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

Date: **October 1, 2018**

Facility: **Fairview Wastewater Treatment Facility**
UPDES No. UT0025542

Receiving water: **San Pitch River (2B, 3A, 4)**

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

Discharge
Outfall 001: San Pitch River→Sevier River

The maximum daily design discharge is 0.3 MGD.

Receiving Water
The receiving water for Outfall 001 is the San Pitch River, which is tributary to the Sevier River.

Per UAC R317-2-13, the designated beneficial uses for San Pitch River and tributaries, from Highway U-132 crossing to headwaters are 2B, 3A 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 3A - Protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in their food chain.*
- *Class 4 - Protected for agricultural uses including irrigation of crops and stock watering.*

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 the San Pitch River, the 20th percentile of the flow measurements from monitoring site 4902720 San Pitch River above Fairview WWTP at Restoration Project for the period 2006-2016 was calculated to estimate seasonal critical low flow in the receiving water (Table 1).

Table 1: San Pitch River critical low flow

Season	Flow (cfs)
Summer	2.7
Fall	3.8
Winter	3.5
Spring	5.0

TMDL

The San Pitch River from U-132 to the Pleasant Creek confluence is listed as impaired for E coli according to the 303(d) list in Utah's 2016 Integrated Report. The source of the impairment will be determined as part of the TMDL, which has not been initiated.

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.

Based on field observations of specific conductivity laterally across the cross-section, the discharge was determined to be fully mixed approximately 30 meters downstream of the discharge point. Therefore, the allowable mixing zone is 30 meters.

Parameters of Concern

The potential parameters of concern identified for the discharge/receiving water are total suspended solids (TSS), dissolved oxygen (DO), BOD_5, total phosphorus (TP), total nitrogen (TN), total ammonia (TAN), total residual chlorine (TRC) 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 under contract by Utah State University (USU). The model was calibrated to synoptic survey data collected in the summer of 2010 by USU and DWQ (8/2 to 8/5/2010). For the wasteload analysis, the calibrated model was extended further downstream. The wasteload model extends from 340 meters above the plant discharge to 2.1 km downstream of the plant to the 1900 South road crossing (approximately 2.4 km total length).

Approximately 475 m downstream of the treatment plant discharge is a diversion structure for the Moroni and Mount Pleasant Canal. The San Pitch River can be completely diverted into the canal from April through October.

Receiving water quality data was obtained from the monitoring site 4902720 San Pitch River above Fairview WWTP at Restoration Project for the period 2006-2016. The average seasonal value was calculated for each constituent with available data in the receiving water.

The QUAL2Kw model was used for determining WQBELs related to eutrophication and low dissolved oxygen. Effluent concentrations were adjusted so that water quality standards were not exceeded in the receiving water.

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 kinetic rates, inputs and outputs are summarized in Appendix A.

A mass balance mixing analysis was conducted for conservative constituents such as dissolved metals. The WQBELs determined using the mass balance mixing analysis are summarized in Appendix B.

The decay of chlorine from the treatment plant to the outfall at the river was estimated based on a first-order decay equation. The outlet conveyance is a combination of open channel, pipe and open pond, with a total length of 464 meters and an estimated travel time of 50 minutes. The analysis for TRC is summarized in Appendix C.

Where WQBELs exceeded secondary standards or categorical limits, the concentration in the model was set at the secondary standard or categorical limit.

Models and supporting documentation are available for review upon request.

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	15%
Fall	11%
Winter	12%
Spring	8%

Effluent Limits

Eutrophication and dissolved oxygen in the receiving water were evaluated using the QUAL2Kw model. Significant algal growth was predicted downstream of the WWTP during critical conditions; however, the DO was not predicted to exceed the criteria for 3A waters (Table 3) and Utah Secondary Treatment Standards for BOD_5 is sufficiently protective of the receiving water.

