Official Draft Public Notice Version **December 7, 2015**The findings, determinations, and assertions contained in this document are not final and subject to change following the public comment period.

STATEMENT OF BASIS CITY OF OREM

RENEWAL PERMIT: DISCHARGE, BIOSOLIDS & STORM WATER UPDES PERMIT NUMBER: UT0020915
UPDES BIOSOLIDS PERMIT NUMBER: UTL-020915

UPDES MULTI-SECTOR STORM WATER GENERAL PERMIT NUMBER: UTR000000 MAJOR MUNICIPAL

FACILITY CONTACTS

Lawrence Burton
Water Reclamation Section Manager
(801) 229-7471

Alan Hatfield Sr. Plant Operator, Biosolids (801) 229-7490

Blaine Shipley Sr. Plant Operator, Maintenance (801) 229-7474 Ned Miner Plant supervisor (801) 229-7472

Loren Willes Industrial Pretreatment Coordinator (801) 229-7491

Facility and Mailing Address 1797 West 1000 South Orem, Utah 84058

DESCRIPTION OF FACILITY

The Orem Water Reclamation Facility, 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 40°16'39" and longitude 111°44'19", with STORET Number 499525.

SUMMARY OF CHANGES FROM PREVIOUS PERMIT

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 not long be required to sample for chlorine.

UAC R317-1-3.3, Technology-based Phosphorus Effluent Limits (TBPEL), establishes new regulations for the discharge of phosphorus to surface waters. The TBPEL rule includes the following requirements for non-lagoon wastewater treatment plants:

- 1. All non-lagoon 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.
- 2. The Director may authorize a variance to the TBPEL under the conditions listed in *UAC R317-3.3.C.* Demonstrations that a variance is applicable must be made by **January 1**, 2018.
- 3. All discharging treatment works are required to implement, at a minimum, monthly monitoring of the following beginning July 1, 2015:
 - a. Influent for total phosphorus (as P) and total Kjeldahl nitrogen (as N) concentrations;
 - b. Effluent for total phosphorus and orthophosphate (as P), ammonia, nitrate-nitrite and total Kjeldahl nitrogen (an N);
 - c. All monitoring shall be based on 24-hour composite samples by use of an automatic sampler or a minimum of four grab samples collected a minimum of two hours apart.
 - d. Discharge Monitoring Reports for your facility will be updated by DWQ to include the above mentioned parameters prior to the July 2015 monitoring period.

Therefore the permit will include requirements for monthly composite sampling of total ammonia, orthophosphate, phosphorus, total kjeldahl nitrogen (TKN), nitrate, and nitrate.

The daily maximum and monthly average ammonia limits are more stringent than the existing permit. These changes were calculated in the waste load analysis.

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 3 years of data indicates there were minimal violations

which did not resulted in enforcement. For more information regarding Provo City's compliance history see the following website echo.epa.gov/effluent-charts#UT0020915.

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 40° 16' 39" and longitude 111° 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 according to Utah Administrative Code (UAC) R317-2-13.5.c.:

- Class 2B -Protected for secondary contact recreation such as boating, wading, or similar uses.
- 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 Class 3A, 3B, or 3C, including the necessary aquatic organisms in their food chain.

TOTAL MAXIMUM DAILY LOAD (TMDL) CONSIDERATIONS

This facility ultimately discharges to Utah Lake which is listed on Utah's 2006 303(d) list of impaired waterbodies. Utah Lake has been identified as impaired for total phosphorous (TP) and total dissolved solids (TDS). Currently, a TMDL evaluation is underway for the lake. The TMDL process may result in pollutant load reductions and wasteload allocations for either of these constituents. Wasteload allocations would then be translated to effluent limits in UPDES permits. It is therefore strongly recommended that the facility's staff participate in the TMDL process. It is also recommended that the facility self-monitor TDS on a monthly basis in order to better quantify loading of this pollutant of concern. Please contact your UPDES permit writer for information on scheduled TMDL meetings.

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*. WET, total residual chlorine (TRC), ammonia and dissolved oxygen (DO) are water quality based and derived by waste load analysis. The oil and grease is based on best professional judgment (BPJ).

