

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

Discharging Facility: Energy Queen Mine
UPDES No: UT-0025712
Current Flow: 0.50 MGD 0.77 cfs
Design Flow 0.50 MGD 0.77 cfs

Receiving Water: Unnamed dry wash -West Coyote Wash
Stream Classification: 2B, 3D
Stream Flows [cfs]:
0.0 Summer (July-Sept) 7Q10
0.0 Fall (Oct-Dec) 7Q10
0.0 Winter (Jan-Mar) 7Q10
0.0 Spring (Apr-June) 7Q10
0.0 Average
Stream TDS Values:
700.0 Summer (July-Sept) 80th Percentile
700.0 Fall (Oct-Dec) 80th Percentile
700.0 Winter (Jan-Mar) 80th Percentile
700.0 Spring (Apr-June) 80th Percentile

| | | |
|-------------------------|---------------|---------------------------------------|
| Effluent Limits: | | WQ Standard: |
| Flow, MGD: | 0.50 MGD | Design Flow |
| BOD, mg/l: | 25.0 Summer | 5.0 Indicator |
| Dissolved Oxygen, mg/l | 4.5 Summer | 5.0 30 Day Average |
| TNH3, Chronic, mg/l: | 8.2 Summer | Varies Function of pH and Temperature |
| TDS, mg/l: | 1200.0 Summer | 1200.0 |

Modeling Parameters:
Acute River Width: 50.0%
Chronic River Width: 100.0%

Antidegradation Level II Review is NOT Required

Date: 2/25/2013

Permit Writer: _____
WLA by: Neil W. Wang
WQM Sec. Approval: _____
TMDL Sec. Approval: _____

2-28-13

Utah Division of Water Quality
Salt Lake City, Utah

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

| |
|-----------|
| 25-Feb-13 |
| 4:00 PM |

Facilities: Energy Queen Mine
Discharging to: Unnamed dry wash -West Coyote Wash

UPDES No: UT-0025712

THIS IS A DRAFT DOCUMENT

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

Unnamed dry wash -West Coyote Wa 2B, 3D
Antidegradation Review: Antidegradation Level II Review is 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) 0.019 mg/l (1 Hour Average) | |
| Chronic Dissolved Oxygen (DO) | 5.00 mg/l (30 Day Average) N/A mg/l (7Day Average) 3.00 mg/l (1 Day Average) | |
| Maximum Total Dissolved Solids | N/A mg/l | 3background |

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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** | 0.363 lbs/day | 750.00 | ug/l | 3.127 lbs/day |
| Arsenic | 190.00 ug/l | 0.792 lbs/day | 340.00 | ug/l | 1.418 lbs/day |
| Cadmium | 0.52 ug/l | 0.002 lbs/day | 5.17 | ug/l | 0.022 lbs/day |
| Chromium III | 175.79 ug/l | 0.733 lbs/day | 3677.92 | ug/l | 15.334 lbs/day |
| ChromiumVI | 11.00 ug/l | 0.046 lbs/day | 16.00 | ug/l | 0.067 lbs/day |
| Copper | 19.63 ug/l | 0.082 lbs/day | 31.79 | ug/l | 0.133 lbs/day |
| Iron | | | 1000.00 | ug/l | 4.169 lbs/day |
| Lead | 9.64 ug/l | 0.040 lbs/day | 247.26 | ug/l | 1.031 lbs/day |
| Mercury | 0.0120 ug/l | 0.000 lbs/day | 2.40 | ug/l | 0.010 lbs/day |
| Nickel | 108.93 ug/l | 0.454 lbs/day | 979.80 | ug/l | 4.085 lbs/day |
| Selenium | 4.60 ug/l | 0.019 lbs/day | 20.00 | ug/l | 0.083 lbs/day |
| Silver | N/A ug/l | N/A lbs/day | 16.91 | ug/l | 0.071 lbs/day |
| Zinc | 250.50 ug/l | 1.044 lbs/day | 250.50 | ug/l | 1.044 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 238.79 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 | 0.006 lbs/day |
| Chlordane | 0.004 ug/l | 0.018 lbs/day | 1.200 | ug/l | 0.005 lbs/day |
| DDT, DDE | 0.001 ug/l | 0.004 lbs/day | 0.550 | ug/l | 0.002 lbs/day |
| Dieldrin | 0.002 ug/l | 0.008 lbs/day | 1.250 | ug/l | 0.005 lbs/day |
| Endosulfan | 0.056 ug/l | 0.236 lbs/day | 0.110 | ug/l | 0.000 lbs/day |
| Endrin | 0.002 ug/l | 0.010 lbs/day | 0.090 | ug/l | 0.000 lbs/day |
| Guthion | | | 0.010 | ug/l | 0.000 lbs/day |
| Heptachlor | 0.004 ug/l | 0.016 lbs/day | 0.260 | ug/l | 0.001 lbs/day |
| Lindane | 0.080 ug/l | 0.338 lbs/day | 1.000 | ug/l | 0.004 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 | 0.059 lbs/day | 2.000 | ug/l | 0.008 lbs/day |
| Pentachlorophenol | 13.00 ug/l | 54.900 lbs/day | 20.000 | ug/l | 0.083 lbs/day |
| Toxephene | 0.0002 ug/l | 0.001 lbs/day | 0.7300 | ug/l | 0.003 lbs/day |

