pretreatment requirements within 30 days. The issuance of such notice shall not be construed to limit the authority of the Director.

H. Formal Action. The Director retains the right to take legal action against any industrial user and/or POTW for those cases where a permit violation has occurred because of the failure of an industrial user to meet an applicable pretreatment standard.

III. BIOSOLIDS REQUIREMENTS

A. Biosolids Treatment and Disposal. The authorization to dispose of biosolids provided under this permit is limited to those biosolids produced from the treatment works owned and operated by the permittee. The treatment methods and disposal practices are designated below.

1. Treatment

   a. Anaerobic Digestion - Sewage sludge is treated in the absence of air for a specific mean cell residence time at a specific temperature. Values for the mean cell residence time and temperature shall be between l5 days at 35 to 55 degrees Celsius and 60 days at 20 degrees Celsius (40 CFR 503 Appendix B. 4.2.).

2. Description of Biosolids Disposal Method

   a. Class A biosolids may be sold or given away to the public for lawn and garden use or land application.

   b. Class B biosolids may be land applied for agriculture use or at reclamation sites at agronomic rates.

   c. Biosolids may be disposed of in a landfill or transferred to another facility for treatment and/or disposal.

3. Changes in Treatment Systems and Disposal Practices.

   a. Should the permittee change their disposal methods or the biosolids generation and handling processes of the plant, the permittee must notify the Director at least 30 days in advance if the process/method is specified in 40 CFR 503. This includes, but is not limited to, the permanent addition or removal of any biosolids treatment units (i.e., digesters, drying beds, belt presses, etc.) and/or any other change.

   b. Should the permittee change their disposal methods or the biosolids generation and handling processes of the plant, the permittee must notify the Director at least 180 days in advance if the process/method is not specified in 40 CFR 503. This includes, but is not limited to, the permanent addition or removal of any biosolids treatment units (i.e., digesters, drying beds, belt presses, etc.) and/or any other change.

For any biosolids that are land filled, the requirements in *Section 2.12* of the latest version of the *EPA Region VIII Biosolids Management Handbook* must be followed

B. Specific Limitations and Monitoring Requirements. All biosolids generated by this facility to be sold or given away to the public shall meet the requirements of *Part III.B.1, 2, 3* and *4* listed below.

1. Metals Limitations. All biosolids sold or given away in a bag or similar container for application to lawns and home gardens must meet the metals limitations as described below. If these metals limitations are not met, the biosolids must be landfilled.

Pollutant Limits, (40 CFR Part 503.13(b)) Dry Mass Basis				
Heavy Metals	Table 1	Table 2	Table 3	Table 4
	Ceiling Conc. Limits †, ‡ (mg/kg)	CPLR §, (mg/ha)	Pollutant Conc. Limits (mg/kg)	APLR **, ((kg/ha)/yr)
Total Arsenic	75	41	41	2.0
Total Cadmium	85	39	39	1.9
Total Copper	4300	1500	1500	7.5
Total Lead	840	300	300	15
Total Mercury	57	17	17	0.85
Total Molybdenum	75	N/A	N/A	N/A
Total Nickel	420	420	420	21
Total Selenium	100	100	100	5.0
Total Zinc	7500	2800	2800	140

2. Pathogen Limitations. All biosolids sold or given away in a bag or a similar container for application to lawns and home gardens must meet the pathogen limitations for Class A. Land applied biosolids must meet the pathogen limitations for Class B as described below. If the pathogen limitations are not met, the biosolids must be landfilled.

   a. Class A biosolids shall meet one of the pathogen measurement requirements in the following Pathogen Control Class table or shall meet the requirements for a Process to Further Reduce Pathogens as defined in *40 CFR Part 503.32(a) Sewage Sludge – Class A.*

      (1) Orem currently uses the following practice to meet Class A Pathogen requirements found under *(40 CFR 503.32(a)(7)(ii)), (Appendix B, B.1.):*

         (a) Class A, Alternative 1 - Thermally Treated Sewage sludge - The temperature of the sewage sludge that is used or disposed shall be maintained at a specific value for a period of time 50° C (122°F) or higher for at least 5 days), (40 CFR 503.32(a)(3)(ii)).

   b. Class B biosolids shall meet the pathogen measurement requirements in the following Pathogen Control Class table or shall meet the requirements for a Process to Significantly Reduce Pathogens as defined in 40 CFR Part 503.32(b) *Sewage Sludge – Class B*. In addition, the permittee shall comply with all applicable site restrictions listed below *(40 CFR Part 503.32,(b),(5)):*

      (1) Food crops with harvested parts that touch the biosolids/soil mixture and are totally above the land surface shall not be harvested for 14 months after application.

†The limitations represent the maximum allowable levels of heavy metals in any biosolids intended for land application

‡ These limitations represent the maximum allowable levels of heavy metals based on an average of all samples taken during a 30-day period.

§ CPLR -- Cumulative Pollutant Loading Rate

** APLR – Annual Pollutant Loading Rate

(2) Food crops with harvested parts below the land surface shall not be harvested for 20 months after application if the biosolids remains on the land surface for four months or more prior to incorporation into the soil.

(3) Food crops with harvested parts below the surface of the land shall not be harvested for 38 months after application of sewage sludge when the sewage sludge remains on the land surface for less than four months prior to incorporation into the soil.

(4) Food crops, feed crops, and fiber crops shall not be harvested from the land for 30 days after application.

(5) Animals shall not be allowed to graze on the land for 30 days after application.

(6) Turf grown on land where biosolids is applied shall not be harvested for one year after application if the harvested turf is placed on either land with a high potential for public exposure or a lawn.

(7) Public access to land with a high potential for public exposure shall be restricted for one year after application.

(8) Public access to land with a low potential for public exposure shall be restricted for 30 days after application.

(9) The sludge or the application of the sludge shall not cause or contribute to the harm of a threatened or endangered species or result in the destruction or adverse modification of critical habitat of a threatened or endangered species after application.

Pathogen Control Class	
503.32 (a)(1) - (5), (7),-(8), Class A	503.32 (b)(1) - (5), Class B
Salmonella species –less than three (3) MPN†† per four (4) grams total solids (DWB)‡‡ or Fecal Coliforms – less than 1,000 MPN per gram total solids (DWB).	Fecal Coliforms – less than 2,000,000 MPN or CFU§§ per gram total solids (DWB).
503.32 (a)(6) Class A—Alternative 4	
Salmonella species –less than three (3) MPN per four (4) grams total solids (DWB) or less than 1,000 MPN Fecal Coliforms per gram total solids (DWB), And - Enteric viruses –less than one (1) plaque forming unit per four (4) grams total solids (DWB) And - Viable helminth ova –less than one (1) per four (4) grams total solids (DWB)	

†† MPN – Most Probable Number
‡‡ DWB – Dry Weight Basis.
§§ CFU – Colony Forming Units

3. Vector Attraction Reduction Requirements.

   a. The permittee will meet vector attraction reduction through use of one of the methods listed in *40 CFR 503.33*. Facility is meeting the requirements though the following methods.

      (1) Under *40 CFR 503.33(b)(1),* the solids need to be treated through anaerobic digestion for at least 15 days at a temperature of a least 35º C (95ºF) with a 38% reduction of volatile solids.

   If the permittee intends to use another one of the alternatives, the Director and the EPA must be informed at least thirty (30) days prior to its use. This change may be made without additional public comment.

4. Self-Monitoring Requirements.

   a. At a minimum, upon the effective date of this permit, all chemical pollutants, pathogens and applicable vector attraction reduction requirements shall be monitored according to *40 CFR 503.16(1)(a)*.

Minimum Frequency of Monitoring (40 CFR Part 503.16, 503.26. and 503.46)		
Amount of Biosolids Disposed Per Year		Monitoring Frequency
Dry US Tons	Dry Metric Tons	Per Year or Batch
> 0 to < 320	> 0 to < 290	Once Per Year or Batch
> 320 to < 1650	> 290 to < 1,500***	Once a Quarter or Four Times
> 1,650 to < 16,500	> 1,500 to < 15,000	Bi-Monthly or Six Times
> 16,500	> 15,000	Monthly or Twelve Times

   b. Sample collection, preservation and analysis shall be performed in a manner consistent with the requirements of *40 CRF 503* and/or other criteria specific to this permit. A metals analysis is to be performed using *Method SW 846* with *Method 3050* used for digestion. For the digestion procedure, an amount of biosolids equivalent to a dry weight of one gram shall be used. The methods are also described in the latest version of the *Region VIII Biosolids Management Handbook.*

   c. The Director may request additional monitoring for specific pollutants derived from biosolids if the data shows a potential for concern.

   d. After two (2) years of monitoring at the frequency specified, the permittee may request that the Director reduce the sampling frequency for the heavy metals. The frequency cannot be reduced to less than once per year for biosolids that are sold or given away to the public for any parameter. The frequency also cannot be reduced for any of the pathogen or vector attraction reduction requirements listed in this permit.

C. Management Practices of Biosolids.

   1. Biosolids Distribution Information

*** Over the last decade Orem has produce an average of 811 DMT of biosolids ever year, therefore they need to sample at least four times a year.

a. For biosolids that are sold or given away, an information sheet shall be provided to the person who receives the biosolids. The label or information sheet shall contain:

(1) The name and address of the person who prepared the biosolids for a sale or to be given away.

(2) A statement that prohibits the application of the biosolids to the land except in accordance with the instructions on the label or information sheet.

2. Biosolids Application Site Storage

a. For biosolids or material derived from biosolids that are stored in piles for one year or longer, measures shall be taken to ensure that erosion (whether by wind or water) does not occur. However, best management practices should also be used for piles used for biosolids treatment. If a treatment pile is considered to have caused a problem, best management practices could be added as a requirement in the next permit renewal

3. Land Application Practices

a. The permittee shall operate and maintain the land application site operations in accordance with the following requirements:

(1) The permittee shall provide to the Director and the EPA within 90 days of the effective date of this permit a land application plan.

(2) Application of biosolids shall be conducted in a manner that will not contaminate the groundwater or impair the use classification for that water underlying the sites.

(3) Application of biosolids shall be conducted in a manner that will not cause a violation of any receiving water quality standard from discharges of surface runoff from the land application sites. Biosolids shall not be applied to land 10 meters or less from waters of the United States (as defined in 40 CFR 122.2).

(4) No person shall apply biosolids for beneficial use to frozen, ice-covered, or snow-covered land where the slope of such land is greater than three percent and is less than or equal to six percent unless one of the following requirements is met:

(a) there is 80 percent vegetative ground cover; or,

(b) approval has been obtained based upon a plan demonstrating adequate runoff containment measures.

(5) Application of biosolids is prohibited to frozen, ice-covered, or snow covered sites where the slope of the site exceeds six percent.

(6) Agronomic Rate

(a) Application of biosolids shall be conducted in a manner that does not exceed the agronomic rate for available nitrogen of the crops grown on the site. At a minimum, the permittee is required to follow the methods for calculating agronomic rate outlined in the latest version of the *Region VIII Biosolids Management Handbook* (other methods may be approved by the Director).

The treatment plant shall provide written notification to the applier of the biosolids of the concentration of total nitrogen (as N on a dry weight basis) in the biosolids. Written permission from the Director is required to exceed the agronomic rate.

(b) The permittee may request the limits of *Part III, C, 6* be modified if different limits would be justified based on local conditions. The limits are required to be developed in cooperation with the local agricultural extension office or university.

