

**FACT SHEET STATEMENT OF BASIS
UTAH POLLUTANT DISCHARGE ELIMINATION SYSTEM
GENERAL PERMIT FOR TREATED GROUND WATER
PERMIT NUMBER UTG790000**

APPROPRIATENESS OF THE GENERAL PERMIT AND BACKGROUND

Utah Administrative Code (UAC) Section R317-8-2 authorizes the issuance of general Utah Pollutant Discharge Elimination System (UPDES) permits to categories of point sources within the same geographical area which involve similar type of operations, discharge the same types of wastes, and require similar effluent limitations and pollution control measures. Gas station type facilities with Standard Industrial Classification (SIC) code 5541 and National American Industry Classification System (NAICS) code 447110 are the most common permit applicants for the Treated Ground Water Permit.

In Utah, approximately 10,000 underground storage tanks (USTs) are used for storing petroleum products and other hazardous substances. It is estimated that approximately one-third of these USTs are leaking or have leaked hazardous substances. In an effort to help protect ground water and public health, the Utah Division of Environmental Response and Remediation (DERR) has developed and implemented UST regulations. These regulations govern cleanup operations for areas which have been contaminated by petroleum products from leaking USTs. Cleanup often consists of pumping contaminated ground water, treating it, and then discharging the treated effluent directly to surface waters, or to a municipal sewer system, or re-injecting it back into the ground. For discharges of treated ground water to surface waters or storm drains, an UPDES discharge permit from the Division of Water Quality (DWQ) is required.

Although leaking underground storage tanks (LUSTs) are the most common sources of pollutants getting into ground water, other spills or leaks may introduce contaminants that are remediated using the same equipment and techniques as a LUST site. This general UPDES permit has been adopted by the State of Utah in order to expedite the permitting process and may be used to cover the cleanup of contaminated ground water whenever, in the opinion of the Director of the DWQ, the general permitting criteria are met. These cleanup operations satisfy the criteria for general permit coverage and would be more effectively controlled under a general permit rather than by individual permits.

A petroleum cleanup typically begins with an effort to recover any free-phase petroleum product. Pumping contaminated ground water and/or floating product to above ground storage tanks or oil/water separators accomplish this. The wastewater then generally requires additional treatment to remove the dissolved organic compounds prior to discharge. Additional treatment may include, but is not limited to, air sparging/stripping and/or granular activated carbon adsorption.

COVERAGE UNDER THE GENERAL PERMIT

This general UPDES permit shall apply to discharges of treated ground water that has been produced at petroleum cleanup operations located in the State of Utah. Anyone wishing to be considered eligible for coverage under the permit must submit a completed Notice of Intent (NOI) application form, which is available upon request from DWQ. After receipt of a completed NOI the Director may deny coverage, request additional information, or authorize the discharge by signing the NOI.

Any owner or operator who feels that coverage under this general permit is not appropriate may request to be excluded from coverage by applying for an individual permit. The Director may approve or deny this request. In addition, the Director may require any person authorized by this general permit to apply for and obtain an individual permit. Last, no discharges to Category 1 or 2 (as defined by *UAC R317-2-3*) waters will be authorized under this permit.

DESCRIPTION OF DISCHARGE AND LOCATION(S)

Petroleum products are mixtures of hydrocarbon compounds with a broad range of physical, chemical, and toxicological properties and chemical composition. Consequently, the concentration of pollutants in wastewaters generated from petroleum leaks is highly variable. See the "*EPA 1986 Technical Report, Interim Report – Fate and Transport of Substances Leaking from Underground Storage Tanks*" for more information on the constituents of petroleum products. Of the types of hydrocarbons found in petroleum products, the aromatics are generally known to be most toxic and, therefore, pose the greatest potential for impact on human health and the environment. Of the aromatics known to be present in gasoline and diesel fuels, the ones that are listed as hazardous substances and/or priority toxics include benzene, toluene, ethylbenzene, xylene (BTEX), and naphthalene. Their concentrations in contaminated ground water will vary depending on the fuel composition and the volatility and solubility of the compound. They will be limited in the permit based on treatability and toxicity data. Lead (in the form of tetraethyl lead) and methyl-tertiary-butyl-ether (MTBE) which were common gasoline additives, must also be addressed and limited based on water quality criteria.

