


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

**Date:** October 3, 2019  
**Prepared by:** Dave Wham   
Standards and Technical Services  
**Facility:** Pacificorp Deer Creek Mine; Discharge 003  
UPDES No. UT0023604

**Receiving water:** Huntington Creek (1C, 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

UPDES Discharge Point 003, Mine water discharge with an estimated mean monthly discharge of 0.72 MGD (1.12 cfs).

Receiving Water

Huntington Creek. Per UAC R317-2-13.1(b), the designated beneficial uses of Huntington Creek and tributaries from Highway 10 crossing to USFS boundary are 1C, 2B, 3A, 4.

- *Class 1C – Protected for domestic purposes with prior treatment by treatment processes as required by the Utah Division of Drinking Water.*
- *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, the 20th percentile of available flow measurements was calculated for the period of record to approximate the 7Q10 low flow condition. Flow data for the receiving water was obtained from Emery Water Conservancy District for their site *Huntington River below Power Plant* from the period 2012-2017. This station is below the Power Plant diversion but above other significant diversions like Huntington North Reservoir. Ambient water quality was characterized using data from DWQ station #4930530, Huntington Creek above UP&L Diversion from the period 2007-2013.

The critical low flow condition for discharges 003 is 12.1 cfs.

#### TMDL

According to the Utah's 2016 303(d) Water Quality Assessment, the assessment unit for this section of Huntington Creek, Huntington Creek and tributaries from Highway 10 crossing to USFS boundary (UT14060009-004) was listed as impaired for pH (Classes 1C, 2B, 3A, 4), dissolved oxygen (Class 3A), temperature (Class 3A) and total dissolved solids (Class 4).

Review of the listing data show that the temperature impairment was based on results from stations located in Bear Creek, a tributary to Huntington Creek located upstream from the proposed discharge. As a result, the proposed discharge cannot cause or contribute to that impairment.

Data from two monitoring stations above and below Deer Creek on Huntington Creek show impairments for pH and dissolved oxygen (DO). As a result, the proposed discharge must meet applicable Water Quality Standards (WQS) at end of pipe for these constituents (6.5 mg/l DO, and pH 6.5-9.0 pH).

Review of the listing data show that the total dissolved solids (TDS) impairment was based on results from the Huntington Creek at U10 crossing monitoring station. In order to protect downstream uses, and to avoid causing or contributing to that impairment, effluent limits for TDS should be set at the WQS of 1200 mg/l TDS.

#### 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.

Mixing zone modeling showed 100 % mixing within 15 minutes travel time, and acute limits defaulted to 50% of the seasonal critical low flow.

#### Parameters of Concern

The potential parameters of concern identified for the discharge/receiving water were temperature, pH, dissolved oxygen, TDS, and iron, as determined in consultation with the

UPDES Permit Writer.

#### 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<sub>50</sub> (lethal concentration, 50%) percent effluent for acute toxicity and the IC<sub>25</sub> (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.

LC50 WET Limits for Outfall 003 should be based on 100% effluent.

IC25 WET limits for Outfalls 003 should be based on 8.4% effluent.

#### Wasteload Allocation Methods

Effluent limits were determined for conservative constituents using a simple mass balance mixing analysis (UDWQ 2012). The mass balance analysis is summarized in the Wasteload Addendums.

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. The AMMTOX Model developed by University of Colorado and adapted by Utah DWQ and EPA Region VIII was used to determine ammonia effluent limits (Lewis et al. 2002). The analysis is summarized in the Wasteload Addendum.

Models and supporting documentation are available for review upon request.

#### 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 facility. The proposed permit is a simple renewal of an existing UPDES permit. No increase in flow or concentration of pollutants over those authorized in the the existing permit is being requested.

#### Documents:

WLA Document: *DeerCk\_003\_WLADoc\_10-3-19.docx*

Wasteload Analysis and Addendums: *DeerCk\_003\_WLA\_10-03-19.xlsm*

#### References:

Emery County Water Conservancy District. <http://www.ewcd.org/canals/huntington-drainage/>  
Utah Division of Water Quality. 2012. *Utah Wasteload Analysis Procedures Version 1.0.*

**Utah Division of Water Quality  
Salt Lake City, Utah**

**WASTELOAD ANALYSIS [WLA]  
Addendum: Statement of Basis**

3-Oct-19

**Facilities:** Deer Creek 003 Discharge  
**Discharging to:** Huntington Creek 0.72 MGD

**UPDES No:** UT-0023604

**I. Introduction**

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 [R317-2-8, UAC]. Projected concentrations are compared to numeric water quality standards to determine acceptability. The anti-degradation policy and procedures are also considered. The primary in-stream parameters of concern may include metals (as a function of hardness), total dissolved solids (TDS), total residual chlorine (TRC), un-ionized ammonia (as a function of pH and temperature, measured and evaluated in terms of total ammonia), and dissolved oxygen.

Mathematical water quality modeling is employed to determine stream quality response to point source discharges. Models aid in the effort of anticipating stream quality at future effluent flows at critical environmental conditions (e.g., low stream flow, high temperature, high pH, etc).

The numeric criteria in this wasteload analysis may always be modified by narrative criteria and other conditions determined by staff of the Division of Water Quality.

**II. Receiving Water and Stream Classification**

|                         |  |
|-------------------------|--|
| Huntington Creek :      | 1C, 2B, 3A, 4  |
| Antidegradation Review: | Level I review completed. Amended Level II review not required |

**III. Numeric Stream Standards for Protection of Aquatic Wildlife**

|                                       |  |
|---------------------------------------|--|
| Total Ammonia (TNH <sub>3</sub> )     | Varies as a function of Temperature and pH Rebound. See Water Quality Standards      |
| Chronic Total Residual Chlorine (TRC) | 0.011 mg/l (4 Day Average)<br>0.019 mg/l (1 Hour Average)                            |
| Chronic Dissolved Oxygen (DO)         | 6.50 mg/l (30 Day Average)<br>5.00 mg/l (7 Day Average)<br>4.00 mg/l (1 Day Average) |
| Maximum Total Dissolved Solids        | 1200.0 mg/l  |



**Utah Division of Water Quality  
Salt Lake City, Utah**

**Acute and Chronic Heavy Metals (Dissolved)**

| Parameter    | 4 Day Average (Chronic) Standard |               | 1 Hour Average (Acute) Standard |      |                |
|--------------|----------------------------------|---------------|---------------------------------|------|----------------|
|              | Concentration                    | Load*         | Concentration                   |      | Load*          |
| Aluminum     | 87.00 ug/l**                     | 0.523 lbs/day | 750.00                          | ug/l | 4.511 lbs/day  |
| Arsenic      | 190.00 ug/l                      | 1.143 lbs/day | 340.00                          | ug/l | 2.045 lbs/day  |
| Cadmium      | 0.52 ug/l                        | 0.003 lbs/day | 5.25                            | ug/l | 0.032 lbs/day  |
| Chromium III | 178.07 ug/l                      | 1.071 lbs/day | 3725.58                         | ug/l | 22.410 lbs/day |
| Chromium VI  | 11.00 ug/l                       | 0.066 lbs/day | 16.00                           | ug/l | 0.096 lbs/day  |
| Copper       | 19.89 ug/l                       | 0.120 lbs/day | 32.26                           | ug/l | 0.194 lbs/day  |
| Iron         |                                  |               | 1000.00                         | ug/l | 6.015 lbs/day  |
| Lead         | 9.83 ug/l                        | 0.059 lbs/day | 252.25                          | ug/l | 1.517 lbs/day  |
| Mercury      | 0.0120 ug/l                      | 0.000 lbs/day | 2.40                            | ug/l | 0.014 lbs/day  |
| Nickel       | 110.39 ug/l                      | 0.664 lbs/day | 992.91                          | ug/l | 5.973 lbs/day  |
| Selenium     | 4.60 ug/l                        | 0.028 lbs/day | 20.00                           | ug/l | 0.120 lbs/day  |
| Silver       | N/A ug/l                         | N/A lbs/day   | 17.38                           | ug/l | 0.105 lbs/day  |
| Zinc         | 253.86 ug/l                      | 1.527 lbs/day | 253.86                          | ug/l | 1.527 lbs/day  |

\* Allowed below discharge

\*\*Chronic Aluminum standard applies only to waters with a pH < 7.0 and a Hardness < 50 mg/l as CaCO<sub>3</sub>

Metals Standards Based upon a Hardness of 242.57 mg/l as CaCO<sub>3</sub>

**Organics [Pesticides]**

| Parameter         | 4 Day Average (Chronic) Standard |                 | 1 Hour Average (Acute) Standard |      |               |
|-------------------|----------------------------------|-----------------|---------------------------------|------|---------------|
|                   | Concentration                    | Load*           | Concentration                   |      | Load*         |
| Aldrin            |                                  |                 | 1.500                           | ug/l | 0.009 lbs/day |
| Chlordane         | 0.004 ug/l                       | 0.306 lbs/day   | 1.200                           | ug/l | 0.007 lbs/day |
| DDT, DDE          | 0.001 ug/l                       | 0.071 lbs/day   | 0.550                           | ug/l | 0.003 lbs/day |
| Dieldrin          | 0.002 ug/l                       | 0.135 lbs/day   | 1.250                           | ug/l | 0.008 lbs/day |
| Endosulfan        | 0.056 ug/l                       | 3.988 lbs/day   | 0.110                           | ug/l | 0.001 lbs/day |
| Endrin            | 0.002 ug/l                       | 0.164 lbs/day   | 0.090                           | ug/l | 0.001 lbs/day |
| Guthion           |                                  |                 | 0.010                           | ug/l | 0.000 lbs/day |
| Heptachlor        | 0.004 ug/l                       | 0.271 lbs/day   | 0.260                           | ug/l | 0.002 lbs/day |
| Lindane           | 0.080 ug/l                       | 5.698 lbs/day   | 1.000                           | ug/l | 0.006 lbs/day |
| Methoxychlor      |                                  |                 | 0.030                           | ug/l | 0.000 lbs/day |
| Mirex             |                                  |                 | 0.010                           | ug/l | 0.000 lbs/day |
| Parathion         |                                  |                 | 0.040                           | ug/l | 0.000 lbs/day |
| PCB's             | 0.014 ug/l                       | 0.997 lbs/day   | 2.000                           | ug/l | 0.012 lbs/day |
| Pentachlorophenol | 13.00 ug/l                       | 925.894 lbs/day | 20.000                          | ug/l | 0.120 lbs/day |
| Toxephene         | 0.0002 ug/l                      | 0.014 lbs/day   | 0.7300                          | ug/l | 0.004 lbs/day |

**Utah Division of Water Quality  
Salt Lake City, Utah**

**IV. Numeric Stream Standards for Protection of Agriculture**

| <b>4 Day Average (Chronic) Standard</b> |                      | <b>1 Hour Average (Acute) Standard</b> |               |
|---|----------------------|--|---------------|
|   | <b>Concentration</b> | <b>Load*</b>                           |               |
| Arsenic                                 |                      | 100.0 ug/l                             | lbs/day       |
| Boron                                   |                      | 750.0 ug/l                             | 2.26 lbs/day  |
| Cadmium                                 |                      | 10.0 ug/l                              | 0.03 lbs/day  |
| Chromium                                |                      | 100.0 ug/l                             | lbs/day       |
| Copper                                  |                      | 200.0 ug/l                             | lbs/day       |
| Lead                                    |                      | 100.0 ug/l                             | lbs/day       |
| Selenium                                |                      | 50.0 ug/l                              | lbs/day       |
| TDS, Summer                             |                      | 1200.0 mg/l                            | 3.61 tons/day |

**V. Numeric Stream Standards for Protection of Human Health (Class 1C Waters)**

| <b>4 Day Average (Chronic) Standard</b> |                      | <b>1 Hour Average (Acute) Standard</b> |                |
|---|----------------------|--|----------------|
| <b>Metals</b>                           | <b>Concentration</b> | <b>Load*</b>                           |                |
| Arsenic                                 |                      | 50.0 ug/l                              | 3.561 lbs/day  |
| Barium                                  |                      | 1000.0 ug/l                            | 71.223 lbs/day |
| Cadmium                                 |                      | 10.0 ug/l                              | 0.712 lbs/day  |
| Chromium                                |                      | 50.0 ug/l                              | 3.561 lbs/day  |
| Lead                                    |                      | 50.0 ug/l                              | 3.561 lbs/day  |
| Mercury                                 |                      | 2.0 ug/l                               | 0.142 lbs/day  |
| Selenium                                |                      | 10.0 ug/l                              | 0.712 lbs/day  |
| Silver                                  |                      | 50.0 ug/l                              | 3.561 lbs/day  |
| Fluoride (3)                            |                      | 1.4 ug/l                               | 0.100 lbs/day  |
| to                                      |                      | 2.4 ug/l                               | 0.171 lbs/day  |
| Nitrates as N                           |                      | 10.0 ug/l                              | 0.712 lbs/day  |

**Chlorophenoxy Herbicides**

|                       |            |               |
|-----------------------|------------|---------------|
| 2,4-D                 | 100.0 ug/l | 7.122 lbs/day |
| 2,4,5-TP              | 10.0 ug/l  | 0.712 lbs/day |
| Endrin                | 0.2 ug/l   | 0.014 lbs/day |
| cyclohexane (Lindane) | 4.0 ug/l   | 0.285 lbs/day |
| Methoxychlor          | 100.0 ug/l | 7.122 lbs/day |
| Toxaphene             | 5.0 ug/l   | 0.356 lbs/day |

**VI. Numeric Stream Standards the Protection of Human Health from Water & Fish Consumption [Toxics]**

| Maximum Conc., ug/l - Acute Standards |   |               |                                      |                 |
|---------------------------------------|---|---------------|--------------------------------------|-----------------|
|                                       | Class 1C                                    |               | Class 3A, 3B                         |                 |
| Toxic Organics                        | [2 Liters/Day for 70 Kg Person over 70 Yr.] |               | [6.5 g for 70 Kg Person over 70 Yr.] |                 |
| Acenaphthene                          | 1200.00 ug/l                                | 85.47 lbs/day | 2700.0 ug/l                          | 192.30 lbs/day  |
| Acrolein                              | 320.00 ug/l                                 | 22.79 lbs/day | 780.0 ug/l                           | 55.55 lbs/day   |
| Acrylonitrile                         | 0.06 ug/l                                   | 0.00 lbs/day  | 0.7 ug/l                             | 0.05 lbs/day    |
| Benzene                               | 1.20 ug/l                                   | 0.09 lbs/day  | 71.0 ug/l                            | 5.06 lbs/day    |
| Benzidine                             | 0.00012 ug/l                                | 0.00 lbs/day  | 0.0 ug/l                             | 0.00 lbs/day    |
| Carbon tetrachloride                  | 0.25 ug/l                                   | 0.02 lbs/day  | 4.4 ug/l                             | 0.31 lbs/day    |
| Chlorobenzene                         | 680.00 ug/l                                 | 48.43 lbs/day | 21000.0 ug/l                         | 1495.67 lbs/day |
| 1,2,4-Trichlorobenzene                |   |               |                                      |                 |
| Hexachlorobenzene                     | 0.00075 ug/l                                | 0.00 lbs/day  | 0.0 ug/l                             | 0.00 lbs/day    |
| 1,2-Dichloroethane                    | 0.38 ug/l                                   | 0.03 lbs/day  | 99.0 ug/l                            | 7.05 lbs/day    |