Table 3: Water Quality Based Effluent Limits Summary

Effluent Constituent	Acute			Chronic		
	Standard	Limit	Averaging Period	Standard	Limit	Averaging Period
Flow (MGD)		0.3	1 day		0.3	30 days
Ammonia (mg/L)	Varies		1 hour	Varies		30 days
Summer		14			10	
Fall		24			20	
Winter		10			10	
Spring		18			18	
Total Phosphorus[2]						
Min. Dissolved Oxygen (mg/L)	4.0	5.0	Minimum	6.5	5.0	30 days
BOD_5 (mg/L)[1]	None	35	7 days	None	25	30 days
Total Residual Chlorine (mg/L)	0.019	0.14	1 hour	0.011	0.14	4 days
1: Limits based on Utah Secondary Treatment Standards (UAC R317-1-3.2).						

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 are not increasing beyond the design capacity of the facility.

Prepared by:
Nicholas von Stackelberg, P.E.
Standards and Technical Services Section

Documents:

WLA Document: *fairview_potw_wla_2018-10-01.docx*
QUAL2Kw Wasteload Model: *fairview_potw_wla_2018.xlsm*

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.

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

WASTELOAD ANALYSIS [WLA] Date: 9/26/2018
Appendix A: QUAL2Kw Analysis Results

Discharging Facility:	Fairview WWTP		
UPDES No:	UT-0025542		
Permit Flow [MGD]:	0.30	Max. Daily	
	0.30	Max. Monthly Average	
Receiving Water:	San Pitch River		
Stream Classification:	2B, 3A, 4		
Stream Flows [cfs]:	2.72	Summer (July-Sept)	Critical Low Flow
	3.80	Fall (Oct-Dec)	
	3.53	Winter (Jan-Mar)	
	5.03	Spring (Apr-June)	
Instantaneously Fully Mixed:	NO		
Acute River Width:	50%		
Chronic River Width:	100%		
Combined Flow [cfs]:	1.82	Acute	
	3.18	Chronic	

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)	2.7	3.8	3.5	5.0
Temperature (deg C)	17.2	5.9	3.8	15.2
Specific Conductance (µmhos)	722	704	678	600
Inorganic Suspended Solids (mg/L)	0.6	4.4	7.0	12.5
Dissolved Oxygen (mg/L)	10.0	10.5	11.7	10.1
Dissolved Oxygen Diel Range (mg/L)	8.0	4.0	4.0	4.0
$CBOD_5$ (mg/L)	16.3	44.7	53.7	37.8
Organic Nitrogen (mg/L)	0.248	0.000	0.317	0.239
NH4-Nitrogen (mg/L)	0.020	0.024	0.021	0.021
NO3-Nitrogen (mg/L)	0.783	1.228	1.061	0.452
Organic Phosphorus (mg/L)	0.002	0.000	0.004	0.006
Inorganic Ortho-Phosphorus (mg/L)	0.012	0.051	0.014	0.016
Phytoplankton (µg/L)	0.0	0.0	0.0	0.0
Detritus [POM] (mg/L)	1.8	4.3	6.9	2.5
Alkalinity (mg/L)	300	300	300	300
pH	8.2	8.0	8.5	8.2

Discharge Information

Acute	Summer	Fall	Winter	Spring
Flow (cfs)	0.3	0.3	0.3	0.3
Temperature (deg C)	18.5	14.9	10.8	14.5
Specific Conductance (µmhos)	1,318	1,227	1,211	1,377
Inorganic Suspended Solids (mg/L)	2.0	3.2	2.0	2.5
Dissolved Oxygen (mg/L)	5.0	5.0	5.0	5.0
$CBOD_5$ (mg/L)	35.0	35.0	35.0	35.0
Organic Nitrogen (mg/L)	0.000	0.555	3.447	4.007
NH4-Nitrogen (mg/L)	14.000	24.000	10.000	18.000
NO3-Nitrogen (mg/L)	6.778	11.933	14.408	10.018
Organic Phosphorus (mg/L)	1.380	1.040	0.000	1.500
Inorganic Ortho-Phosphorus (mg/L)	3.500	3.660	3.860	2.790
Phytoplankton (µg/L)	0.000	0.000	0.000	0.000
Detritus [POM] (mg/L)	0.000	0.000	0.000	0.000
Alkalinity (mg/L)	309	309	309	309
pH	8.3	8.3	8.7	8.2