(c) Deep soil monitoring for nitrate-nitrogen is required for all land application sites (does not apply to sites where biosolids are applied less than once every five years). A minimum of six samples for each 320 (or less) acre area is to be collected. These samples are to be collected down to either a 5 foot depth, or the confining layer, whichever is shallower (sample at 1 foot, 2 foot, 3 foot, 4 foot and 5 foot intervals). Each of these one-foot interval samples shall be analyzed for nitrate-nitrogen. In addition to the one-foot interval samples, a composite sample of the 5 foot intervals shall be taken, and analyzed for nitrate-nitrogen as well. Samples are required to be taken once every five years for non-irrigated sites that receive more than 18 inches of precipitation annually or for irrigated sites

(7) Biosolids shall not be applied to any site area with standing surface water. If the annual high groundwater level is known or suspected to be within five feet of the surface, additional deep soil monitoring for nitrate-nitrogen as described in *Part III.C.(6),(c).* is to be performed. At a minimum, this additional monitoring will involve a collection of more samples in the affected area and possibly more frequent sampling. The exact number of samples to be collected will be outlined in a deep soil monitoring plan to be submitted to the Director and the EPA within 90 days of the effective date of this permit. The plan is subject to approval by the Director.

(8) The specified cover crop shall be planted during the next available planting season. If this does not occur, the permittee shall notify the Director in writing. Additional restrictions may be placed on the application of the biosolids on that site on a case-by-case basis to control nitrate movement. Deep soil monitoring may be increased under the discretion of the Director.

(9) When weather and or soil conditions prevent adherence to the biosolids application procedure, biosolids shall not be applied on the site.

(10) For biosolids that are sold or given away, an information sheet shall be provided to the person who receives the biosolids. The label or information sheet shall contain:

(a) The name and address of the person who prepared the biosolids for sale or give away for application to the land.

(b) A statement that prohibits the application of the biosolids to the land except in accordance with the instructions on the label or information sheet.

(c) The annual whole biosolids application rate for the biosolids that do not cause the metals loading rates in Tables 1, 2, and 3 (*Part III.B.1.*) to be exceeded.

(11) Biosolids subject to the cumulative pollutant loading rates in Table 2 (*Part III.B.1.*) shall not be applied to agricultural land, forest, a public contact site, or a reclamation site if any of the cumulative pollutant loading rates in Table 2 have been reached.

(12) If the treatment plant applies the biosolids, it shall provide the owner or leaseholder of the land on which the biosolids are applied notice and necessary information to comply with the requirements in this permit.

(13) The permittee shall inspect the application of the biosolids to active sites to prevent malfunctions and deterioration, operator errors and discharges, which may cause or lead to the release of biosolids to the environment or a threat to human health. The permittee must conduct these inspections often enough to identify problems in time to correct them before they harm human health or the environment. The permittee shall keep an inspection log or summary including at least the date and time of inspection, the printed name and the handwritten signature of the inspector, a notation of observations made and the date and nature of any repairs or corrective action.

D. Special Conditions on Biosolids Storage. Permanent storage of biosolids is prohibited. Biosolids shall not be temporarily stored for more than two (2) years. Written permission to store biosolids for more than two years must be obtained from the Director. Storage of biosolids for more than two years will be allowed only if it is determined that significant treatment is occurring.

E. Representative Sampling. Biosolids samples used to measure compliance with *Part III* of this Permit shall be collected at locations representative of the quality of biosolids generated at the treatment works and immediately prior to land application.

F. Reporting of Monitoring Results.

1. Biosolids. The permittee shall provide the results of all monitoring performed in accordance with *Part III.B*, and information on management practices, biosolids treatment, site restrictions and certifications shall be provided no later than February 19 of each year. Each report is for the previous calendar year. If no biosolids were sold or given away during the reporting period, "no biosolids were sold or given away" shall be reported. Legible copies of these reports required herein, shall be signed and certified in accordance with the Signatory Requirements (see Part VII.G), and submitted to the Utah Division of Water Quality and the EPA by the NeT-Biosolids system through the EPA Central Data Exchange (CDX) system.:

G. Additional Record Keeping Requirements Specific to Biosolids.

1. Unless otherwise required by the Director, **the permittee is not required to keep records** on compost products if the permittee prepared them from biosolids that meet the limits in Table 3 (*Part III.B.1*), the Class A pathogen requirements in *Part III.B.2* and the vector attraction reduction requirements in *Part III.B.3*. The Director may notify the permittee that additional record keeping is required if it is determined to be significant to protecting public health and the environment.

2. **The permittee is required** to keep the following information for at least 5 years:

a. Concentration of each heavy metal in Table 3 (*Part III.B.1*).

b. A description of how the pathogen reduction requirements in *Part III.B.2* were met.

c. A description of how the vector attraction reduction requirements in *Part III.B.3* were met.

d. A description of how the management practices in *Part III.C* were met (if necessary).

e. The following certification statement:

"I certify under the penalty of law, that the heavy metals requirements in *Part III.B.1*, the pathogen requirements in *Part III.B.2*, the vector attraction requirements in *Part III.B.3*, the management practices in *Part III.C*. This determination has been made under my direction and supervision in accordance with the system designed to assure that qualified personnel properly gather and evaluate the information used to determine that the pathogen requirements, the vector attraction reduction requirements and the management practices have been met. I am aware that there are significant penalties for false certification including the possibility of imprisonment."

3. 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 the life of the permit. Data collected on site, copies of Biosolids Report forms, and a copy of this UPDES biosolids-only permit must be maintained on site during the duration of activity at the permitted location.

IV. STORM WATER REQUIREMENTS.

A. Industrial Storm Water Permit. Based on the type of industrial activities occurring at the facility, the permittee is required to maintain separate coverage or an appropriate exclusion under the Multi-Sector General Permit (MSGP) for Storm Water Discharges Associated with Industrial Activities (UTR000000). If the facility is not already covered, the permittee has 30 days from when this permit is issued to submit the appropriate Notice of Intent (NOI) for the MSGP or exclusion documentation.

B. Construction Storm Water Permit. Any construction at the facility that disturbs an acre or more of land, including less than an acre if it is part of a common plan of development or sale, is required to obtain coverage under the UPDES Construction General Storm Water Permit (UTRC00000). Permit coverage must be obtained prior to land disturbance. If the site qualifies, a Low Erosivity Waiver (LEW) Certification may be submitted instead of permit coverage.

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.

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 V.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;

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:

      (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 judgement 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 VI.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 VI.G.2.a (1), (2) and (3)*.

3. Notice.

   a. *Anticipated bypass*. Except as provided above in *section VI.G.2* and below in *section VI.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 VI.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 IV.H*, Twenty Four Hour Reporting. The permittee shall also immediately notify the Director of the Department of Natural 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

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 VII.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 VII.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;

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 areawide 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, whole effluent toxicity (WET) limitations, a compliance date, a compliance schedule, a change in the whole effluent toxicity (biomonitoring) protocol, additional or modified numerical limitations, or any other conditions related to the control of toxicants if one or more of the following events occur;

1. Toxicity is detected, as per *Part I.C.4.a* of this permit, during the duration of this permit.

2. The TRE results indicate that the toxicant(s) represent pollutant(s) or pollutant parameter(s) that may be controlled with specific numerical limits, and the Director concludes that numerical controls are appropriate.

3. Following the implementation of numerical control(s) of toxicant(s), the Director agrees that a modified biomonitoring protocol is necessary to compensate for those toxicants that are controlled numerically.

4. The TRE reveals other unique conditions or characteristics, which in the opinion of the permit issuing authority justify the incorporation of unanticipated special conditions in the permit.

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_{50}").

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_{25}< 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_{25}" 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:

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.

18. "Biosolids," means any material or material derived from sewage solids that have been biologically treated.

19. "Dry Weight-Basis," means 100 percent solids (i.e. zero percent moisture).

20. "Land Application" is the spraying or spreading of biosolids onto the land surface; the injection of biosolids below the land surface; or the incorporation of biosolids into the land so that the biosolids can either condition the soil or fertilize crops or vegetation grown in

the soil. Land application includes distribution and marketing (i.e. the selling or giving away of the biosolids).

21. "Pathogen," means an organism that is capable of producing an infection or disease in a susceptible host.

22. "Pollutant" for the purposes of this permit is an organic substance, an inorganic substance, a combination of organic and inorganic substances, or pathogenic organisms that after discharge and upon exposure, ingestion, inhalation, or assimilation into an organism either directly from the environment or indirectly by ingestion through the food-chain, could on the basis of information available to the Administrator of EPA, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunction in reproduction), or physical deformations in either organisms or offspring of the organisms.

23. "Runoff" is rainwater, leachate, or other liquid that drains over any part of a land surface and runs off the land surface.

24. "Similar Container" is either an open or closed receptacle. This includes, but is not limited to, a bucket, a box, a carton, and a vehicle or trailer with a load capacity of one metric ton or less.

25. "Total Solids" are the materials in the biosolids that remain as a residue if the biosolids are dried at 103^{o} or 105^{o} Celsius.

26. "Treatment Works" are either Federally owned, publicly owned, or privately-owned devices or systems used to treat (including recycling and reclamation) either domestic sewage or a combination of domestic sewage and industrial waste or liquid manure.

27. "Vector Attraction" is the characteristic of biosolids that attracts rodents, flies mosquitos or other organisms capable of transporting infectious agents.

28. "Animals" for the purpose of this permit are domestic livestock.

29. "Annual Whole Sludge Application Rate" is the amount of sewage sludge (dry-weight basis) that can be applied to a unit area of land during a cropping cycle.

30. "Agronomic Rate is the whole sludge application rate (dry-weight basis) designed to: (1) provide the amount of nitrogen needed by the crop or vegetation grown on the land; and (2) minimize the amount of nitrogen in the sewage sludge that passes below the root zone of the crop or vegetation grown on the land to the ground water.

31. "Annual Pollutant Loading Rate" is the maximum amount of a pollutant (dry-weight basis) that can be applied to a unit area of land during a 365-day period.

32. "Application Site or Land Application Site" means all contiguous areas of a users' property intended for sludge application.

33. "Cumulative Pollutant Loading Rate" is the maximum amount of an inorganic pollutant (dry-weight basis) that can be applied to a unit area of land.

34. "Grit and Screenings" are sand, gravel, cinders, other materials with a high specific gravity and relatively large materials such as rags generated during preliminary treatment of domestic sewage at a treatment works and shall be disposed of according to *40 CFR 258*.

35. "High Potential for Public Contact Site" is land with a high potential for contact by the public. This includes, but is not limited to, public parks, ball fields, cemeteries, plant nurseries, turf farms, and golf courses.

36. "Low Potential for Public Contact Site" is the land with a low potential for contact by the public. This includes, but is not limited to, farms, ranches, reclamation areas, and other lands which are private lands, restricted public lands, or lands which are not generally accessible to or used by the public.

37. "Monthly Average" is the arithmetic mean of all measurements taken during the month.

38. "Volatile Solids" is the amount of the total solids in sewage sludge lost when the sludge is combusted at 550 degrees Celsius for 15-20 minutes in the presence of excess air.