**Utah Division of Water Quality**  
**Salt Lake City, Utah**

|                              |              |                |               |                  |
|------------------------------|--------------|----------------|---------------|------------------|
| 1,1,1-Trichloroethane        |              |                |               |                  |
| Hexachloroethane             | 1.90 ug/l    | 0.14 lbs/day   | 8.9 ug/l      | 0.63 lbs/day     |
| 1,1-Dichloroethane           |              |                |               |                  |
| 1,1,2-Trichloroethane        | 0.61 ug/l    | 0.04 lbs/day   | 42.0 ug/l     | 2.99 lbs/day     |
| 1,1,2,2-Tetrachloroethane    | 0.17 ug/l    | 0.01 lbs/day   | 11.0 ug/l     | 0.78 lbs/day     |
| Chloroethane                 |              |                | 0.0 ug/l      | 0.00 lbs/day     |
| Bis(2-chloroethyl) ether     | 0.03 ug/l    | 0.00 lbs/day   | 1.4 ug/l      | 0.10 lbs/day     |
| 2-Chloroethyl vinyl ether    | 0.00 ug/l    | 0.00 lbs/day   | 0.0 ug/l      | 0.00 lbs/day     |
| 2-Chloronaphthalene          | 1700.00 ug/l | 121.08 lbs/day | 4300.0 ug/l   | 306.26 lbs/day   |
| 2,4,6-Trichlorophenol        | 2.10 ug/l    | 0.15 lbs/day   | 6.5 ug/l      | 0.46 lbs/day     |
| p-Chloro-m-cresol            |              |                | 0.0 ug/l      | 0.00 lbs/day     |
| Chloroform (HM)              | 5.70 ug/l    | 0.41 lbs/day   | 470.0 ug/l    | 33.47 lbs/day    |
| 2-Chlorophenol               | 120.00 ug/l  | 8.55 lbs/day   | 400.0 ug/l    | 28.49 lbs/day    |
| 1,2-Dichlorobenzene          | 2700.00 ug/l | 192.30 lbs/day | 17000.0 ug/l  | 1210.78 lbs/day  |
| 1,3-Dichlorobenzene          | 400.00 ug/l  | 28.49 lbs/day  | 2600.0 ug/l   | 185.18 lbs/day   |
| 1,4-Dichlorobenzene          | 400.00 ug/l  | 28.49 lbs/day  | 2600.0 ug/l   | 185.18 lbs/day   |
| 3,3'-Dichlorobenzidine       | 0.04 ug/l    | 0.00 lbs/day   | 0.1 ug/l      | 0.01 lbs/day     |
| 1,1-Dichloroethylene         | 0.06 ug/l    | 0.00 lbs/day   | 3.2 ug/l      | 0.23 lbs/day     |
| 1,2-trans-Dichloroethylene   | 700.00 ug/l  | 49.86 lbs/day  | 0.0 ug/l      | 0.00 lbs/day     |
| 2,4-Dichlorophenol           | 93.00 ug/l   | 6.62 lbs/day   | 790.0 ug/l    | 56.27 lbs/day    |
| 1,2-Dichloropropane          | 0.52 ug/l    | 0.04 lbs/day   | 39.0 ug/l     | 2.78 lbs/day     |
| 1,3-Dichloropropylene        | 10.00 ug/l   | 0.71 lbs/day   | 1700.0 ug/l   | 121.08 lbs/day   |
| 2,4-Dimethylphenol           | 540.00 ug/l  | 38.46 lbs/day  | 2300.0 ug/l   | 163.81 lbs/day   |
| 2,4-Dinitrotoluene           | 0.11 ug/l    | 0.01 lbs/day   | 9.1 ug/l      | 0.65 lbs/day     |
| 2,6-Dinitrotoluene           | 0.00 ug/l    | 0.00 lbs/day   | 0.0 ug/l      | 0.00 lbs/day     |
| 1,2-Diphenylhydrazine        | 0.04 ug/l    | 0.00 lbs/day   | 0.5 ug/l      | 0.04 lbs/day     |
| Ethylbenzene                 | 3100.00 ug/l | 220.79 lbs/day | 29000.0 ug/l  | 2065.46 lbs/day  |
| Fluoranthene                 | 300.00 ug/l  | 21.37 lbs/day  | 370.0 ug/l    | 26.35 lbs/day    |
| 4-Chlorophenyl phenyl ether  |              |                |               |                  |
| 4-Bromophenyl phenyl ether   |              |                |               |                  |
| Bis(2-chloroisopropyl) ether | 1400.00 ug/l | 99.71 lbs/day  | 170000.0 ug/l | 12107.84 lbs/day |
| Bis(2-chloroethoxy) methane  | 0.00 ug/l    | 0.00 lbs/day   | 0.0 ug/l      | 0.00 lbs/day     |
| Methylene chloride (HM)      | 4.70 ug/l    | 0.33 lbs/day   | 1600.0 ug/l   | 113.96 lbs/day   |
| Methyl chloride (HM)         | 0.00 ug/l    | 0.00 lbs/day   | 0.0 ug/l      | 0.00 lbs/day     |
| Methyl bromide (HM)          | 0.00 ug/l    | 0.00 lbs/day   | 0.0 ug/l      | 0.00 lbs/day     |
| Bromoform (HM)               | 4.30 ug/l    | 0.31 lbs/day   | 360.0 ug/l    | 25.64 lbs/day    |
| Dichlorobromomethane         | 0.27 ug/l    | 0.02 lbs/day   | 22.0 ug/l     | 1.57 lbs/day     |
| Chlorodibromomethane         | 0.41 ug/l    | 0.03 lbs/day   | 34.0 ug/l     | 2.42 lbs/day     |
| Hexachlorobutadiene(c)       | 0.44 ug/l    | 0.03 lbs/day   | 50.0 ug/l     | 3.56 lbs/day     |
| Hexachlorocyclopentadiene    | 240.00 ug/l  | 17.09 lbs/day  | 17000.0 ug/l  | 1210.78 lbs/day  |
| Isophorone                   | 8.40 ug/l    | 0.60 lbs/day   | 600.0 ug/l    | 42.73 lbs/day    |
| Naphthalene                  |              |                |               |                  |
| Nitrobenzene                 | 17.00 ug/l   | 1.21 lbs/day   | 1900.0 ug/l   | 135.32 lbs/day   |
| 2-Nitrophenol                | 0.00 ug/l    | 0.00 lbs/day   | 0.0 ug/l      | 0.00 lbs/day     |
| 4-Nitrophenol                | 0.00 ug/l    | 0.00 lbs/day   | 0.0 ug/l      | 0.00 lbs/day     |
| 2,4-Dinitrophenol            | 70.00 ug/l   | 4.99 lbs/day   | 14000.0 ug/l  | 997.12 lbs/day   |
| 4,6-Dinitro-o-cresol         | 13.00 ug/l   | 0.93 lbs/day   | 765.0 ug/l    | 54.49 lbs/day    |
| N-Nitrosodimethylamine       | 0.00069 ug/l | 0.00 lbs/day   | 8.1 ug/l      | 0.58 lbs/day     |
| N-Nitrosodiphenylamine       | 5.00 ug/l    | 0.36 lbs/day   | 16.0 ug/l     | 1.14 lbs/day     |
| N-Nitrosodi-n-propylamine    | 0.01 ug/l    | 0.00 lbs/day   | 1.4 ug/l      | 0.10 lbs/day     |
| Pentachlorophenol            | 0.28 ug/l    | 0.02 lbs/day   | 8.2 ug/l      | 0.58 lbs/day     |

**Utah Division of Water Quality**  
**Salt Lake City, Utah**

|                          |               |                  |               |                  |
|--------------------------|---------------|------------------|---------------|------------------|
| Phenol                   | 2.10E+04 ug/l | 1.50E+03 lbs/day | 4.6E+06 ug/l  | 3.28E+05 lbs/day |
| Bis(2-ethylhexyl)phthala | 1.80 ug/l     | 0.13 lbs/day     | 5.9 ug/l      | 0.42 lbs/day     |
| Butyl benzyl phthalate   | 3000.00 ug/l  | 213.67 lbs/day   | 5200.0 ug/l   | 370.36 lbs/day   |
| Di-n-butyl phthalate     | 2700.00 ug/l  | 192.30 lbs/day   | 12000.0 ug/l  | 854.67 lbs/day   |
| Di-n-octyl phthlate      |               |                  |               |                  |
| Diethyl phthalate        | 23000.00 ug/l | 1638.12 lbs/day  | 120000.0 ug/l | 8546.71 lbs/day  |
| Dimethyl phthlate        | 3.13E+05 ug/l | 2.23E+04 lbs/day | 2.9E+06 ug/l  | 2.07E+05 lbs/day |
| Benzo(a)anthracene (P/   | 0.0028 ug/l   | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| Benzo(a)pyrene (PAH)     | 0.0028 ug/l   | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| Benzo(b)fluoranthene (F  | 0.0028 ug/l   | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| Benzo(k)fluoranthene (F  | 0.0028 ug/l   | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| Chrysene (PAH)           | 0.0028 ug/l   | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| Acenaphthylene (PAH)     |               |                  |               |                  |
| Anthracene (PAH)         | 9600.00 ug/l  | 683.74 lbs/day   | 0.0 ug/l      | 0.00 lbs/day     |
| Dibenzo(a,h)anthracene   | 0.0028 ug/l   | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| Indeno(1,2,3-cd)pyrene   | 0.0028 ug/l   | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| Pyrene (PAH)             | 960.00 ug/l   | 68.37 lbs/day    | 11000.0 ug/l  | 783.45 lbs/day   |
| Tetrachloroethylene      | 0.80 ug/l     | 0.06 lbs/day     | 8.9 ug/l      | 0.63 lbs/day     |
| Toluene                  | 6800.00 ug/l  | 484.31 lbs/day   | 200000 ug/l   | 14244.52 lbs/day |
| Trichloroethylene        | 2.70 ug/l     | 0.19 lbs/day     | 81.0 ug/l     | 5.77 lbs/day     |
| Vinyl chloride           | 2.00 ug/l     | 0.14 lbs/day     | 525.0 ug/l    | 37.39 lbs/day    |

**Pesticides**

|                    |             |              |          |              |
|--------------------|-------------|--------------|----------|--------------|
| Aldrin             | 0.0001 ug/l | 0.00 lbs/day | 0.0 ug/l | 0.00 lbs/day |
| Dieldrin           | 0.0001 ug/l | 0.00 lbs/day | 0.0 ug/l | 0.00 lbs/day |
| Chlordane          | 0.0006 ug/l | 0.00 lbs/day | 0.0 ug/l | 0.00 lbs/day |
| 4,4'-DDT           | 0.0006 ug/l | 0.00 lbs/day | 0.0 ug/l | 0.00 lbs/day |
| 4,4'-DDE           | 0.0006 ug/l | 0.00 lbs/day | 0.0 ug/l | 0.00 lbs/day |
| 4,4'-DDD           | 0.0008 ug/l | 0.00 lbs/day | 0.0 ug/l | 0.00 lbs/day |
| alpha-Endosulfan   | 0.9300 ug/l | 0.07 lbs/day | 2.0 ug/l | 0.14 lbs/day |
| beta-Endosulfan    | 0.9300 ug/l | 0.07 lbs/day | 2.0 ug/l | 0.14 lbs/day |
| Endosulfan sulfate | 0.9300 ug/l | 0.07 lbs/day | 2.0 ug/l | 0.14 lbs/day |
| Endrin             | 0.7600 ug/l | 0.05 lbs/day | 0.8 ug/l | 0.06 lbs/day |
| Endrin aldehyde    | 0.7600 ug/l | 0.05 lbs/day | 0.8 ug/l | 0.06 lbs/day |
| Heptachlor         | 0.0002 ug/l | 0.00 lbs/day | 0.0 ug/l | 0.00 lbs/day |
| Heptachlor epoxide |             |              |          |              |

**PCB's**

|                        |               |              |          |              |
|------------------------|---------------|--------------|----------|--------------|
| PCB 1242 (Arochlor 124 | 0.000044 ug/l | 0.00 lbs/day | 0.0 ug/l | 0.00 lbs/day |
| PCB-1254 (Arochlor 125 | 0.000044 ug/l | 0.00 lbs/day | 0.0 ug/l | 0.00 lbs/day |
| PCB-1221 (Arochlor 122 | 0.000044 ug/l | 0.00 lbs/day | 0.0 ug/l | 0.00 lbs/day |
| PCB-1232 (Arochlor 123 | 0.000044 ug/l | 0.00 lbs/day | 0.0 ug/l | 0.00 lbs/day |
| PCB-1248 (Arochlor 124 | 0.000044 ug/l | 0.00 lbs/day | 0.0 ug/l | 0.00 lbs/day |
| PCB-1260 (Arochlor 126 | 0.000044 ug/l | 0.00 lbs/day | 0.0 ug/l | 0.00 lbs/day |
| PCB-1016 (Arochlor 101 | 0.000044 ug/l | 0.00 lbs/day | 0.0 ug/l | 0.00 lbs/day |

**Pesticide**

|           |               |      |          |              |
|-----------|---------------|------|----------|--------------|
| Toxaphene | 0.000750 ug/l | 0.00 | 0.0 ug/l | 0.00 lbs/day |
|-----------|---------------|------|----------|--------------|

**Dioxin**

|                       |               |              |          |      |
|-----------------------|---------------|--------------|----------|------|
| Dioxin (2,3,7,8-TCDD) | 1.30E-08 ug/l | 0.00 lbs/day | 1.40E-08 | 0.00 |
|-----------------------|---------------|--------------|----------|------|

**Utah Division of Water Quality  
Salt Lake City, Utah**

**Metals**

|                |               |                  |              |                  |
|----------------|---------------|------------------|--------------|------------------|
| Antimony       | 14.0 ug/l     | 1.00 lbs/day     |              |                  |
| Arsenic        | 50.0 ug/l     | 3.56 lbs/day     | 4300.00 ug/l | 306.26 lbs/day   |
| Asbestos       | 7.00E+06 ug/l | 4.99E+05 lbs/day |              |                  |
| Beryllium      |               |                  |              |                  |
| Cadmium        |               |                  |              |                  |
| Chromium (III) |               |                  |              |                  |
| Chromium (VI)  |               |                  |              |                  |
| Copper         |               |                  |              |                  |
| Cyanide        | 1.30E+03 ug/l | 92.59 lbs/day    | 2.2E+05 ug/l | 15668.97 lbs/day |
| Lead           | 700.0 ug/l    | 49.86 lbs/day    |              |                  |
| Mercury        |               |                  | 0.15 ug/l    | 0.01 lbs/day     |
| Nickel         |               |                  | 4600.00 ug/l | 327.62 lbs/day   |
| Selenium       | 0.1 ug/l      | 0.01 lbs/day     |              |                  |
| Silver         | 610.0 ug/l    | 43.45 lbs/day    |              |                  |
| Thallium       |               |                  | 6.30 ug/l    | 0.45 lbs/day     |
| Zinc           |               |                  |              |                  |

**There are additional standards that apply to this receiving water, but were not considered in this modeling/waste load allocation analysis.**

## **VII. Mathematical Modeling of Stream Quality**

Model configuration was accomplished utilizing standard modeling procedures. Data points were plotted and coefficients adjusted as required to match observed data as closely as possible.

The modeling approach used in this analysis included one or a combination of the following models.

(1) The Utah River Model, Utah Division of Water Quality, 1992. Based upon STREAMDO IV (Region VIII) and Supplemental Ammonia Toxicity Models; EPA Region VIII, Sept. 1990 and QUAL2E (EPA, Athens, GA).

(2) Utah Ammonia/Chlorine Model, Utah Division of Water Quality, 1992.

(3) AMMTOX Model, University of Colorado, Center of Limnology, and EPA Region 8

(4) Principles of Surface Water Quality Modeling and Control. Robert V. Thomann, et.al. Harper Collins Publisher, Inc. 1987, pp. 644.

Coefficients used in the model were based, in part, upon the following references:

(1) Rates, Constants, and Kinetics Formulations in Surface Water Quality Modeling. Environmental Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Athens Georgia. EPA/600/3-85/040 June 1985.