The permit limitations are:

	Effluent Limitations				
Parameter	Maximum Monthly Avg	Maximum Weekly Avg	Yearly Average	Daily Minimum	Daily Maximum
Total Flow	14	NA	NA	NA	NA
BOD ₅ , mg/L BOD ₅ Min. % Removal	25 85	35 NA	NA NA	NA NA	NA NA
TSS, mg/L TSS Min. % Removal	25 85	35 NA	NA NA	NA NA	NA NA
Dissolved Oxygen, mg/L	NA	NA	NA	5.5	NA
Total Ammonia (as N), mg/L Summer (Jul-Sep) Fall (Oct-Dec) Winter (Jan-Mar) Spring (Apr-Jun)	3.0 4.0 5.0 4.0	NA NA NA NA	NA NA NA NA	NA NA NA NA	11.0 15.0 19.0 14.0
E-Coli, No./100mL	126	157	NA	NA	NA
WET, Chronic Biomonitoring	NA	NA	NA	NA	IC ₂₅ > 89% effluent (from WLA)
Oil & Grease, mg/L	NA	NA	NA	NA	10.0
pH, Standard Units	NA	NA	NA	6.5	9

NA – Not Applicable.

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 quarterly, as applicable, on Discharge Monitoring Report (DMR) forms due 28 days after the end of the monitoring period. Lab sheets for biomonitoring must be attached to the biomonitoring DMR.

The monitoring requirements are based on the Division of Water Quality's guidelines for self-monitoring. The guidelines indicate that Orem should be sampling five times a week, due to a good compliance history sampling will be reduced to three times a week.

Parameter	f-Monitoring and Reporting Requirements	Sample Type	Units
Total Flow	Continuous	Recorder	MGD
BOD ₅ , Influent Effluent	3 x Weekly 3 x Weekly	Composite Composite	mg/L mg/L
TSS, Influent Effluent	3 x Weekly 3 x Weekly	Composite Composite	mg/L mg/L
E. Coli	3 x Weekly	Grab	No./100mI
pН	3 x Weekly	Grab	SU
Total Ammonia (as N)	3 x Weekly	Grab	mg/L
DO	3 x Weekly	Grab	mg/L
WET – Biomonitoring	Quarterly	Composite	Pass/Fail
Oil & Grease	When Sheen is Observed	Grab	mg/L
Total Ammonia	Monthly	Composite	mg/L
Orthophosphate, (as P)	Monthly	Composite	mg/L
Phosphorus, Total Influent Effluent	Monthly Monthly	Composite Composite	mg/L mg/L
Total Kjeldahl Nitrogen, TKN (as N) Influent Effluent	Monthly Monthly	Composite Composite	mg/L mg/L
Nitrite-Nitrate	Monthly	Composite	mg/L
Metals, Influent Effluent	Quarterly Quarterly	Composite Composite	mg/L mg/L
Organic Toxics	Yearly	Grab	mg/L

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

During the previous permit cycle Orem has completed the changeover of their process to a 100% anaerobic digestion. This required the completion of thermophilic and mesophilic digesters, and transition of the old digesters to holding tanks. The trickling filters have been removed and the oxidation ditches have been converted to biological nutrient removal basins. They no longer produce aerobic solids.

DESCRIPTION OF TREATMENT AND DISPOSAL

The Permittee submitted their 2014 annual biosolids report on February 13, 2015. The report states the Permittee produced 1,088 dry metric tons (DMT) of solids. 1088 DMT were land applied on agricultural land. An additional 762 DMT were stored for next year.

Orem treats the waste water 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 solid 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	

In 2014, Orem disposed of 1,088 DMT of biosolids; therefore they need to sample at least Four times a year. This is less than in the prior permit. The changes in their process have reduced the biosolids production. Orem has chosen to continue sampling at the previous rate in anticipation of growth in the system.

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

 $(40 \ CFR \ 258.28(c)(1))$. No biosolids were landfilled in 2015.

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 Table 1 and the heavy metals loading rates in Table 2; or

The maximum heavy metals in Table 1 and the monthly heavy metals concentrations in 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, (mg/kg) *a, *b, *c	CPLR ¹ , (mg/ha)	Pollutant Conc. Limits, (mg/kg)	APLR ² , (mg/ha-yr) *a, *b, *c	
Total Arsenic	75	41	41	41	
Total Cadmium	85	39	39	39	
Total Copper	4300	1500	1500	1500	
Total Lead	840	300	300	300	
Total Mercury	57	17	17	17	
Total Molybdenum	75	N/A	N/A	N/A	
Total Nickel	420	420	420	420	
Total Selenium	100	100	100	100	
Total Zinc	7500	2800	2800	2800	

^{*}a, The limitations represent the maximum allowable levels of heavy metals in any biosolids intended for land application.

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;

^{*}c, Any violation of these limitations shall be reported in accordance with the requirements of Part III.F.1. of the permit.