FACT SHEET AND STATEMENT OF BASIS
CITY OF OREM
RENEWAL PERMIT: DISCHARGE & BIOSOLIDS
UPDES PERMIT NUMBER: UT0020915
UPDES BIOSOLIDS PERMIT NUMBER: UTL-020915
MAJOR MUNICIPAL

FACILITY CONTACTS

Person Name:	Giles Demke	Person Name:	Ned Miner
Position:	Section Manager	Position:	Plant Supervisor
Phone Number:	(801) 229-7475	Phone Number:	(801) 229-7472
Person Name:	Dan Shorten	Person Name:	Dylan Hanseen
Position:	Sr. Plant Operator, Biosolids	Position:	Industrial Pretreatment Coordinator
Phone Number:	(801) 229-7490	Phone Number:	(801) 229-7491
Person Name:	Blair Blonquist		
Position:	Process		
Phone Number:	(801) 229-7473		

Facility Name:	City of Orem
Mailing and Facility Address:	1797 West 1000 South Orem, Utah 84059
Telephone:	(801) 229-7475

DESCRIPTION OF FACILITY

The Orem Water Reclamation Facility (OWRF), originally constructed in 1958, was last upgraded in 2014. The facility consists of three mechanical bar screens and two aerated grit chambers, followed by a division between four primary clarifiers. The overflow from all four primary clarifiers goes to a system of biological nutrient removal (BNR) basins. After treatment in these basins the overflow goes to final clarifiers for separation which consists of return activated sludge (RAS), waste activated sludge (WAS), or cleaned water for final disinfection at an ultra violet (UV) disinfection system. The final effluent is discharged to Powell Slough with final receiving water being Utah Lake. All WAS is sent to an equalization basin and mixed with the primary clarifier underflow and then introduced to the anaerobic digester system for final treatment.

Solids are handled by the following: three anaerobic digesters including one thermophilic digester and two mesophilic digesters. The mesophilic digesters consist of one fixed lid primary and one floating lid secondary. The underflow from the primary digesters is pumped to the above referenced digester system. The anaerobic digesters consistently produce class B biosolids. All of the biosolids, after a belt press dewatering facility, are tested to meet regulation and land applied to farmland in southern Utah County.

The facility serves the City of Orem, the City of Lindon, and a portion of the Town of Vineyard. The average design flow is 13.5 MGD, with a design population equivalent of 135,000. The facility is located at 1797 West 1000 South in Orem City, Utah County, Utah latitude 40º16’39” and longitude 111º44’19”, with STORET Number 499525.

SUMMARY OF CHANGES FROM PREVIOUS PERMIT

Plant Upgrade:
The City of Orem has modified the disinfection at the wastewater treatment plant from chlorine to UV. Due to the modification, the City of Orem will no longer be required to sample for total residual chlorine (TRC).

Permit:
The City of Orem reported 13.5 MGD design flow on their permit application. As a result, effluent flow maximum monthly average limit has been changed from 14 MGD to 13.5 MGD.

Storm Water permit provisions have been removed as part of a programmatic separation of the previously combined UPDES Industrial permit. The City of Orem will now be required to apply for and obtain separate UPDES Industrial Storm Water Permit coverage under the MSGP No. UTR000000, or an applicable exemption, as described further in the Storm Water Requirements section of this Fact Sheet.

TBPEL:
On December 16, 2014, the Utah Water Quality Board adopted *Utah Administrative Code (UAC) R317-1-3.3, Technology-Based Limits for Controlling Phosphorus Pollution*. The Technology-Based Phosphorous Effluent Limits (TBPEL) establishes new regulations for the discharge of phosphorus to surface waters and is self-implementing. The TBPEL rule includes the following requirements for non-lagoon wastewater treatment plants:

The TBPEL 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 unless a variance has been granted by DWQ. OWRF requested two permit variances. These permit variance were subject to public notice, and on December 17, 2019 OWRF was granted both variances related to the compliance date to achieve TBPEL. This permit is incorporating the approved variances with the interim limits and dates that were public noticed in the local newspaper, in which no comments were received.

The first variance (DWQ-2019-013871) is in relation to the final effluent phosphorus limit discharged to Powell Slough. This variance does not to extend beyond January 1, 2023 and has an interim total phosphorus annual average limit of 2.5 mg/L beginning January 1, 2020. The second variance (DWQ-2019-013875) grants OWRF a compliance alternative to achieve the TBPEL in relation to reuse – this variance does not expire. Effective January 1, 2020, OWRF shall report the calculated TBPEL Reuse Average Annual Discharge Concentration for the annual average concentration for total phosphorus and comply with the effluent limitations for the annual average total phosphorus concentrations specified in the UPDES permit based on the calculated TBPEL Reuse Average Annual Discharge Concentration.

The permit effluent limits will incorporate the following changes:

Effluent Limitations Changes for Discharge to Powell Slough	
Parameter	Annual Average
Interim Total Phosphorus, mg/L (Effective Jan 1, 2020 – Dec 31, 2022)	2.5
Final Total Phosphorus, mg/L, (Effective Jan 1, 2023)	1.0

DISCHARGE

DESCRIPTION OF DISCHARGE

The City of Orem has been reporting self-monitoring results on Discharge Monitoring Reports on a monthly basis. A review of the last three years of data indicates there were minimal violations which did not result in enforcement.

Outfall	Description of Discharge Point
001	A 36 inch diameter pipe located between a ground water drain pipe and the outlet from Clegg's pond into Powell Slough at latitude 40º 16' 39" and longitude 111º 44' 19".

RECEIVING WATERS AND STREAM CLASSIFICATION

The discharge flows into the Powell Slough and thence to Utah Lake. Powell Slough is Class 2B, 3C and 3D, and Utah Lake is Class 2A and 3B, according to *Utah Administrative Code (UAC) R317-2-13*:

Class 2A -- Protected for frequent primary contact recreation where there is a high likelihood of ingestion of water or a high degree of bodily contact with the water. Examples include, but are not limited to, swimming, rafting, kayaking, diving, and water skiing.

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 3C -- Protected for nongame fish and other 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.

IMPAIRED WATERS CONSIDERATIONS

This facility ultimately discharges to Utah Lake which is listed on Utah's 2020 303(d) list of impaired waterbodies. Utah Lake has been identified as impaired for harmful algal blooms, PCB in fish tissue, total phosphorus (TP) and total dissolved solids (TDS). Due to the listing of TDS the facility will be required to self-monitor for TDS on a monthly basis in order to better quantify loading of this pollutant of concern. The TP listing was based on an indicator of 0.025 mg/L in 2004.

Currently, a Utah Lake strategy is in the process of being developed. The process will include time frames for further assessment and decision points for developing a Use Attainability Analysis, TMDL, or site-specific standards for phosphorus and/or nitrogen. This process may result in pollutant load reductions and wasteload allocations. Wasteload allocations would then be translated to effluent limits in UPDES permits. At this time there is not a water quality-based standard for nutrients.

BASIS FOR EFFLUENT LIMITATIONS

Limitations on total suspended solids (TSS), biochemical oxygen demand (BOD5), *E. coli*, pH and percent removal for BOD5 and TSS are based on current Utah Secondary Treatment Standards, UAC R317-1-3.2. The oil and grease is based on best professional judgment (BPJ). WET, ammonia and dissolved oxygen (DO) are water quality based and derived by waste load analysis, which is attached. It has been determined that this discharge will not cause a violation of water quality standards. An Antidegradation Level II review

is not required since the Level I review shows that water quality impacts are minimal. The permittee is expected to be able to comply with these limitations. The permit limitations are below.

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 framework for what routine monitoring or effluent limitations are required.

A quantitative RP analysis was performed on TDS, arsenic, cadmium, copper, cyanide, lead, mercury, molybdenum, nickel, selenium, silver, and zinc data to determine if there was reasonable potential for the discharge to exceed the applicable water quality standards. Based on the RP analysis, none of the parameters exceeded the most stringent chronic water quality standard or were determined to have a reasonable potential to exceed the standard. A copy of the RP analysis is included at the end of this Fact Sheet.

The permit limitations are:

Parameter	Effluent Limitations *a				
	Maximum Monthly Avg	Maximum Weekly Avg	Yearly Average	Daily Minimum	Daily Maximum
Total Flow	13.5	--	--	--	--
BOD_5, mg/L	25	35	--	--	--
BOD_5 Min. % Removal	85	--	--	--	--
TSS, mg/L	25	35	--	--	--
TSS Min. % Removal	85	--	--	--	--
Dissolved Oxygen, mg/L	--	--	--	5.5	--
Total Ammonia (as N), mg/L					
Summer (Jul-Sep)	3.0	--	--	--	11.0
Fall (Oct-Dec)	4.0	--	--	--	15.0
Winter (Jan-Mar)	5.0	--	--	--	19.0
Spring (Apr-Jun)	4.0	--	--	--	14.0
E. coli, No./100mL	126	157	--	--	--
Total Phosphorus, mg/L *h					
Interim	--	--	2.5	--	--
Final (Effective Jan 1, 2023)	--	--	1.0	--	--
WET, Chronic Biomonitoring	--	--	--	--	IC_{25} > 92% effluent
Oil & Grease, mg/L	--	--	--	--	10.0
pH, Standard Units	--	--	--	6.5	9

SELF-MONITORING AND REPORTING REQUIREMENTS

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

Self-Monitoring and Reporting Requirements *a			
Parameter	Frequency	Sample Type	Units
Total Flow *b, *c	Continuous	Recorder	MGD
BOD_5, Influent *d	3 x Weekly	Composite	mg/L
Effluent	3 x Weekly	Composite	mg/L
TSS, Influent *d	3 x Weekly	Composite	mg/L
Effluent	3 x Weekly	Composite	mg/L
E. coli	3 x Weekly	Grab	No./100mL
pH	3 x Weekly	Grab	SU
Total Ammonia (as N)	3 x Weekly	Grab	mg/L
DO	3 x Weekly	Grab	mg/L
WET – Biomonitoring *f	Quarterly		
Ceriodaphnia - Chronic	2nd & 4th Quarter	Composite	Pass/Fail
Fathead Minnows - Chronic	1st & 3rd Quarter	Composite	Pass/Fail
Oil & Grease *e	When Sheen Observed	Grab	mg/L
Total Dissolved Solids	Monthly	Composite	mg/L
Total Ammonia	Monthly	Composite	mg/L
Orthophosphate (as P), *h			
Effluent	Monthly	Composite	mg/L
Total Phosphorus (as P), *h, *i			
Influent	Monthly	Composite	mg/L
Effluent	Monthly	Composite	mg/L
Total Kjeldahl Nitrogen TKN (as N), *h, *i			
Influent	Monthly	Composite	mg/L
Effluent	Monthly	Composite	mg/L
Nitrate, NO3 *h, *i	Monthly	Composite	mg/L
Nitrite, NO2 *h, *i	Monthly	Composite	mg/L
Metals, Influent *g	Quarterly	Composite	mg/L
Effluent	Quarterly	Composite	mg/L
Organic Toxics	Yearly	Grab	mg/L

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

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

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

*d In addition to monitoring the final discharge, influent samples shall be taken and analyzed for this constituent at the same frequency as required for this constituent in the discharge.

*e Oil & Grease sampled when sheen is present or visible. If no sheen is present or visible, report NA.

*f Chronic Ceriodaphnia will be tested during the 2nd and 4th quarters, and the chronic fathead minnows will be tested during the 1st and 3rd quarters.

*g Metals results were reviewed for the last 36 months. No limits are required at this time.