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Salt Lake City, Utah**

IV. Numeric Stream Standards for Protection of Agriculture

| | 4 Day Average (Chronic) Standard | | 1 Hour Average (Acute) Standard | |
|-------------|----------------------------------|-------|---------------------------------|----------|
| | Concentration | Load* | Concentration | Load* |
| Arsenic | | | ug/l | lbs/day |
| Boron | | | ug/l | lbs/day |
| Cadmium | | | ug/l | #VALUE! |
| Chromium | | | ug/l | lbs/day |
| Copper | | | ug/l | lbs/day |
| Lead | | | ug/l | lbs/day |
| Selenium | | | ug/l | lbs/day |
| TDS, Summer | | | mg/l | tons/day |

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

| | 4 Day Average (Chronic) Standard | | 1 Hour Average (Acute) Standard | |
|---------------------------------|----------------------------------|-------|---------------------------------|---------|
| | Concentration | Load* | Concentration | Load* |
| Metals | | | | |
| Arsenic | | | ug/l | lbs/day |
| Barium | | | ug/l | lbs/day |
| Cadmium | | | ug/l | lbs/day |
| Chromium | | | ug/l | lbs/day |
| Lead | | | ug/l | lbs/day |
| Mercury | | | ug/l | lbs/day |
| Selenium | | | ug/l | lbs/day |
| Silver | | | ug/l | lbs/day |
| Fluoride (3) | | | ug/l | lbs/day |
| to | | | ug/l | lbs/day |
| Nitrates as N | | | ug/l | lbs/day |
| Chlorophenoxy Herbicides | | | | |
| 2,4-D | | | ug/l | lbs/day |
| 2,4,5-TP | | | ug/l | lbs/day |
| Endrin | | | ug/l | lbs/day |
| ocyclohexane (Lindane) | | | ug/l | lbs/day |
| Methoxychlor | | | ug/l | lbs/day |
| Toxaphene | | | ug/l | lbs/day |

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

| | Maximum Conc., ug/l - Acute Standards | | | |
|------------------------|---|---------|--|---------------|
| | Class 1C [2 Liters/Day for 70 Kg Person over 70 Yr.] | | Class 3A, 3B [6.5 g for 70 Kg Person over 70 Yr.] | |
| Toxic Organics | | | | |
| Acenaphthene | ug/l | lbs/day | 2700.0 ug/l | 11.40 lbs/day |
| Acrolein | ug/l | lbs/day | 780.0 ug/l | 3.29 lbs/day |
| Acrylonitrile | ug/l | lbs/day | 0.7 ug/l | 0.00 lbs/day |
| Benzene | ug/l | lbs/day | 71.0 ug/l | 0.30 lbs/day |
| Benzidine | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| Carbon tetrachloride | ug/l | lbs/day | 4.4 ug/l | 0.02 lbs/day |
| Chlorobenzene | ug/l | lbs/day | 21000.0 ug/l | 88.68 lbs/day |
| 1,2,4-Trichlorobenzene | | | | |
| Hexachlorobenzene | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| 1,2-Dichloroethane | ug/l | lbs/day | 99.0 ug/l | 0.42 lbs/day |

