Utah Division of Water Quality
Statement of Basis
ADDENDUM
Wasteload Analysis and Antidegradation Level I Review - FINAL
Facility Upgrade at Current Capacity – Preliminary Intended for Planning Purposes

Date: **April 9, 2019**

Facility: **Provo City Water Reclamation Facility**
UPDES No. UT0021717

Receiving water: **Mill Race (2B, 3B, 4)**

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

Discharge
Outfall 001: Mill Race → Provo Bay in Utah Lake

The maximum daily design discharge is 28.0 MGD and the maximum monthly design discharge is 21.0 MGD for the facility.

Receiving Water
The receiving water for Outfall 001 is Mill Race, which is tributary to Provo Bay in Utah Lake.

Per UAC R317-2-13.5.c, the designated beneficial uses for Mill Race from Interstate Highway 15 to the Provo City wastewater treatment plant discharge are 2B, 3B, and 4.

- *Class 2B - Protected for infrequent primary contact recreation. Also protected for secondary contact recreation where there is a low likelihood of ingestion of water or a low degree of bodily contact with the water. Examples include, but are not limited to, wading, hunting, and fishing.*

- *Class 3B - Protected for warm water species of game fish and other warm water aquatic life, including the necessary aquatic organisms in their food chain.*

- *Class 4 - Protected for agricultural uses including irrigation of crops and stock watering.*

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 Mill Race, the 20th percentile of flow measurements from sampling station 4996570 Mill Race above Provo WWTP was calculated to estimate annual critical flow in the receiving water (Table 1).

Table 1: Annual critical low flow

Season	Flow (cfs)
Summer	2.0
Fall	2.0
Winter	1.8
Spring	2.0

Protection of Downstream Uses

Per UAC R317-2-8, *all actions to control waste discharges under these rules shall be modified as necessary to protect downstream designated uses*. The effluent limits for the discharge to Mill Race must be protective of downstream uses in Provo Bay and Utah Lake.

TMDL

Mill Race Creek was listed as impaired for benthic macroinvertebrates on the 303(d) list in the 2016 Integrated Report (DWQ, 2016). Utah Lake was listed for harmful algal blooms, total dissolved solids, total phosphorus and PCBs in fish tissue and Provo Bay was listed for pH, total ammonia, total phosphorus and PCBs in fish tissue on the 2016 303(d) list of impaired waterbodies.

The Utah Lake Water Quality Study is ongoing with the objective to develop numeric nutrient criteria for Utah Lake and Provo Bay.

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. The discharge is considered instantaneously fully mixed since the effluent discharge is twice the background receiving water 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), 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 by DWQ staff in October and November of 2014 and is documented in the *QUAL2Kw Calibration Report for Mill Race* (DWQ 2019). The model of Mill Race extends 4.2 kilometers

downstream from the treatment facility outfall across I-15 and into Provo Bay.

Ambient receiving water quality data were obtained from monitoring site 4996570 Mill Race above Provo WWTP. The average seasonal value was calculated for each constituent with available data in the receiving water. Effluent parameters were characterized using data from monitoring site 4996560 Provo 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. QUAL2Kw rates, input and output for DO and eutrophication related constituents are summarized in Appendix A.

A mass balance mixing analysis was conducted for conservative constituents such as dissolved metals. 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	94%
Fall	94%
Winter	95%
Spring	94%

Ammonia Limits

The water quality criteria for ammonia toxicity are dependent on the temperature and pH of the waterbody. The temperature and pH of the effluent after the proposed plant upgrade were provided by WaterWorks Engineers on behalf of Provo City. If the pH of the effluent is different under the plant upgrade than assumed, the ammonia limits calculated in this WLA will be modified in the future. The chronic ammonia criterion is also dependent on the presence or absence of fish early life stages (ELS). Presence of fish ELS was assumed for all seasons.

In 2013, EPA adopted new criteria for ammonia that are lower than current criteria based on the presence of unionid mussels and nonpulmonate snails. States are required to adopt the criteria or establish alternative, scientifically defensible criteria. For planning purposes, ammonia limits were determined to meet both the current criteria and the most stringent potential future criteria with mussels present (Table 2 and 3). The proposed future criteria with mussels absent are higher than the current criteria with fish ELS present. Therefore, the limits to meet the current criteria are sufficient to meet the potential future criteria with mussels absent and are not repeated in the tables.

As a result of the downstream impairment of Provo Bay, the ammonia limits were not to exceed the limits in the current permit (2016).