**Utah Division of Water Quality  
Salt Lake City, Utah**

(2) Principles of Surface Water Quality Modeling and Control. Robert V. Thomann, et.al.  
Harper Collins Publisher, Inc. 1987, pp. 644.

### VIII. Modeling Information

The required information for the model may include the following information for both the upstream conditions at low flow and the effluent conditions:

|                       |                                     |
|-----------------------|-------------------------------------|
| Flow, Q, (cfs or MGD) | D.O. mg/l                           |
| Temperature, Deg. C.  | Total Residual Chlorine (TRC), mg/l |
| pH                    | Total NH3-N, mg/l                   |
| BOD5, mg/l            | Total Dissolved Solids (TDS), mg/l  |
| Metals, ug/l          | Toxic Organics of Concern, ug/l     |

### Other Conditions

In addition to the upstream and effluent conditions, the models require a variety of physical and biological coefficients and other technical information. In the process of actually establishing the permit limits for an effluent, values are used based upon the available data, model calibration, literature values, site visits and best professional judgement.

### 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.

### Current Upstream Information

|                        | Stream      |                 | pH         | T-NH3<br>mg/l as N | BOD5<br>mg/l | DO<br>mg/l     | TRC<br>mg/l | TDS<br>mg/l |
|------------------------|-------------|-----------------|------------|--------------------|--------------|----------------|-------------|-------------|
|                        | Flow<br>cfs | Temp.<br>Deg. C |            |                    |              |                |             |             |
| Summer (Irrig. Season) | 12.10       | 12.0            | 8.5        | 0.01               | 0.05         | 7.64           | 0.00        | 213.0       |
| Fall                   | 12.10       | 2.1             | 8.4        | 0.01               | 0.05         | ---            | 0.00        | 265.0       |
| Winter                 | 12.10       | 1.0             | 8.3        | 0.01               | 0.05         | ---            | 0.00        | 307.0       |
| Spring                 | 12.10       | 7.3             | 8.4        | 0.01               | 0.05         | ---            | 0.00        | 230.0       |
| Dissolved Metals       | Al<br>ug/l  | As<br>ug/l      | Cd<br>ug/l | CrIII<br>ug/l      | CrVI<br>ug/l | Copper<br>ug/l | Fe<br>ug/l  | Pb<br>ug/l  |
| All Seasons            | 13.67       | 0.50            | 0.06       | 1.77               | 3.975*       | 0.95           | 15.2        | 0.35        |
| Dissolved Metals       | Hg<br>ug/l  | Ni<br>ug/l      | Se<br>ug/l | Ag<br>ug/l         | Zn<br>ug/l   | Boron<br>ug/l  | * ~80% MDL  |             |
| All Seasons            | 0.0000      | 2.50            | 0.92       | 0.25               | 7.12         | 20.1           |             |             |

**Utah Division of Water Quality  
Salt Lake City, Utah**

**Projected Discharge Information**

| Season | Flow, MGD | Temp. | TDS<br>mg/l | TDS<br>tons/day |
|--------|-----------|-------|-------------|-----------------|
| Summer | 0.72000   | 13.9  | 542.00      | 1.62697         |
| Fall   | 0.72000   | 13.9  |             |                 |
| Winter | 0.72000   | 13.9  |             |                 |
| Spring | 0.72000   | 13.9  |             |                 |

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

**IX. 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 coincide with the environmental conditions expected at low stream flows.

**Effluent Limitation for Flow based upon Water Quality Standards**

In-stream criteria of downstream segments will be met with an effluent flow maximum value as follows:

| Season | Daily Average |           |
|--------|---------------|-----------|
| Summer | 0.720 MGD     | 1.114 cfs |
| Fall   | 0.720 MGD     | 1.114 cfs |
| Winter | 0.720 MGD     | 1.114 cfs |
| Spring | 0.720 MGD     | 1.114 cfs |

**Flow Requirement or Loading Requirement**

The calculations in this wasteload analysis utilize the maximum effluent discharge flow of 0.72 MGD. If the discharger is allowed to have a flow greater than 0.72 MGD during 7Q10 conditions, and effluent limit concentrations as indicated, then water quality standards will be violated. In order to prevent this from occurring, the permit writers must include the discharge flow limitation as indicated above; or, include loading effluent limits in the permit.

**Effluent Limitation for Whole Effluent Toxicity (WET) based upon WET Policy**

Effluent Toxicity will not occur in downstream segments if the values below are met.

|                  |        |                |           |
|------------------|--------|----------------|-----------|
| WET Requirements | LC50 > | 61.4% Effluent | [Acute]   |
|                  | IC25 > | 8.4% Effluent  | [Chronic] |

**Utah Division of Water Quality  
Salt Lake City, Utah**

**Effluent Limitation for Biological Oxygen Demand (BOD) based upon Water Quality Standards or Regulations**

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

| Season | Concentration     |               |
|--------|-------------------|---------------|
| Summer | 25.0 mg/l as BOD5 | 150.1 lbs/day |
| Fall   | 25.0 mg/l as BOD5 | 150.1 lbs/day |
| Winter | 25.0 mg/l as BOD5 | 150.1 lbs/day |
| Spring | 25.0 mg/l as BOD5 | 150.1 lbs/day |

**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 D.O. limitation as follows:

| Season | Concentration |
|--------|---------------|
| Summer | 6.50          |
| Fall   | 6.50          |
| Winter | 6.50          |
| Spring | 6.50          |

**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:

| Season |                      | Concentration  | Load          |
|--------|----------------------|----------------|---------------|
| Summer | 4 Day Avg. - Chronic | 16.2 mg/l as N | 97.1 lbs/day  |
|        | 1 Hour Avg. - Acute  | 25.5 mg/l as N | 153.2 lbs/day |
| Fall   | 4 Day Avg. - Chronic | 18.2 mg/l as N | 109.0 lbs/day |
|        | 1 Hour Avg. - Acute  | 25.0 mg/l as N | 150.3 lbs/day |
| Winter | 4 Day Avg. - Chronic | 19.9 mg/l as N | 119.2 lbs/day |
|        | 1 Hour Avg. - Acute  | 28.7 mg/l as N | 172.2 lbs/day |
| Spring | 4 Day Avg. - Chronic | 17.2 mg/l as N | 103.2 lbs/day |
|        | 1 Hour Avg. - Acute  | 25.0 mg/l as N | 150.3 lbs/day |

Acute limit calculated with an Acute Zone of Initial Dilution (ZID) to be equal to 50.0%.

**Utah Division of Water Quality  
Salt Lake City, Utah**

**Effluent Limitation for Total Residual Chlorine based upon Water Quality Standards**

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

| Season |                      | Concentration |      | Load |         |
|--------|----------------------|---------------|------|------|---------|
| Summer | 4 Day Avg. - Chronic | 0.119         | mg/l | 0.72 | lbs/day |
|        | 1 Hour Avg. - Acute  | 0.117         | mg/l | 0.70 | lbs/day |
| Fall   | 4 Day Avg. - Chronic | 0.119         | mg/l | 0.72 | lbs/day |
|        | 1 Hour Avg. - Acute  | 0.117         | mg/l | 0.70 | lbs/day |
| Winter | 4 Day Avg. - Chronic | 0.119         | mg/l | 0.72 | lbs/day |
|        | 1 Hour Avg. - Acute  | 0.117         | mg/l | 0.70 | lbs/day |
| Spring | 4 Day Avg. - Chronic | 0.119         | mg/l | 0.00 | lbs/day |
|        | 1 Hour Avg. - Acute  | 0.117         | mg/l | 0.00 | lbs/day |

**Effluent Limitations for Total Dissolved Solids based upon Water Quality Standards**

| Season |                      | Concentration |      | Load  |          |
|--------|----------------------|---------------|------|-------|----------|
| Summer | Maximum, Acute       | 11922.1       | mg/l | 35.79 | tons/day |
| Fall   | Maximum, Acute       | 11357.2       | mg/l | 34.09 | tons/day |
| Winter | Maximum, Acute       | 10900.9       | mg/l | 32.72 | tons/day |
| Spring | 4 Day Avg. - Chronic | 11737.4       | mg/l | 35.23 | tons/day |

Colorado Salinity Forum Limits

Determined by Permitting Section

**Effluent Limitations for Total Recoverable Metals based upon  
Water Quality Standards**

In-stream criteria of downstream segments for Dissolved Metals will be met with an effluent limitation as follows (based upon a hardness of 242.57 mg/l):

|              | 4 Day Average |      | Load        | 1 Hour Average |      | Load          |
|--------------|---------------|------|-------------|----------------|------|---------------|
|              | Concentration |      |             | Concentration  |      |               |
| Aluminum*    | N/A           |      | N/A         | 4,749.5        | ug/l | 28.6 lbs/day  |
| Arsenic*     | 2,248.60      | ug/l | 8.7 lbs/day | 2,184.0        | ug/l | 13.1 lbs/day  |
| Cadmium      | 5.55          | ug/l | 0.0 lbs/day | 33.5           | ug/l | 0.2 lbs/day   |
| Chromium III | 2,093.33      | ug/l | 8.1 lbs/day | 23,952.1       | ug/l | 144.1 lbs/day |
| Chromium VI* | 87.31         | ug/l | 0.3 lbs/day | 81.3           | ug/l | 0.5 lbs/day   |
| Copper       | 225.72        | ug/l | 0.9 lbs/day | 202.4          | ug/l | 1.2 lbs/day   |
| Iron*        | N/A           |      | N/A         | 7,072.1        | ug/l | 42.5 lbs/day  |
| Lead         | 112.87        | ug/l | 0.4 lbs/day | 1,620.5        | ug/l | 9.7 lbs/day   |
| Mercury*     | 0.14          | ug/l | 0.0 lbs/day | 15.4           | ug/l | 0.1 lbs/day   |
| Nickel       | 1,282.47      | ug/l | 5.0 lbs/day | 6,372.5        | ug/l | 38.3 lbs/day  |
| Selenium*    | 44.61         | ug/l | 0.2 lbs/day | 123.7          | ug/l | 0.7 lbs/day   |
| Silver       | N/A           | ug/l | N/A lbs/day | 110.4          | ug/l | 0.7 lbs/day   |

**Utah Division of Water Quality  
Salt Lake City, Utah**

|          |               |              |              |             |
|----------|---------------|--------------|--------------|-------------|
| Zinc     | 2,934.28 ug/l | 11.4 lbs/day | 1,594.1 ug/l | 9.6 lbs/day |
| Cyanide* | 61.69 ug/l    | 0.2 lbs/day  | 141.5 ug/l   | 0.9 lbs/day |

\*Limits for these metals are based on the dissolved standard.

**Effluent Limitations for Heat/Temperature based upon  
Water Quality Standards**

|        |              |             |
|--------|--------------|-------------|
| Summer | 35.7 Deg. C. | 96.3 Deg. F |
| Fall   | 25.8 Deg. C. | 78.5 Deg. F |
| Winter | 24.7 Deg. C. | 76.5 Deg. F |
| Spring | 31.0 Deg. C. | 87.8 Deg. F |

**Effluent Limitations for Organics [Pesticides]  
Based upon Water Quality Standards**

In-stream criteria of downstream segments for Organics [Pesticides]  
will be met with an effluent limit as follows:

|                   | 4 Day Average |                  | 1 Hour Average |                  |
|-------------------|---------------|------------------|----------------|------------------|
|                   | Concentration | Load             | Concentration  | Load             |
| Aldrin            |               |                  | 1.5E+00 ug/l   | 1.40E-02 lbs/day |
| Chlordane         | 4.30E-03 ug/l | 2.58E-02 lbs/day | 1.2E+00 ug/l   | 1.12E-02 lbs/day |
| DDT, DDE          | 1.00E-03 ug/l | 6.00E-03 lbs/day | 5.5E-01 ug/l   | 5.12E-03 lbs/day |
| Dieldrin          | 1.90E-03 ug/l | 1.14E-02 lbs/day | 1.3E+00 ug/l   | 1.16E-02 lbs/day |
| Endosulfan        | 5.60E-02 ug/l | 3.36E-01 lbs/day | 1.1E-01 ug/l   | 1.02E-03 lbs/day |
| Endrin            | 2.30E-03 ug/l | 1.38E-02 lbs/day | 9.0E-02 ug/l   | 8.38E-04 lbs/day |
| Guthion           | 0.00E+00 ug/l | 0.00E+00 lbs/day | 1.0E-02 ug/l   | 9.31E-05 lbs/day |
| Heptachlor        | 3.80E-03 ug/l | 2.28E-02 lbs/day | 2.6E-01 ug/l   | 2.42E-03 lbs/day |
| Lindane           | 8.00E-02 ug/l | 4.80E-01 lbs/day | 1.0E+00 ug/l   | 9.31E-03 lbs/day |
| Methoxychlor      | 0.00E+00 ug/l | 0.00E+00 lbs/day | 3.0E-02 ug/l   | 2.79E-04 lbs/day |
| Mirex             | 0.00E+00 ug/l | 0.00E+00 lbs/day | 1.0E-02 ug/l   | 9.31E-05 lbs/day |
| Parathion         | 0.00E+00 ug/l | 0.00E+00 lbs/day | 4.0E-02 ug/l   | 3.72E-04 lbs/day |
| PCB's             | 1.40E-02 ug/l | 8.41E-02 lbs/day | 2.0E+00 ug/l   | 1.86E-02 lbs/day |
| Pentachlorophenol | 1.30E+01 ug/l | 7.80E+01 lbs/day | 2.0E+01 ug/l   | 1.86E-01 lbs/day |
| Toxephene         | 2.00E-04 ug/l | 1.20E-03 lbs/day | 7.3E-01 ug/l   | 6.79E-03 lbs/day |



**Utah Division of Water Quality  
Salt Lake City, Utah**

**Effluent Targets for Pollution Indicators  
Based upon Water Quality Standards**

In-stream criteria of downstream segments for Pollution Indicators will be met with an effluent limit as follows:

|                        | <b>1 Hour Average</b> |               |
|------------------------|-----------------------|---------------|
|                        | Concentration         | Loading       |
| Gross Beta (pCi/l)     | 50.0 pCi/L            |               |
| BOD (mg/l)             | 5.0 mg/l              | 30.1 lbs/day  |
| Nitrates as N          | 4.0 mg/l              | 24.1 lbs/day  |
| Total Phosphorus as P  | 0.05 mg/l             | 0.3 lbs/day   |
| Total Suspended Solids | 90.0 mg/l             | 541.4 lbs/day |

Note: Pollution indicator targets are for information purposes only.