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Salt Lake City, Utah**

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|------------------------------|------|---------|---------------|----------------|
| 1,1,1-Trichloroethane | | | | |
| Hexachloroethane | ug/l | lbs/day | 8.9 ug/l | 0.04 lbs/day |
| 1,1-Dichloroethane | | | | |
| 1,1,2-Trichloroethane | ug/l | lbs/day | 42.0 ug/l | 0.18 lbs/day |
| 1,1,2,2-Tetrachloroethane | ug/l | lbs/day | 11.0 ug/l | 0.05 lbs/day |
| Chloroethane | | | 0.0 ug/l | 0.00 lbs/day |
| Bis(2-chloroethyl) ether | ug/l | lbs/day | 1.4 ug/l | 0.01 lbs/day |
| 2-Chloroethyl vinyl ether | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| 2-Chloronaphthalene | ug/l | lbs/day | 4300.0 ug/l | 18.16 lbs/day |
| 2,4,6-Trichlorophenol | ug/l | lbs/day | 6.5 ug/l | 0.03 lbs/day |
| p-Chloro-m-cresol | | | 0.0 ug/l | 0.00 lbs/day |
| Chloroform (HM) | ug/l | lbs/day | 470.0 ug/l | 1.98 lbs/day |
| 2-Chlorophenol | ug/l | lbs/day | 400.0 ug/l | 1.69 lbs/day |
| 1,2-Dichlorobenzene | ug/l | lbs/day | 17000.0 ug/l | 71.79 lbs/day |
| 1,3-Dichlorobenzene | ug/l | lbs/day | 2600.0 ug/l | 10.98 lbs/day |
| 1,4-Dichlorobenzene | ug/l | lbs/day | 2600.0 ug/l | 10.98 lbs/day |
| 3,3'-Dichlorobenzidine | ug/l | lbs/day | 0.1 ug/l | 0.00 lbs/day |
| 1,1-Dichloroethylene | ug/l | lbs/day | 3.2 ug/l | 0.01 lbs/day |
| 1,2-trans-Dichloroethylene | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| 2,4-Dichlorophenol | ug/l | lbs/day | 790.0 ug/l | 3.34 lbs/day |
| 1,2-Dichloropropane | ug/l | lbs/day | 39.0 ug/l | 0.16 lbs/day |
| 1,3-Dichloropropylene | ug/l | lbs/day | 1700.0 ug/l | 7.18 lbs/day |
| 2,4-Dimethylphenol | ug/l | lbs/day | 2300.0 ug/l | 9.71 lbs/day |
| 2,4-Dinitrotoluene | ug/l | lbs/day | 9.1 ug/l | 0.04 lbs/day |
| 2,6-Dinitrotoluene | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| 1,2-Diphenylhydrazine | ug/l | lbs/day | 0.5 ug/l | 0.00 lbs/day |
| Ethylbenzene | ug/l | lbs/day | 29000.0 ug/l | 122.47 lbs/day |
| Fluoranthene | ug/l | lbs/day | 370.0 ug/l | 1.56 lbs/day |
| 4-Chlorophenyl phenyl ether | | | | |
| 4-Bromophenyl phenyl ether | | | | |
| Bis(2-chloroisopropyl) ether | ug/l | lbs/day | 170000.0 ug/l | 717.92 lbs/day |
| Bis(2-chloroethoxy) methane | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| Methylene chloride (HM) | ug/l | lbs/day | 1600.0 ug/l | 6.76 lbs/day |
| Methyl chloride (HM) | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| Methyl bromide (HM) | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| Bromoform (HM) | ug/l | lbs/day | 360.0 ug/l | 1.52 lbs/day |
| Dichlorobromomethane | ug/l | lbs/day | 22.0 ug/l | 0.09 lbs/day |
| Chlorodibromomethane | ug/l | lbs/day | 34.0 ug/l | 0.14 lbs/day |
| Hexachlorobutadiene(c) | ug/l | lbs/day | 50.0 ug/l | 0.21 lbs/day |
| Hexachlorocyclopentadiene | ug/l | lbs/day | 17000.0 ug/l | 71.79 lbs/day |
| Isophorone | ug/l | lbs/day | 600.0 ug/l | 2.53 lbs/day |
| Naphthalene | | | | |
| Nitrobenzene | ug/l | lbs/day | 1900.0 ug/l | 8.02 lbs/day |
| 2-Nitrophenol | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| 4-Nitrophenol | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| 2,4-Dinitrophenol | ug/l | lbs/day | 14000.0 ug/l | 59.12 lbs/day |
| 4,6-Dinitro-o-cresol | ug/l | lbs/day | 765.0 ug/l | 3.23 lbs/day |
| N-Nitrosodimethylamine | ug/l | lbs/day | 8.1 ug/l | 0.03 lbs/day |
| N-Nitrosodiphenylamine | ug/l | lbs/day | 16.0 ug/l | 0.07 lbs/day |
| N-Nitrosodi-n-propylamine | ug/l | lbs/day | 1.4 ug/l | 0.01 lbs/day |
| Pentachlorophenol | ug/l | lbs/day | 8.2 ug/l | 0.03 lbs/day |

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Salt Lake City, Utah**

| | | | | |
|--------------------------|------|---------|---------------|------------------|
| Phenol | ug/l | lbs/day | 4.6E+06 ug/l | 1.94E+04 lbs/day |
| Bis(2-ethylhexyl)phthala | ug/l | lbs/day | 5.9 ug/l | 0.02 lbs/day |
| Butyl benzyl phthalate | ug/l | lbs/day | 5200.0 ug/l | 21.96 lbs/day |
| Di-n-butyl phthalate | ug/l | lbs/day | 12000.0 ug/l | 50.68 lbs/day |
| Di-n-octyl phthlate | | | | |
| Diethyl phthalate | ug/l | lbs/day | 120000.0 ug/l | 506.77 lbs/day |
| Dimethyl phthlate | ug/l | lbs/day | 2.9E+06 ug/l | 1.22E+04 lbs/day |
| Benzo(a)anthracene (P/ | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| Benzo(a)pyrene (PAH) | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| Benzo(b)fluoranthene (F | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| Benzo(k)fluoranthene (F | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| Chrysene (PAH) | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| Acenaphthylene (PAH) | | | | |
| Anthracene (PAH) | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| Dibenzo(a,h)anthracene | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| Indeno(1,2,3-cd)pyrene | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| Pyrene (PAH) | ug/l | lbs/day | 11000.0 ug/l | 46.45 lbs/day |
| Tetrachloroethylene | ug/l | lbs/day | 8.9 ug/l | 0.04 lbs/day |
| Toluene | ug/l | lbs/day | 200000 ug/l | 844.61 lbs/day |
| Trichloroethylene | ug/l | lbs/day | 81.0 ug/l | 0.34 lbs/day |
| Vinyl chloride | ug/l | lbs/day | 525.0 ug/l | 2.22 lbs/day |
| | | | | lbs/day |
| | | | | lbs/day |
| Pesticides | | | | |
| Aldrin | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| Dieldrin | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| Chlordane | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| 4,4'-DDT | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| 4,4'-DDE | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| 4,4'-DDD | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| alpha-Endosulfan | ug/l | lbs/day | 2.0 ug/l | 0.01 lbs/day |
| beta-Endosulfan | ug/l | lbs/day | 2.0 ug/l | 0.01 lbs/day |
| Endosulfan sulfate | ug/l | lbs/day | 2.0 ug/l | 0.01 lbs/day |
| Endrin | ug/l | lbs/day | 0.8 ug/l | 0.00 lbs/day |
| Endrin aldehyde | ug/l | lbs/day | 0.8 ug/l | 0.00 lbs/day |
| Heptachlor | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| Heptachlor epoxide | | | | |
| PCB's | | | | |
| PCB 1242 (Arochlor 124 | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| PCB-1254 (Arochlor 124 | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| PCB-1221 (Arochlor 122 | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| PCB-1232 (Arochlor 123 | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| PCB-1248 (Arochlor 124 | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| PCB-1260 (Arochlor 126 | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| PCB-1016 (Arochlor 101 | ug/l | lbs/day | 0.0 ug/l | 0.00 lbs/day |
| Pesticide | | | | |
| Toxaphene | ug/l | | 0.0 ug/l | 0.00 lbs/day |
| Dioxin | | | | |
| Dioxin (2,3,7,8-TCDD) | ug/l | lbs/day | | |