*h These reflect changes required with the adoption of UCA R317-1-3.3, Technology-based Phosphorus Effluent Limits rule. Orem Water Reclamation Facility (OWTF) was granted a variance in regards to the 1.0 mg/L total phosphorous annual average limit. This variance does not to extend beyond January 1, 2023 and has an interim total phosphorous annual average limit of 2.5 mg/L. Frequency of sample collection listed in table represents the minimum requirement.

*i Pollutants are being sampled in support of the work being done for the TMDL currently underway for Utah Lake. The Pollutants Of Concern (POC) will be monitored and reported (on a monthly basis by the facility on Discharge Monitoring Report). If the City of Orem decides to sample more frequently for these POC's, the additional data will be welcome.

BIOSOLIDS

For clarification purposes, sewage sludge is considered solids, until treatment or testing shows that the solids are safe, and meet beneficial use standards. After the solids are tested or treated, the solids are then known as biosolids. Class A biosolids, may be used for high public contact sites, such as home lawns and gardens, parks, or playing fields, etc. Class B biosolids may be used for low public contact sites, such as farms, rangeland, or reclamation sites, etc.

SUBSTANTIAL BIOSOLIDS TREATMENT CHANGES

There have been no changes to biosolids treatment during the last permit cycle.

DESCRIPTION OF TREATMENT AND DISPOSAL

The Permittee submitted their 2019 annual biosolids report on February 12, 2020. The report states the Permittee produced 902 dry metric tons (DMT) of solids; 782 DMT were land applied on agricultural land, the remaining 263 DMT are stored on site for the future.

Orem treats the wastewater through clarification and BNR's. The solids removed in the clarifier are sent to solids treatment. The solids are first thickened in diffused air floatation (DAF) basin prior to digestion. From the DAF the solids go to the Thermophilic Digester, then to the Mesophilic Digesters (one primary, one secondary). From here the solids are directed to the old aerobic digester which has been converted to a holding tank. This process produces 100% anaerobic biosolids.

The solids are dewatered by belt presses four days a week. Dewatered solids are stored in drying beds until they are delivered to farm for land application. This storage allows them to increase and adjust production as needed.

The solids could meet Class A, but Orem has chosen to only test for Class B. The solids are hauled off to multiple farms across Utah County to improve crop production.

The last inspection conducted at the land application site was September 30, 2015. The inspection showed that Orem was in compliance with all aspects of the biosolids management program.

SELF-MONITORING REQUIREMENTS

Under *40 CFR 503.16(a)(1),* the self-monitoring requirements are based upon the amount of biosolids disposed per year and shall be monitored according to the chart below.

Minimum Frequency of Monitoring (40 CFR Part 503.16, 503.26. and 503.46)		
Amount of Biosolids Disposed Per Year		Monitoring Frequency
Dry US Tons	Dry Metric Tons	Per Year or Batch
> 0 to < 320	> 0 to < 290	Once Per Year or Batch
> 320 to < 1650	> 290 to < 1,500	Once a Quarter or Four Times
> 1,650 to < 16,500	> 1,500 to < 15,000	Bi-Monthly or Six Times
> 16,500	> 15,000	Monthly or Twelve Times

Over the last decade Orem has produce an average of 811 DMT of biosolids ever year, therefore they need to sample at least four times a year.

Landfill Monitoring

Under *40 CFR 258,* the landfill monitoring requirements include a paint filter test. If the biosolids do not pass a paint filter test, the biosolids cannot be disposed in the sanitary landfill *(40 CFR 258.28(c)(1).*

BIOSOLIDS LIMITATIONS

Heavy Metals

Class A Biosolids for Home Lawn and Garden Use

The intent of the heavy metals regulations of Table 3, *40 CFR 503.13* is to ensure the heavy metals do not build up in the soil in home lawn and gardens to the point where the heavy metals become phytotoxic to plants. The permittee will be required to produce an information sheet (see *Part III. C*. of the permit) to made available to all people who are receiving and land applying Class A biosolids to their lawns and gardens. If the instructions of the information sheet are followed to any reasonable degree, the Class A biosolids will be able to be land applied year after year, to the same lawns and garden plots without any deleterious effects to the environment. The information sheet must be provided to the public, because the permittee is not required, nor able to track the quantity of Class A biosolids that are land applied to home lawns and gardens.

Class A Requirements With Regards to Heavy Metals

If the biosolids are to be applied to a lawn or home garden, the biosolids shall not exceed the maximum heavy metals in Table 1 and the monthly average pollutant concentrations in Table 3 (see Table 1 and Table 3 below). If the biosolids do not meet these requirements, the biosolids cannot be sold or given away for applications to home lawns and gardens.

Class B Requirements for Agriculture and Reclamation Sites

The intent of the heavy metals regulations of Tables 1, 2 and 3, of *40 CFR 503.13* is to ensure that heavy

metals do not build up in the soil at farms, forest land, and land reclamation sites to the point where the heavy metals become phytotoxic to plants. The permittee will be required to produce an information sheet (see *Part III. C*. of the permit) to be handed out to all people who are receiving and land applying Class B biosolids to farms, ranches, and land reclamation sites (if biosolids are only applied to land owned by the permittee, the information sheet requirements are waived). If the biosolids are land applied according to the regulations of *40 CFR 503.13*, to any reasonable degree, the Class B biosolids will be able to be land applied year after year, to the same farms, ranches, and land reclamation sites without any deleterious effects to the environment.

Class B Requirements With Regards to Heavy Metals

If the biosolids are to be land applied to agricultural land, forest land, a public contact site or a reclamation site it must meet at all times:

> The maximum heavy metals listed in *40 CFR Part 503.13(b) Table 1* and the heavy metals loading rates in *40 CFR Part 503.13(b) Table 2*; or
>
> The maximum heavy metals in *40 CFR Part 503.13(b) Table 1* and the monthly heavy metals concentrations in *40 CFR Part 503.13(b) Table 3*.

Tables 1, 2, and 3 of Heavy Metal Limitations

Pollutant Limits, (40 CFR Part 503.13(b)) Dry Mass Basis				
Heavy Metals	Table 1	Table 2	Table 3	Table 4
	Ceiling Conc. Limits [1], [2] (mg/kg)	CPLR [3], (mg/ha)	Pollutant Conc. Limits [1], [2], (mg/kg)	APLR [4], ((kg/ha)/yr)
Total Arsenic	75	41	41	2.0
Total Cadmium	85	39	39	1.9
Total Copper	4300	1500	1500	75
Total Lead	840	300	300	15
Total Mercury	57	17	17	0.85
Total Molybdenum	75	N/A	N/A	N/A
Total Nickel	420	420	420	21
Total Selenium	100	100	100	5.0
Total Zinc	7500	2800	2800	140

Any violation of these limitations shall be reported in accordance with the requirements of Part III.F.1. of the permit. If the biosolids do not meet these requirements they cannot be land applied.

Pathogens

The Pathogen Control class listed in the table below must be met;

[1] The limitations represent the maximum allowable levels of heavy metals in any biosolids intended for land application

[2] These limitations represent the maximum allowable levels of heavy metals based on an average of all samples taken during a 30-day period.

[3] CPLR -- Cumulative Pollutant Loading Rate

[4] APLR – Annual Pollutant Loading Rate

Pathogen Control Class	
503.32 (a)(1) - (5), (7),-(8), Class A	503.32 (b)(1) - (5), Class B
Salmonella species –less than three (3) MPN[5] per four (4) grams total solids (DWB)[6] or Fecal Coliforms – less than 1,000 MPN per gram total solids (DWB).	Fecal Coliforms – less than 2,000,000 MPN or CFU[7] per gram total solids (DWB).
503.32 (a)(6) Class A—Alternative 4	
Salmonella species –less than three (3) MPN per four (4) grams total solids (DWB) or less than 1,000 MPN Fecal Coliforms per gram total solids (DWB), And – Enteric viruses –less than one (1) plaque forming unit per four (4) grams total solids (DWB) And - Viable helminth ova –less than one (1) per four (4) grams total solids (DWB)	

Class A Requirements for Home Lawn and Garden Use

If biosolids are land applied to home lawns and gardens, the biosolids need to be treated by a specific process to further reduce pathogens (PFRP), and meet a microbiological limit of less than less than 3 most probable number (MPN) of *Salmonella* per 4 grams of total solids (or less than 1,000 most probable number (MPN/g) of fecal coliform per gram of total solids) to be considered Class A biosolids. The Orem has chosen to achieve PFRP through one of the following methods;

1. Class A, Alternative 1 - Thermally Treated Sewage sludge - The temperature of the sewage sludge that is used or disposed shall be maintained at a specific value for a period of time 50° C (122°F) or higher for at least 5 days), (40 CFR 503.32(a)(3)(ii).

This method is found under *(40 CFR 503.32(a))*.

The practice of sale or giveaway to the public is an acceptable use of biosolids of this quality as long as the biosolids continue to meet Class A standards with respect to pathogens. If the biosolids do not meet Class A pathogen standards the biosolids cannot be sold or given away to the public, and the permittee will need find another method of beneficial use or disposal.

Pathogens Class B

If biosolids are to be land applied for agriculture or land reclamation the solids need to be treated by a specific process to significantly reduce pathogens (PSRP). Orem has chosen to achieve PSRP through one of the following methods:

1. Under *40 CFR 503.32 (b)(2)*, Orem may test the biosolids and must meet a microbiological limit of less than 2,000,000 MPN of fecal coliform per gram for the biosolids to be considered Class B biosolids with respect to pathogens.

[5] MPN – Most Probable Number
[6] DWB – Dry Weight Basis.
[7] CFU – Colony Forming Units

2. Under *40 CFR 503.32 (b)(3),* the PSRP may be accomplished through anaerobic digesters that have a minimum retention time of 15 days at 95° F (35° C) or 60 days at 68° F (20°C).

Vector Attraction Reduction (VAR)
If the biosolids are land applied Orem will be required to meet VAR through the use of a method of listed under *40 CFR 503.33.* The Orem biosolids will meet the vector attraction reduction requirements through one of the methods listed below.

1. Under *40 CFR 503.33(b)(1),* the solids need to be treated through anaerobic digestion for at least 15 days at a temperature of a least 35° C (95° F) with a 38% reduction of volatile solids.

If the biosolids do not meet a method of VAR, the biosolids cannot be land applied.

If the permittee intends to use another one of the listed alternatives in *40 CFR 503.33*, the Director and the EPA must be informed at least thirty (30) days prior to its use. This change may be made without additional public notice

Landfill Monitoring
Under *40 CFR 258,* the landfill monitoring requirements include a paint filter test to determine if the biosolids exhibit free liquid. If the biosolids do not pass a paint filter test, the biosolids cannot be disposed in the sanitary landfill *(40 CFR 258.28(c)(1).*

Record Keeping
The record keeping requirements from *40 CFR 503.17* are included under *Part III.G*. of the permit. The amount of time the records must be maintained are dependent on the quality of the biosolids in regards to the metals concentrations. If the biosolids continue to meet the metals limits of *Table 3* of *40 CFR 503.13*, and are sold or given away the records must be retained for a minimum of five years. If the biosolids are disposed in a landfill the records must retained for a minimum of five years.

Reporting
Orem must report annually as required in *40 CFR 503.18*. This report is to include the results of all monitoring performed in accordance with *Part III.B* of the permit, information on management practices, biosolids treatment, and certifications. This report is due no later than February 19 of each year. Each report is for the previous calendar year.