Chronic	Summer	Fall	Winter	Spring
Flow (cfs)	0.3	0.3	0.3	0.3
Temperature (deg C)	18.5	14.9	10.8	14.5
Specific Conductance (µmhos)	1,318	1,227	1,211	1,377
Inorganic Suspended Solids (mg/L)	2.0	3.2	2.0	2.5
Dissolved Oxygen (mg/L)	5.0	5.0	5.0	5.0
$CBOD_5$ (mg/L)	25.0	25.0	25.0	25.0
Organic Nitrogen (mg/L)	0.000	0.555	3.447	4.007
NH4-Nitrogen (mg/L)	10.000	20.000	10.000	18.000
NO3-Nitrogen (mg/L)	6.778	11.933	14.408	10.018
Organic Phosphorus (mg/L)	0.907	0.335	0.000	1.096
Inorganic Ortho-Phosphorus (mg/L)	1.706	3.384	3.188	2.750
Phytoplankton (µg/L)	0.000	0.000	0.000	0.000
Detritus [POM] (mg/L)	0.000	0.000	0.000	0.000
Alkalinity (mg/L)	309	309	309	309
pH	8.0	8.0	8.0	8.0

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 Limitation for Biological Oxygen Demand (BOD_5) based upon Secondary Standards

In-stream criteria of downstream segments for Dissolved Oxygen will be met with an effluent BOD5 limitation as follows:

	Concentration		
Season	**Chronic**	**Acute**	
Summer	25.0	35.0	mg/L as CBOD5
Fall	25.0	35.0	mg/L as CBOD5
Winter	25.0	35.0	mg/L as CBOD5
Spring	25.0	35.0	mg/L as CBOD5

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

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

	Concentration		
Season	**Chronic**	**Acute**	
Summer	5.0	5.0	mg/L
Fall	5.0	5.0	mg/L
Winter	5.0	5.0	mg/L
Spring	5.0	5.0	mg/L

Effluent Limitation for Total Ammonia based upon Water Quality Standards

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

	Total Ammonia		
Season	**Chronic**	**Acute**	
Summer	10.0	14.0	mg/L as N
Fall	20.0	24.0	mg/L as N
Winter	10.0	10.0	mg/L as N
Spring	18.0	18.0	mg/L as N

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	2	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	0.61971067	/d
Temp correction	1.07	
Settling velocity	0.097716	m/d
Ammonium:		
Nitrification	8.6356657	/d
Temp correction	1.07	
Nitrate:		
Denitrification	1.03600496	/d
Temp correction	1.07	
Sed denitrification transfer coeff	0.003685	m/d
Temp correction	1.07	
Organic P:		
Hydrolysis	0.56611432	/d
Temp correction	1.07	
Settling velocity	0.020553	m/d
Inorganic P:		
Settling velocity	0.453255	m/d
Sed P oxygen attenuation half sat constant	0.27356	mgO2/L

Phytoplankton:		
Max Growth rate	2.685375	/d
Temp correction	1.07	
Respiration rate	0.0925322	/d
Temp correction	1.07	
Death rate	0.10456	/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	9.83175	ugN/L
Settling velocity	0.21137	m/d
Bottom Plants:		
Growth model	Zero-order	
Max Growth rate	49.06007	gD/m2/d or /d
Temp correction	1.07	
First-order model carrying capacity	100	gD/m2
Basal respiration rate	0.0501236	/d
Photo-respiration rate parameter	0.01	unitless
Temp correction	1.07	
Excretion rate	0.106182	/d
Temp correction	1.07	
Death rate	0.068256	/d
Temp correction	1.07	
External nitrogen half sat constant	355.2396	ugN/L
External phosphorus half sat constant	49.0929	ugP/L
Inorganic carbon half sat constant	7.85E-05	moles/L
Bottom algae use HCO3- as substrate	Yes	
Light model	Smith	
Light constant	54.8028	mgO^2/L
Ammonia preference	23.7415	ugN/L
Subsistence quota for nitrogen	6.05075	mgN/gD
Subsistence quota for phosphorus	2.9939	mgP/gD
Maximum uptake rate for nitrogen	167.496	mgN/gD/d
Maximum uptake rate for phosphorus	137.4714	mgP/gD/d
Internal nitrogen half sat ratio	1.0737	
Internal phosphorus half sat ratio	4.684316	
Nitrogen uptake water column fraction	1	
Phosphorus uptake water column fraction	1	
Detritus (POM):		
Dissolution rate	2.9460445	/d
Temp correction	1.07	
Settling velocity	0.9081	m/d
pH:		
Partial pressure of carbon dioxide	370	ppm