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Salt Lake City, Utah**

Metals

| | ug/l | lbs/day | | |
|----------------|------|---------|--------------|----------------|
| Antimony | | | | |
| Arsenic | ug/l | lbs/day | 4300.00 ug/l | 18.16 lbs/day |
| Asbestos | ug/l | lbs/day | | |
| Beryllium | | | | |
| Cadmium | | | | |
| Chromium (III) | | | | |
| Chromium (VI) | | | | |
| Copper | | | | |
| Cyanide | ug/l | lbs/day | 2.2E+05 ug/l | 929.07 lbs/day |
| Lead | ug/l | lbs/day | | |
| Mercury | | | 0.15 ug/l | 0.00 lbs/day |
| Nickel | | | 4600.00 ug/l | 19.43 lbs/day |
| Selenium | ug/l | lbs/day | | |
| Silver | ug/l | lbs/day | | |
| Thallium | | | 6.30 ug/l | 0.03 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 | | | | | | | |
|------------------------|--------------|--------|--------|-----------|--------|--------|-------|-----------|
| | Critical Low | | | | | | | |
| | Flow | Temp. | pH | T-NH3 | BOD5 | DO | TRC | TDS |
| | cfs | Deg. C | | mg/l as N | mg/l | mg/l | mg/l | mg/l |
| Summer (Irrig. Season) | 0.0 | 20.0 | 8.2 | 0.10 | 0.50 | 9.79 | 0.00 | 700.0 |
| Fall | 0.0 | 12.0 | 8.1 | 0.10 | 0.50 | --- | 0.00 | 700.0 |
| Winter | 0.0 | 4.0 | 8.0 | 0.10 | 0.50 | --- | 0.00 | 700.0 |
| Spring | 0.0 | 12.0 | 8.1 | 0.10 | 0.50 | --- | 0.00 | 700.0 |
| Dissolved Metals | Al | As | Cd | CrIII | CrVI | Copper | Fe | Pb |
| | ug/l | ug/l | ug/l | ug/l | ug/l | ug/l | ug/l | ug/l |
| All Seasons | 1.59* | 0.53* | 0.053* | 0.53* | 2.65* | 0.53* | 0.83* | 0.53* |
| Dissolved Metals | Hg | Ni | Se | Ag | Zn | Boron | | |
| | ug/l | ug/l | ug/l | ug/l | ug/l | ug/l | | |
| All Seasons | 0.0000 | 0.53* | 1.06* | 0.1* | 0.053* | 10.0 | | * 1/2 MDL |

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Salt Lake City, Utah**

Projected Discharge Information

| Season | Flow, MGD | Temp. | TDS mg/l | TDS tons/day |
|--------|--------------|-------|-------------|-----------------|
| Summer | 0.50000 | NA | 700.00 | 1.45921 |
| Fall | 0.50000 | NA | | |
| Winter | 0.50000 | NA | | |
| Spring | 0.50000 | NA | | |

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 | 0.500 MGD | 0.774 cfs |
| Fall | 0.500 MGD | 0.774 cfs |
| Winter | 0.500 MGD | 0.774 cfs |
| Spring | 0.500 MGD | 0.774 cfs |

Flow Requirement or Loading Requirement

The calculations in this wasteload analysis utilize the maximum effluent discharge flow of 0.5 MGD. If the discharger is allowed to have a flow greater than 0.5 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 > | 98.7% Effluent | [Chronic] |

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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 | 104.2 lbs/day |
| Fall | 25.0 mg/l as BOD5 | 104.2 lbs/day |
| Winter | 25.0 mg/l as BOD5 | 104.2 lbs/day |
| Spring | 25.0 mg/l as BOD5 | 104.2 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 | 4.50 |
| Fall | 4.50 |
| Winter | 4.50 |
| Spring | 4.50 |

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 | 8.2 mg/l as N | 34.0 lbs/day |
| | 1 Hour Avg. - Acute | 64.5 mg/l as N | 268.8 lbs/day |
| Fall | 4 Day Avg. - Chronic | 8.2 mg/l as N | 34.0 lbs/day |
| | 1 Hour Avg. - Acute | 64.5 mg/l as N | 268.8 lbs/day |
| Winter | 4 Day Avg. - Chronic | 8.2 mg/l as N | 34.0 lbs/day |
| | 1 Hour Avg. - Acute | 64.5 mg/l as N | 268.8 lbs/day |
| Spring | 4 Day Avg. - Chronic | 8.2 mg/l as N | 0.0 lbs/day |
| | 1 Hour Avg. - Acute | 64.5 mg/l as N | 0.0 lbs/day |

Acute limit calculated with an Acute Zone of Initial Dilution (ZID) to be equal to 100.%. .

