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

**Date:** **September 4, 2013**

**Prepared by:** **Nicholas von Stackelberg, P.E.**
**Water Quality Management Section**

**Facility:** **Magna Water Reclamation Facility**
**UPDES No. UT0021440**

**Receiving water:** **Kersey Creek (2B, 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: Kersey Creek

The maximum design flow for the discharge is 4.0 MGD average monthly and 8.0 maximum daily, as provided by the treatment plant.

Receiving Water
The receiving water for Outfall 001 is Kersey Creek, which is tributary to C-7 Ditch, Lee Creek and finally Gilbert Bay of the Great Salt Lake. The receiving channel is variously referred to as Kersey Creek Canal (USGS) and Kersey Creek (Salt Lake County). In order to maintain consistency with the local water quality planning authority (Salt Lake County), the receiving channel will be referred to as Kersey Creek.

Per UAC R317-2-13.5.a, the designated beneficial uses for Kersey Creek from the confluence of C-7 Ditch to headwaters are 2B 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 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 Kersey Creek, the 20$^{th}$ percentile of flow measurements from water quality monitoring above the facility outfall was calculated to estimate seasonal critical flow in the receiving water (Table 1).

**Table 1: Seasonal critical low flow**

| Season | Flow (cfs) |
|---|---|
| Summer | 0.00 |
| Fall | 0.01 |
| Winter | 0.50 |
| Spring | 0.02 |

Due to the lack of flow measurements, low background flow, and limited seasonal variability, an annual background flow of 0.2 cfs was used.

Mixing Zone

The discharge is considered instantaneously fully mixed since the discharge is more than twice the background receiving water flow. Therefore, no mixing zone is allowed.

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 nitrogen (TAN), E. coli, pH, and total residual chlorine (TRC) as determined in consultation with the UPDES Permit Writer.

TMDL

The receiving waters are not listed as impaired for any parameters according to the 2010 303(d) list.

Water Quality Modeling

A QUAL2Kw model of the receiving water was populated based on physiographic information from Google Earth and site data collected by DWQ staff. The model extends from immediately upstream of the plant discharge to the confluence of Kersey Creek with C-7 Ditch.

Insufficient observed data was available for model calibration. The rate parameters used in the model were the same as those used for the Box Elder Creek/Brigham City WWTP QUAL2Kw, which was calibrated under contract by Utah State University. Kersey Creek was considered to have similar stream characteristics to Box Elder Creek.

Receiving water quality data was obtained from STORET 4991650 Kersey Creek above Magna WWTP. 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, including ammonia. Effluent concentrations were adjusted so that water quality standards were not exceeded in the receiving water. QUAL2Kw rates, input and output are summarized in Appendix A.

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

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 | 96% |
| Fall | 96% |
| Winter | 96% |
| Spring | 96% |

Effluent Limits

The effect of the effluent on the DO in the receiving water was evaluated using the QUAL2Kw model. A DO sag downstream in Kersey Creek resulting from the plant discharge was predicted by the model due to low reaeration rate in the low gradient stream, decay of CBOD in the effluent, nitrification of ammonia, and benthic algal growth and decomposition resulting from nutrients in the effluent. The existence of the DO sag was confirmed through the deployment of continuous sondes in Kersey Creek during the summer of 2013. Limits for DO and $CBOD_5$ in the discharge were determined in order to meet DO criteria in the receiving water (Table 3).

Algal growth was predicted due to the addition of nitrogen and phosphorus from the treatment plant. Ammonia nitrogen also exerts an oxygen demand during transformation to nitrate (nitrification). Therefore, effluent limits were determined for ammonia due to plant uptake and oxygen demand. The ammonia limits required for meeting the DO criteria are similar to those required to meet toxicity requirements.

QUAL2Kw rates, input and output for DO and nutrient related constituents are summarized in Appendix A.

A simple mixing analysis was conducted for constituents not related to DO and nutrients such as dissolved metals and TRC. Since the summer critical flow in Kersey Creek is so small compared to the plant discharge, no dilution was assumed and water quality standards need to be met end-of-pipe. The simple mixing analysis WQBELs are summarized in Appendix B.

Models and supporting documentation are available for review upon request.