MONITORING DATA

METALS MONITORING DATA
Orem was required to sample for metals at least four times in 2019. Orem sampled the Class B biosolids 9 times. All biosolids land applied in 2019 met *Table 3* of *40 CFR 503.13,* therefore Orem biosolids qualify as EQ with regards to metals. The monitoring data is below.

Orem Metals Monitoring Data 2019

Orem Monitoring Data, 2011 - 2019			
Parameter	Table 3, mg/kg (Exceptional Quality)	Average, mg/kg	Maximum, mg/kg
Arsenic	41.0	8.2	19.8
Cadmium	39.0	2.9	6.72
Copper	1,500.0	505	773

Lead	300.0	28	140
Mercury	17.0	1.5	4.27
Molybdenum	75.0	16	26.4
Nickel	400.0	52	158
Selenium	36.0	14.4	59.3
Zinc	2,800.0	777	1570

PATHOGEN MONITORING DATA (Anaerobic Cake)

The Permittee must sample for pathogen at least 4 times per year. They sample once per batch/drying bed. Resulting in more samples than the minimum required. All biosolids land applied have met the Class B pathogen standards through anaerobic digestion.

Orem Fecal Coliform Monitoring Data

Fecal Coliform	
Year	Geometric Mean
2019	151
2018	609
2017	64
2016	112
2015	62

STORM WATER REQUIREMENTS

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

Permit coverage under the Multi Sector General Permit (MSGP) for Storm Water Discharges from Industrial Activities is required based on the Standard Industrial Classification (SIC) code for the facility and the types of industrial activities occurring. If the facility is not already covered, it has 30 days from when this permit is issued to submit the appropriate Notice of Intent (NOI) for the MSGP or exclusion documentation. Previously storm water discharge requirements and coverage were combined in this individual permit. These have been separated to provide consistency among permittees, electronic reporting for storm water discharge monitoring reports, and increase flexibility to changing site conditions.

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

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

PRETREATMENT REQUIREMENTS

The pretreatment requirements, regarding administering an approved pretreatment program, remain the same as in the current permit. Any substantial and/or non-substantial changes to the program as defined in 40 CFR 403.18, must be submitted for approval to the Division of Water Quality. Authority to require a pretreatment program is provided for in 19-5-108 UCA, 1953 ann. and UAC R317-8-8.

The sampling of metals will be conducted quarterly and the sampling of organic toxics yearly, see Part II of the UPDES Permit. This is consistent with the guidance developed by the Division of Water Quality. Additional requirements have been added to the permit to ensure that if the allowable headworks loading is above the value calculated for the local limit development that additional monitoring and notification must occur.

The permittee will be required to perform an annual evaluation of the need to revise or develop technically based local limits to implement the general and specific prohibitions of 40 CFR, Part 403.5(a) and Part 403.5(b). This evaluation may indicate that present local limits are sufficiently protective, or that they must be revised. The initial evaluation is due twelve months after the effective date of the permit. As part of this evaluation, the permit requires influent and effluent monitoring for metals and organic toxics. The permittee should utilize the EPA Local Limits Development Guidance to justify the re-evaluation of the local limits.

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.

Since the permittee is a major municipal discharger, the renewal permit will again require whole effluent toxicity (WET) testing. A review of the past three years of WET testing results indicates that no pattern of toxicity has been reported. Therefore, the permittee will continue Chronic WET testing using one species quarterly, alternating between Ceriodaphnia dubia and Pimephales promelas (fathead minnow). The permit will contain the standard requirements for re-testing upon failure of a WET test, and for a Toxicity Reduction Evaluation (TRE) as appropriate.

Chronic toxicity occurs when the IC_{25} is less than 92% effluent dilution. The permit will also contain a toxicity limitation re-opener provision. This provision allows for modification of the permit at any time to include WET limitations and/or increased WET monitoring, should additional information indicate the presence of toxicity in the discharge.

PERMIT DURATION

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

Drafted by
Danielle Lenz, Discharge
Daniel Griffin, Biosolids
Jennifer Robinson, Pretreatment
Lonnie Shull, Biomonitoring
Carl Adams, Storm Water
Danielle Lenz, Reasonable Potential Analysis
Christopher Shope, Wasteload Analysis
Utah Division of Water Quality, (801) 536-4300

PUBLIC NOTICE

Began: March 3, 2021
Ended: April 3, 2021

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 on the DWQ webpage.

During the public comment period provided under R317-8-6.5, any interested person may submit written comments on the draft permit and may request a public hearing, if no hearing has already been scheduled. A request for a public hearing shall be in writing and shall state the nature of the issues proposed to be raised in the hearing. All comments will be considered in making the final decision and shall be answered as provided in R317-8-6.12.

ADDENDUM TO FSSOB

During finalization of the Permit certain dates, spelling edits and minor language corrections were completed. Due to the nature of these changes they were not considered Major and the permit is not required to be re-Public Noticed. During Public Notice period, a rounding error was discovered in the Pretreatment Section – this has been corrected.

Responsiveness Summary

No comments were received during the Public Notice comment period.

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ATTACHMENT 1

Effluent Monitoring Data

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Effluent Monitoring Data.

	Flow	pH		O & G		*E. coli*		BOD5		TSS	
Month	Ave	Min	Max	Visual	TDS	Ave	Max	Max Weekly	Max Monthly	Max Weekly	Max Monthly
Jan-18	8.52	7.07	7.57	Pass	604	2	3	6	6	4.53	3.6
Feb-18	8.58	7	7.62	Pass	582	2	5	7	6	6.53	5.4
Mar-18	8.63	7.07	7.5	Pass	610	2	3	5	5	7.2	5.82
Apr-18	8.6	7.05	7.56	Pass	608	1	2	6	5	16.4	6.74
May-18	8.6	7.06	7.58	Pass	622	1	3	5	5	4.07	3.49
Jun-18	8.39	7.09	7.54	Pass	600	1	1	5	5	6.67	4.3
Jul-18	8.45	7.04	7.73	Pass	668	1	5	5	5	4.53	4.33
Aug-18	8.65	7.07	7.6	Pass	580	1	1	5	5	9	3.9
Sep-18	8.38	7.19	7.68	Pass	650	1	1	5	5	8.13	5.53
Oct-18	8.56	7.13	7.64	Pass	592	2	3	5	5	4.93	3.56
Nov-18	8.28	7.16	7.64	Pass	714	2	3	5	5	4.53	3.98
Dec-18	8.11	7.21	7.65	Pass	572	1	3	5	5	5.87	4.35
Jan-19	8.58	7	7.54	Pass	682	1	2	10	6	5.07	4.73
Feb-19	8.59	7	7.34	Pass	658	2	5	5	5	5.87	4.57
Mar-19	8.83	7.12	7.32	Pass	650	1	1	5	5	6.87	3.63
Apr-19	8.46	6.68	7.8	Pass	638	1	1	5	5	4.93	4.11
May-19	8.53	6.72	7.47	Pass	588	1	1	5	5	4.4	3.97
Jun-19	8.51	7.31	7.52	Pass	680	1	1	6	5	5.07	3.9
Jul-19	8.63	7.32	7.51	Pass	654	1	2	5	5	6.93	5.32
Aug-19	8.8	7.23	7.53	Pass	592	2	7	6	5	4.07	4.03
Sep-19	8.67	7.15	7.41	Pass	634	1	2	5	5	8.67	5.94
Oct-19	8.4	6.85	7.46	Pass	622	2	3	5	5	11	8.16
Nov-19	8.33	7.04	7.38	Pass	570	1	4	7	6	11.6	5
Dec-19	8.37	7.05	7.39	Pass	544	2	5	8	6	10.13	6.38
Jan-20	8.48	7.1	7.41	Pass	712	1	2	9	6	6.67	5.61
Feb-20	8.3	7.01	7.24	Pass	638	3	3	5	5	5.87	4.22
Mar-20	8.23	7.02	7.59	Pass	658	2	5	5	5	6.13	5.11
Apr-20	8.1	6.82	7.33	Pass	496	1	2	9	6	8.8	5.65
May-20	8.23	7.13	7.6	Pass	610	1	1	5	5	15.47	6.83
Jun-20	8.31	7.14	7.57	Pass	648	1	1	6	6	6.07	4
Jul-20	8.22	6.73	7.69	Pass	744	1	1	9	5	6.2	4.55
Aug-20	8.45	7.09	7.62	Pass	640	1	2	5	5	4.53	3.83
Sep-20	8.44	7.01	7.69	Pass	660	1	2	5	5	6.53	5
Oct-20	8.09	7.2	7.72	Pass	600	1	1	9	6	9	6.08
Nov-20	7.85	7.1	7.58	Pass	560	1	1	5	5	5.6	3.92

WET Results

Month	WET Test	Pass / Fail
Sep-17	Chronic Pimephales Promelas	Pass
Dec-17	Chronic Ceriodaphnia	Pass
Mar-18	Chronic Pimephales Promelas	Pass
Jun-18	Chronic Ceriodaphnia	Pass
Sep-18	Chronic Pimephales Promelas	Pass
Dec-18	Chronic Ceriodaphnia	Pass
Mar-19	Chronic Pimephales Promelas	Pass
Jun-19	Chronic Ceriodaphnia	Pass
Sep-19	Chronic Pimephales Promelas	Pass
Dec-19	Chronic Ceriodaphnia	Pass
Mar-20	Chronic Pimephales Promelas	Pass
Jun-20	Chronic Ceriodaphnia	Pass
Sep-20	Chronic Pimephales Promelas	Pass
Dec-20	Chronic Ceriodaphnia	Pass

ATTACHMENT 2

Wasteload Analysis

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

Date: **December 21, 2020**

Facility: **Orem City Water Reclamation Facility**
Orem, UT
UPDES No. UT0020915

Receiving water: **Powell Slough (2B, 3C, 3D)**

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
Outfall 001: Powell Slough → Utah Lake → Jordan River → Great Salt Lake

The maximum daily discharge is not projected to exceed 13.5 MGD during this permit cycle and the maximum monthly design discharge for the facility is 13.5 MGD. The Orem City Water Reclamation Facility plans to install a 5.00 MGD reuse facility that will be operational by early 2023. At that time, an additional wasteload analysis will need to be performed with the updated information.

Receiving Water
The receiving water for Outfall 001 is Powell Slough Waterfowl Management Area, which is a tributary to Utah Lake.

Per UAC R317-2-13.11, the designated beneficial uses for Powell Slough Waterfowl Management Area are 2B, 3C, and 3D.

- *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 3C - Protected for nongame fish and other 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.*

Typically, the critical flow for the wasteload analysis is considered the lowest stream flow for seven consecutive days with a ten year return frequency (7Q10). Due to a lack of flow records for Powell Slough, the 20th percentile of flow measurements was calculated to estimate annual critical flow. Previously, the critical flow was calculated from sampling station 4995260 Powell Slough above Orem WWTP at Golden Pond Outfall. However, measurements have not been collected since 2013 and therefore, Clegg's Pond Outfall sampling station 499252 was used (Table 1). In addition, Orem WRF collected flow measurements in September 2014 of the groundwater outfall for the plant's underdrain system, which were used in this analysis.