**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 | 0.05 | lbs/day |
| | 1 Hour Avg. - Acute | 0.019 | mg/l | 0.08 | lbs/day |
| Fall | 4 Day Avg. - Chronic | 0.011 | mg/l | 0.05 | lbs/day |
| | 1 Hour Avg. - Acute | 0.019 | mg/l | 0.08 | lbs/day |
| Winter | 4 Day Avg. - Chronic | 0.011 | mg/l | 0.05 | lbs/day |
| | 1 Hour Avg. - Acute | 0.019 | mg/l | 0.08 | 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 | 1206.5 | mg/l | 2.51 | tons/day |
| Fall | Maximum, Acute | 1206.5 | mg/l | 2.51 | tons/day |
| Winter | Maximum, Acute | 1206.5 | mg/l | 2.51 | tons/day |
| Spring | 4 Day Avg. - Chronic | 1206.5 | mg/l | 2.51 | 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 238.79 mg/l):

| | 4 Day Average | | 1 Hour Average | | Load |
|--------------|---------------|-------------|----------------|------|--------------|
| | Concentration | Load | Concentration | Load | |
| Aluminum | N/A | N/A | 759.7 | ug/l | 3.2 lbs/day |
| Arsenic | 192.45 ug/l | 0.5 lbs/day | 344.4 | ug/l | 1.4 lbs/day |
| Cadmium | 0.52 ug/l | 0.0 lbs/day | 5.2 | ug/l | 0.0 lbs/day |
| Chromium III | 178.05 ug/l | 0.5 lbs/day | 3,725.5 | ug/l | 15.5 lbs/day |
| Chromium VI | 11.09 ug/l | 0.0 lbs/day | 16.2 | ug/l | 0.1 lbs/day |
| Copper | 19.87 ug/l | 0.1 lbs/day | 32.2 | ug/l | 0.1 lbs/day |
| Iron | N/A | N/A | 1,012.9 | ug/l | 4.2 lbs/day |
| Lead | 9.75 ug/l | 0.0 lbs/day | 250.4 | ug/l | 1.0 lbs/day |
| Mercury | 0.01 ug/l | 0.0 lbs/day | 2.4 | ug/l | 0.0 lbs/day |
| Nickel | 110.33 ug/l | 0.3 lbs/day | 992.5 | ug/l | 4.1 lbs/day |
| Selenium | 4.64 ug/l | 0.0 lbs/day | 20.2 | ug/l | 0.1 lbs/day |
| Silver | N/A ug/l | N/A lbs/day | 17.1 | ug/l | 0.1 lbs/day |

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

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|---------|-------------|-------------|-------|------|-------------|
| Zinc | 253.74 ug/l | 0.7 lbs/day | 253.7 | ug/l | 1.1 lbs/day |
| Cyanide | 5.27 ug/l | 0.0 lbs/day | 22.3 | ug/l | 0.1 lbs/day |

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

| | | |
|--------|--------------|-------------|
| Summer | 22.0 Deg. C. | 71.6 Deg. F |
| Fall | 14.0 Deg. C. | 57.2 Deg. F |
| Winter | 6.0 Deg. C. | 42.8 Deg. F |
| Spring | 14.0 Deg. C. | 57.2 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 | 9.67E-03 lbs/day |
| Chlordane | 4.30E-03 ug/l | 1.79E-02 lbs/day | 1.2E+00 | ug/l | 7.74E-03 lbs/day |
| DDT, DDE | 1.00E-03 ug/l | 4.17E-03 lbs/day | 5.5E-01 | ug/l | 3.55E-03 lbs/day |
| Dieldrin | 1.90E-03 ug/l | 7.92E-03 lbs/day | 1.3E+00 | ug/l | 8.06E-03 lbs/day |
| Endosulfan | 5.60E-02 ug/l | 2.33E-01 lbs/day | 1.1E-01 | ug/l | 7.09E-04 lbs/day |
| Endrin | 2.30E-03 ug/l | 9.59E-03 lbs/day | 9.0E-02 | ug/l | 5.80E-04 lbs/day |
| Guthion | 0.00E+00 ug/l | 0.00E+00 lbs/day | 1.0E-02 | ug/l | 6.45E-05 lbs/day |
| Heptachlor | 3.80E-03 ug/l | 1.58E-02 lbs/day | 2.6E-01 | ug/l | 1.68E-03 lbs/day |
| Lindane | 8.00E-02 ug/l | 3.34E-01 lbs/day | 1.0E+00 | ug/l | 6.45E-03 lbs/day |
| Methoxychlor | 0.00E+00 ug/l | 0.00E+00 lbs/day | 3.0E-02 | ug/l | 1.93E-04 lbs/day |
| Mirex | 0.00E+00 ug/l | 0.00E+00 lbs/day | 1.0E-02 | ug/l | 6.45E-05 lbs/day |
| Parathion | 0.00E+00 ug/l | 0.00E+00 lbs/day | 4.0E-02 | ug/l | 2.58E-04 lbs/day |
| PCB's | 1.40E-02 ug/l | 5.84E-02 lbs/day | 2.0E+00 | ug/l | 1.29E-02 lbs/day |
| Pentachlorophenol | 1.30E+01 ug/l | 5.42E+01 lbs/day | 2.0E+01 | ug/l | 1.29E-01 lbs/day |
| Toxephene | 2.00E-04 ug/l | 8.34E-04 lbs/day | 7.3E-01 | ug/l | 4.71E-03 lbs/day |