**Table 3: Water Quality Based Effluent Limits Summary**

| Effluent Constituent | Acute | | | Chronic | | |
|---|---|---|---|---|---|---|
| | Standard | Limit | Averaging Period | Standard | Limit | Averaging Period |
| Flow (MGD) | | 8.0 | 1 day | | 4.0 | 30 days |
| Ammonia (mg/L) | Varies | | 1 hour | Varies | | 30 days |
| Summer | | 12 | | | 2.5 | |
| Fall | | 12 | | | 4.0 | |
| Winter | | 8 | | | 5.0 | |
| Spring | | 8 | | | 4.0 | |
| Min. Dissolved Oxygen (mg/L)[2] | 3.0 | 5.0 | Instantaneous | 5.0 | 6.5 | 30 days |
| $CBOD_5$ (mg/L) | NA | | 7 days | NA | | 30 days |
| Summer | | 10 | | | 5 | |
| Fall | | 20 | | | 15 | |
| Winter | | 35 | | | 25 | |
| Spring | | 20 | | | 15 | |
| Total Residual Chlorine (mg/L) | 0.019 | 0.019 | 1 hour | 0.011 | 0.011 | 4 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, as neither pollutant concentration nor load is being increased under this permit renewal.

WLA Document: *magna_potw_wla_2013_revised.docx*
QUAL2Kw Wasteload Model: *magna_potw_wla_2013.xlsm*

**WASTELOAD ANALYSIS [WLA]** Date: 9/4/2013
**Appendix A: QUAL2Kw Analysis for Eutrophication**

| | | | |
|---|---|---|---|
| Discharging Facility: | Magna WWTP | | |
| UPDES No: | UT-0021440 | | |
| Permit Flow [MGD]: | 4.00 | Maximum Monthly Flow | |
| | 8.00 | Maximum Daily Flow | |
| Receiving Water: | Kersey Creek | | |
| Stream Classification: | 2B, 3D | | |
| Stream Flows [cfs]: | 0.20 | Summer (July-Sept) | Critical Low Flow |
| | 0.20 | Fall (Oct-Dec) | |
| | 0.20 | Winter (Jan-Mar) | |
| | 0.20 | Spring (Apr-June) | |
| Acute River Width: | 50.0% | | |
| 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 Inputs** | **Summer** | **Fall** | **Winter** | **Spring** |
|---|---|---|---|---|
| Flow (cfs) | 0.2 | 0.2 | 0.2 | 0.2 |
| Temperature (deg C) | 19.7 | 11.0 | 4.5 | 15.9 |
| Specific Conductance (µmhos) | 2,487 | 2,287 | 3,080 | 3,070 |
| Inorganic Suspended Solids (mg/L) | 37.8 | 37.8 | 37.8 | 37.8 |
| Dissolved Oxygen (mg/L) | 8.0 | 10.7 | 12.6 | 9.9 |
| $CBOD_5$ (mg/L) | 2.3 | 7.3 | 6.1 | 4.1 |
| Organic Nitrogen (mg/L) | 0.500 | 0.500 | 0.500 | 0.500 |
| NH4-Nitrogen (mg/L) | 0.102 | 0.095 | 0.089 | 0.416 |
| NO3-Nitrogen (mg/L) | 4.400 | 4.400 | 4.400 | 4.400 |
| Organic Phosphorus (mg/L) | 0.000 | 0.000 | 0.000 | 0.000 |
| Inorganic Ortho-Phosphorus (mg/L) | 0.085 | 0.069 | 0.128 | 0.140 |
| Phytoplankton (µg/L) | 0.0 | 0.0 | 0.0 | 0.0 |
| Detritus [POM] (mg/L) | 4.2 | 4.2 | 4.2 | 4.2 |
| Alkalinity (mg/L) | 160 | 160 | 160 | 160 |
| pH | 7.9 | 8.2 | 8.2 | 8.5 |