**Effluent Limitations for Protection of Human Health [Toxics Rule]  
Based upon Water Quality Standards (Most stringent of 1C or 3A & 3B as appropriate.)**

In-stream criteria of downstream segments for Protection of Human Health [Toxics] will be met with an effluent limit as follows:

|                           | <b>Maximum Concentration</b> |                  |
|---------------------------|------------------------------|------------------|
|                           | Concentration                | Load             |
| <b>Toxic Organics</b>     |                              |                  |
| Acenaphthene              | 1.42E+04 ug/l                | 8.55E+01 lbs/day |
| Acrolein                  | 3.80E+03 ug/l                | 2.28E+01 lbs/day |
| Acrylonitrile             | 7.00E-01 ug/l                | 4.20E-03 lbs/day |
| Benzene                   | 1.42E+01 ug/l                | 8.55E-02 lbs/day |
| Benidine                  | ug/l                         | lbs/day          |
| Carbon tetrachloride      | 2.97E+00 ug/l                | 1.78E-02 lbs/day |
| Chlorobenzene             | 8.07E+03 ug/l                | 4.84E+01 lbs/day |
| 1,2,4-Trichlorobenzene    |                              |                  |
| Hexachlorobenzene         | 8.90E-03 ug/l                | 5.34E-05 lbs/day |
| 1,2-Dichloroethane        | 4.51E+00 ug/l                | 2.71E-02 lbs/day |
| 1,1,1-Trichloroethane     |                              |                  |
| Hexachloroethane          | 2.25E+01 ug/l                | 1.35E-01 lbs/day |
| 1,1-Dichloroethane        |                              |                  |
| 1,1,2-Trichloroethane     | 7.24E+00 ug/l                | 4.34E-02 lbs/day |
| 1,1,2,2-Tetrachloroethane | 2.02E+00 ug/l                | 1.21E-02 lbs/day |
| Chloroethane              |                              |                  |
| Bis(2-chloroethyl) ether  | 3.68E-01 ug/l                | 2.21E-03 lbs/day |
| 2-Chloroethyl vinyl ether |                              |                  |
| 2-Chloronaphthalene       | 2.02E+04 ug/l                | 1.21E+02 lbs/day |
| 2,4,6-Trichlorophenol     | 2.49E+01 ug/l                | 1.50E-01 lbs/day |
| p-Chloro-m-cresol         |                              |                  |
| Chloroform (HM)           | 6.76E+01 ug/l                | 4.06E-01 lbs/day |
| 2-Chlorophenol            | 1.42E+03 ug/l                | 8.55E+00 lbs/day |
| 1,2-Dichlorobenzene       | 3.20E+04 ug/l                | 1.92E+02 lbs/day |
| 1,3-Dichlorobenzene       | 4.75E+03 ug/l                | 2.85E+01 lbs/day |

**Utah Division of Water Quality  
Salt Lake City, Utah**

|                              |               |                  |
|------------------------------|---------------|------------------|
| 1,4-Dichlorobenzene          | 4.75E+03 ug/l | 2.85E+01 lbs/day |
| 3,3'-Dichlorobenzidine       | 4.75E-01 ug/l | 2.85E-03 lbs/day |
| 1,1-Dichloroethylene         | 6.76E-01 ug/l | 4.06E-03 lbs/day |
| 1,2-trans-Dichloroethylene1  |               |                  |
| 2,4-Dichlorophenol           | 1.10E+03 ug/l | 6.62E+00 lbs/day |
| 1,2-Dichloropropane          | 6.17E+00 ug/l | 3.70E-02 lbs/day |
| 1,3-Dichloropropylene        | 1.19E+02 ug/l | 7.12E-01 lbs/day |
| 2,4-Dimethylphenol           | 6.41E+03 ug/l | 3.85E+01 lbs/day |
| 2,4-Dinitrotoluene           | 1.30E+00 ug/l | 7.83E-03 lbs/day |
| 2,6-Dinitrotoluene           |               |                  |
| 1,2-Diphenylhydrazine        | 4.75E-01 ug/l | 2.85E-03 lbs/day |
| Ethylbenzene                 | 3.68E+04 ug/l | 2.21E+02 lbs/day |
| Fluoranthene                 | 3.56E+03 ug/l | 2.14E+01 lbs/day |
| 4-Chlorophenyl phenyl ether  |               |                  |
| 4-Bromophenyl phenyl ether   |               |                  |
| Bis(2-chloroisopropyl) ether | 1.66E+04 ug/l | 9.97E+01 lbs/day |
| Bis(2-chloroethoxy) methane  |               |                  |
| Methylene chloride (HM)      | 5.58E+01 ug/l | 3.35E-01 lbs/day |
| Methyl chloride (HM)         |               |                  |
| Methyl bromide (HM)          |               |                  |
| Bromoform (HM)               | 5.10E+01 ug/l | 3.06E-01 lbs/day |
| Dichlorobromomethane(HM)     | 3.20E+00 ug/l | 1.92E-02 lbs/day |
| Chlorodibromomethane (HM)    | 4.86E+00 ug/l | 2.92E-02 lbs/day |
| Hexachlorocyclopentadiene    | 2.85E+03 ug/l | 1.71E+01 lbs/day |
| Isophorone                   | 9.97E+01 ug/l | 5.98E-01 lbs/day |
| Naphthalene                  |               |                  |
| Nitrobenzene                 | 2.02E+02 ug/l | 1.21E+00 lbs/day |
| 2-Nitrophenol                |               |                  |
| 4-Nitrophenol                |               |                  |
| 2,4-Dinitrophenol            | 8.30E+02 ug/l | 4.99E+00 lbs/day |
| 4,6-Dinitro-o-cresol         | 1.54E+02 ug/l | 9.26E-01 lbs/day |
| N-Nitrosodimethylamine       | 8.19E-03 ug/l | 4.91E-05 lbs/day |
| N-Nitrosodiphenylamine       | 5.93E+01 ug/l | 3.56E-01 lbs/day |
| N-Nitrosodi-n-propylamine    | 5.93E-02 ug/l | 3.56E-04 lbs/day |
| Pentachlorophenol            | 3.32E+00 ug/l | 1.99E-02 lbs/day |
| Phenol                       | 2.49E+05 ug/l | 1.50E+03 lbs/day |
| Bis(2-ethylhexyl)phthalate   | 2.14E+01 ug/l | 1.28E-01 lbs/day |
| Butyl benzyl phthalate       | 3.56E+04 ug/l | 2.14E+02 lbs/day |
| Di-n-butyl phthalate         | 3.20E+04 ug/l | 1.92E+02 lbs/day |
| Di-n-octyl phthlate          |               |                  |
| Diethyl phthalate            | 2.73E+05 ug/l | 1.64E+03 lbs/day |
| Dimethyl phthlate            | 3.71E+06 ug/l | 2.23E+04 lbs/day |
| Benzo(a)anthracene (PAH)     | 3.32E-02 ug/l | 1.99E-04 lbs/day |
| Benzo(a)pyrene (PAH)         | 3.32E-02 ug/l | 1.99E-04 lbs/day |
| Benzo(b)fluoranthene (PAH)   | 3.32E-02 ug/l | 1.99E-04 lbs/day |
| Benzo(k)fluoranthene (PAH)   | 3.32E-02 ug/l | 1.99E-04 lbs/day |
| Chrysene (PAH)               | 3.32E-02 ug/l | 1.99E-04 lbs/day |
| Acenaphthylene (PAH)         |               |                  |
| Anthracene (PAH)             |               |                  |
| Dibenzo(a,h)anthracene (PAH) | 3.32E-02 ug/l | 1.99E-04 lbs/day |
| Indeno(1,2,3-cd)pyrene (PAH) | 3.32E-02 ug/l | 1.99E-04 lbs/day |

**Utah Division of Water Quality  
Salt Lake City, Utah**

|                     |               |                  |
|---------------------|---------------|------------------|
| Pyrene (PAH)        | 1.14E+04 ug/l | 6.84E+01 lbs/day |
| Tetrachloroethylene | 9.49E+00 ug/l | 5.70E-02 lbs/day |
| Toluene             | 8.07E+04 ug/l | 4.84E+02 lbs/day |
| Trichloroethylene   | 3.20E+01 ug/l | 1.92E-01 lbs/day |
| Vinyl chloride      | 2.37E+01 ug/l | 1.42E-01 lbs/day |

**Pesticides**

|                    |               |                  |
|--------------------|---------------|------------------|
| Aldrin             | 1.54E-03 ug/l | 9.26E-06 lbs/day |
| Dieldrin           | 1.66E-03 ug/l | 9.97E-06 lbs/day |
| Chlordane          | 6.76E-03 ug/l | 4.06E-05 lbs/day |
| 4,4'-DDT           | 7.00E-03 ug/l | 4.20E-05 lbs/day |
| 4,4'-DDE           | 7.00E-03 ug/l | 4.20E-05 lbs/day |
| 4,4'-DDD           | 9.85E-03 ug/l | 5.91E-05 lbs/day |
| alpha-Endosulfan   | 1.10E+01 ug/l | 6.62E-02 lbs/day |
| beta-Endosulfan    | 1.10E+01 ug/l | 6.62E-02 lbs/day |
| Endosulfan sulfate | 1.10E+01 ug/l | 6.62E-02 lbs/day |
| Endrin             | 9.02E+00 ug/l | 5.41E-02 lbs/day |
| Endrin aldehyde    | 9.02E+00 ug/l | 5.41E-02 lbs/day |
| Heptachlor         | 2.49E-03 ug/l | 1.50E-05 lbs/day |
| Heptachlor epoxide |               |                  |

**PCB's**

|                          |               |                  |
|--------------------------|---------------|------------------|
| PCB 1242 (Arochlor 1242) | 5.22E-04 ug/l | 3.13E-06 lbs/day |
| PCB-1254 (Arochlor 1254) | 5.22E-04 ug/l | 3.13E-06 lbs/day |
| PCB-1221 (Arochlor 1221) | 5.22E-04 ug/l | 3.13E-06 lbs/day |
| PCB-1232 (Arochlor 1232) | 5.22E-04 ug/l | 3.13E-06 lbs/day |
| PCB-1248 (Arochlor 1248) | 5.22E-04 ug/l | 3.13E-06 lbs/day |
| PCB-1260 (Arochlor 1260) | 5.22E-04 ug/l | 3.13E-06 lbs/day |
| PCB-1016 (Arochlor 1016) | 5.22E-04 ug/l | 3.13E-06 lbs/day |

**Pesticide**

|           |               |                  |
|-----------|---------------|------------------|
| Toxaphene | 8.66E-03 ug/l | 5.20E-05 lbs/day |
|-----------|---------------|------------------|

**Metals**

|                |               |                  |
|----------------|---------------|------------------|
| Antimony       | 166.09 ug/l   | 1.00 lbs/day     |
| Arsenic        | 587.73 ug/l   | 3.53 lbs/day     |
| Asbestos       | 8.30E+07 ug/l | 4.99E+05 lbs/day |
| Beryllium      |               |                  |
| Cadmium        |               |                  |
| Chromium (III) |               |                  |
| Chromium (VI)  |               |                  |
| Copper         | 15422.32 ug/l | 92.59 lbs/day    |
| Cyanide        | 8304.32 ug/l  | 49.86 lbs/day    |
| Lead           | 0.00          | 0.00             |
| Mercury        | 1.66 ug/l     | 0.01 lbs/day     |
| Nickel         | 7236.63 ug/l  | 43.45 lbs/day    |
| Selenium       | 0.00          | 0.00             |
| Silver         | 0.00          | 0.00             |
| Thallium       | 20.17 ug/l    | 0.12 lbs/day     |
| Zinc           |               |                  |

**Utah Division of Water Quality  
Salt Lake City, Utah**

**Dioxin**

Dioxin (2,3,7,8-TCDD)

1.54E-07 ug/l

9.26E-10 lbs/day

**Metals Effluent Limitations for Protection of All Beneficial Uses  
Based upon Water Quality Standards and Toxics Rule**

|                | <b>Class 4<br/>Acute<br/>Agricultural<br/>ug/l</b> | <b>Class 3<br/>Acute<br/>Aquatic<br/>Wildlife<br/>ug/l</b> | <b>Acute<br/>Toxics<br/>Drinking<br/>Water<br/>Source<br/>ug/l</b> | <b>Acute<br/>Toxics<br/>Wildlife<br/>ug/l</b> | <b>1C Acute<br/>Health<br/>Criteria<br/>ug/l</b> | <b>Acute<br/>Most<br/>Stringent<br/>ug/l</b> | <b>Class 3<br/>Chronic<br/>Aquatic<br/>Wildlife<br/>ug/l</b> |
|----------------|--|--|--|---|--|--|--|
| Aluminum       |  | 4749.5   |  |   |  | 4749.5                                       | N/A  |
| Antimony       |  |  | 166.1  | 51012.3                                       |  | 166.1  |  |
| Arsenic        | 1186.3   | 2184.0   | 587.7  |   | 0.0  | 587.7  | 2248.6   |
| Barium         |  |  |  |   | 11863.3  | 11863.3                                      |  |
| Beryllium      |  |  |  |   |  | 0.0  |  |
| Cadmium        | 118.0  | 33.5   |  |   | 0.0  | 33.5   | 5.5  |
| Chromium (III) |  | 23952.1  |  |   | 0.0  | 23952.1                                      | 2093.3   |
| Chromium (VI)  | 1167.2   | 81.3   |  |   | 0.0  | 81.32  | 87.31  |
| Copper         | 2362.4   | 202.4  | 15422.3  |   |  | 202.4  | 225.7  |
| Cyanide        |  | 141.5  | 2609930.3  |   |  | 141.5  | 61.7   |
| Iron           |  | 7072.1   |  |   |  | 7072.1                                       |  |
| Lead           | 1182.6   | 1620.5   |  |   | 0.0  | 1182.6                                       | 112.9  |
| Mercury        |  | 15.44  | 1.7  | 1.78  | 0.0  | 1.66   | 0.142  |
| Nickel         |  | 6372.5   | 7236.6   | 54571.3                                       |  | 6372.5                                       | 1282.5   |
| Selenium       | 583.2  | 123.7  |  |   | 0.0  | 123.7  | 44.6   |
| Silver         |  | 110.4  |  |   | 0.0  | 110.4  |  |
| Thallium       |  |  | 20.2   | 74.7  |  | 20.2   |  |
| Zinc           |  | 1594.1   |  |   |  | 1594.1                                       | 2934.3   |
| Boron          | 8679.1   |  |  |   |  | 8679.1                                       |  |
| Sulfate        | 23726.6  |  |  |   |  | 23726.6                                      |  |

**Summary Effluent Limitations for Metals [Wasteload Allocation, TMDL]**

[If Acute is more stringent than Chronic, then the Chronic takes on the Acute value.]

|                | <b>WLA Acute<br/>ug/l</b> | <b>WLA Chronic<br/>ug/l</b> |                |
|----------------|---------------------------|-----------------------------|----------------|
| Aluminum       | 4749.5                    | N/A                         |                |
| Antimony       | 166.09                    |                             |                |
| Arsenic        | 587.7                     | 2248.6                      | Acute Controls |
| Asbestos       | 8.30E+07                  |                             |                |
| Barium         |                           |                             |                |
| Beryllium      |                           |                             |                |
| Cadmium        | 33.5                      | 5.5                         |                |
| Chromium (III) | 23952.1                   | 2093                        |                |
| Chromium (VI)  | 81.3                      | 87.3                        | Acute Controls |
| Copper         | 202.4                     | 225.7                       | Acute Controls |

**Utah Division of Water Quality  
Salt Lake City, Utah**

|          |         |        |                       |
|----------|---------|--------|-----------------------|
| Cyanide  | 141.5   | 61.7   |                       |
| Iron     | 7072.1  |        |                       |
| Lead     | 1182.6  | 112.9  |                       |
| Mercury  | 1.661   | 0.142  |                       |
| Nickel   | 6372.5  | 1282   |                       |
| Selenium | 123.7   | 44.6   |                       |
| Silver   | 110.4   | N/A    |                       |
| Thallium | 20.2    |        |                       |
| Zinc     | 1594.1  | 2934.3 | Acute Controls        |
| Boron    | 8679.14 |        |                       |
| Sulfate  | 23726.6 |        | N/A at this Waterbody |

Other Effluent Limitations are based upon R317-1.

E. coli 126.0 organisms per 100 ml

#### **X. Antidegradation Considerations**

The Utah Antidegradation Policy allows for degradation of existing quality where it is determined that such lowering of water quality is necessary to accommodate important economic or social development in the area in which the waters are protected [R317-2-3]. It has been determined that certain chemical parameters introduced by this discharge will cause an increase of the concentration of said parameters in the receiving waters. Under no conditions will the increase in concentration be allowed to interfere with existing instream water uses.

The antidegradation rules and procedures allow for modification of effluent limits less than those based strictly upon mass balance equations utilizing 100% of the assimilative capacity of the receiving water. Additional factors include considerations for "Blue-ribbon" fisheries, special recreational areas, threatened and endangered species, and drinking water sources.