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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:

| | 1 Hour Average | |
|------------------------|----------------|---------------|
| | Concentration | Loading |
| Gross Beta (pCi/l) | 50.0 pCi/L | |
| BOD (mg/l) | 5.0 mg/l | 20.8 lbs/day |
| Nitrates as N | 4.0 mg/l | 16.7 lbs/day |
| Total Phosphorus as P | 0.05 mg/l | 0.2 lbs/day |
| Total Suspended Solids | 90.0 mg/l | 375.2 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:

| Toxic Organics | Maximum Concentration | |
|---------------------------|-----------------------|------------------|
| | Concentration | Load |
| Acenaphthene | 2.73E+03 ug/l | 1.14E+01 lbs/day |
| Acrolein | 7.90E+02 ug/l | 3.29E+00 lbs/day |
| Acrylonitrile | 6.69E-01 ug/l | 2.79E-03 lbs/day |
| Benzene | 7.19E+01 ug/l | 3.00E-01 lbs/day |
| Benzidine | ug/l | lbs/day |
| Carbon tetrachloride | 4.46E+00 ug/l | 1.86E-02 lbs/day |
| Chlorobenzene | 2.13E+04 ug/l | 8.87E+01 lbs/day |
| 1,2,4-Trichlorobenzene | | |
| Hexachlorobenzene | 7.80E-04 ug/l | 3.25E-06 lbs/day |
| 1,2-Dichloroethane | 1.00E+02 ug/l | 4.18E-01 lbs/day |
| 1,1,1-Trichloroethane | | |
| Hexachloroethane | 9.02E+00 ug/l | 3.76E-02 lbs/day |
| 1,1-Dichloroethane | | |
| 1,1,2-Trichloroethane | 4.25E+01 ug/l | 1.77E-01 lbs/day |
| 1,1,2,2-Tetrachloroethane | 1.11E+01 ug/l | 4.65E-02 lbs/day |
| Chloroethane | | |
| Bis(2-chloroethyl) ether | 1.42E+00 ug/l | 5.91E-03 lbs/day |
| 2-Chloroethyl vinyl ether | | |
| 2-Chloronaphthalene | 4.36E+03 ug/l | 1.82E+01 lbs/day |
| 2,4,6-Trichlorophenol | 6.58E+00 ug/l | 2.74E-02 lbs/day |
| p-Chloro-m-cresol | | |
| Chloroform (HM) | 4.76E+02 ug/l | 1.98E+00 lbs/day |
| 2-Chlorophenol | 4.05E+02 ug/l | 1.69E+00 lbs/day |
| 1,2-Dichlorobenzene | 1.72E+04 ug/l | 7.18E+01 lbs/day |
| 1,3-Dichlorobenzene | 2.63E+03 ug/l | 1.10E+01 lbs/day |

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

| | | |
|------------------------------|---------------|------------------|
| 1,4-Dichlorobenzene | 2.63E+03 ug/l | 1.10E+01 lbs/day |
| 3,3'-Dichlorobenzidine | 7.80E-02 ug/l | 3.25E-04 lbs/day |
| 1,1-Dichloroethylene | 3.24E+00 ug/l | 1.35E-02 lbs/day |
| 1,2-trans-Dichloroethylene1 | | |
| 2,4-Dichlorophenol | 8.00E+02 ug/l | 3.34E+00 lbs/day |
| 1,2-Dichloropropane | 3.95E+01 ug/l | 1.65E-01 lbs/day |
| 1,3-Dichloropropylene | 1.72E+03 ug/l | 7.18E+00 lbs/day |
| 2,4-Dimethylphenol | 2.33E+03 ug/l | 9.71E+00 lbs/day |
| 2,4-Dinitrotoluene | 9.22E+00 ug/l | 3.84E-02 lbs/day |
| 2,6-Dinitrotoluene | | |
| 1,2-Diphenylhydrazine | 5.47E-01 ug/l | 2.28E-03 lbs/day |
| Ethylbenzene | 2.94E+04 ug/l | 1.22E+02 lbs/day |
| Fluoranthene | 3.75E+02 ug/l | 1.56E+00 lbs/day |
| 4-Chlorophenyl phenyl ether | | |
| 4-Bromophenyl phenyl ether | | |
| Bis(2-chloroisopropyl) ether | 1.72E+05 ug/l | 7.18E+02 lbs/day |
| Bis(2-chloroethoxy) methane | | |
| Methylene chloride (HM) | 1.62E+03 ug/l | 6.76E+00 lbs/day |
| Methyl chloride (HM) | | |
| Methyl bromide (HM) | | |
| Bromoform (HM) | 3.65E+02 ug/l | 1.52E+00 lbs/day |
| Dichlorobromomethane(HM) | 2.23E+01 ug/l | 9.29E-02 lbs/day |
| Chlorodibromomethane (HM) | 3.44E+01 ug/l | 1.44E-01 lbs/day |
| Hexachlorocyclopentadiene | 1.72E+04 ug/l | 7.18E+01 lbs/day |
| Isophorone | 6.08E+02 ug/l | 2.53E+00 lbs/day |
| Naphthalene | | |
| Nitrobenzene | 1.92E+03 ug/l | 8.02E+00 lbs/day |
| 2-Nitrophenol | | |
| 4-Nitrophenol | | |
| 2,4-Dinitrophenol | 1.42E+04 ug/l | 5.91E+01 lbs/day |
| 4,6-Dinitro-o-cresol | 7.75E+02 ug/l | 3.23E+00 lbs/day |
| N-Nitrosodimethylamine | 8.20E+00 ug/l | 3.42E-02 lbs/day |
| N-Nitrosodiphenylamine | 1.62E+01 ug/l | 6.76E-02 lbs/day |
| N-Nitrosodi-n-propylamine | 1.42E+00 ug/l | 5.91E-03 lbs/day |
| Pentachlorophenol | 8.31E+00 ug/l | 3.46E-02 lbs/day |
| Phenol | 4.66E+06 ug/l | 1.94E+04 lbs/day |
| Bis(2-ethylhexyl)phthalate | 5.98E+00 ug/l | 2.49E-02 lbs/day |
| Butyl benzyl phthalate | 5.27E+03 ug/l | 2.20E+01 lbs/day |
| Di-n-butyl phthalate | 1.22E+04 ug/l | 5.07E+01 lbs/day |
| Di-n-octyl phthlate | | |
| Diethyl phthalate | 1.22E+05 ug/l | 5.07E+02 lbs/day |
| Dimethyl phthlate | 2.94E+06 ug/l | 1.22E+04 lbs/day |
| Benzo(a)anthracene (PAH) | 3.14E-02 ug/l | 1.31E-04 lbs/day |
| Benzo(a)pyrene (PAH) | 3.14E-02 ug/l | 1.31E-04 lbs/day |
| Benzo(b)fluoranthene (PAH) | 3.14E-02 ug/l | 1.31E-04 lbs/day |
| Benzo(k)fluoranthene (PAH) | 3.14E-02 ug/l | 1.31E-04 lbs/day |
| Chrysene (PAH) | 3.14E-02 ug/l | 1.31E-04 lbs/day |
| Acenaphthylene (PAH) | | |
| Anthracene (PAH) | | |
| Dibenzo(a,h)anthracene (PAH) | 3.14E-02 ug/l | 1.31E-04 lbs/day |
| Indeno(1,2,3-cd)pyrene (PAH) | 3.14E-02 ug/l | 1.31E-04 lbs/day |