| **Discharge Inputs - Chronic** | **Summer** | **Fall** | **Winter** | **Spring** |
|---|---|---|---|---|
| Flow (cfs) | 4.0 | 4.0 | 4.0 | 4.0 |
| Temperature (deg C) | 22.2 | 17.3 | 12.5 | 17.1 |
| Specific Conductance (µmhos) | 2,481 | 2,339 | 2,644 | 2,750 |
| Inorganic Suspended Solids (mg/L) | 2.4 | 2.1 | 3.2 | 2.2 |
| Dissolved Oxygen (mg/L) | 6.5 | 6.5 | 6.5 | 6.5 |
| $CBOD_5$ (mg/L) | 5.0 | 15.0 | 25.0 | 15.0 |
| Organic Nitrogen (mg/L) | 5.0 | 5.0 | 5.0 | 5.0 |
| NH4-Nitrogen (mg/L) | 2.5 | 4.0 | 5.0 | 4.0 |
| NO3-Nitrogen (mg/L) | 12.3 | 14.4 | 12.3 | 13.0 |
| Organic Phosphorus (mg/L) | 0.0 | 0.0 | 0.0 | 0.0 |
| Inorganic Ortho-Phosphorus (mg/L) | 5.0 | 5.0 | 5.0 | 5.0 |
| 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) | 400 | 400 | 400 | 400 |
| pH | 7.6 | 7.6 | 7.6 | 7.6 |

| Discharge Inputs - Acute | Summer | Fall | Winter | Spring |
|---|---|---|---|---|
| Flow (cfs) | 8.0 | 8.0 | 8.0 | 8.0 |
| Temperature (deg C) | 22.2 | 17.3 | 12.5 | 17.1 |
| Specific Conductance (µmhos) | 2,481 | 2,339 | 2,644 | 2,750 |
| Inorganic Suspended Solids (mg/L) | 2.4 | 2.1 | 3.2 | 2.2 |
| Dissolved Oxygen (mg/L) | 5.0 | 5.0 | 5.0 | 5.0 |
| $CBOD_5$ (mg/L) | 10.0 | 20.0 | 20.0 | 20.0 |
| Organic Nitrogen (mg/L) | 10.0 | 10.0 | 10.0 | 10.0 |
| NH4-Nitrogen (mg/L) | 12.0 | 12.0 | 8.0 | 8.0 |
| NO3-Nitrogen (mg/L) | 12.3 | 16.3 | 12.4 | 23.3 |
| Organic Phosphorus (mg/L) | 0.0 | 0.0 | 0.0 | 0.0 |
| Inorganic Ortho-Phosphorus (mg/L) | 10.0 | 10.0 | 10.0 | 10.0 |
| 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) | 400 | 400 | 400 | 400 |
| pH | 7.8 | 7.8 | 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 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 | Standard | Summer | Fall | Winter | Spring |
|---|---|---|---|---|---|
| Flow (MGD) | N/A | 4.0 | 4.0 | 4.0 | 4.0 |
| NH4-Nitrogen (mg/L) | Varies | 2.5 | 4.0 | 5.0 | 4.0 |
| $CBOD_5$ (mg/L) | N/A | 5.0 | 15.0 | 25.0 | 15.0 |
| Dissolved Oxygen [30-day Ave] (mg/L) | 5.0 | 6.5 | 6.5 | 6.5 | 6.5 |

| Acute | Standard | Summer | Fall | Winter | Spring |
|---|---|---|---|---|---|
| Flow (cfs) | N/A | 8.0 | 8.0 | 8.0 | 8.0 |
| NH4-Nitrogen (mg/L) | Varies | 12.0 | 12.0 | 8.0 | 8.0 |
| $CBOD_5$ (mg/L) | N/A | 10.0 | 20.0 | 20.0 | 20.0 |
| Dissolved Oxygen [Minimum] (mg/L) | 3.0 | 5.0 | 5.0 | 5.0 | 5.0 |