The authorization to discharge provided under this permit is limited to those outfalls specifically designated in the NOI as discharge locations. Discharges at any location not authorized under a UPDES permit are a violation of the Utah Water Quality Act (*Act*) and may be subject to penalties under the *Act*. Knowingly discharging from an unauthorized location or failing to report an unauthorized discharge may be subject to criminal penalties as provided under the *Act*.

WASTE LOAD ANALYSIS AND ANTIDegradation REVIEW

Effluent limitations may also be derived using a Waste Load Analysis (WLA), which is appended to this statement of basis as an ADDENDUM. The WLA incorporates Secondary Treatment Standards, Water Quality Standards, Antidegradation Reviews (ADR), as appropriate, and designated uses into a water quality model that projects the effects of discharge concentrations on receiving water quality. Based on historic information the WLA was evaluated twice; once for waters with designate use Class 1C and again for waters without the Class 1C designated use.

The ADR Level II review evaluated typical conditions of a project based on cleanup of legacy petroleum contamination for project duration, effluent quality, and effluent quantity. The DWQ concluded that a site specific ADR Level II will be required if a project discharges to Class 1C water and will last greater than one year. The WLA indicates that the effluent limitations should be sufficiently protective of water quality in order to meet State water quality standards in the receiving waters.

BASIS FOR EFFLUENT LIMITATIONS

Discharging facilities will be required to meet all effluent limitations based upon applicable federal and state regulations. Applicable state requirements are found in *Utah Administrative Code (UAC) R-317*. In cases where multiple limits have been developed, those that are more stringent apply. In cases where no limits have been developed, Best Professional Judgment (BPJ) may be used where applicable.

A flow limitation of 100 gpm has been included in the permit. The flow limitation is based on the flow used in the Waste Load Analysis (WLA) and is based on BPJ of typical ground water remediation projects and underground storage tank removal projects.

The pH is limited by Utah secondary treatment standards, *UAC R317-1-3.2D*, to the range of 6.5 to 9.0 standard units.

The total suspended solids (TSS) effluent limitations of 25 mg/L for an average monthly concentration and 35 mg/L for an average weekly concentration are based on the Utah secondary treatment standards contained in the *Utah Wastewater Disposal Regulations, UAC Section R317-1-3.2B*. The maximum daily TSS concentration allowed is 70 mg/L, which is based on BPJ and is the same as in the previous permit.

The total dissolved solids (TDS) maximum daily effluent limitation will be 2,000 mg/L based on the WLA. In addition, if the discharge is within the Colorado River Basin the TDS effluent wasteload limitation will be 1 ton TDS per day based on the requirements of the Colorado River Basin Salinity Control Forum. It is the responsibility of the permittee to maintain annual TDS loading information and submit it to the Director.

Lead will be limited at different concentrations in the permit based on state water quality criteria for the designated use based on the WLA.

The Oil & Grease effluent limitation of 10 mg/L and no visible sheen or floating solids are based on BPJ.

Volatile Compounds

Several of the individual constituents of petroleum fuels will also be included in the permit effluent limitations. Benzene, toluene, ethylbenzene, and naphthalene are included because they are the components of gasoline that have been identified as toxic pollutants in the Clean Water Act. Xylene is included because it is one of the contaminants of concern to be regulated under the Safe Drinking Water Act of 1986.

EPA has developed a model National Pollutant Discharge Elimination System (NPDES) permit for discharges resulting from the cleanup of gasoline released from USTs. The model permit provides effluent limitations for surface water discharges from corrective actions at gasoline UST sites. The limits are based on the characterization of constituents commonly found in gasoline. The permit was developed to assist permitting authorities by recommending specific effluent limitations, standard conditions, and special conditions for inclusion in all NPDES permits for discharges from these sites.

Of the aromatics known to be present in gasoline and diesel fuels, the ones that are listed as hazardous substances and/or priority toxics include naphthalene. Naphthalene has been present in detectable concentration in the effluent of greater than 10% of historic projects. Naphthalene's effluent limitation is based on BPJ and is the same as in the previous permit.

Benzene, for which the EPA Office of Drinking Water has issued a health advisory, is a known human carcinogen. The EPA has set the Maximum Contaminant Level (MCL) for benzene in drinking water at 0.005 mg/L. In addition, EPA's model permit recommends an effluent limitation of 0.005 mg/L. The effluent limit for Benzene in this renewal permit is the same as in the previous permit.