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

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|---------------------|---------------|------------------|
| Pyrene (PAH) | 1.11E+04 ug/l | 4.65E+01 lbs/day |
| Tetrachloroethylene | 9.02E+00 ug/l | 3.76E-02 lbs/day |
| Toluene | 2.03E+05 ug/l | 8.45E+02 lbs/day |
| Trichloroethylene | 8.20E+01 ug/l | 3.42E-01 lbs/day |
| Vinyl chloride | 5.32E+02 ug/l | 2.22E+00 lbs/day |

Pesticides

| | | |
|--------------------|---------------|------------------|
| Aldrin | 1.42E-04 ug/l | 5.91E-07 lbs/day |
| Dieldrin | 1.42E-04 ug/l | 5.91E-07 lbs/day |
| Chlordane | 5.98E-04 ug/l | 2.49E-06 lbs/day |
| 4,4'-DDT | 5.98E-04 ug/l | 2.49E-06 lbs/day |
| 4,4'-DDE | 5.98E-04 ug/l | 2.49E-06 lbs/day |
| 4,4'-DDD | 8.51E-04 ug/l | 3.55E-06 lbs/day |
| alpha-Endosulfan | 2.03E+00 ug/l | 8.45E-03 lbs/day |
| beta-Endosulfan | 2.03E+00 ug/l | 8.45E-03 lbs/day |
| Endosulfan sulfate | 2.03E+00 ug/l | 8.45E-03 lbs/day |
| Endrin | 8.20E-01 ug/l | 3.42E-03 lbs/day |
| Endrin aldehyde | 8.20E-01 ug/l | 3.42E-03 lbs/day |
| Heptachlor | 2.13E-04 ug/l | 8.87E-07 lbs/day |
| Heptachlor epoxide | | |

PCB's

| | | |
|--------------------------|---------------|------------------|
| PCB 1242 (Arochlor 1242) | 4.56E-05 ug/l | 1.90E-07 lbs/day |
| PCB-1254 (Arochlor 1254) | 4.56E-05 ug/l | 1.90E-07 lbs/day |
| PCB-1221 (Arochlor 1221) | 4.56E-05 ug/l | 1.90E-07 lbs/day |
| PCB-1232 (Arochlor 1232) | 4.56E-05 ug/l | 1.90E-07 lbs/day |
| PCB-1248 (Arochlor 1248) | 4.56E-05 ug/l | 1.90E-07 lbs/day |
| PCB-1260 (Arochlor 1260) | 4.56E-05 ug/l | 1.90E-07 lbs/day |
| PCB-1016 (Arochlor 1016) | 4.56E-05 ug/l | 1.90E-07 lbs/day |

Pesticide

| | | |
|-----------|---------------|------------------|
| Toxaphene | 7.60E-04 ug/l | 3.17E-06 lbs/day |
|-----------|---------------|------------------|

Metals

| | | |
|----------------|------|---------|
| Antimony | ug/l | lbs/day |
| Arsenic | ug/l | lbs/day |
| Asbestos | ug/l | lbs/day |
| Beryllium | | |
| Cadmium | | |
| Chromium (III) | | |
| Chromium (VI) | | |
| Copper | ug/l | lbs/day |
| Cyanide | ug/l | lbs/day |
| Lead | | |
| Mercury | ug/l | lbs/day |
| Nickel | ug/l | lbs/day |
| Selenium | | |
| Silver | | |
| Thallium | ug/l | lbs/day |
| Zinc | | |