An Antidegradation Level I Review was conducted on this discharge and its effect on the receiving water. Based upon that review, it has been determined that an Antidegradation Level II Review is required because the receiving water for the discharge is a Class 1C Drinking Water Source.

#### **XI. Colorado River Salinity Forum Considerations**

Discharges in the Colorado River Basin are required to have their discharge at a TDS loading of less than 1.00 tons/day unless certain exemptions apply. Refer to the Forum's Guidelines for additional information allowing for an exceedence of this value.

#### **XII. 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 downstream segments, will not occur for the evaluated parameters of concern as discussed above if the effluent limitations indicated above are met.



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

**Date:** October 3, 2019

**Prepared by:** Dave Wham   
Standards and Technical Services

**Facility:** Pacificorp Deer Creek Mine; Discharge 002  
UPDES No. UT0023604

**Receiving water:** Deer Creek => Huntington Creek (1C, 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

UPDES Discharge Point 002, Mine water discharge with an estimated mean monthly discharge of 5.0 MGD (7.74 cfs).

Receiving Water

Deer Creek thence to Huntington Creek. Per UAC R317-2-13.1(b), the designated beneficial uses of Huntington Creek and tributaries from Highway 10 crossing to USFS boundary are 1C, 2B, 3A, 4.

- *Class 1C – Protected for domestic purposes with prior treatment by treatment processes as required by the Utah Division of Drinking Water.*
- *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). ). Deer Creek is an intermittent stream that has no flow for large parts of the year. As a result, the annual critical low flow was determined to be zero. As a result, water quality based effluent limits revert to end-of-pipe water quality standards. Ambient water quality was characterized using data from DWQ station #4930530, Huntington Creek above UP&L Diversion from the period 2007-2013.

#### TMDL

According to the Utah's 2016 303(d) Water Quality Assessment, the assessment unit for this section of Huntington Creek, Huntington Creek and tributaries from Highway 10 crossing to USFS boundary (UT14060009-004) was listed as impaired for pH (Classes 1C, 2B, 3A, 4), dissolved oxygen (Class 3A), temperature (Class 3A) and total dissolved solids (Class 4).

Review of the listing data show that the temperature impairment was based on results from stations located in Bear Creek, a tributary to Huntington Creek located upstream from the proposed discharge. As a result, the proposed discharge cannot cause or contribute to that impairment.

Data from two monitoring stations above and below Deer Creek on Huntington Creek show impairments for pH and dissolved oxygen (DO). As a result, the proposed discharge must meet applicable Water Quality Standards (WQS) at end of pipe for these constituents (6.5 mg/l DO, and pH 6.5-9.0 pH).

Review of the listing data show that the total dissolved solids (TDS) impairment was based on results from the Huntington Creek at U10 crossing monitoring station. In order to protect downstream uses, and to avoid causing or contributing to that impairment, effluent limits for TDS should be set at the WQS of 1200 mg/l TDS.

#### 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.

Because the critical low flow for the receiving water is zero, no mixing zone was considered.

#### Parameters of Concern

The potential parameters of concern identified for the discharge/receiving water were temperature, pH, dissolved oxygen, TDS, and iron, as determined in consultation with the UPDES Permit Writer.

#### 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<sub>50</sub> (lethal concentration, 50%) percent effluent for acute toxicity and the IC<sub>25</sub> (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.

LC50 WET Limits for Outfall 002 should be based on 100% effluent.  
IC25 WET limits for Outfalls 002 should be based on 100% effluent.

#### Wasteload Allocation Methods

Effluent limits were determined for conservative constituents using a simple mass balance mixing analysis (UDWQ 2012). The mass balance analysis is summarized in the Wasteload Addendums.

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. The AMMTOX Model developed by University of Colorado and adapted by Utah DWQ and EPA Region VIII was used to determine ammonia effluent limits (Lewis et al. 2002). The analysis is summarized in the Wasteload Addendum.

Models and supporting documentation are available for review upon request.

#### 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 facility. The proposed permit is a simple renewal of an existing UPDES permit. No increase in flow or concentration of pollutants over those authorized in the the existing permit is being requested.

#### Documents:

WLA Document: *DeerCk\_002\_WLADoc\_10-3-19.docx*

Wasteload Analysis and Addendums: *DeerCk\_002\_WLA\_10-3-19.xlsm*

#### References:

Emery County Water Conservancy District. <http://www.ewcd.org/canals/huntington-drainage/>  
Utah Division of Water Quality. 2012. *Utah Wasteload Analysis Procedures Version 1.0.*

**Utah Division of Water Quality  
Salt Lake City, Utah**

**WASTELOAD ANALYSIS [WLA]  
Addendum: Statement of Basis**

3-Oct-19

**Facilities:** Deer Creek 002 Discharge  
**Discharging to:** Deer Creek=>Huntington 5.00 MGD

**UPDES No:** UT-0023604

**I. Introduction**

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 [R317-2-8, UAC]. Projected concentrations are compared to numeric water quality standards to determine acceptability. The anti-degradation policy and procedures are also considered. The primary in-stream parameters of concern may include metals (as a function of hardness), total dissolved solids (TDS), total residual chlorine (TRC), un-ionized ammonia (as a function of pH and temperature, measured and evaluated in terms of total ammonia), and dissolved oxygen.

Mathematical water quality modeling is employed to determine stream quality response to point source discharges. Models aid in the effort of anticipating stream quality at future effluent flows at critical environmental conditions (e.g., low stream flow, high temperature, high pH, etc).

The numeric criteria in this wasteload analysis may always be modified by narrative criteria and other conditions determined by staff of the Division of Water Quality.

**II. Receiving Water and Stream Classification**

|                                |  |
|--------------------------------|--|
| Deer Creek=>Huntington Creek : | 1C, 2B, 3A, 4  |
| Antidegradation Review:        | Level I review completed. Amended Level II review not required |

**III. Numeric Stream Standards for Protection of Aquatic Wildlife**

|                                       |  |
|---------------------------------------|--|
| Total Ammonia (TNH3)                  | Varies as a function of Temperature and pH Rebound. See Water Quality Standards      |
| Chronic Total Residual Chlorine (TRC) | 0.011 mg/l (4 Day Average)<br>0.019 mg/l (1 Hour Average)                            |
| Chronic Dissolved Oxygen (DO)         | 6.50 mg/l (30 Day Average)<br>5.00 mg/l (7 Day Average)<br>4.00 mg/l (1 Day Average) |
| Maximum Total Dissolved Solids        | 1200.0 mg/l  |

**Utah Division of Water Quality  
Salt Lake City, Utah**

**Acute and Chronic Heavy Metals (Dissolved)**

| Parameter    | 4 Day Average (Chronic) Standard |                | 1 Hour Average (Acute) Standard |      |                 |
|--------------|----------------------------------|----------------|---------------------------------|------|-----------------|
|              | Concentration                    | Load*          | Concentration                   |      | Load*           |
| Aluminum     | 87.00 ug/l**                     | 3.634 lbs/day  | 750.00                          | ug/l | 31.329 lbs/day  |
| Arsenic      | 190.00 ug/l                      | 7.937 lbs/day  | 340.00                          | ug/l | 14.203 lbs/day  |
| Cadmium      | 0.63 ug/l                        | 0.026 lbs/day  | 6.83                            | ug/l | 0.285 lbs/day   |
| Chromium III | 219.98 ug/l                      | 9.189 lbs/day  | 4602.34                         | ug/l | 192.251 lbs/day |
| ChromiumVI   | 11.00 ug/l                       | 0.459 lbs/day  | 16.00                           | ug/l | 0.668 lbs/day   |
| Copper       | 24.80 ug/l                       | 1.036 lbs/day  | 41.14                           | ug/l | 1.719 lbs/day   |
| Iron         |                                  |                | 1000.00                         | ug/l | 41.773 lbs/day  |
| Lead         | 13.65 ug/l                       | 0.570 lbs/day  | 350.35                          | ug/l | 14.635 lbs/day  |
| Mercury      | 0.0120 ug/l                      | 0.001 lbs/day  | 2.40                            | ug/l | 0.100 lbs/day   |
| Nickel       | 137.33 ug/l                      | 5.736 lbs/day  | 1235.16                         | ug/l | 51.596 lbs/day  |
| Selenium     | 4.60 ug/l                        | 0.192 lbs/day  | 20.00                           | ug/l | 0.835 lbs/day   |
| Silver       | N/A ug/l                         | N/A lbs/day    | 27.08                           | ug/l | 1.131 lbs/day   |
| Zinc         | 315.90 ug/l                      | 13.196 lbs/day | 315.90                          | ug/l | 13.196 lbs/day  |

\* Allowed below discharge

\*\*Chronic Aluminum standard applies only to waters with a pH < 7.0 and a Hardness < 50 mg/l as CaCO3

Metals Standards Based upon a Hardness of 313.99 mg/l as CaCO3

**Organics [Pesticides]**

| Parameter         | 4 Day Average (Chronic) Standard |                 | 1 Hour Average (Acute) Standard |      |               |
|-------------------|----------------------------------|-----------------|---------------------------------|------|---------------|
|                   | Concentration                    | Load*           | Concentration                   |      | Load*         |
| Aldrin            |                                  |                 | 1.500                           | ug/l | 0.063 lbs/day |
| Chlordane         | 0.004 ug/l                       | 0.179 lbs/day   | 1.200                           | ug/l | 0.050 lbs/day |
| DDT, DDE          | 0.001 ug/l                       | 0.042 lbs/day   | 0.550                           | ug/l | 0.023 lbs/day |
| Dieldrin          | 0.002 ug/l                       | 0.079 lbs/day   | 1.250                           | ug/l | 0.052 lbs/day |
| Endosulfan        | 0.056 ug/l                       | 2.335 lbs/day   | 0.110                           | ug/l | 0.005 lbs/day |
| Endrin            | 0.002 ug/l                       | 0.096 lbs/day   | 0.090                           | ug/l | 0.004 lbs/day |
| Guthion           |                                  |                 | 0.010                           | ug/l | 0.000 lbs/day |
| Heptachlor        | 0.004 ug/l                       | 0.158 lbs/day   | 0.260                           | ug/l | 0.011 lbs/day |
| Lindane           | 0.080 ug/l                       | 3.336 lbs/day   | 1.000                           | ug/l | 0.042 lbs/day |
| Methoxychlor      |                                  |                 | 0.030                           | ug/l | 0.001 lbs/day |
| Mirex             |                                  |                 | 0.010                           | ug/l | 0.000 lbs/day |
| Parathion         |                                  |                 | 0.040                           | ug/l | 0.002 lbs/day |
| PCB's             | 0.014 ug/l                       | 0.584 lbs/day   | 2.000                           | ug/l | 0.084 lbs/day |
| Pentachlorophenol | 13.00 ug/l                       | 542.062 lbs/day | 20.000                          | ug/l | 0.835 lbs/day |
| Toxephene         | 0.0002 ug/l                      | 0.008 lbs/day   | 0.7300                          | ug/l | 0.030 lbs/day |



**Utah Division of Water Quality  
Salt Lake City, Utah**

**IV. Numeric Stream Standards for Protection of Agriculture**

| <b>4 Day Average (Chronic) Standard</b> |                      | <b>1 Hour Average (Acute) Standard</b> |                |
|---|----------------------|--|----------------|
|   | <b>Concentration</b> | <b>Load*</b>                           |                |
| Arsenic                                 |                      | 100.0 ug/l                             | lbs/day        |
| Boron                                   |                      | 750.0 ug/l                             | 15.66 lbs/day  |
| Cadmium                                 |                      | 10.0 ug/l                              | 0.21 lbs/day   |
| Chromium                                |                      | 100.0 ug/l                             | lbs/day        |
| Copper                                  |                      | 200.0 ug/l                             | lbs/day        |
| Lead                                    |                      | 100.0 ug/l                             | lbs/day        |
| Selenium                                |                      | 50.0 ug/l                              | lbs/day        |
| TDS, Summer                             |                      | 1200.0 mg/l                            | 25.06 tons/day |

**V. Numeric Stream Standards for Protection of Human Health (Class 1C Waters)**

| <b>4 Day Average (Chronic) Standard</b> |                      | <b>1 Hour Average (Acute) Standard</b> |                |
|---|----------------------|--|----------------|
| <b>Metals</b>                           | <b>Concentration</b> | <b>Load*</b>                           |                |
| Arsenic                                 |                      | 50.0 ug/l                              | 2.085 lbs/day  |
| Barium                                  |                      | 1000.0 ug/l                            | 41.697 lbs/day |
| Cadmium                                 |                      | 10.0 ug/l                              | 0.417 lbs/day  |
| Chromium                                |                      | 50.0 ug/l                              | 2.085 lbs/day  |
| Lead                                    |                      | 50.0 ug/l                              | 2.085 lbs/day  |
| Mercury                                 |                      | 2.0 ug/l                               | 0.083 lbs/day  |
| Selenium                                |                      | 10.0 ug/l                              | 0.417 lbs/day  |
| Silver                                  |                      | 50.0 ug/l                              | 2.085 lbs/day  |
| Fluoride (3)                            |                      | 1.4 ug/l                               | 0.058 lbs/day  |
| to                                      |                      | 2.4 ug/l                               | 0.100 lbs/day  |
| Nitrates as N                           |                      | 10.0 ug/l                              | 0.417 lbs/day  |

**Chlorophenoxy Herbicides**

|                        |            |               |
|------------------------|------------|---------------|
| 2,4-D                  | 100.0 ug/l | 4.170 lbs/day |
| 2,4,5-TP               | 10.0 ug/l  | 0.417 lbs/day |
| Endrin                 | 0.2 ug/l   | 0.008 lbs/day |
| ocyclohexane (Lindane) | 4.0 ug/l   | 0.167 lbs/day |
| Methoxychlor           | 100.0 ug/l | 4.170 lbs/day |
| Toxaphene              | 5.0 ug/l   | 0.208 lbs/day |

**VI. Numeric Stream Standards the Protection of Human Health from Water & Fish Consumption [Toxics]**

| Maximum Conc., ug/l - Acute Standards |   |               |                                      |                |
|---------------------------------------|---|---------------|--------------------------------------|----------------|
|                                       | Class 1C                                    |               | Class 3A, 3B                         |                |
| Toxic Organics                        | [2 Liters/Day for 70 Kg Person over 70 Yr.] |               | [6.5 g for 70 Kg Person over 70 Yr.] |                |
| Acenaphthene                          | 1200.00 ug/l                                | 50.04 lbs/day | 2700.0 ug/l                          | 112.58 lbs/day |
| Acrolein                              | 320.00 ug/l                                 | 13.34 lbs/day | 780.0 ug/l                           | 32.52 lbs/day  |
| Acrylonitrile                         | 0.06 ug/l                                   | 0.00 lbs/day  | 0.7 ug/l                             | 0.03 lbs/day   |
| Benzene                               | 1.20 ug/l                                   | 0.05 lbs/day  | 71.0 ug/l                            | 2.96 lbs/day   |
| Benzidine                             | 0.00012 ug/l                                | 0.00 lbs/day  | 0.0 ug/l                             | 0.00 lbs/day   |
| Carbon tetrachloride                  | 0.25 ug/l                                   | 0.01 lbs/day  | 4.4 ug/l                             | 0.18 lbs/day   |
| Chlorobenzene                         | 680.00 ug/l                                 | 28.35 lbs/day | 21000.0 ug/l                         | 875.64 lbs/day |
| 1,2,4-Trichlorobenzene                |   |               |                                      |                |
| Hexachlorobenzene                     | 0.00075 ug/l                                | 0.00 lbs/day  | 0.0 ug/l                             | 0.00 lbs/day   |
| 1,2-Dichloroethane                    | 0.38 ug/l                                   | 0.02 lbs/day  | 99.0 ug/l                            | 4.13 lbs/day   |