Atmospheric Inputs:	Spring	Fall	Winter	Spring
Max. Air Temperature, F	79.6	45.2	34.6	62.7
Min. Air Temperature, F	49.4	21.9	13.1	35.5
Dew Point, Temp., F	54.5	29.9	26.0	44.3
Wind, ft./sec. @ 21 ft.	6.6	5.8	5.8	8.4
Cloud Cover, %	0.1	0.1	0.1	0.1

Other Inputs:

Bottom Algae Coverage	100.0%	
Bottom SOD Coverage	100.0%	
Prescribed SOD	0.0	gO2/m2/d

WASTELOAD ANALYSIS [WLA] Date: 9/26/2018

Appendix B: Mass Balance Mixing Analysis for Conservative Constituents

Discharging Facility:	Fairview WWTP		
UPDES No:	UT-0025542		
Permit Flow [MGD]:	0.30	Maximum Monthly Flow	
	0.30	Maximum Daily Flow	
Receiving Water:	San Pitch River		
Stream Classification:	2B, 3A, 4		
Stream Flows [cfs]:	2.72	Summer (July-Sept)	Critical Low Flow
	3.80	Fall (Oct-Dec)	
	3.53	Winter (Jan-Mar)	
	5.03	Spring (Apr-June)	
Instantaneously Fully Mixed:	No		
Acute River Width:	50%		
Chronic River Width:	100%		

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 **San Pitch River**	**Flow** cfs
Summer	2.7
Fall	3.8
Winter	3.5
Spring	5.0

Discharge Information	**Flow** cfs
Maximum Daily	0.46
Maximum Monthly	0.46

Combined Flow Information	**Flow** cfs
Acute	1.82
Chronic	3.18

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 3A Waters)

Physical

Parameter	Maximum Concentration
Temperature (deg C)	20
Temperature Change (deg C)	2

Inorganics	Chronic Standard (4 Day Average)			Acute Standard (1 Hour Average)		
Parameter	Standard	Background	Limit	Standard	Background[2]	Limit
Phenol (mg/L)				0.010	0.007	0.020
Hydrogen Sulfide (Undissociated) [mg/L]				0.002	0.001	0.004
Total Residual Chlorine (mg/L)	0.011	0.0	0.1	0.019	0.000	0.075

Dissolved 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)	N/A[3]		None	750.0	502.5	1,475
Arsenic (µg/L)	150.0	100.5	440	340.0	100.5	1,042
Cadmium (µg/L)	0.6	0.4	1.7	6.8	0.4	25.6
Chromium VI (µg/L)	11.0	7.4	32.3	16.0	7.4	41.3
Chromium III (µg/L)	206.8	138.5	607	1589.6	138.5	5,842
Copper (µg/L)	26.1	17.5	76.6	43.8	17.5	121
Cyanide (µg/L)	5.2	3.5	15.3	22.0	3.5	76.3
Iron (µg/L)				1000.0	670.0	1,967
Lead (µg/L)	9.5	6.4	28.0	244.8	6.4	943
Mercury (µg/L)	0.012	0.008	0.035	2.4	0.0	9.4
Nickel (µg/L)	150.1	100.6	440	1351.3	100.6	5,016
Selenium (µg/L)	4.6	3.1	13.5	18.4	3.1	63.3
Silver (µg/L)				27.7	18.6	54.6
Tributylin (µg/L)	0.072	0.048	0.211	0.46	0.05	1.67
Zinc (µg/L)	341.5	228.8	1,002	338.7	228.8	661