**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 | Internal | |
| 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 | 0.242802 | /d |
| Temp correction | 1.047 | |
| *Fast CBOD:* | | |
| Oxidation rate | 10 | /d |
| Temp correction | 1.047 | |
| *Organic N:* | | |
| Hydrolysis | 0.2625675 | /d |
| Temp correction | 1.07 | |
| Settling velocity | 0.087906 | m/d |
| *Ammonium:* | | |
| Nitrification | 2.817054 | /d |
| Temp correction | 1.07 | |
| *Nitrate:* | | |
| Denitrification | 1.756367 | /d |
| Temp correction | 1.07 | |
| Sed denitrification transfer coeff | 0.24334 | m/d |
| Temp correction | 1.07 | |
| *Organic P:* | | |
| Hydrolysis | 0.227735 | /d |
| Temp correction | 1.07 | |
| Settling velocity | 0.103774 | m/d |
| *Inorganic P:* | | |
| Settling velocity | 0.06798 | m/d |
| Sed P oxygen attenuation half sat constant | 0.99342 | mgO2/L |

| | | |
|---|---|---|
| *Phytoplankton:* | | |
| Max Growth rate | 2.57133 | /d |
| Temp correction | 1.07 | |
| Respiration rate | 0.1432355 | /d |
| Temp correction | 1.07 | |
| Death rate | 0.45734 | /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 | 15 | ugN/L |
| Settling velocity | 0.0645665 | m/d |
| *Bottom Plants:* | | |
| Growth model | Zero-order | |
| Max Growth rate | 8.663865 | gD/m2/d or /d |
| Temp correction | 1.07 | |
| First-order model carrying capacity | 100 | gD/m2 |
| Basal respiration rate | 0.1046738 | /d |
| Photo-respiration rate parameter | 0.39 | unitless |
| Temp correction | 1.07 | |
| Excretion rate | 0.05015 | /d |
| Temp correction | 1.07 | |
| Death rate | 0.1437 | /d |
| Temp correction | 1.07 | |
| External nitrogen half sat constant | 127.576 | ugN/L |
| External phosphorus half sat constant | 89.161 | ugP/L |
| Inorganic carbon half sat constant | 1.10E-04 | moles/L |
| Bottom algae use HCO3- as substrate | Yes | |
| Light model | Half saturation | |
| Light constant | 71.6656 | langleys/d |
| Ammonia preference | 15.2922 | ugN/L |
| Subsistence quota for nitrogen | 0.9375732 | mgN/gD |
| Subsistence quota for phosphorus | 0.058037 | mgP/gD |
| Maximum uptake rate for nitrogen | 640.4095 | mgN/gD/d |
| Maximum uptake rate for phosphorus | 190.7675 | mgP/gD/d |
| Internal nitrogen half sat ratio | 1.8677685 | |
| Internal phosphorus half sat ratio | 4.4374015 | |
| Nitrogen uptake water column fraction | 1 | |
| Phosphorus uptake water column fraction | 1 | |
| *Detritus (POM):* | | |
| Dissolution rate | 3.773984 | /d |
| Temp correction | 1.07 | |
| Settling velocity | 0.097025 | m/d |
| *pH:* | | |
| Partial pressure of carbon dioxide | 370 | ppm |

| Atmospheric Inputs: | Summer | Fall | Winter | Spring |
|---|---|---|---|---|
| Min. Air Temperature, F | 61.7 | 29.9 | 24.8 | 46.3 |
| Max. Air Temperature, F | 90.3 | 50.0 | 43.4 | 72.1 |
| Dew Point, Temp., F | 58.6 | 35.0 | 30.3 | 48.5 |
| Wind, ft./sec. @ 21 ft. | 9.8 | 7.5 | 7.6 | 9.2 |
| Cloud Cover, % | 10% | 10% | 10% | 10% |

| Other Inputs: | |
|---|---|
| Bottom Algae Coverage | 10% |
| Bottom SOD Coverage | 100% |
| Prescribed SOD, $gO_2/m^2/day$ | 0 |

**WASTELOAD ANALYSIS [WLA]** Date: 9/4/2013

**Appendix B: Simple Mixing Analysis for Conservative Constituents**

| | | | |
|---|---|---|---|
| Discharging Facility: | Magna WWTP | | |
| UPDES No: | UT-0021440 | | |
| Permit Flow [MGD]: | 4.0 | Maximum Monthly Flow | |
| | 8.0 | Maximum Daily Flow | |
| Receiving Water: | Kersey Creek | | |
| Stream Classification: | 2B, 3D | | |
| Stream Flows [cfs]: | 0.2 | Summer (July-Sept) | Critical Low Flow |
| | 0.2 | Fall (Oct-Dec) | |
| | 0.2 | Winter (Jan-Mar) | |
| | 0.2 | Spring (Apr-June) | |
| 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. Dry washes are considered to have an upstream flow equal to the flow of the discharge.