The aggregate BTEX parameter's effluent limitation will be set equal to EPA's model permit at 0.1 mg/L and is the same as in the previous permit.

MTBE is included as a pollutant of concern with the effluent limitation based on BPJ and is the same as in the previous permit.

Total Toxic Organics

The aromatic chemicals are the primary sources of concern at cleanup sites. However, many of the toxic organics may be found in contaminated ground water. They are often used as solvents or as oil additives to extend the useful life of oils. Although there are variations of toxicity among the toxic organic pollutants, a number are known carcinogens and many pose significant environmental hazards. Since there are potential adverse effects associated with these organics, they must also be addressed. The control of toxic organics will be achieved in this permit by setting an effluent limit for total toxic organics (TTO). Other detectable organic chemicals will be limited on a case-by-case basis. TTO is defined as the sum of the concentrations of the specific toxic organic compounds (listed in Table B of the NOI) found in the wastewater discharge. For Class 1C waters permittee will be required to sample all of the TTOs on a quarterly basis.

For receiving waters which do not have designated use Class 1C, the permittee may be required to do an initial screening for all of the priority toxics that may be present in concentrations greater than 0.01 mg/L for the NOI submittal (See Table B of the NOI for a full list of the total toxic organics). From then on, only those organics that showed up in a concentration greater than 0.01 mg/L in the screening of the influent to the treatment system will be required to be sampled for and included in the TTO analysis of the effluent.

The maximum daily effluent limitation for TTO is 2.0 mg/L and is the same as in the previous permit. This is similar to the EPA pretreatment standards for TTO in several industries in which toxic organics are a concern, such as the "Electroplating and Metal Finishing" and the "Electrical and Electronic Components" categories. Organics generally have a higher solubility in hydrocarbons than in water and are therefore present in highest concentrations in the oily waste stream of the wastewater. Since the treatment systems employed in these cleanup projects are designed to remove the waste oil, they should sufficiently reduce organic chemicals as well.

For receiving waters which do not have designated use Class 1C, Total Petroleum Hydrocarbon (TPH) analyses may be substituted for the TTO analyses upon approval from the Director. It is the permittee's responsibility to petition the Director. The Director may then approve, partially approve, or deny the request based on all available information. If approval is given, the modification will take place without a public notice.

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

This general permit has effluent limitations and monitoring provisions for discharges to *Category 3 waters with designated use Class 1C Drinking Water* as well as for discharges to *all other Category 3 waters*. These designations were made to address the different water quality standards of the receiving waters and the requirements for Antidegradation Review. Designated uses of Waters of the State are listed in *Utah Administrative Code (UAC) R317-2-13*.

These effluent limitations cover discharges to receiving waters with designated use which **INCLUDES** Class 1C. (Protected for domestic purposes with prior treatment)

Specific Limitations for Discharges to Category 3 Waters with Designated Class 1C Drinking Waters Use

Effluent Characteristics ^{b. c.}	Effluent Limitations ^{a.}			
	Daily Minimum	Daily Maximum	Average Weekly ^{d.}	Average Monthly ^{d.}
Flow, gpm		100		
pH, SU	6.5	9.0		
Total Suspended Solids, mg/L		70	35	25
Total Dissolved Solids, mg/L		2,000 ^{e.}		
Total Lead, mg/L		0.038		
Oil & Grease, mg/L		10		
Benzene, mg/L		0.005		
BTEX, mg/L ^{f.}		0.1		
MTBE, mg/L		0.2		
Naphthalene, mg/L		0.7		
Total Toxic Organics		2.0		
Individual Toxic Organics		^{g.}		

- a. See Definitions, *Part VI.A* for definition of terms.
- b. There shall be no visible sheen or floating solids or visible foam other than in trace amounts.
- c. There shall be no discharge of sanitary wastes or process water other than the treated ground water.
- d. Average Weekly and Average Monthly Effluent Limitations will not apply if discharge occurs only once during project coverage as a continuous discharge not lasting more than 48 hours.
- e. In addition to the TDS concentration limitation, facilities discharging into watersheds within the Colorado River Basin shall not discharge more than 1.0 ton per day of TDS as a sum from all discharge points. It is the responsibility of the permittee to maintain annual TDS loading information and submit it to the Director.
- f. BTEX shall be measured as the sum of benzene, ethylbenzene, toluene, and xylenes.