1: Based upon a Hardness of 350 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	Standard	Background[1]	Limit	Standard	Background[1]	Limit
Aldrin (µg/L)				1.5	1.0	3.0
Chlordane (µg/L)	0.0043	0.0029	0.0126	1.2	0.0	4.7
DDT, DDE (µg/L)	0.001	0.001	0.003	0.55	0.00	2.16
Diazinon (µg/L)	0.17	0.11	0.50	0.17	0.11	0.33
Dieldrin (µg/L)	0.0056	0.0038	0.0164	0.24	0.00	0.93
Endosulfan, a & b (µg/L)	0.056	0.038	0.164	0.11	0.04	0.32
Endrin (µg/L)	0.036	0.024	0.106	0.086	0.024	0.267
Heptachlor & H. epoxide (µg/L)	0.0038	0.0025	0.0111	0.26	0.00	1.01
Lindane (µg/L)	0.08	0.05	0.23	1.0	0.1	3.8
Methoxychlor (µg/L)				0.03	0.02	0.06
Mirex (µg/L)				0.001	0.001	0.002
Nonylphenol (µg/L)	6.6	4.4	19.4	28.0	4.4	97.1
Parathion (µg/L)	0.0130	0.0087	0.0381	0.066	0.009	0.234
PCB's (µg/L)	0.014	0.009	0.041			
Pentachlorophenol (µg/L)	15.0	10.1	44.0	19.0	10.1	45.2
Toxephene (µg/L)	0.0002	0.0001	0.0006	0.73	0.00	2.87

1: Background concentration assumed 67% of chronic standard

Radiological	Maximum Concentration		
Parameter	Standard	Background[1]	Limit
Gross Alpha (pCi/L)	15	10.1	44.0

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

Effluent Limitation for Protection of Agriculture (Class 4 Waters)

	Maximum Concentration		
Parameter	Standard	Background[1]	Limit
Total Dissolved Solids (mg/L)	1200	376	6,029
Boron (µg/L)	75	50.25	220
Arsenic (µg/L)	100	67	293
Cadmium (µg/L)	10	6.7	29
Chromium (µg/L)	100	67	293
Copper (µg/L)	200	134	587
Lead (µg/L)	100	67	293
Selenium (µg/L)	50	33.5	147
Gross Alpha (pCi/L)	15	10.05	44

WASTELOAD ANALYSIS [WLA]
Appendix C: Total Residual Chlorine

Date: 9/26/2018

Discharging Facility: Fairview WWTP
UPDES No: UT-0025542

CHRONIC

	Season	Receiving Water	Standard	Total Effluent	Mixing Zone Boundary	Effluent Limit Without Decay	Temperature (°C)	Decay Rate (/day) @ 20 deg C	Decay Rate (/day) @ T deg C	Travel Time (min)	Decay Coefficient	Effluent Limit
Discharge (cfs)	Summer	2.7		0.46	3.2							
	Fall	3.8		0.46	4.3							
	Winter	3.5		0.46	4.0							
	Spring	5.0		0.46	5.5							
TRC (mg/L)	Summer	0.000	0.011			0.075	18.5	20	18.6	50	0.5235	0.144
	Fall	0.000	0.011			0.101	14.9	20	15.8	50	0.5779	0.175
	Winter	0.000	0.011			0.095	10.8	20	13.1	50	0.6345	0.149
	Spring	0.000	0.011			0.130	14.5	20	15.5	50	0.5832	0.223

ACUTE

	Season	Receiving Water	Standard	Total Effluent	Mixing Zone Boundary	Effluent Limit Without Decay	Temperature (°C)	Decay Rate (/day) @ 20 °C	Decay Rate (/day) @ T °C	Travel Time (min)	Decay Coefficient	Effluent Limit
Discharge (cfs)	Summer	1.4		0.46	1.8							
	Fall	1.9		0.46	2.4							
	Winter	1.8		0.46	2.2							
	Spring	2.5		0.46	3.0							
TRC (mg/L)	Summer	0.000	0.019			0.075	18.5	20	18.6	50	0.5235	0.143
	Fall	0.000	0.019			0.097	14.9	20	15.8	50	0.5779	0.167
	Winter	0.000	0.019			0.091	10.8	20	13.1	50	0.6345	0.144
	Spring	0.000	0.019			0.122	14.5	20	15.5	50	0.5832	0.209