**Utah Division of Water Quality  
Salt Lake City, Utah**

|                              |              |                |               |                 |
|------------------------------|--------------|----------------|---------------|-----------------|
| 1,1,1-Trichloroethane        |              |                |               |                 |
| Hexachloroethane             | 1.90 ug/l    | 0.08 lbs/day   | 8.9 ug/l      | 0.37 lbs/day    |
| 1,1-Dichloroethane           |              |                |               |                 |
| 1,1,2-Trichloroethane        | 0.61 ug/l    | 0.03 lbs/day   | 42.0 ug/l     | 1.75 lbs/day    |
| 1,1,2,2-Tetrachloroethane    | 0.17 ug/l    | 0.01 lbs/day   | 11.0 ug/l     | 0.46 lbs/day    |
| Chloroethane                 |              |                | 0.0 ug/l      | 0.00 lbs/day    |
| Bis(2-chloroethyl) ether     | 0.03 ug/l    | 0.00 lbs/day   | 1.4 ug/l      | 0.06 lbs/day    |
| 2-Chloroethyl vinyl ether    | 0.00 ug/l    | 0.00 lbs/day   | 0.0 ug/l      | 0.00 lbs/day    |
| 2-Chloronaphthalene          | 1700.00 ug/l | 70.88 lbs/day  | 4300.0 ug/l   | 179.30 lbs/day  |
| 2,4,6-Trichlorophenol        | 2.10 ug/l    | 0.09 lbs/day   | 6.5 ug/l      | 0.27 lbs/day    |
| p-Chloro-m-cresol            |              |                | 0.0 ug/l      | 0.00 lbs/day    |
| Chloroform (HM)              | 5.70 ug/l    | 0.24 lbs/day   | 470.0 ug/l    | 19.60 lbs/day   |
| 2-Chlorophenol               | 120.00 ug/l  | 5.00 lbs/day   | 400.0 ug/l    | 16.68 lbs/day   |
| 1,2-Dichlorobenzene          | 2700.00 ug/l | 112.58 lbs/day | 17000.0 ug/l  | 708.85 lbs/day  |
| 1,3-Dichlorobenzene          | 400.00 ug/l  | 16.68 lbs/day  | 2600.0 ug/l   | 108.41 lbs/day  |
| 1,4-Dichlorobenzene          | 400.00 ug/l  | 16.68 lbs/day  | 2600.0 ug/l   | 108.41 lbs/day  |
| 3,3'-Dichlorobenzidine       | 0.04 ug/l    | 0.00 lbs/day   | 0.1 ug/l      | 0.00 lbs/day    |
| 1,1-Dichloroethylene         | 0.06 ug/l    | 0.00 lbs/day   | 3.2 ug/l      | 0.13 lbs/day    |
| 1,2-trans-Dichloroethylene   | 700.00 ug/l  | 29.19 lbs/day  | 0.0 ug/l      | 0.00 lbs/day    |
| 2,4-Dichlorophenol           | 93.00 ug/l   | 3.88 lbs/day   | 790.0 ug/l    | 32.94 lbs/day   |
| 1,2-Dichloropropane          | 0.52 ug/l    | 0.02 lbs/day   | 39.0 ug/l     | 1.63 lbs/day    |
| 1,3-Dichloropropylene        | 10.00 ug/l   | 0.42 lbs/day   | 1700.0 ug/l   | 70.88 lbs/day   |
| 2,4-Dimethylphenol           | 540.00 ug/l  | 22.52 lbs/day  | 2300.0 ug/l   | 95.90 lbs/day   |
| 2,4-Dinitrotoluene           | 0.11 ug/l    | 0.00 lbs/day   | 9.1 ug/l      | 0.38 lbs/day    |
| 2,6-Dinitrotoluene           | 0.00 ug/l    | 0.00 lbs/day   | 0.0 ug/l      | 0.00 lbs/day    |
| 1,2-Diphenylhydrazine        | 0.04 ug/l    | 0.00 lbs/day   | 0.5 ug/l      | 0.02 lbs/day    |
| Ethylbenzene                 | 3100.00 ug/l | 129.26 lbs/day | 29000.0 ug/l  | 1209.21 lbs/day |
| Fluoranthene                 | 300.00 ug/l  | 12.51 lbs/day  | 370.0 ug/l    | 15.43 lbs/day   |
| 4-Chlorophenyl phenyl ether  |              |                |               |                 |
| 4-Bromophenyl phenyl ether   |              |                |               |                 |
| Bis(2-chloroisopropyl) ether | 1400.00 ug/l | 58.38 lbs/day  | 170000.0 ug/l | 7088.50 lbs/day |
| Bis(2-chloroethoxy) methane  | 0.00 ug/l    | 0.00 lbs/day   | 0.0 ug/l      | 0.00 lbs/day    |
| Methylene chloride (HM)      | 4.70 ug/l    | 0.20 lbs/day   | 1600.0 ug/l   | 66.72 lbs/day   |
| Methyl chloride (HM)         | 0.00 ug/l    | 0.00 lbs/day   | 0.0 ug/l      | 0.00 lbs/day    |
| Methyl bromide (HM)          | 0.00 ug/l    | 0.00 lbs/day   | 0.0 ug/l      | 0.00 lbs/day    |
| Bromoform (HM)               | 4.30 ug/l    | 0.18 lbs/day   | 360.0 ug/l    | 15.01 lbs/day   |
| Dichlorobromomethane         | 0.27 ug/l    | 0.01 lbs/day   | 22.0 ug/l     | 0.92 lbs/day    |
| Chlorodibromomethane         | 0.41 ug/l    | 0.02 lbs/day   | 34.0 ug/l     | 1.42 lbs/day    |
| Hexachlorobutadiene(c)       | 0.44 ug/l    | 0.02 lbs/day   | 50.0 ug/l     | 2.08 lbs/day    |
| Hexachlorocyclopentadiene    | 240.00 ug/l  | 10.01 lbs/day  | 17000.0 ug/l  | 708.85 lbs/day  |
| Isophorone                   | 8.40 ug/l    | 0.35 lbs/day   | 600.0 ug/l    | 25.02 lbs/day   |
| Naphthalene                  |              |                |               |                 |
| Nitrobenzene                 | 17.00 ug/l   | 0.71 lbs/day   | 1900.0 ug/l   | 79.22 lbs/day   |
| 2-Nitrophenol                | 0.00 ug/l    | 0.00 lbs/day   | 0.0 ug/l      | 0.00 lbs/day    |
| 4-Nitrophenol                | 0.00 ug/l    | 0.00 lbs/day   | 0.0 ug/l      | 0.00 lbs/day    |
| 2,4-Dinitrophenol            | 70.00 ug/l   | 2.92 lbs/day   | 14000.0 ug/l  | 583.76 lbs/day  |
| 4,6-Dinitro-o-cresol         | 13.00 ug/l   | 0.54 lbs/day   | 765.0 ug/l    | 31.90 lbs/day   |
| N-Nitrosodimethylamine       | 0.00069 ug/l | 0.00 lbs/day   | 8.1 ug/l      | 0.34 lbs/day    |
| N-Nitrosodiphenylamine       | 5.00 ug/l    | 0.21 lbs/day   | 16.0 ug/l     | 0.67 lbs/day    |
| N-Nitrosodi-n-propylamine    | 0.01 ug/l    | 0.00 lbs/day   | 1.4 ug/l      | 0.06 lbs/day    |
| Pentachlorophenol            | 0.28 ug/l    | 0.01 lbs/day   | 8.2 ug/l      | 0.34 lbs/day    |

**Utah Division of Water Quality**  
**Salt Lake City, Utah**

|                          |               |                  |               |                  |
|--------------------------|---------------|------------------|---------------|------------------|
| Phenol                   | 2.10E+04 ug/l | 8.76E+02 lbs/day | 4.6E+06 ug/l  | 1.92E+05 lbs/day |
| Bis(2-ethylhexyl)phthala | 1.80 ug/l     | 0.08 lbs/day     | 5.9 ug/l      | 0.25 lbs/day     |
| Butyl benzyl phthalate   | 3000.00 ug/l  | 125.09 lbs/day   | 5200.0 ug/l   | 216.82 lbs/day   |
| Di-n-butyl phthalate     | 2700.00 ug/l  | 112.58 lbs/day   | 12000.0 ug/l  | 500.36 lbs/day   |
| Di-n-octyl phthlate      |               |                  |               |                  |
| Diethyl phthalate        | 23000.00 ug/l | 959.03 lbs/day   | 120000.0 ug/l | 5003.64 lbs/day  |
| Dimethyl phthlate        | 3.13E+05 ug/l | 1.31E+04 lbs/day | 2.9E+06 ug/l  | 1.21E+05 lbs/day |
| Benzo(a)anthracene (P/   | 0.0028 ug/l   | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| Benzo(a)pyrene (PAH)     | 0.0028 ug/l   | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| Benzo(b)fluoranthene (F  | 0.0028 ug/l   | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| Benzo(k)fluoranthene (F  | 0.0028 ug/l   | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| Chrysene (PAH)           | 0.0028 ug/l   | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| Acenaphthylene (PAH)     |               |                  |               |                  |
| Anthracene (PAH)         | 9600.00 ug/l  | 400.29 lbs/day   | 0.0 ug/l      | 0.00 lbs/day     |
| Dibenzo(a,h)anthracene   | 0.0028 ug/l   | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| Indeno(1,2,3-cd)pyrene   | 0.0028 ug/l   | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| Pyrene (PAH)             | 960.00 ug/l   | 40.03 lbs/day    | 11000.0 ug/l  | 458.67 lbs/day   |
| Tetrachloroethylene      | 0.80 ug/l     | 0.03 lbs/day     | 8.9 ug/l      | 0.37 lbs/day     |
| Toluene                  | 6800.00 ug/l  | 283.54 lbs/day   | 200000 ug/l   | 8339.41 lbs/day  |
| Trichloroethylene        | 2.70 ug/l     | 0.11 lbs/day     | 81.0 ug/l     | 3.38 lbs/day     |
| Vinyl chloride           | 2.00 ug/l     | 0.08 lbs/day     | 525.0 ug/l    | 21.89 lbs/day    |
|                          |               |                  | 0.0           | 0.00 lbs/day     |
| <b>Pesticides</b>        |               |                  | 0.0           | 0.00 lbs/day     |
| Aldrin                   | 0.0001 ug/l   | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| Dieldrin                 | 0.0001 ug/l   | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| Chlordane                | 0.0006 ug/l   | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| 4,4'-DDT                 | 0.0006 ug/l   | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| 4,4'-DDE                 | 0.0006 ug/l   | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| 4,4'-DDD                 | 0.0008 ug/l   | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| alpha-Endosulfan         | 0.9300 ug/l   | 0.04 lbs/day     | 2.0 ug/l      | 0.08 lbs/day     |
| beta-Endosulfan          | 0.9300 ug/l   | 0.04 lbs/day     | 2.0 ug/l      | 0.08 lbs/day     |
| Endosulfan sulfate       | 0.9300 ug/l   | 0.04 lbs/day     | 2.0 ug/l      | 0.08 lbs/day     |
| Endrin                   | 0.7600 ug/l   | 0.03 lbs/day     | 0.8 ug/l      | 0.03 lbs/day     |
| Endrin aldehyde          | 0.7600 ug/l   | 0.03 lbs/day     | 0.8 ug/l      | 0.03 lbs/day     |
| Heptachlor               | 0.0002 ug/l   | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| Heptachlor epoxide       |               |                  |               |                  |
| <b>PCB's</b>             |               |                  |               |                  |
| PCB 1242 (Arochlor 124   | 0.000044 ug/l | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| PCB-1254 (Arochlor 124   | 0.000044 ug/l | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| PCB-1221 (Arochlor 124   | 0.000044 ug/l | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| PCB-1232 (Arochlor 124   | 0.000044 ug/l | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| PCB-1248 (Arochlor 124   | 0.000044 ug/l | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| PCB-1260 (Arochlor 124   | 0.000044 ug/l | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| PCB-1016 (Arochlor 10    | 0.000044 ug/l | 0.00 lbs/day     | 0.0 ug/l      | 0.00 lbs/day     |
| <b>Pesticide</b>         |               |                  |               |                  |
| Toxaphene                | 0.000750 ug/l | 0.00             | 0.0 ug/l      | 0.00 lbs/day     |
| <b>Dioxin</b>            |               |                  |               |                  |
| Dioxin (2,3,7,8-TCDD)    | 1.30E-08 ug/l | 0.00 lbs/day     | 1.40E-08      | 0.00             |

**Utah Division of Water Quality  
Salt Lake City, Utah**

**Metals**

|                |               |                  |              |                 |
|----------------|---------------|------------------|--------------|-----------------|
| Antimony       | 14.0 ug/l     | 0.58 lbs/day     |              |                 |
| Arsenic        | 50.0 ug/l     | 2.08 lbs/day     | 4300.00 ug/l | 179.30 lbs/day  |
| Asbestos       | 7.00E+06 ug/l | 2.92E+05 lbs/day |              |                 |
| Beryllium      |               |                  |              |                 |
| Cadmium        |               |                  |              |                 |
| Chromium (III) |               |                  |              |                 |
| Chromium (VI)  |               |                  |              |                 |
| Copper         |               |                  |              |                 |
| Cyanide        | 1.30E+03 ug/l | 54.21 lbs/day    | 2.2E+05 ug/l | 9173.35 lbs/day |
| Lead           | 700.0 ug/l    | 29.19 lbs/day    |              |                 |
| Mercury        |               |                  | 0.15 ug/l    | 0.01 lbs/day    |
| Nickel         |               |                  | 4600.00 ug/l | 191.81 lbs/day  |
| Selenium       | 0.1 ug/l      | 0.01 lbs/day     |              |                 |
| Silver         | 610.0 ug/l    | 25.44 lbs/day    |              |                 |
| Thallium       |               |                  | 6.30 ug/l    | 0.26 lbs/day    |
| Zinc           |               |                  |              |                 |

**There are additional standards that apply to this receiving water, but were not considered in this modeling/waste load allocation analysis.**

## **VII. Mathematical Modeling of Stream Quality**

Model configuration was accomplished utilizing standard modeling procedures. Data points were plotted and coefficients adjusted as required to match observed data as closely as possible.

The modeling approach used in this analysis included one or a combination of the following models.

(1) The Utah River Model, Utah Division of Water Quality, 1992. Based upon STREAMDO IV (Region VIII) and Supplemental Ammonia Toxicity Models; EPA Region VIII, Sept. 1990 and QUAL2E (EPA, Athens, GA).

(2) Utah Ammonia/Chlorine Model, Utah Division of Water Quality, 1992.

(3) AMMTOX Model, University of Colorado, Center of Limnology, and EPA Region 8

(4) Principles of Surface Water Quality Modeling and Control. Robert V. Thomann, et.al. Harper Collins Publisher, Inc. 1987, pp. 644.

Coefficients used in the model were based, in part, upon the following references:

(1) Rates, Constants, and Kinetics Formulations in Surface Water Quality Modeling. Environmental Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Athens Georgia. EPA/600/3-85/040 June 1985.

**Utah Division of Water Quality  
Salt Lake City, Utah**

(2) Principles of Surface Water Quality Modeling and Control. Robert V. Thomann, et.al.  
Harper Collins Publisher, Inc. 1987, pp. 644.

### VIII. Modeling Information

The required information for the model may include the following information for both the upstream conditions at low flow and the effluent conditions:

|                       |                                     |
|-----------------------|-------------------------------------|
| Flow, Q, (cfs or MGD) | D.O. mg/l                           |
| Temperature, Deg. C.  | Total Residual Chlorine (TRC), mg/l |
| pH                    | Total NH3-N, mg/l                   |
| BOD5, mg/l            | Total Dissolved Solids (TDS), mg/l  |
| Metals, ug/l          | Toxic Organics of Concern, ug/l     |

### Other Conditions

In addition to the upstream and effluent conditions, the models require a variety of physical and biological coefficients and other technical information. In the process of actually establishing the permit limits for an effluent, values are used based upon the available data, model calibration, literature values, site visits and best professional judgement.