Table 1: Seasonal critical low flow

Season	Flow (cfs)		
	Clegg's Pond Outfall	**GW Outfall**	**Combined**
Summer	2.24	0.8	3.04
Fall	2.60	0.8	3.40
Winter	1.05	0.8	1.85
Spring	3.84	0.8	4.64
Annual Average	**3.38**		

Total Maximum Daily Load (TMDL)

According to the Utah's 2016 303(d) Water Quality Assessment Report dated December 7, 2016, the receiving water for the discharge, Powell Slough (UT16020201-010_00) was listed as "Not Supporting" for dissolved oxygen in beneficial use 3D. The Provo Bay portion of Utah Lake (UT-L-16020201-004_02) is "Not Supporting" for PCB in Fish Tissue, pH, Total Ammonia, and Total Phosphorous. The Utah Lake other than Provo Bay portion (UT-L-16020201-004_01) is "Not Supporting" for Harmful Algal Blooms, PCB in Fish Tissue, Total Dissolved Solids, and Total Phosphorous.

Mixing Zone

The maximum allowable mixing zone is 15 minutes of travel time for acute conditions, not to exceed 50% of stream width, and 2,500 feet for chronic conditions, per UAC R317-2-5. Water quality standards must be met at the end of the mixing zone.

Since the receiving water low flow is equal to or less than twice the flow of a point source discharge, the combined flows are considered to be totally mixed. Acute limits were calculated using 100% of the seasonal critical low flow. Therefore, no mixing zone is allowed per UAC R317-2-5.

Parameters of Concern

The potential parameters of concern identified for the discharge/receiving water were total suspended solids (TSS), dissolved oxygen (DO), BOD_5, total phosphorus (TP), total nitrogen (TN), total ammonia (TAN), E. coli, and pH as determined in consultation with the UPDES Permit Writer.

Water Quality Modeling

A QUAL2Kw model of the receiving water was built and calibrated to synoptic survey data collected in September of 2014 by DWQ staff using standard operating procedures (DWQ 2012). The model of Powell Slough extends 2.1 kilometers downstream from the treatment facility outfall to the outlet at Utah Lake. Calibration of the model parameters and rates is described in detail in the updated 2020 Calibration Report.

Receiving water quality data were obtained from monitoring site 4995252 Clegg's Pond Outfall. Previous wasteload analysis calculated the average seasonal value for each constituent with available data in the receiving water from monitoring sites 4995260 Powell Slough above Orem WWTP and 4995251 Orem WRF GW Outfall. However, monitoring sites 4995260 and 4995251 did not have any data collected after 2013. Effluent parameters were characterized using data from monitoring site 4995250 Orem WWTP.

The QUAL2Kw model was used for determining the WQBELs for parameters related to eutrophication and in-stream DO criteria, as well as ammonia toxicity. Effluent concentrations were adjusted so that water quality standards were not exceeded in the receiving water. Where WQBELs exceeded secondary standards or technology based effluent limits (TBEL), the concentration in the model was set at the secondary standard or TBEL.

The QUAL2Kw model was also used to determine the limits for ammonia. 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.

A mass balance mixing analysis was conducted for conservative constituents such as dissolved metals.

QUAL2Kw rates, input and output for DO and eutrophication related constituents are summarized in Appendix A. The WQBELs for conservative constituents are summarized in Appendix B.

The calibration and wasteload models are available for review by request.

Whole Effluent Toxicity (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_{50} (lethal concentration, 50%) percent effluent for acute toxicity and the IC_{25} (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_{50} is typically 100% effluent and does not need to be determined by the WLA.

Table 2: WET Limits for IC_{25}

Season	Percent Effluent
Summer	87%
Fall	86%
Winter	92%
Spring	82%

Effluent Limits

The effect of the effluent on the DO in the receiving water was evaluated using the QUAL2Kw model. A DO sag downstream resulting from the plant discharge was predicted by the model in Powell Slough. However, the DO remained above the minimum criteria and limits more stringent than secondary standards are not required for BOD_5 (Table 3).

Table 3: Water Quality Based Effluent Limits Summary

Effluent Constituent	Acute			Chronic		
	Standard	Limit	Averaging Period	Standard	Limit	Averaging Period
Flow (MGD)	N/A	13.5	1 day	N/A	13.5	30 days
Ammonia (mg/L)	Varies		1 hour	Varies		30 days
Summer (Jul-Sep)		11.0			3.0	
Fall (Oct-Dec)		15.0			4.0	
Winter (Jan-Mar)		19.0			5.0	
Spring (Apr-Jun)		14.0			4.0	
Min. Dissolved Oxygen (mg/L)	3.0	5.5	Instantaneous	5.0	5.5	30 days
BOD_5 (mg/L)	N/A	35	7 days	N/A	25	30 days

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 discharge since the pollutant concentration and load is not increasing under this permit renewal.

Prepared by: Christopher L. Shope, PhD
Standards and Technical Services Section

Documents:

WLA Document: *orem_potw_q2kw_wla_2020.docx*
QUAL2Kw Calibration Model: *orem_potw_q2kw_cal_2015.xlsm*
QUAL2Kw Wasteload Model: *orem_potw_q2kw_wla_2020.xlsm*
QUAL2Kw Calibration Report: *PowellSloughQ2KwCalibrationReport.docx*

References:

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

Field Data Collection for QUAL2Kw Model Build and Calibration Standard Operating Procedures Version 1.0. 2012. Utah Division of Water Quality.

Using QUAL2K Modeling to Support Nutrient Criteria Development and Wasteload Analyses in Utah. 2012. Neilson, B.T., A.J. Hobson, N. von Stackelberg, M. Shupryt, and J.D. Ostermiller.

WASTELOAD ANALYSIS [WLA] Date: 12/22/2020

Appendix A: QUAL2Kw Analysis for Eutrophication

Discharging Facility:	Orem WRF	
UPDES No:	UT-0020915	
Permit Flow [MGD]:	13.50	Maximum Monthly Flow
	13.50	Maximum Daily Flow
Receiving Water:	Powell Slough	
Stream Classification:	2B, 3C, 3D	AUID: UT 16020201-010_00
Stream Flows [cfs]:	2.2	Summer (July-Sept) Critical Low Flow
	2.6	Fall (Oct-Dec)
	1.1	Winter (Jan-Mar)
	3.8	Spring (Apr-June)
Fully Mixed:	YES	
Acute River Width:	100%	
Chronic River Width:	100%	

Modeling Information

A QUAL2Kw model was used to determine these effluent limits.

Model Inputs

The following is upstream and discharge information that was utilized as inputs for the analysis. Dry washes are considered to have an upstream flow equal to the flow of the discharge.

Headwater/Upstream Information	Summer	Fall	Winter	Spring
Golden Pond Outfall Flow (cfs)	2.2	2.6	1.1	3.8
Groundwater Outfall Flow (cfs)	0.8	0.8	0.8	0.8
Temperature (deg C)	21.0	10.3	10.0	18.2
Specific Conductance (µmhos)	670	682	720	710
Inorganic Suspended Solids (mg/L)	14.0	8.1	10.1	14.4
Dissolved Oxygen (mg/L)	7.7	10.7	11.5	9.9
$CBOD_5$ (mg/L)	3.7	6.0	3.0	3.5
Organic Nitrogen (mg/L)	0.468	0.200	0.323	0.305
NH4-Nitrogen (mg/L)	0.048	0.019	0.025	0.025
NO3-Nitrogen (mg/L)	0.083	0.440	0.471	0.286
Organic Phosphorus (mg/L)	0.013	-0.044	0.000	0.009
Inorganic Ortho-Phosphorus (mg/L)	0.024	0.196	0.138	0.023
Phytoplankton (µg/L)	0.0	0.0	0.0	0.0
Detritus [POM] (mg/L)	6.0	3.5	4.3	6.2
Alkalinity (mg/L)	260	260	260	260
pH	7.9	8.0	7.9	7.9

Discharge Information

Chronic	Summer	Fall	Winter	Spring
Flow (MGD)	13.5	13.5	13.5	13.5
Temperature (deg C)	23.0	17.0	13.2	20.0
Specific Conductance (µmhos)	1045	1042	1006	1077
Inorganic Suspended Solids (mg/L)	4.8	4.7	5.3	5.5
Dissolved Oxygen (mg/L)	5.5	5.5	5.5	5.5
$CBOD_5$ (mg/L)	25.0	25.0	25.0	25.0
Organic Nitrogen (mg/L)	4.373	3.016	3.450	2.869
NH4-Nitrogen (mg/L)	3.000	4.000	5.000	4.000
NO3-Nitrogen (mg/L)	12.484	16.717	12.850	16.548
Organic Phosphorus (mg/L)	1.000	1.000	1.000	1.000
Inorganic Ortho-Phosphorus (mg/L)	0.200	0.200	0.200	0.200
Phytoplankton (µg/L)	0.0	0.0	0.0	0.0
Detritus [POM] (mg/L)	0.0	0.0	0.0	0.0
Alkalinity (mg/L)	188	154	168	160
pH	7.9	7.5	7.5	7.6

Acute	Summer	Fall	Winter	Spring
Flow (MGD)	13.5	13.5	13.5	13.5
Temperature (deg C)	23.0	17.0	13.2	20.0
Specific Conductance (µmhos)	1045	1042	1006	1077
Inorganic Suspended Solids (mg/L)	4.8	4.7	5.3	5.5
Dissolved Oxygen (mg/L)	5.5	5.5	5.5	5.5
$CBOD_5$ (mg/L)	35.0	35.0	35.0	35.0
Organic Nitrogen (mg/L)	4.373	3.016	3.450	2.869
NH4-Nitrogen (mg/L)	11.000	15.000	19.000	14.000
NO3-Nitrogen (mg/L)	12.484	16.717	12.850	16.548
Organic Phosphorus (mg/L)	0.200	0.200	0.200	0.200
Inorganic Ortho-Phosphorus (mg/L)	0.800	0.800	0.800	0.800
Phytoplankton (µg/L)	0.0	0.0	0.0	0.0
Detritus [POM] (mg/L)	0.0	0.0	0.0	0.0
Alkalinity (mg/L)	188	154	168	160
pH	7.8	7.8	7.8	7.8

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

Effluent Limitations

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

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

Effluent Limitations based upon Water Quality Standards for DO

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

Constituent	Standard	Summer	Fall	Winter	Spring
Flow [Maximum Daily] (MGD)	N/A	13.5	13.5	13.5	13.5
Flow [Monthly Average] (MGD)	N/A	13.5	13.5	13.5	13.5
BOD_5 [7-day Average] (mg/L)	N/A	35.0	35.0	35.0	35.0
BOD_5 [30-day Average] (mg/L)	N/A	25.0	25.0	25.0	25.0
Dissolved Oxygen [30-day Average] (mg/L)	5.0	5.5	5.5	5.5	5.5
Dissolved Oxygen [Minimum] (mg/L)	3.0	5.5	5.5	5.5	5.5
NH4-Nitrogen (mg/L)	N/A	3.0	4.0	5.0	4.0

Effluent Limitations based upon Water Quality Standards for Ammonia

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

NH4-Nitrogen (mg/L)	Standard	Summer	Fall	Winter	Spring
Acute [1-hour Average]	Varies	11.0	15.0	19.0	14.0
Chronic [30-day Average]	Varies	3.0	4.0	5.0	4.0

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.