Table 2: Ammonia Limits (mg/L) to Meet Acute Ammonia Criteria (1 hour average)

Season	Current 1999 Criteria	2013 EPA Mussels Present
Summer (July-September)	8.0	4.0
Fall (October-December)	12.0	7.5
Winter (January-March)	14.0	11.0
Spring (April-June)	12.0	8.0

Table 3: Ammonia Limits (mg/L) to Meet Chronic Ammonia Criteria (30 day average)

Season	Current 1999 Criteria	2013 EPA Mussels Present
Summer (July-September)	3.0	1.5
Fall (October-December)	4.0	2.0
Winter (January-March)	5.0	2.5
Spring (April-June)	3.5	2.0

Effluent Limits

The effect of the effluent on the DO in the receiving water was evaluated using the QUAL2Kw model. Based on secondary standards for BOD_5 and minimum DO limits, the DO sag downstream of the plant discharge in Mill Race was predicted to remain above the minimum instream criteria (Table 4).

Table 4: Water Quality Based Effluent Limits Summary

Effluent Constituent	Acute			Chronic		
	Standard	Limit	Averaging Period	Standard	Limit	Averaging Period
Flow (MGD)	N/A	28.0	1 day	N/A	21.0	30 days
Min. Dissolved Oxygen (mg/L)	5.0	5.0	Instantaneous	6.0	6.0	7 days
BOD_5 (mg/L)	N/A	35.0	7 days	N/A	25.0	30 days

For parameters without a WQBEL, permit limits should be set according to rules found in R317-1-3 and categorical UPDES discharge requirements.

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 since the pollutant concentrations and loads are not being increased from the current permit.

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Files

WLA Document: *provo_potw_wla_upgrade_21mgd_2019-04-09.docx*
QUAL2Kw Calibration Model: *provo_potw_q2kw_cal_2019.xlsm*
QUAL2Kw Wasteload Model: *provo_potw_wla_upgrade_2019_v2.xlsm*

References

Utah 2016 Integrated Report. 2016. Utah Division of Water Quality.

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

QUAL2Kw Model Calibration Report for Mill Race. 2019. Utah Division of Water Quality.

WASTELOAD ANALYSIS [WLA] Date: 4/9/2019

Appendix A: QUAL2Kw Analysis for Eutrophication

Discharging Facility:	Provo WWTP	
UPDES No:	UT-0021717	
Permit Flow [MGD]:	21.00	Maximum Monthly Flow
	28.00	Maximum Daily Flow
Receiving Water:	Mill Race	
Stream Classification:	2B, 3B, 4	
Stream Flows [cfs]:	2.0	Summer (July-Sept) Critical Low Flow
	2.0	Fall (Oct-Dec)
	1.8	Winter (Jan-Mar)
	2.0	Spring (Apr-June)
Acute River Width:	100.0%	
Chronic River Width:	100.0%	

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
Flow (cfs)	2.0	2.0	1.8	2.0
Temperature (deg C)	25.0	14.3	9.9	13.9
Specific Conductance (µmhos)	850	882	998	824
Inorganic Suspended Solids (mg/L)	2.9	6.5	10.2	6.1
Dissolved Oxygen (mg/L)	10.6	9.9	12.1	11.2
$CBOD_5$ (mg/L)	2.5	2.7	2.7	1.9
Organic Nitrogen (mg/L)	0.376	0.488	0.251	0.263
NH4-Nitrogen (mg/L)	0.030	0.044	0.052	0.051
NO3-Nitrogen (mg/L)	2.366	2.643	2.675	2.011
Organic Phosphorus (mg/L)	0.000	0.000	0.000	0.000
Inorganic Ortho-Phosphorus (mg/L)	0.090	0.082	0.215	0.075
Phytoplankton (µg/L)	0.0	0.0	0.0	0.0
Detritus [POM] (mg/L)	0.3	0.7	1.1	0.7
Alkalinity (mg/L)	294	300	300	261
pH	8.2	8.3	8.5	8.6

Discharge Information Chronic	Summer	Fall	Winter	Spring
Flow (cfs)	21.0	21.0	21.0	21.0
Temperature (deg C)	22.1	18.3	13.1	16.2
Inorganic Suspended Solids (mg/L)	0.0	0.0	0.0	0.0
Organic Nitrogen (mg/L)	2.000	2.000	2.000	2.000
NO3-Nitrogen (mg/L)	5.000	5.000	5.000	5.000
Organic Phosphorus (mg/L)	0.100	0.100	0.100	0.100
Inorganic Phosphorus (mg/L)	0.900	0.900	0.900	0.900
Alkalinity (mg/L)	158	141	134	161
pH	7.2	7.2	7.2	7.2