**Headwater/Upstream Information**

| | 7Q10 Flow cfs |
|---|---|
| Summer | 0.2 |
| Fall | 0.2 |
| Winter | 0.2 |
| Spring | 0.2 |

**Discharge Information**

| | Flow MGD |
|---|---|
| Maximum Daily | 8.0 |
| Maximum Monthly | 4.0 |

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 3D Waters)**

| Parameter | Maximum Concentration | | | |
|---|---|---|---|---|
| **Physical** | | | | |
| **Inorganics** | **Chronic Standard (4 Day Average)** | | **Acute Standard (1 Hour Average)** | |
| | **Standard** | **Limit** | **Standard** | **Limit** |
| Total Residual Chlorine (TRC) | 0.011 | 0.011 mg/L | 0.019 | 0.019 mg/L |
| Phenol | | | 0.010 | 0.010 mg/L |
| Hydrogen Sulfide (Undissociated) | | | 0.002 | 0.002 mg/L |
| **Dissolved Metals** | | | | |
| | **Chronic Standard (4 Day Average)** | | **Acute Standard (1 Hour Average)** | |
| **Parameter** | **Standard** | **Limit** | **Standard** | **Limit** |
| Aluminum | 87.0 | 87.0 µg/L | 750.0 | 750.0 µg/L |
| Arsenic | 150.0 | 150.0 µg/L | 340.0 | 340.0 µg/L |
| Cadmium | 0.4 | 0.4 µg/L | 3.9 | 3.9 µg/L |
| Chromium VI | 11.0 | 11.0 µg/L | 16.0 | 16.0 µg/L |
| Chromium III | 130.8 | 130.8 µg/L | 1005.2 | 1005.2 µg/L |
| Copper | 16.2 | 16.2 µg/L | 25.8 | 25.8 µg/L |
| Cyanide | 22.0 | 22.0 µg/L | 5.2 | 5.2 µg/L |
| Iron | | | 1000.0 | 1000.0 µg/L |
| Lead | 5.3 | 5.3 µg/L | 136.1 | 136.1 µg/L |
| Mercury | 0.012 | 0.012 µg/L | 2.4 | 2.4 µg/L |
| Nickel | 93.5 | 93.5 µg/L | 841.7 | 841.7 µg/L |
| Selenium | 4.6 | 4.6 µg/L | 18.4 | 18.4 µg/L |
| Silver | | | 10.6 | 10.6 µg/L |
| Tributylin | 0.072 | 0.072 µg/L | 0.46 | 0.46 µg/L |
| Zinc | 212.5 | 212.5 µg/L | 210.8 | 210.8 µg/L |

Based upon a Hardness of 200 mg/l as CaCO3

**Organics [Pesticides]**

| Parameter | Chronic Standard (4 Day Average) Concentration | Acute Standard (1 Hour Average) Concentration |
|---|---|---|
| Aldrin | | 1.500 µg/L |
| Chlordane | 0.0043 µg/L | 1.200 µg/L |
| DDT, DDE | 0.001 µg/L | 0.550 µg/L |
| Diazinon | 0.17 µg/L | 0.17 µg/L |
| Dieldrin | 0.0056 µg/L | 0.240 µg/L |
| Endosulfan, a & b | 0.056 µg/L | 0.110 µg/L |
| Endrin | 0.036 µg/L | 0.086 µg/L |
| Heptachlor & H. epoxide | 0.0038 µg/L | 0.260 µg/L |
| Lindane | 0.08 µg/L | 1.000 µg/L |
| Methoxychlor | | 0.030 µg/L |
| Mirex | | 0.001 µg/L |
| Nonylphenol | 6.6 µg/L | 28.0 µg/L |
| Parathion | 0.0130 µg/L | 0.066 µg/L |
| PCB's | 0.014 µg/L | |
| Pentachlorophenol | 15.00 µg/L | 19.000 µg/L |
| Toxephene | 0.0002 µg/L | 0.730 µg/L |

**Radiological**

| Parameter | Maximum Concentration |
|---|---|
| Gross Alpha | 15 pCi/L |