Coefficients and Other Model Information

Parameter	*Value*	*Units*
Stoichiometry:		
Carbon	40	gC
Nitrogen	7.2	gN
Phosphorus	1	gP
Dry weight	100	gD
Chlorophyll	1	gA
Inorganic suspended solids:		
Settling velocity	0.001	m/d
Oxygen:		
Reaeration model	Thackston-Dawson	
Temp correction	1.024	
Reaeration wind effect	None	
O2 for carbon oxidation	2.69	gO2/gC
O2 for NH4 nitrification	4.57	gO2/gN
Oxygen inhib model CBOD oxidation	Exponential	
Oxygen inhib parameter CBOD oxidation	0.60	L/mgO2
Oxygen inhib model nitrification	Exponential	
Oxygen inhib parameter nitrification	0.60	L/mgO2
Oxygen enhance model denitrification	Exponential	
Oxygen enhance parameter denitrification	0.60	L/mgO2
Oxygen inhib model phyto resp	Exponential	
Oxygen inhib parameter phyto resp	0.60	L/mgO2
Oxygen enhance model bot alg resp	Exponential	
Oxygen enhance parameter bot alg resp	0.60	L/mgO2
Slow CBOD:		
Hydrolysis rate	0	/d
Temp correction	1.047	
Oxidation rate	0.103	/d
Temp correction	1.047	
Fast CBOD:		
Oxidation rate	10	/d
Temp correction	1.047	
Organic N:		
Hydrolysis	0.84524491	/d
Temp correction	1.07	
Settling velocity	0.056128	m/d
Ammonium:		
Nitrification	0.1761337	/d
Temp correction	1.07	
Nitrate:		
Denitrification	0.66745388	/d
Temp correction	1.07	
Sed denitrification transfer coeff	0.045495	m/d
Temp correction	1.07	
Organic P:		
Hydrolysis	0.32642425	/d
Temp correction	1.07	
Settling velocity	0.086465	m/d
Inorganic P:		
Settling velocity	0.015655	m/d
Sed P oxygen attenuation half sat constant	0.28717	mgO2/L

Phytoplankton:		
Max Growth rate	2.8944	/d
Temp correction	1.07	
Respiration rate	0.480803	/d
Temp correction	1.07	
Death rate	0.86518	/d
Temp correction	1	
Nitrogen half sat constant	15	ugN/L
Phosphorus half sat constant	2	ugP/L
Inorganic carbon half sat constant	1.30E-05	moles/L
Phytoplankton use HCO3- as substrate	Yes	
Light model	Smith	
Light constant	57.6	langleys/d
Ammonia preference	25.4151	ugN/L
Settling velocity	0.468545	m/d
Bottom Plants:		
Growth model	Zero-order	
Max Growth rate	15.15954	gD/m2/d or /d
Temp correction	1.07	
First-order model carrying capacity	100	gD/m2
Basal respiration rate	0.6500528	/d
Photo-respiration rate parameter	0.01	unitless
Temp correction	1.07	
Excretion rate	0.192404	/d
Temp correction	1.07	
Death rate	0.168976	/d
Temp correction	1.07	
External nitrogen half sat constant	609.3926	ugN/L
External phosphorus half sat constant	166.1311	ugP/L
Inorganic carbon half sat constant	1.00E-04	moles/L
Bottom algae use HCO3- as substrate	Yes	
Light model	Smith	
Light constant	77.733	mgO^2/L
Ammonia preference	17.54875	ugN/L
Subsistence quota for nitrogen	5.1638	mgN/gD
Subsistence quota for phosphorus	3.7292	mgP/gD
Maximum uptake rate for nitrogen	80.134	mgN/gD/d
Maximum uptake rate for phosphorus	72.3308	mgP/gD/d
Internal nitrogen half sat ratio	2.531408	
Internal phosphorus half sat ratio	1.7292025	
Nitrogen uptake water column fraction	1	
Phosphorus uptake water column fraction	1	
Detritus (POM):		
Dissolution rate	2.7941785	/d
Temp correction	1.07	
Settling velocity	0.38251	m/d
pH:		
Partial pressure of carbon dioxide	370	ppm

Atmospheric Inputs:	Summer	Fall	Winter	Spring
Min. Air Temperature, F	61.6	31.4	24.5	48.4
Max. Air Temperature, F	89.5	49.4	42.5	74.1
Dew Point, Temp., F	58.6	35.0	30.3	48.5
Wind, ft./sec. @ 21 ft.	6.6	5.2	6.0	7.4
Cloud Cover, %	10%	10%	10%	10%

Other Inputs:	
Bottom Algae Coverage	100%
Bottom SOD Coverage	100%
Prescribed SOD, $gO_2/m^2/day$	0 to 1.5
Prescribed NH4 Flux, $\mu gN/m^2/day$	0 to 600
Prescribed PO4 Flux, $\mu gP/m^2/day$	0 to 300

WASTELOAD ANALYSIS [WLA] Date: 1/11/2021

Appendix B: Mass Balance Mixing Analysis for Conservative Constituents

Discharging Facility:	2B, 3C, 3D		
UPDES No:	UT-0020915		
Permit Flow [MGD]:	13.50	Maximum Daily Flow	
	13.50	Maximum Monthly Flow	
Receiving Water:	Powell Slough		
Stream Classification:	2B, 3C, 3D		
Stream Flows [cfs]:	3.04	Summer (July-Sept)	Critical Low Flow
	3.40	Fall (Oct-Dec)	
	1.85	Winter (Jan-Mar)	
	4.64	Spring (Apr-June)	
Fully Mixed:	YES		
Acute River Width:	100%		
Chronic River Width:	100%		

Modeling Information

A simple mixing analysis was used to determine these effluent limits.

Model Inputs

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

Headwater/Upstream Information

	Flow cfs
Summer	3.0
Fall	3.4
Winter	1.9
Spring	4.6

Discharge Information

	Flow MGD
Maximum Daily	13.5
Maximum Monthly	13.5

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

Effluent Limitations

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

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

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

Physical Parameter	**Maximum Concentration**
pH Minimum	6.5
pH Maximum	9.0
Bacteriological	
E. coli (30 Day Geometric Mean)	206 (#/100 mL)

E. coli (Maximum)	668 (#/100 mL)

Effluent Limitations for Protection of Aquatic Wildlife (Class 3C Waters)

Physical

Parameter	Maximum Concentration
Temperature (deg C)	27
Temperature Change (deg C)	4

Inorganics	Chronic Standard (4 Day Average)	Acute Standard (1 Hour Average)
Parameter	Standard	Standard
Phenol (mg/L)		0.010
Hydrogen Sulfide (Undissociated) [mg/L]		0.002

Total Recoverable Metals	Chronic Standard (4 Day Average)[1]			Acute Standard (1 Hour Average)[1]		
Parameter	Standard	Background[2]	Limit	Standard	Background[2]	Limit
Aluminum (µg/L)	87.0	24.3	N/A	750.0	24.3	855.6
Arsenic (µg/L)	150.0	1.1	171.7	340.0	1.1	389.3
Cadmium (µg/L)	0.52	0.05	0.59	5.3	0.1	6.0
Chromium VI (µg/L)[3]	11.0	7.4	11.5	16.0	7.4	17.3
Chromium III (µg/L)[3]	178.9	1.4	204.8	3743.5	1.4	4288.2
Copper (µg/L)	20.0	4.5	22.2	32.4	4.5	36.5
Cyanide (µg/L))[3]	5.2	3.5	5.4	22.0	3.5	24.7
Iron (µg/L)		46.4		1000.0	17.7	1143.0
Lead (µg/L)	9.9	0.3	11.3	254.1	0.3	291.1
Mercury (µg/L)[3]	0.012	0.008	0.013	2.4	0.0	2.7
Molybdenum (ug/L)		2.5			2.5	
Nickel (µg/L)	110.9	2.5	126.7	997.9	2.5	1142.7
Selenium (µg/L)	4.6	0.7	5.2	18.4	0.7	21.0
Silver (µg/L)		0.3		17.6	0.6	20.0
Tributylin (µg/L)[3]	0.072	0.048	0.075	0.46	0.05	0.52
Zinc (µg/L)	255.1	48.4	285.2	255.1	48.4	285.2

1: Based upon a Hardness of 244 mg/l as CaCO3

2: Background concentration average of monitoring data

3: Background assumed 67% of chronic standard

Organics [Pesticides]	Chronic Standard (4 Day Average)			Acute Standard (1 Hour Average)		
Parameter	Standard	Background[1]	Limit	Standard	Background[1]	Limit
Aldrin (µg/L)				1.5	1.0	1.6
Chlordane (µg/L)	0.0043	0.0029	0.0045	1.2	0.0	1.4
DDT, DDE (µg/L)	0.001	0.001	0.001	0.55	0.00	0.63
Diazinon (µg/L)	0.17	0.11	0.18	0.17	0.11	0.18
Dieldrin (µg/L)	0.0056	0.0038	0.0059	0.24	0.00	0.27
Endosulfan, a & b (µg/L)	0.056	0.038	0.059	0.11	0.04	0.12
Endrin (µg/L)	0.036	0.024	0.038	0.086	0.024	0.095
Heptachlor & H. epoxide (µg/L)	0.0038	0.0025	0.0040	0.26	0.00	0.30
Lindane (µg/L)	0.08	0.05	0.08	1.0	0.1	1.1
Methoxychlor (µg/L)				0.03	0.02	0.03
Mirex (µg/L)				0.001	0.001	0.001
Nonylphenol (µg/L)	6.6	4.4	6.9	28.0	4.4	31.4
Parathion (µg/L)	0.0130	0.0087	0.0136	0.066	0.009	0.074
PCB's (µg/L)	0.014	0.009	0.015			
Pentachlorophenol (µg/L)	15.0	10.1	15.7	19.0	10.1	20.3
Toxephene (µg/L)	0.0002	0.0001	0.0002	0.73	0.00	0.84

1: Background concentration assumed 67% of chronic standard

Radiological	Maximum Concentration		
Parameter	Standard	Background[1]	Limit
Gross Alpha (pCi/L)	15	10.1	15.7

1: Background concentration assumed 67% of chronic standard; TDS is based on observed ambient data

DWQ-2020-025811

ATTACHMENT 3

Reasonable Potential Analysis

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REASONABLE POTENTIAL ANALYSIS

Water Quality has worked to improve our reasonable potential analysis (RP) for the inclusion of limits for parameters in the permit by using an EPA provided model. As a result of the model, more parameters may be included in the renewal permit. A Copy of the Reasonable Potential Analysis Guidance (RP Guide) is available at Water Quality. There are four outcomes for the RP Analysis[8]. They are;

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

Initial screening for metals values that were submitted through the DMRs showed that a closer look at some of the metals is needed. A copy of the initial screening is included in the "Effluent Metals and RP Screening Results" table in this attachment. The initial screening check for metals showed that the full model needed to be run on cyanide, arsenic, cadmium, copper, lead, molybdenum, nickel, silver, zinc, selenium, and mercury. Based on DMR data, Total Dissolved Solids (TDS) also needed to modeled for RP.

The RP model was run on cyanide, arsenic, cadmium, chromium, copper, lead, molybdenum, nickel, silver, zinc, selenium, mercury, and TDS using the most recent data back through the previous three years. This resulted in 12 data points for each metal constitute and 36 data points for TDS. The results of the models for arsenic, copper, lead, molybdenum, nickel, silver, selenium, zinc, and mercury are that there is not acute or chronic RP at 95% confidence or 99% confidence (Outcome C from Reasonable Potential Guide).

The result of the model for cyanide is that there is chronic RP at 95% confidence and 99% confidence. The result of the model for cadmium is that there is chronic RP at 99% confidence. This model does not allow for less than or greater than data points. Most data points for both cyanide and cadmium were less than values. After looking at the values, Best Professional Judgement (BPJ) was used to determine Outcome C in both cases.