Acute	Summer	Fall	Winter	Spring
Flow (cfs)	28.0	28.0	28.0	28.0
Temperature (deg C)	22.1	18.3	13.1	16.2
Inorganic Suspended Solids (mg/L)	0.0	0.0	0.0	0.0
Organic Nitrogen (mg/L)	2.000	2.000	2.000	2.000
NO3-Nitrogen (mg/L)	5.000	5.000	5.000	5.000
Organic Phosphorus (mg/L)	0.000	0.000	0.100	0.100
Inorganic Phosphorus (mg/L)	0.900	0.900	0.900	0.900
Alkalinity (mg/L)	158	141	134	161
pH	7.7	7.7	7.7	7.7

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 and Ammonia Toxicity

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

Chronic	Time Period	Standard	Summer	Fall	Winter	Spring
Flow (MGD)	Monthly	N/A	21.0	21.0	21.0	21.0
NH4-Nitrogen (mg/L)	30 day	Varies	3.0	4.0	5.0	3.5
$CBOD_5$ (mg/L)	7 day	N/A	35.0	35.0	35.0	35.0
$CBOD_5$ (mg/L)	30 day	N/A	25.0	25.0	25.0	25.0
Dissolved Oxygen [Minimum] (mg/L)	30 day	5.5	6.0	6.0	6.0	6.0

Acute	Time Period	Standard	Summer	Fall	Winter	Spring
Flow (MGD)	Daily	N/A	28.0	28.0	28.0	28.0
NH4-Nitrogen (mg/L)	1 hour	Varies	8.0	12.0	14.0	12.0
Dissolved Oxygen [Minimum] (mg/L)	Instantaneous	5.0	5.0	5.0	5.0	5.0

2013 EPA Ammonia Criteria with Mussels Present	Time Period	Standard	Summer	Fall	Winter	Spring
NH4-Nitrogen (mg/L)	1 hour	Varies	4.0	7.5	11.0	8.0
NH4-Nitrogen (mg/L)	30 day	Varies	1.5	2.0	2.5	2.0

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	Tsivoglou-Neal	
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	0.95792212	/d
Temp correction	1.07	
Settling velocity	0.069088	m/d
Ammonium:		
Nitrification	0.9821269	/d
Temp correction	1.07	
Nitrate:		
Denitrification	0.85318796	/d
Temp correction	1.07	
Sed denitrification transfer coeff	0.01274	m/d
Temp correction	1.07	
Organic P:		
Hydrolysis	0.45860194	/d
Temp correction	1.07	
Settling velocity	0.006892	m/d
Inorganic P:		
Settling velocity	0.064225	m/d
Sed P oxygen attenuation half sat constant	0.58451	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	11.11173	gD/m2/d or /d
Temp correction	1.07	
First-order model carrying capacity	100	gD/m2
Basal respiration rate	0.1667726	/d
Photo-respiration rate parameter	0.01	unitless
Temp correction	1.07	
Excretion rate	0.186706	/d
Temp correction	1.07	
Death rate	0.687408	/d
Temp correction	1.07	
External nitrogen half sat constant	205.8336	ugN/L
External phosphorus half sat constant	161.0464	ugP/L
Inorganic carbon half sat constant	3.30E-05	moles/L
Bottom algae use HCO3- as substrate	Yes	
Light model	Smith	
Light constant	82.9662	mgO^2/L
Ammonia preference	25.72375	ugN/L
Subsistence quota for nitrogen	28.8914	mgN/gD
Subsistence quota for phosphorus	2.53193	mgP/gD
Maximum uptake rate for nitrogen	76.144	mgN/gD/d
Maximum uptake rate for phosphorus	117.8042	mgP/gD/d
Internal nitrogen half sat ratio	1.1499745	
Internal phosphorus half sat ratio	3.396379	
Nitrogen uptake water column fraction	1	
Phosphorus uptake water column fraction	1	
Detritus (POM):		
Dissolution rate	2.196361	/d
Temp correction	1.07	
Settling velocity	0.89671	m/d
pH:		
Partial pressure of carbon dioxide	370	ppm

Atmospheric Inputs:	Summer	Fall	Winter	Spring
Min. Air Temperature, F	89.5	49.4	42.5	74.1
Max. Air Temperature, F	61.6	31.4	24.5	48.4
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

WASTELOAD ANALYSIS [WLA] Date: 4/9/2019

Appendix B: Mass Balance Mixing Analysis for Conservative Constituents

Discharging Facility:	Provo WWTP		
UPDES No:	UT-0021717		
Permit Flow [MGD]:	21.00	Maximum Monthly Flow	
	28.00	Maximum Daily Flow	
Receiving Water:	Mill Race		
Stream Classification:	2B, 3B, 4		
Stream Flows [cfs]:	2.0	Summer (July-Sept)	Critical Low Flow
	2.0	Fall (Oct-Dec)	
	1.8	Winter (Jan-Mar)	
	2.0	Spring (Apr-June)	
Acute River Width:	100.0%		
Chronic River Width:	100.0%		

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. Dry washes are considered to have an upstream flow equal to the flow of the discharge.