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

Dioxin
Dioxin (2,3,7,8-TCDD) 1.42E-08 ug/l 5.91E-11 lbs/day

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

| | Class 4 Acute Agricultural ug/l | Class 3 Acute Aquatic Wildlife ug/l | Acute Toxics Drinking Water Source ug/l | Acute Toxics Wildlife ug/l | 1C Acute Health Criteria ug/l | Acute Most Stringent ug/l | Class 3 Chronic Aquatic Wildlife ug/l |
|----------------|--|--|--|---|--|--|--|
| Aluminum | | 759.7 | | | | 759.7 | N/A |
| Antimony | | | | 4355.6 | | 4355.6 | |
| Arsenic | | 344.4 | | | 0.0 | 344.4 | 192.4 |
| Barium | | | | | | 0.0 | |
| Beryllium | | | | | | 0.0 | |
| Cadmium | | 5.2 | | | 0.0 | 5.2 | 0.5 |
| Chromium (III) | | 3725.5 | | | 0.0 | 3725.5 | 178.1 |
| Chromium (VI) | | 16.2 | | | 0.0 | 16.16 | 11.09 |
| Copper | | 32.2 | | | | 32.2 | 19.9 |
| Cyanide | | 22.3 | 222844.2 | | | 22.3 | 5.3 |
| Iron | | 1012.9 | | | | 1012.9 | |
| Lead | | 250.4 | | | 0.0 | 250.4 | 9.7 |
| Mercury | | 2.43 | | 0.15 | 0.0 | 0.15 | 0.012 |
| Nickel | | 992.5 | | 4659.5 | | 992.5 | 110.3 |
| Selenium | | 20.2 | | | 0.0 | 20.2 | 4.6 |
| Silver | | 17.1 | | | 0.0 | 17.1 | |
| Thallium | | | | 6.4 | | 6.4 | |
| Zinc | | 253.7 | | | | 253.7 | 253.7 |
| Boron | 759.7 | | | | | 759.7 | |

Summary Effluent Limitations for Metals [Wasteload Allocation, TMDL]
[If Acute is more stringent than Chronic, then the Chronic takes on the Acute value.]

| | WLA Acute ug/l | WLA Chronic ug/l |
|----------------|---------------------------|-----------------------------|
| Aluminum | 759.7 | N/A |
| Antimony | 4355.59 | |
| Arsenic | 344.4 | 192.4 |
| Asbestos | 0.00E+00 | |
| Barium | | |
| Beryllium | | |
| Cadmium | 5.2 | 0.5 |
| Chromium (III) | 3725.5 | 178 |
| Chromium (VI) | 16.2 | 11.1 |
| Copper | 32.2 | 19.9 |

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

| | | |
|----------|--------|-------|
| Cyanide | 22.3 | 5.3 |
| Iron | 1012.9 | |
| Lead | 250.4 | 9.7 |
| Mercury | 0.152 | 0.012 |
| Nickel | 992.5 | 110 |
| Selenium | 20.2 | 4.6 |
| Silver | 17.1 | N/A |
| Thallium | 6.4 | |
| Zinc | 253.7 | 253.7 |
| Boron | 759.70 | |

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 NOT Required

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
Salt Lake City, Utah**

XIII. Notice of UPDES Requirement

This Addendum to the Statement of Basis does not authorize any entity or party to discharge to the waters of the State of Utah. That authority is granted through a UPDES permit issued by the Utah Division of Water Quality. The numbers presented here may be changed as a function of other factors. Dischargers are strongly urged to contact the Permits Section for further information. Permit writers may utilize other information to adjust these limits and/or to determine other limits based upon best available technology and other considerations provided that the values in this wasteload analysis [TMDL] are not compromised. See special provisions in Utah Water Quality Standards for adjustments in the Total Dissolved Solids values based upon background concentration.

THIS IS A DRAFT DOCUMENT

Utah Division of Water Quality
801-538-6052
File Name: EnergyQueen_WLA_2-28-13

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Salt Lake City, Utah**

APPENDIX - Coefficients and Other Model Information

| | | | | | | | |
|--|---|---|---|--|---|--|---|
| CBOD Coeff. (Kd)20 1/day 2.000 | CBOD Coeff. FORCED (Kd)/day 0.000 | CBOD Coeff. (Ka)T 1/day 0.875 | REAER. Coeff. (Ka)20 (Ka)/day 925.945 | REAER. Coeff. FORCED 1/day 0.000 | REAER. Coeff. (Ka)T 1/day 604.207 | NBOD Coeff. (Kn)20 1/day 0.400 | NBOD Coeff. (Kn)T 1/day 0.100 |
| Open Coeff. (K4)20 1/day 0.000 | Open Coeff. (K4)T 1/day 0.000 | NH3 LOSS (K5)20 1/day 4.000 | NH3 (K5)T 1/day 1.750 | NO2+NO3 LOSS (K6)20 1/day 0.000 | NO2+NO3 (K6)T 1/day 0.000 | TRC Decay K(CI)20 1/day 32.000 | TRC K(CI)(T) 1/day 11.211 |
| BENTHIC DEMAND (SOD)20 gm/m2/day 1.000 | BENTHIC DEMAND (SOD)T gm/m2/day 0.322 | | | | | | |
| K1 CBOD {theta} 1.0 | K2 Reaer. {theta} 1.0 | K3 NH3 {theta} 1.1 | K4 Open {theta} 1.0 | K5 NH3 Loss {theta} 1.0 | K6 NO2+3 {theta} 1.0 | K(CI) TRC {theta} 1.1 | S Benthic {theta} 1.1 |