### 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.

### Current Upstream Information

|                        | Stream      |                 | pH         | T-NH3<br>mg/l as N | BOD5<br>mg/l | DO<br>mg/l     | TRC<br>mg/l | TDS<br>mg/l |
|------------------------|-------------|-----------------|------------|--------------------|--------------|----------------|-------------|-------------|
|                        | Flow<br>cfs | Temp.<br>Deg. C |            |                    |              |                |             |             |
| Summer (Irrig. Season) | 0.00        | 12.0            | 8.5        | 0.01               | 0.05         | 10.38          | 0.00        | 213.0       |
| Fall                   | 0.00        | 2.1             | 8.4        | 0.01               | 0.05         | ---            | 0.00        | 265.0       |
| Winter                 | 0.00        | 1.0             | 8.3        | 0.01               | 0.05         | ---            | 0.00        | 307.0       |
| Spring                 | 0.00        | 7.3             | 8.4        | 0.01               | 0.05         | ---            | 0.00        | 230.0       |
| Dissolved Metals       | Al<br>ug/l  | As<br>ug/l      | Cd<br>ug/l | CrIII<br>ug/l      | CrVI<br>ug/l | Copper<br>ug/l | Fe<br>ug/l  | Pb<br>ug/l  |
| All Seasons            | 13.67       | 0.50            | 0.06       | 1.77               | 3.975*       | 0.95           | 15.2        | 0.35        |
| Dissolved Metals       | Hg<br>ug/l  | Ni<br>ug/l      | Se<br>ug/l | Ag<br>ug/l         | Zn<br>ug/l   | Boron<br>ug/l  | * ~80% MDL  |             |
| All Seasons            | 0.0000      | 2.50            | 0.92       | 0.25               | 7.12         | 20.1           |             |             |

**Utah Division of Water Quality  
Salt Lake City, Utah**

**Projected Discharge Information**

| Season | Flow, MGD | Temp. | TDS<br>mg/l | TDS<br>tons/day |
|--------|-----------|-------|-------------|-----------------|
| Summer | 5.00000   | 13.9  | 542.00      | 11.29844        |
| Fall   | 5.00000   | 13.9  |             |                 |
| Winter | 5.00000   | 13.9  |             |                 |
| Spring | 5.00000   | 13.9  |             |                 |

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

**IX. 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 coincide with the environmental conditions expected at low stream flows.

**Effluent Limitation for Flow based upon Water Quality Standards**

In-stream criteria of downstream segments will be met with an effluent flow maximum value as follows:

| Season | Daily Average |           |
|--------|---------------|-----------|
| Summer | 5.000 MGD     | 7.735 cfs |
| Fall   | 5.000 MGD     | 7.735 cfs |
| Winter | 5.000 MGD     | 7.735 cfs |
| Spring | 5.000 MGD     | 7.735 cfs |

**Flow Requirement or Loading Requirement**

The calculations in this wasteload analysis utilize the maximum effluent discharge flow of 5 MGD. If the discharger is allowed to have a flow greater than 5 MGD during 7Q10 conditions, and effluent limit concentrations as indicated, then water quality standards will be violated. In order to prevent this from occurring, the permit writers must include the discharge flow limitation as indicated above; or, include loading effluent limits in the permit.

**Effluent Limitation for Whole Effluent Toxicity (WET) based upon WET Policy**

Effluent Toxicity will not occur in downstream segments if the values below are met.

|                  |        |                 |           |
|------------------|--------|-----------------|-----------|
| WET Requirements | LC50 > | EOP Effluent    | [Acute]   |
|                  | IC25 > | 100.0% Effluent | [Chronic] |

**Utah Division of Water Quality  
Salt Lake City, Utah**

**Effluent Limitation for Biological Oxygen Demand (BOD) based upon Water Quality Standards or Regulations**

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

| Season | Concentration     |                |
|--------|-------------------|----------------|
| Summer | 25.0 mg/l as BOD5 | 1042.3 lbs/day |
| Fall   | 25.0 mg/l as BOD5 | 1042.3 lbs/day |
| Winter | 25.0 mg/l as BOD5 | 1042.3 lbs/day |
| Spring | 25.0 mg/l as BOD5 | 1042.3 lbs/day |

**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 D.O. limitation as follows:

| Season | Concentration |
|--------|---------------|
| Summer | 6.50          |
| Fall   | 6.50          |
| Winter | 6.50          |
| Spring | 6.50          |

**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:

| Season |                      | Concentration  | Load          |
|--------|----------------------|----------------|---------------|
| Summer | 4 Day Avg. - Chronic | 4.0 mg/l as N  | 166.0 lbs/day |
|        | 1 Hour Avg. - Acute  | 10.3 mg/l as N | 430.4 lbs/day |
| Fall   | 4 Day Avg. - Chronic | 4.1 mg/l as N  | 169.0 lbs/day |
|        | 1 Hour Avg. - Acute  | 9.8 mg/l as N  | 409.5 lbs/day |
| Winter | 4 Day Avg. - Chronic | 4.4 mg/l as N  | 182.5 lbs/day |
|        | 1 Hour Avg. - Acute  | 10.8 mg/l as N | 451.8 lbs/day |
| Spring | 4 Day Avg. - Chronic | 4.1 mg/l as N  | 169.0 lbs/day |
|        | 1 Hour Avg. - Acute  | 9.8 mg/l as N  | 409.5 lbs/day |

Acute limit calculated with an Acute Zone of Initial Dilution (ZID) to be equal to 100.0%.

**Utah Division of Water Quality  
Salt Lake City, Utah**

**Effluent Limitation for Total Residual Chlorine based upon Water Quality Standards**

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

| Season |                      | Concentration |      | Load |         |
|--------|----------------------|---------------|------|------|---------|
| Summer | 4 Day Avg. - Chronic | 0.011         | mg/l | 0.46 | lbs/day |
|        | 1 Hour Avg. - Acute  | 0.019         | mg/l | 0.79 | lbs/day |
| Fall   | 4 Day Avg. - Chronic | 0.011         | mg/l | 0.46 | lbs/day |
|        | 1 Hour Avg. - Acute  | 0.019         | mg/l | 0.79 | lbs/day |
| Winter | 4 Day Avg. - Chronic | 0.011         | mg/l | 0.46 | lbs/day |
|        | 1 Hour Avg. - Acute  | 0.019         | mg/l | 0.79 | lbs/day |
| Spring | 4 Day Avg. - Chronic | 0.011         | mg/l | 0.00 | lbs/day |
|        | 1 Hour Avg. - Acute  | 0.019         | mg/l | 0.00 | lbs/day |

**Effluent Limitations for Total Dissolved Solids based upon Water Quality Standards**

| Season |                      | Concentration |      | Load  |          |
|--------|----------------------|---------------|------|-------|----------|
| Summer | Maximum, Acute       | 1200.1        | mg/l | 25.02 | tons/day |
| Fall   | Maximum, Acute       | 1200.1        | mg/l | 25.02 | tons/day |
| Winter | Maximum, Acute       | 1200.1        | mg/l | 25.02 | tons/day |
| Spring | 4 Day Avg. - Chronic | 1200.1        | mg/l | 25.02 | tons/day |

Colorado Salinity Forum Limits

Determined by Permitting Section

**Effluent Limitations for Total Recoverable Metals based upon Water Quality Standards**

In-stream criteria of downstream segments for Dissolved Metals will be met with an effluent limitation as follows (based upon a hardness of 313.99 mg/l):

|              | 4 Day Average |             |         | 1 Hour Average |               |
|--------------|---------------|-------------|---------|----------------|---------------|
|              | Concentration | Load        |         | Concentration  | Load          |
| Aluminum*    | N/A           | N/A         | 750.0   | ug/l           | 31.3 lbs/day  |
| Arsenic*     | 190.02 ug/l   | 5.1 lbs/day | 340.0   | ug/l           | 14.2 lbs/day  |
| Cadmium      | 0.63 ug/l     | 0.0 lbs/day | 6.8     | ug/l           | 0.3 lbs/day   |
| Chromium III | 220.01 ug/l   | 5.9 lbs/day | 4,602.3 | ug/l           | 192.3 lbs/day |
| Chromium VI* | 11.00 ug/l    | 0.3 lbs/day | 16.0    | ug/l           | 0.7 lbs/day   |
| Copper       | 24.80 ug/l    | 0.7 lbs/day | 41.1    | ug/l           | 1.7 lbs/day   |
| Iron*        | N/A           | N/A         | 7,735.0 | ug/l           | 323.1 lbs/day |
| Lead         | 13.65 ug/l    | 0.4 lbs/day | 350.3   | ug/l           | 14.6 lbs/day  |
| Mercury*     | 0.01 ug/l     | 0.0 lbs/day | 2.4     | ug/l           | 0.1 lbs/day   |
| Nickel       | 137.34 ug/l   | 3.7 lbs/day | 1,235.2 | ug/l           | 51.6 lbs/day  |
| Selenium*    | 4.60 ug/l     | 0.1 lbs/day | 20.0    | ug/l           | 0.8 lbs/day   |
| Silver       | N/A ug/l      | N/A lbs/day | 27.1    | ug/l           | 1.1 lbs/day   |



**Utah Division of Water Quality  
Salt Lake City, Utah**

|          |             |             |       |      |              |
|----------|-------------|-------------|-------|------|--------------|
| Zinc     | 315.94 ug/l | 8.5 lbs/day | 315.9 | ug/l | 13.2 lbs/day |
| Cyanide* | 5.20 ug/l   | 0.1 lbs/day | 22.0  | ug/l | 0.9 lbs/day  |

\*Limits for these metals are based on the dissolved standard.

**Effluent Limitations for Heat/Temperature based upon  
Water Quality Standards**

|        |              |             |
|--------|--------------|-------------|
| Summer | 14.0 Deg. C. | 57.2 Deg. F |
| Fall   | 4.1 Deg. C.  | 39.4 Deg. F |
| Winter | 3.0 Deg. C.  | 37.4 Deg. F |
| Spring | 9.3 Deg. C.  | 48.7 Deg. F |

**Effluent Limitations for Organics [Pesticides]  
Based upon Water Quality Standards**

In-stream criteria of downstream segments for Organics [Pesticides]  
will be met with an effluent limit as follows:

|                   | 4 Day Average |                  | 1 Hour Average |      |                  |
|-------------------|---------------|------------------|----------------|------|------------------|
|                   | Concentration | Load             | Concentration  |      | Load             |
| Aldrin            |               |                  | 1.5E+00        | ug/l | 9.69E-02 lbs/day |
| Chlordane         | 4.30E-03 ug/l | 1.79E-01 lbs/day | 1.2E+00        | ug/l | 7.75E-02 lbs/day |
| DDT, DDE          | 1.00E-03 ug/l | 4.17E-02 lbs/day | 5.5E-01        | ug/l | 3.55E-02 lbs/day |
| Dieldrin          | 1.90E-03 ug/l | 7.92E-02 lbs/day | 1.3E+00        | ug/l | 8.08E-02 lbs/day |
| Endosulfan        | 5.60E-02 ug/l | 2.33E+00 lbs/day | 1.1E-01        | ug/l | 7.11E-03 lbs/day |
| Endrin            | 2.30E-03 ug/l | 9.59E-02 lbs/day | 9.0E-02        | ug/l | 5.82E-03 lbs/day |
| Guthion           | 0.00E+00 ug/l | 0.00E+00 lbs/day | 1.0E-02        | ug/l | 6.46E-04 lbs/day |
| Heptachlor        | 3.80E-03 ug/l | 1.58E-01 lbs/day | 2.6E-01        | ug/l | 1.68E-02 lbs/day |
| Lindane           | 8.00E-02 ug/l | 3.34E+00 lbs/day | 1.0E+00        | ug/l | 6.46E-02 lbs/day |
| Methoxychlor      | 0.00E+00 ug/l | 0.00E+00 lbs/day | 3.0E-02        | ug/l | 1.94E-03 lbs/day |
| Mirex             | 0.00E+00 ug/l | 0.00E+00 lbs/day | 1.0E-02        | ug/l | 6.46E-04 lbs/day |
| Parathion         | 0.00E+00 ug/l | 0.00E+00 lbs/day | 4.0E-02        | ug/l | 2.58E-03 lbs/day |
| PCB's             | 1.40E-02 ug/l | 5.84E-01 lbs/day | 2.0E+00        | ug/l | 1.29E-01 lbs/day |
| Pentachlorophenol | 1.30E+01 ug/l | 5.42E+02 lbs/day | 2.0E+01        | ug/l | 1.29E+00 lbs/day |
| Toxephene         | 2.00E-04 ug/l | 8.34E-03 lbs/day | 7.3E-01        | ug/l | 4.72E-02 lbs/day |

**Utah Division of Water Quality**  
**Salt Lake City, Utah**

**Effluent Targets for Pollution Indicators**  
**Based upon Water Quality Standards**

In-stream criteria of downstream segments for Pollution Indicators will be met with an effluent limit as follows:

|                        | <b>1 Hour Average</b> |                |
|------------------------|-----------------------|----------------|
|                        | Concentration         | Loading        |
| Gross Beta (pCi/l)     | 50.0 pCi/L            |                |
| BOD (mg/l)             | 5.0 mg/l              | 208.9 lbs/day  |
| Nitrates as N          | 4.0 mg/l              | 167.1 lbs/day  |
| Total Phosphorus as P  | 0.05 mg/l             | 2.1 lbs/day    |
| Total Suspended Solids | 90.0 mg/l             | 3759.5 lbs/day |

Note: Pollution indicator targets are for information purposes only.