Headwater/Upstream Information

	7Q10 Flow
	cfs
Summer	2.0
Fall	2.0
Winter	1.8
Spring	2.0

Discharge Information

	Flow
	MGD
Maximum Daily	28.0
Maximum Monthly	21.0

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)

Parameter	Maximum Concentration
Physical	
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 3B Waters)

Parameter	Maximum Concentration				
Physical					
Inorganics	**Chronic Standard (4 Day Average)**		**Acute Standard (1 Hour Average)**		
	Standard	**Limit**	**Standard**	**Limit**	
Phenol			0.010	0.010	mg/L
Hydrogen Sulfide (Undissociated)			0.002	0.002	mg/L

Total Recoverable Metals

	Chronic Standard (4 Day Average)			Acute Standard (1 Hour Average)		
Parameter (µg/L)	**Standard[1]**	**Background[2]**	**Limit**	**Standard[1]**	**Background[2]**	**Limit**
Aluminum	N/A[3]	20.6	N/A	750	20.6	802
Arsenic	150	2.8	164	340	2.8	364
Cadmium	0.5	0.2	0.6	5.6	0.2	6.0
Chromium VI	11.0	2.9	11.8	16.0	2.9	16.9
Chromium III	188	2.9	206	3,931	2.9	4,212
Copper	21.0	3.4	22.7	34.3	3.4	36.5
Cyanide	5.2	3.5	5.4	22.0	3.5	23.3
Iron				1,000	19.3	1,070
Lead	10.7	0.6	11.6	274.2	0.6	294
Mercury	0.012	0.008	0.012	2.4	0.008	2.6
Nickel	117	3.7	127	1,050	3.7	1,124
Selenium	4.6	2.0	4.8	18.4	2.0	19.6
Silver				19.4	9.7	20.1
Tributylin	0.072	0.048	0.074	0.46	0.048	0.49
Zinc	268	13.0	293	268	13.0	287

1: Based upon a Hardness of 259 mg/l as CaCO3

2: Background concentration assumed 67% of chronic standard

3: Where the pH is equal to or greater than 7.0 and the hardness is equal to or greater than 50 ppm as $CaC0_3$ in the receiving water after mixing, the 87 ug/L chronic criterion (expressed as total recoverable) will not apply, and aluminum will be regulated based on compliance with the 750 ug/L acute aluminum criterion (expressed as total recoverable).

Organics [Pesticides]

	Chronic Standard (4 Day Average)			Acute Standard (1 Hour Average)		
Parameter (µg/L)	**Standard**	**Background**	**Limit**	**Standard**	**Background**	**Limit**
Aldrin				1.500	1.000	1.536
Chlordane	0.0043	0.0029	0.0044	1.200	0.003	1.286
DDT, DDE	0.001	0.0007	0.0010	0.550	0.001	0.589
Diazinon	0.17	0.1133	0.175	0.17	0.113	0.174
Dieldrin	0.0056	0.0037	0.0058	0.240	0.004	0.257
Endosulfan, a & b	0.056	0.0373	0.058	0.110	0.037	0.115
Endrin	0.036	0.0240	0.037	0.086	0.024	0.090
Heptachlor & H. epoxide	0.0038	0.0025	0.0039	0.260	0.003	0.278
Lindane	0.08	0.0533	0.08	1.000	0.053	1.068
Methoxychlor				0.030	0.020	0.031
Mirex				0.001	0.001	0.001
Nonylphenol	6.6	4.4	6.8	28.0	4.4	29.7
Parathion	0.0130	0.0087	0.0134	0.066	0.009	0.070
PCB's	0.014	0.0093	0.014			
Pentachlorophenol	15.00	10	15.5	19.000	10.0	19.643
Toxephene	0.0002	0.0001	0.00020635	0.730	0.0001	0.782

Radiological

Parameter	**Maximum Concentration**
Gross Alpha	15 pCi/L

Effluent Limitation for Protection of Agriculture (Class 4 Waters)

	Maximum Concentration			
Parameter	**Standard**	**Background**	**Limit**	
Total Dissolved Solids (mg/L)	1,200	521	1,200	* Utah Lake impaired
Boron (µg/L)	750	110	796	
Arsenic (µg/L)	100	2.8	107	
Cadmium (µg/L)	10	0.2	10.7	
Chromium (µg/L)	100	2.9	107	
Copper (µg/L)	200	3.4	214	
Lead (µg/L)	100	0.6	107	
Selenium (µg/L)	50	2.0	53.4	
Gross Alpha (pCi/L)	15	10	15.4	