A Summary of the RP Model inputs and outputs are included in the tables below.

Outfall 001 RP Input/Output Summary Tables

RP Procedure Output	Outfall Number: 001 Data Units: mg/L	
Parameter	Cyanide	
Distribution	Lognormal	
Reporting Limit	0.0010	
Significant Figures	2	
Maximum Reported Effluent Conc.	<0.005	
Coefficient of Variation (CV)	0.38	
Acute Criterion	0.0332	
Chronic Criterion	0.0204	
Confidence Interval	95	99
Projected Maximum Effluent Conc. (MEC)	0.0074	0.0081
RP Multiplier	1.1	1.9
RP for Acute?	NO	NO

[8] See Reasonable Potential Analysis Guidance for definitions of terms

RP for Chronic?	YES*	YES*
RP for Human Health?	NO	NO
Outcome	C	

* Model cannot accept < as value, which resulted in the exceedance in the model for Chronic. When considering the < there is no RP for Chronic.

RP Procedure Output	Outfall Number: 001 Data Units: mg/L	
Parameter	Arsenic	
Distribution	Lognormal	
Reporting Limit	0.0010	
Significant Figures	2	
Maximum Reported Effluent Conc.	0.00098	
Coefficient of Variation (CV)	0.21	
Acute Criterion	0.3893	
Chronic Criterion	0.1717	
Confidence Interval	95	99
Projected Maximum Effluent Conc. (MEC)	0.0024	0.0029
RP Multiplier	1.2	1.5
RP for Acute?	NO	NO
RP for Chronic?	NO	NO
RP for Human Health?	NO	NO
Outcome	C	

RP Procedure Output	Outfall Number: 001 Data Units: mg/L	
Parameter	Cadmium	
Distribution	Lognormal	
Reporting Limit	0.0010	
Significant Figures	2	
Maximum Reported Effluent Conc.	<0.0002	
Coefficient of Variation (CV)	NA	
Acute Criterion	0.0059	
Chronic Criterion	0.0006	
Confidence Interval	95	99
Projected Maximum Effluent Conc. (MEC)	0.0007	0.0011
RP Multiplier	1.4	1.0
RP for Acute?	NO	NO
RP for Chronic?	NO	YES*
RP for Human Health?	NO	NO
Outcome	C	

* Model cannot accept < as value, which resulted in the exceedance in the model for Chronic. When considering the < there is no RP for Chronic.

RP Procedure Output	Outfall Number: 001 Data Units: mg/L	
Parameter	Copper	
Distribution	Lognormal	
Reporting Limit	0.0010	
Significant Figures	2	
Maximum Reported Effluent Conc.	0.0119	
Coefficient of Variation (CV)	0.28	
Acute Criterion	0.0365	
Chronic Criterion	0.0222	
Confidence Interval	95	99
Projected Maximum Effluent Conc. (MEC)	0.0150	0.0200
RP Multiplier	1.3	1.7
RP for Acute?	NO	NO
RP for Chronic?	NO	NO
RP for Human Health?	NO	NO
Outcome	C	

RP Procedure Output	Outfall Number: 001 Data Units: mg/L	
Parameter	Lead	
Distribution	Lognormal	
Reporting Limit	0.0010	
Significant Figures	2	
Maximum Reported Effluent Conc.	<0.002	
Coefficient of Variation (CV)	0.42	
Acute Criterion	0.2911	
Chronic Criterion	0.0113	
Confidence Interval	95	99
Projected Maximum Effluent Conc. (MEC)	0.0028	0.0042
RP Multiplier	1.4	2.1
RP for Acute?	NO	NO
RP for Chronic?	NO	NO
RP for Human Health?	NO	NO
Outcome	C	

RP Procedure Output	Outfall Number: 001 Data Units: mg/L
Parameter	Mercury
Distribution	Lognormal
Reporting Limit	0.0010
Significant Figures	2
Maximum Reported Effluent Conc.	2.3E-06

Coefficient of Variation (CV)	0.50	
Acute Criterion	0.0027	
Chronic Criterion	1.3E-05	
Confidence Interval	95	99
Projected Maximum Effluent Conc. (MEC)	0.0000*	0.0000*
RP Multiplier	1.5	2.4
RP for Acute?	NO	NO
RP for Chronic?	NO	NO
RP for Human Health?	NO	NO
Outcome	C	

*Model could not output below listed MEC. No RP for Acute or Chronic.

RP Procedure Output	Outfall Number: 001 Data Units: mg/L	
Parameter	Molybdenum	
Distribution	Lognormal	
Reporting Limit	0.0010	
Significant Figures	2	
Maximum Reported Effluent Conc.	0.00487	
Coefficient of Variation (CV)	0.25	
Acute Criterion	NA	
Chronic Criterion	NA	
Confidence Interval	95	99
Projected Maximum Effluent Conc. (MEC)	0.0061	0.0077
RP Multiplier	1.2	1.6
RP for Acute?	NA	NA
RP for Chronic?	NA	NA
RP for Human Health?	NA	NA
Outcome	C	

RP Procedure Output	Outfall Number: 001 Data Units: mg/L	
Parameter	Nickel	
Distribution	Lognormal	
Reporting Limit	0.0010	
Significant Figures	2	
Maximum Reported Effluent Conc.	<0.002	
Coefficient of Variation (CV)	0.12	
Acute Criterion	1.1427	
Chronic Criterion	0.1267	
Confidence Interval	95	99
Projected Maximum Effluent Conc. (MEC)	0.0022	0.0025
RP Multiplier	1.1	1.3
RP for Acute?	NO	NO
RP for Chronic?	NO	NO

RP for Human Health?	NO	NO
Outcome	C	

RP Procedure Output	Outfall Number: 001 Data Units: mg/L	
Parameter	Selenium	
Distribution	Lognormal	
Reporting Limit	0.0010	
Significant Figures	2	
Maximum Reported Effluent Conc.	<0.002	
Coefficient of Variation (CV)	0.11	
Acute Criterion	0.0210	
Chronic Criterion	0.0052	
Confidence Interval	95	99
Projected Maximum Effluent Conc. (MEC)	0.0022	0.0025
RP Multiplier	1.1	1.2
RP for Acute?	NO	NO
RP for Chronic?	NO	NO
RP for Human Health?	NO	NO
Outcome	C	

RP Procedure Output	Outfall Number: 001 Data Units: mg/L	
Parameter	Silver	
Distribution	Lognormal	
Reporting Limit	0.0010	
Significant Figures	2	
Maximum Reported Effluent Conc.	0.002	
Coefficient of Variation (CV)	0.42	
Acute Criterion	0.020	
Chronic Criterion	NA	
Confidence Interval	95	99
Projected Maximum Effluent Conc. (MEC)	0.0028	0.0042
RP Multiplier	1.4	2.1
RP for Acute?	NO	NO
RP for Chronic?	NA	NA
RP for Human Health?	NO	NO
Outcome	C	

RP Procedure Output	Outfall Number: 001 Data Units: mg/L
Parameter	Zinc
Distribution	Lognormal
Reporting Limit	0.0010

Significant Figures	2	
Maximum Reported Effluent Conc.	0.0885	
Coefficient of Variation (CV)	0.21	
Acute Criterion	0.2852	
Chronic Criterion	0.2852	
Confidence Interval	95	99
Projected Maximum Effluent Conc. (MEC)	0.1100	0.130
RP Multiplier	1.2	1.5
RP for Acute?	NO	NO
RP for Chronic?	NO	NO
RP for Human Health?	NO	NO
Outcome	C	

RP Procedure Output	Outfall Number: 001 Data Units: mg/L	
Parameter	TDS	
Distribution	Lognormal	
Reporting Limit	0.0010	
Significant Figures	2	
Maximum Reported Effluent Conc.	744	
Coefficient of Variation (CV)	0.081	
Criterion	1200	
Confidence Interval	95	99
Projected Maximum Effluent Conc. (MEC)	760	820
RP Multiplier	1.0	1.1
RP?	NO	NO
Outcome	C	

Metals Monitoring and RP Check

Effluent											
Metal	Arsenic	Cadmium	Copper	Cyanide	Lead	Mercury	Moly.	Nickel	Selenium	Silver	Zinc
ARP Val	0.3893	0.0060	0.0365	0.0247	0.2911	0.0027	NA	1.1427	0.0210	0.020	0.2852
CRP Val	0.1717	0.00059	0.0222	0.0054	0.0113	1.3E-05	NA	0.1267	0.0052	NA	0.2852
Metals, mg/L	<0.002	<0.0005	0.0119	<0.005	<0.002	1.1E-06	0.0028	<0.002	<0.002	<0.002	*0.362
	<0.002	<0.0005	0.0058	0.00687	<0.002	6E-07	0.00291	<0.002	<0.002	<0.002	0.0591
	0.00098	<0.000125	0.0064	<0.005	<0.0005	2.3E-06	0.00306	0.00131	0.00135	<0.0005	0.0615
	<0.002	<0.0005	0.008	<0.005	<0.002	8E-07	0.00487	<0.002	<0.002	<0.002	0.0885
	<0.002	<0.0005	0.0049	<0.005	<0.002	1.1E-06	0.002	<0.002	<0.002	<0.002	0.0489
	<0.002	<0.0005	0.0052	<0.005	<0.002	5E-07	0.00227	<0.002	<0.002	<0.002	0.0569
	<0.002	<0.0005	0.0072	<0.005	<0.002	1.6E-06	0.00304	<0.002	<0.002	<0.002	0.0614
	<0.002	<0.0005	0.0103	<0.005	<0.002	5E-07	0.00233	<0.002	<0.002	<0.002	0.0623
	<0.002	<0.0005	0.0075	<0.005	<0.002	0.000001	0.00234	<0.002	<0.002	<0.002	0.0533
	<0.002	<0.0005	0.0075	<0.005	<0.002	0.000001	0.00234	<0.002	<0.002	<0.002	0.0533
	<0.002	<0.0005	0.0051	<0.005	<0.002	1.1E-06	0.00372	<0.002	<0.002	<0.002	0.054
	<0.002	<0.0005	0.0062	<0.005	<0.002	1.6E-06	0.00321	<0.002	<0.002	0.002	0.0373
Max	<0.002	<0.0005	0.0119	<0.005	<0.002	2.3E-06	0.00487	<0.002	<0.002	0.002	0.0885
A RP?	NO	NO	NO	NO	NO	NO	NA	NO	NO	NO	NO
C RP?	NO	NO	NO	NO	NO	NO	NA	NO	NO	NO	NO

*The EPA ProUCL model was used to evaluate the data. 0.362 mg/L is an Outlier. Results are on the next page. This data point was not used in RP Analysis.

Dixon's Outlier Test for C0
Number of Observations = 12
10% critical value: 0.49
5% critical value: 0.546
1% critical value: 0.642
1. Observation Value 0.362 is a Potential Outlier (Upper Tail)?
Test Statistic: 0.957
For 10% significance level, 0.362 is an outlier.
For 5% significance level, 0.362 is an outlier.
For 1% significance level, 0.362 is an outlier.

TDS RP Check

Effluent		
Parameter	TDS	
RP Val	1200	
TDS , mg/L	608	592
	604	634
	582	622
	610	570
	608	544
	622	712
	600	638
	668	658
	580	496
	650	610
	592	648
	714	744
	572	640
	682	660
	658	600
	650	560
	638	
	588	
	680	
	654	
Max	744	
RP?	NO	

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