**Effluent Limitations for Protection of Human Health [Toxics Rule]**  
**Based upon Water Quality Standards (Most stringent of 1C or 3A & 3B as appropriate.)**

In-stream criteria of downstream segments for Protection of Human Health [Toxics] will be met with an effluent limit as follows:

|                           | <b>Maximum Concentration</b> |                  |
|---------------------------|------------------------------|------------------|
|                           | Concentration                | Load             |
| <b>Toxic Organics</b>     |                              |                  |
| Acenaphthene              | 1.20E+03 ug/l                | 5.00E+01 lbs/day |
| Acrolein                  | 3.20E+02 ug/l                | 1.33E+01 lbs/day |
| Acrylonitrile             | 5.90E-02 ug/l                | 2.46E-03 lbs/day |
| Benzene                   | 1.20E+00 ug/l                | 5.00E-02 lbs/day |
| Benzidine                 | ug/l                         | lbs/day          |
| Carbon tetrachloride      | 2.50E-01 ug/l                | 1.04E-02 lbs/day |
| Chlorobenzene             | 6.80E+02 ug/l                | 2.84E+01 lbs/day |
| 1,2,4-Trichlorobenzene    |                              |                  |
| Hexachlorobenzene         | 7.50E-04 ug/l                | 3.13E-05 lbs/day |
| 1,2-Dichloroethane        | 3.80E-01 ug/l                | 1.58E-02 lbs/day |
| 1,1,1-Trichloroethane     |                              |                  |
| Hexachloroethane          | 1.90E+00 ug/l                | 7.92E-02 lbs/day |
| 1,1-Dichloroethane        |                              |                  |
| 1,1,2-Trichloroethane     | 6.10E-01 ug/l                | 2.54E-02 lbs/day |
| 1,1,2,2-Tetrachloroethane | 1.70E-01 ug/l                | 7.09E-03 lbs/day |
| Chloroethane              |                              |                  |
| Bis(2-chloroethyl) ether  | 3.10E-02 ug/l                | 1.29E-03 lbs/day |
| 2-Chloroethyl vinyl ether |                              |                  |
| 2-Chloronaphthalene       | 1.70E+03 ug/l                | 7.09E+01 lbs/day |
| 2,4,6-Trichlorophenol     | 2.10E+00 ug/l                | 8.76E-02 lbs/day |
| p-Chloro-m-cresol         |                              |                  |
| Chloroform (HM)           | 5.70E+00 ug/l                | 2.38E-01 lbs/day |
| 2-Chlorophenol            | 1.20E+02 ug/l                | 5.00E+00 lbs/day |
| 1,2-Dichlorobenzene       | 2.70E+03 ug/l                | 1.13E+02 lbs/day |
| 1,3-Dichlorobenzene       | 4.00E+02 ug/l                | 1.67E+01 lbs/day |

**Utah Division of Water Quality**  
**Salt Lake City, Utah**

|   |               |                  |
|---|---------------|------------------|
| 1,4-Dichlorobenzene                     | 4.00E+02 ug/l | 1.67E+01 lbs/day |
| 3,3'-Dichlorobenzidine                  | 4.00E-02 ug/l | 1.67E-03 lbs/day |
| 1,1-Dichloroethylene                    | 5.70E-02 ug/l | 2.38E-03 lbs/day |
| 1,2-trans-Dichloroethylene <sup>1</sup> |               |                  |
| 2,4-Dichlorophenol                      | 9.30E+01 ug/l | 3.88E+00 lbs/day |
| 1,2-Dichloropropane                     | 5.20E-01 ug/l | 2.17E-02 lbs/day |
| 1,3-Dichloropropylene                   | 1.00E+01 ug/l | 4.17E-01 lbs/day |
| 2,4-Dimethylphenol                      | 5.40E+02 ug/l | 2.25E+01 lbs/day |
| 2,4-Dinitrotoluene                      | 1.10E-01 ug/l | 4.59E-03 lbs/day |
| 2,6-Dinitrotoluene                      |               |                  |
| 1,2-Diphenylhydrazine                   | 4.00E-02 ug/l | 1.67E-03 lbs/day |
| Ethylbenzene                            | 3.10E+03 ug/l | 1.29E+02 lbs/day |
| Fluoranthene                            | 3.00E+02 ug/l | 1.25E+01 lbs/day |
| 4-Chlorophenyl phenyl ether             |               |                  |
| 4-Bromophenyl phenyl ether              |               |                  |
| Bis(2-chloroisopropyl) ether            | 1.40E+03 ug/l | 5.84E+01 lbs/day |
| Bis(2-chloroethoxy) methane             |               |                  |
| Methylene chloride (HM)                 | 4.70E+00 ug/l | 1.96E-01 lbs/day |
| Methyl chloride (HM)                    |               |                  |
| Methyl bromide (HM)                     |               |                  |
| Bromoform (HM)                          | 4.30E+00 ug/l | 1.79E-01 lbs/day |
| Dichlorobromomethane(HM)                | 2.70E-01 ug/l | 1.13E-02 lbs/day |
| Chlorodibromomethane (HM)               | 4.10E-01 ug/l | 1.71E-02 lbs/day |
| Hexachlorocyclopentadiene               | 2.40E+02 ug/l | 1.00E+01 lbs/day |
| Isophorone                              | 8.40E+00 ug/l | 3.50E-01 lbs/day |
| Naphthalene                             |               |                  |
| Nitrobenzene                            | 1.70E+01 ug/l | 7.09E-01 lbs/day |
| 2-Nitrophenol                           |               |                  |
| 4-Nitrophenol                           |               |                  |
| 2,4-Dinitrophenol                       | 7.00E+01 ug/l | 2.92E+00 lbs/day |
| 4,6-Dinitro-o-cresol                    | 1.30E+01 ug/l | 5.42E-01 lbs/day |
| N-Nitrosodimethylamine                  | 6.90E-04 ug/l | 2.88E-05 lbs/day |
| N-Nitrosodiphenylamine                  | 5.00E+00 ug/l | 2.08E-01 lbs/day |
| N-Nitrosodi-n-propylamine               | 5.00E-03 ug/l | 2.08E-04 lbs/day |
| Pentachlorophenol                       | 2.80E-01 ug/l | 1.17E-02 lbs/day |
| Phenol                                  | 2.10E+04 ug/l | 8.76E+02 lbs/day |
| Bis(2-ethylhexyl)phthalate              | 1.80E+00 ug/l | 7.51E-02 lbs/day |
| Butyl benzyl phthalate                  | 3.00E+03 ug/l | 1.25E+02 lbs/day |
| Di-n-butyl phthalate                    | 2.70E+03 ug/l | 1.13E+02 lbs/day |
| Di-n-octyl phthalate                    |               |                  |
| Diethyl phthalate                       | 2.30E+04 ug/l | 9.59E+02 lbs/day |
| Dimethyl phthalate                      | 3.13E+05 ug/l | 1.31E+04 lbs/day |
| Benzo(a)anthracene (PAH)                | 2.80E-03 ug/l | 1.17E-04 lbs/day |
| Benzo(a)pyrene (PAH)                    | 2.80E-03 ug/l | 1.17E-04 lbs/day |
| Benzo(b)fluoranthene (PAH)              | 2.80E-03 ug/l | 1.17E-04 lbs/day |
| Benzo(k)fluoranthene (PAH)              | 2.80E-03 ug/l | 1.17E-04 lbs/day |
| Chrysene (PAH)                          | 2.80E-03 ug/l | 1.17E-04 lbs/day |
| Acenaphthylene (PAH)                    |               |                  |
| Anthracene (PAH)                        |               |                  |
| Dibenzo(a,h)anthracene (PAH)            | 2.80E-03 ug/l | 1.17E-04 lbs/day |
| Indeno(1,2,3-cd)pyrene (PAH)            | 2.80E-03 ug/l | 1.17E-04 lbs/day |

**Utah Division of Water Quality  
Salt Lake City, Utah**

|                     |               |                  |
|---------------------|---------------|------------------|
| Pyrene (PAH)        | 9.60E+02 ug/l | 4.00E+01 lbs/day |
| Tetrachloroethylene | 8.00E-01 ug/l | 3.34E-02 lbs/day |
| Toluene             | 6.80E+03 ug/l | 2.84E+02 lbs/day |
| Trichloroethylene   | 2.70E+00 ug/l | 1.13E-01 lbs/day |
| Vinyl chloride      | 2.00E+00 ug/l | 8.34E-02 lbs/day |

**Pesticides**

|                    |               |                  |
|--------------------|---------------|------------------|
| Aldrin             | 1.30E-04 ug/l | 5.42E-06 lbs/day |
| Dieldrin           | 1.40E-04 ug/l | 5.84E-06 lbs/day |
| Chlordane          | 5.70E-04 ug/l | 2.38E-05 lbs/day |
| 4,4'-DDT           | 5.90E-04 ug/l | 2.46E-05 lbs/day |
| 4,4'-DDE           | 5.90E-04 ug/l | 2.46E-05 lbs/day |
| 4,4'-DDD           | 8.30E-04 ug/l | 3.46E-05 lbs/day |
| alpha-Endosulfan   | 9.30E-01 ug/l | 3.88E-02 lbs/day |
| beta-Endosulfan    | 9.30E-01 ug/l | 3.88E-02 lbs/day |
| Endosulfan sulfate | 9.30E-01 ug/l | 3.88E-02 lbs/day |
| Endrin             | 7.60E-01 ug/l | 3.17E-02 lbs/day |
| Endrin aldehyde    | 7.60E-01 ug/l | 3.17E-02 lbs/day |
| Heptachlor         | 2.10E-04 ug/l | 8.76E-06 lbs/day |
| Heptachlor epoxide |               |                  |

**PCB's**

|                          |               |                  |
|--------------------------|---------------|------------------|
| PCB 1242 (Arochlor 1242) | 4.40E-05 ug/l | 1.83E-06 lbs/day |
| PCB-1254 (Arochlor 1254) | 4.40E-05 ug/l | 1.83E-06 lbs/day |
| PCB-1221 (Arochlor 1221) | 4.40E-05 ug/l | 1.83E-06 lbs/day |
| PCB-1232 (Arochlor 1232) | 4.40E-05 ug/l | 1.83E-06 lbs/day |
| PCB-1248 (Arochlor 1248) | 4.40E-05 ug/l | 1.83E-06 lbs/day |
| PCB-1260 (Arochlor 1260) | 4.40E-05 ug/l | 1.83E-06 lbs/day |
| PCB-1016 (Arochlor 1016) | 4.40E-05 ug/l | 1.83E-06 lbs/day |

**Pesticide**

|           |               |                  |
|-----------|---------------|------------------|
| Toxaphene | 7.30E-04 ug/l | 3.04E-05 lbs/day |
|-----------|---------------|------------------|

**Metals**

|                |               |                  |
|----------------|---------------|------------------|
| Antimony       | 14.00 ug/l    | 0.58 lbs/day     |
| Arsenic        | 50.01 ug/l    | 2.08 lbs/day     |
| Asbestos       | 7.00E+06 ug/l | 2.92E+05 lbs/day |
| Beryllium      |               |                  |
| Cadmium        |               |                  |
| Chromium (III) |               |                  |
| Chromium (VI)  |               |                  |
| Copper         | 1300.17 ug/l  | 54.21 lbs/day    |
| Cyanide        | 700.09 ug/l   | 29.19 lbs/day    |
| Lead           | 0.00          | 0.00             |
| Mercury        | 0.14 ug/l     | 0.01 lbs/day     |
| Nickel         | 610.08 ug/l   | 25.44 lbs/day    |
| Selenium       | 0.00          | 0.00             |
| Silver         | 0.00          | 0.00             |
| Thallium       | 1.70 ug/l     | 0.07 lbs/day     |
| Zinc           |               |                  |

**Utah Division of Water Quality  
Salt Lake City, Utah**

**Dioxin**

Dioxin (2,3,7,8-TCDD)

1.30E-08 ug/l

5.42E-10 lbs/day

**Metals Effluent Limitations for Protection of All Beneficial Uses  
Based upon Water Quality Standards and Toxics Rule**

|                | <b>Class 4<br/>Acute<br/>Agricultural<br/>ug/l</b> | <b>Class 3<br/>Acute<br/>Aquatic<br/>Wildlife<br/>ug/l</b> | <b>Acute<br/>Toxics<br/>Drinking<br/>Water<br/>Source<br/>ug/l</b> | <b>Acute<br/>Toxics<br/>Wildlife<br/>ug/l</b> | <b>1C Acute<br/>Health<br/>Criteria<br/>ug/l</b> | <b>Acute<br/>Most<br/>Stringent<br/>ug/l</b> | <b>Class 3<br/>Chronic<br/>Aquatic<br/>Wildlife<br/>ug/l</b> |
|----------------|--|--|--|---|--|--|--|
| Aluminum       |  | 750.0  |  |   |  | 750.0  | N/A  |
| Antimony       |  |  | 14.0   | 4300.6  |  | 14.0   |  |
| Arsenic        | 100.0  | 340.0  | 50.0   |   | 0.0  | 50.0   | 190.0  |
| Barium         |  |  |  |   | 1000.1   | 1000.1                                       |  |
| Beryllium      |  |  |  |   |  | 0.0  |  |
| Cadmium        | 10.0   | 6.8  |  |   | 0.0  | 6.8  | 0.6  |
| Chromium (III) |  | 4602.3   |  |   | 0.0  | 4602.3                                       | 220.0  |
| Chromium (VI)  | 100.0  | 16.0   |  |   | 0.0  | 16.00  | 11.00  |
| Copper         | 200.0  | 41.1   | 1300.2   |   |  | 41.1   | 24.8   |
| Cyanide        |  | 22.0   | 220028.4   |   |  | 22.0   | 5.2  |
| Iron           |  | 7735.0   |  |   |  | 7735.0                                       |  |
| Lead           | 100.0  | 350.3  |  |   | 0.0  | 100.0  | 13.7   |
| Mercury        |  | 2.40   | 0.1  | 0.15  | 0.0  | 0.14   | 0.012  |
| Nickel         |  | 1235.2   | 610.1  | 4600.6  |  | 610.1  | 137.3  |
| Selenium       | 50.0   | 20.0   |  |   | 0.0  | 20.0   | 4.6  |
| Silver         |  | 27.1   |  |   | 0.0  | 27.1   |  |
| Thallium       |  |  | 1.7  | 6.3   |  | 1.7  |  |
| Zinc           |  | 315.9  |  |   |  | 315.9  | 315.9  |
| Boron          | 750.1  |  |  |   |  | 750.1  |  |
| Sulfate        | 2000.3   |  |  |   |  | 2000.3                                       |  |

**Summary Effluent Limitations for Metals [Wasteload Allocation, TMDL]**

[If Acute is more stringent than Chronic, then the Chronic takes on the Acute value.]

|                | <b>WLA Acute<br/>ug/l</b> | <b>WLA Chronic<br/>ug/l</b> |                |
|----------------|---------------------------|-----------------------------|----------------|
| Aluminum       | 750.0                     | N/A                         |                |
| Antimony       | 14.00                     |                             |                |
| Arsenic        | 50.0                      | 190.0                       | Acute Controls |
| Asbestos       | 7.00E+06                  |                             |                |
| Barium         |                           |                             |                |
| Beryllium      |                           |                             |                |
| Cadmium        | 6.8                       | 0.6                         |                |
| Chromium (III) | 4602.3                    | 220                         |                |
| Chromium (VI)  | 16.0                      | 11.0                        |                |
| Copper         | 41.1                      | 24.8                        |                |

**Utah Division of Water Quality  
Salt Lake City, Utah**

|          |        |       |                       |
|----------|--------|-------|-----------------------|
| Cyanide  | 22.0   | 5.2   |                       |
| Iron     | 7735.0 |       |                       |
| Lead     | 100.0  | 13.7  |                       |
| Mercury  | 0.140  | 0.012 |                       |
| Nickel   | 610.1  | 137   |                       |
| Selenium | 20.0   | 4.6   |                       |
| Silver   | 27.1   | N/A   |                       |
| Thallium | 1.7    |       |                       |
| Zinc     | 315.9  | 315.9 | Acute Controls        |
| Boron    | 750.09 |       |                       |
| Sulfate  | 2000.3 |       | N/A at this Waterbody |

Other Effluent Limitations are based upon R317-1.

E. coli 126.0 organisms per 100 ml

#### **X. Antidegradation Considerations**

The Utah Antidegradation Policy allows for degradation of existing quality where it is determined that such lowering of water quality is necessary to accommodate important economic or social development in the area in which the waters are protected [R317-2-3]. It has been determined that certain chemical parameters introduced by this discharge will cause an increase of the concentration of said parameters in the receiving waters. Under no conditions will the increase in concentration be allowed to interfere with existing instream water uses.

The antidegradation rules and procedures allow for modification of effluent limits less than those based strictly upon mass balance equations utilizing 100% of the assimilative capacity of the receiving water. Additional factors include considerations for "Blue-ribbon" fisheries, special recreational areas, threatened and endangered species, and drinking water sources.

An Antidegradation Level I Review was conducted on this discharge and its effect on the receiving water. Based upon that review, it has been determined that an Antidegradation Level II Review is required because the receiving water for the discharge is a Class 1C Drinking Water Source.

#### **XI. Colorado River Salinity Forum Considerations**

Discharges in the Colorado River Basin are required to have their discharge at a TDS loading of less than 1.00 tons/day unless certain exemptions apply. Refer to the Forum's Guidelines for additional information allowing for an exceedence of this value.

#### **XII. 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 downstream segments, will not occur for the evaluated parameters of concern as discussed above if the effluent limitations indicated above are met.