^{*}d, These limitations represent the maximum allowable levels of heavy metals based on an average of all samples taken during a 30-day period.

¹ CPLR -- Cumulative Pollutant Loading Rate

² APLR – Annual Pollutant Loading Rate

Pathogen Control Class		
Class A	Class B	
B Salmonella species –less than three (3) MPN ³ per four (4) grams total solids (or less than 1,000 fecal coliforms per gram total solids)	Fecal Coliforms –less than 2,000,000 colony forming units (CFU) per gram total solids	
Enteric viruses –less than one (1) MPN (or plaque forming unit) per four (4) grams total solids		
Viable helminth ova –less than one (1) MPN per four (4) grams total solids		

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. Orem may achieve PFRP through one of the following methods;

- 1. Class A Alternative 6- The density of fecal coliform in the sewage sludge shall be less than 1000 MPN per gram of total solids (dry weight basis) at the time the sewage sludge is used or disposed; at the time the sewage sludge is prepared for sale or given away, (40 CFR 503.32(a)(8)(ii).
- 2. 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).

Both of these composting methods are 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 may 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

³ MPN –Most Probable Number

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.

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. Orem intends to meet the vector attraction reduction requirements through 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 2014. Orem sampled and the

Class B biosolids four times. All biosolids land applied in 2014 met *Table 3* of 40 CFR 503.13, therefore the Orem biosolids qualify as EQ with regards to metals. The monitoring data is below.

Orem Metals Monitoring Data 2014

PERM	IITTEE Metals Monitoring	Data, 20XX (Land App	olication)
Parameter	Table 3, mg/kg (Exceptional Quality)	Average, mg/kg	Maximum, mg/kg
Arsenic	41.0	10.19	17.4
Cadmium	39.0	3.13	5.93
Copper	1,500.0	477	550
Lead	300.0	25.64	45.3
Mercury	17.0	2.09	4.27
Molybdenum	75.0	40.84	140
Nickel	400.0	70.05	140
Selenium	36.0	23.04	59.3
Zinc	2,800.0	694	1010

PATHOGEN MONITORING DATA (Anaerobic Cake)

Orem monitored the anaerobic biosolids (sludge cake) for pathogens 11 times. All biosolids land applied in 2014 met the Class B pathogen standards through anaerobic digestion. The monitoring data is below

Orem Fecal Coliform Monitoring Data 2014 (Anaerobic Cake)

Average of Six Samples, Most Probable Number Per Gram (2014)	Maximum of Six Samples, Most Probable Number Per Gram (2014)	
130	717	

STORM WATER

STORMWATER REQUIREMENTS

Storm water provisions are included in this combined UPDES permit.

The storm water requirements are based on the UPDES Multi-Sector General Permit for Storm Water Discharges for Industrial Activity, General Permit No. UTR000000 (MSGP). All sections of the MSGP that pertain to discharges from wastewater treatment plants have been included and sections which are redundant or do not pertain have been deleted.

The permit requires the preparation and implementation of a storm water pollution prevention plan for all areas within the confines of the plant. Elements of this plan are required to include:

1. The development of a pollution prevention team: 2. Development of drainage maps and materials stockpiles: 3. An inventory of exposed materials: 4. Spill reporting and response procedures: 5. A preventative maintenance program: 6. Employee training: 7. Certification that storm water discharges are not mixed with non-storm water discharges: 8. Compliance site evaluations and potential pollutant source identification, and: 9. Visual examinations of storm water discharges.

Orem is currently covered under the UPDES Multi Sector General Permit for Industrial Activities.

PRETREATMENT REQUIREMENTS

The pretreatment requirements remain the same as in the current permit with the permittee administering an approved pretreatment program. Any changes to the program must be submitted 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 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. As part of this evaluation, the permit requires quarterly influent and effluent monitoring for metals and yearly organic toxics listed in R317-8-7.5 and sludge monitoring for potential pollutants listed in $40 \ CFR \ 503$.

BIOMONITORING REQUIREMENTS

A nationwide effort to control toxic discharges where effluent toxicity is an existing or potential concern is regulated in accordance with the State of Utah Permitting and Enforcement Guidance Document for Whole Effluent Toxicity Control (biomonitoring). 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 <u>Ceriodaphnia dubia</u> and <u>Pimephales promelas</u> (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 IC₂₅ 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 Jennifer Robinson, Discharge Daniel Griffin, Biosolids

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Mike George, Storm Water Mike Herkimer, WET Matthew Garn, Pretreatment Utah Division of Water Quality