- g. Those toxic organics that were detected at concentrations greater than 0.01 mg/L or greater than the drinking water maximum contaminant level (MCL) in the initial influent screening are required to be analyzed for during discharge. Organic chemicals detected in concentrations greater than 0.01 mg/L or the MCL shall have discharge limitations established on a case-by-case basis. These additional effluent limitations will be specified in the DWQ section of the NOI.

Self-Monitoring Requirements for Discharges to Category 3 Waters with Designated Class 1C Drinking Waters Use

Influent Characteristics	Monitoring Requirements ^{a.}	
	Measurement Frequency	Sample Type
Total Toxic Organics (TTOs)	Prior to submission of the NOI ^{h.}	Grab
	Quarterly	

Effluent Characteristics ^{b. c.}	Monitoring Requirements	
	Measurement Frequency	Sample Type
Flow, gpm	2/month	Measured
pH, SU	2/month	Measured
Total Suspended Solids, mg/L	Monthly	Grab
Total Dissolved Solids, mg/L	Monthly	Grab
Total Lead, mg/L	Monthly	Grab
Oil & Grease, mg/L	Monthly	Grab
Benzene, mg/L	2/month	Grab
BTEX, mg/L ^{i.}	2/month	Grab
MTBE, mg/L	2/month	Grab
Naphthalene, mg/L	Monthly	Grab
Total Toxic Organics	Monthly	Grab
Individual Toxic Organics ^{i.}	Monthly	Grab

h. A source sample analyzed for TTOs must be included with the notice of intent.

i. If a new toxic organic is detected at concentrations greater than 0.01 mg/L or greater than the drinking water MCL not previously detected. The permittee shall notify the Division of Water Quality immediately within having knowledge of the detection. A new effluent limitation or monitoring requirements maybe added at that time by DWQ.

Additional monitoring shall be required for facilities that discharge into watersheds on the Utah state 303(d) list of impaired waters. These facilities shall be required to monitor for the pollutant(s) that contribute to the impairment for these waters. For projects temporary and limited in nature DWQ will incorporate for monitoring purposes only, any additional sampling data for parameters of concern. Longer term projects will be assigned monitoring and maybe assigned an effluent limitation on a case-by-case basis.

These effluent limitations cover discharges to Category 3 receiving waters with designated uses which **DO NOT** include Class 1C. (Protected for domestic purposes with prior treatment)

Specific Limitations for Discharges to all other Category 3 Waters

Effluent Characteristics ^{b, c.}	Effluent Limitations ^{a.}			
	Daily Minimum	Daily Maximum	Average Weekly ^{d.}	Average Monthly ^{d.}
Flow, gpm		100		
pH, SU	6.5	9.0		
Total Suspended Solids, mg/L		70	35	25
Total Dissolved Solids, mg/L		2,000 ^{f.}		
Total Lead, mg/L		0.36		
Oil & Grease, mg/L		10		
Benzene, mg/L ^{f.}		0.005		
BTEX, mg/L ^{f.}		0.1		
MTBE, mg/L		0.2		
Naphthalene, mg/L		0.7		
Total Toxic Organics		2.0 ^{h.}		
Individual Toxic Organics		^{g, h.}		
TPH-GRO, mg/L ^{h.}		1.0		
TPH-DRO, mg/L ^{h.}		1.0		

- a. See Definitions, *Part IV.A* for definition of terms.
- b. There shall be no visible sheen or floating solids or visible foam other than in trace amounts.
- c. There shall be no discharge of sanitary wastes or process water other than the treated ground water.
- d. Average Weekly and Average Monthly Effluent Limitations will not apply if discharge occurs only once during project coverage as a continuous discharge not lasting more than 48 hours.
- e. BTEX shall be measured as the sum of benzene, ethylbenzene, toluene, and xylenes.
- f. In addition to the TDS concentration limitation, facilities discharging into watersheds within the Colorado River Basin shall not discharge more than 1.0 ton per day of TDS as a sum from all discharge points. It is the responsibility of the permittee to maintain annual TDS loading information and submit it to the Director.
- g. Only those toxic organics that were present in concentrations greater than 0.01 mg/L in the initial influent screening are required to be analyzed for in the TTOs sample of the effluent. Organic chemicals detected in concentrations greater than 0.01 mg/L shall have discharge limitations established on a case-by-case basis. These additional effluent limitations will be specified in the DWQ section of the NOI.
- h. Total Petroleum Hydrocarbon (TPH-GRO and TPH-DRO) analyses may be substituted for the TTO analyses upon approval from the Director. Maximum Daily Effluent limitations of 1.0 mg/L TPH-GRO and TPH-DRO will be substituted for the TTO effluent limitation. It is the permittee's responsibility to petition the Director. Ongoing treatment systems will be required to conduct at least one TTO analysis per permit cycle. The Director may then

approve, partially approve, or deny the request based on all available information. If approval is given, the modification will take place without a public notice.

Self-Monitoring Requirements for Discharges to all other Category 3

Effluent Characteristics ^{c. d.}	Monitoring Requirements	
	Measurement Frequency	Sample Type
Flow, gpm	2/month	Measured
pH, SU	2/month	Measured
Total Suspended Solids, mg/L	Monthly	Grab
Total Dissolved Solids, mg/L	Monthly	Grab
Total Lead, mg/L	Monthly	Grab
Oil & Grease, mg/L	Monthly	Grab
Benzene, mg/L	2/month	Grab
BTEX, mg/L ^{i.}	2/month	Grab
MTBE, mg/L	2/month	Grab
Naphthalene, mg/L	Monthly	Grab
Total Toxic Organics ^{h.}	Monthly	Grab
Individual Toxic Organics ^{h.}	Monthly	Grab
TPH-GRO, mg/L ^{h.}	Monthly	Grab
TPH-DRO, mg/L ^{h.}	Monthly	Grab

In addition to the monitoring requirements above, facilities that discharge into waters on the Utah state 303(d) list of impaired water bodies shall be required to monitor for the pollutant(s) that contribute to the impairment for these waters. For projects temporary and limited in nature DWQ will incorporate, for monitoring purposes only, any additional sampling data for parameters of concern. Longer term projects will be assigned monitoring and maybe assigned an effluent limitation on a case-by-case basis.

BIOMONITORING REQUIREMENTS

As part of a nationwide effort to control toxic discharges, biomonitoring requirements are being included in permits for facilities where effluent toxicity is an existing or potential concern. In Utah, this is done in accordance with the State of Utah's "UPDES Permitting and Enforcement Guidance Document for Whole Effluent Toxicity (WET) Control (Biomonitoring), Division of Water Quality, March 1999." Authority to require effluent biomonitoring is provided in UAC R317-8, Utah Pollutant Discharge Elimination System and UAC R317-2, Water Quality Standards.

Permittees covered under this general permit are not classified as major or significant minor facilities. Based on the result of the WLA, treatment will be conducted to effluent limitations protective of the receiving water's designated use(s). Based on these considerations, there is no reasonable potential for toxicity in the facility's discharge (*per State of Utah's UPDES Permitting and Enforcement Guidance Document for WET Control*) so long as the treatment facilities are operated properly. As such, there will be no numerical WET limitations or WET monitoring requirements in this permit. However, the permit will contain a toxicity limitation re-opener

provision that allows for modification of the permit at any time in the future should additional information indicate the presence of toxicity in any discharges.

STORM WATER REQUIREMENTS

There are no storm water requirements as the permittees do not currently meet the criteria to obtain coverage or include separate permitting provisions, therefore a storm water permit is not required at this time based on *Utah Administrative Code R317-8-3.9*. However, a requirement for a best management practices plan for on-going treatment facilities at the request of the Director is included. In addition, a storm water re-opener provision is included in the permit should a storm water permit be needed in the future, following proper administrative procedures as per *UAC R317-8*, to include any applicable storm water provisions and requirements if appropriate.

PRETREATMENT

There are no pretreatment requirements as the facility does not discharge to a public sanitary sewer. However, any process wastewater that any permittee may discharge to a sanitary sewer system, either as a direct discharge or as a hauled waste, is subject to Federal, State, and local pretreatment regulations. Pursuant to Section 307 of the Clean Water Act, the permittee shall comply with all applicable Federal general pretreatment regulations promulgated, found in *40 CFR 403*, the State's pretreatment requirements found in *UAC R317-8-8*, and any specific local discharge limitations developed by the Publicly Owned Treatment Works (POTW) accepting the waste. Any permittee seeking to discharge process wastewater to the local sanitary sewer system shall coordinate directly with the POTW for monitoring and authorization as required.

SIGNIFICANT CHANGES FROM PREVIOUS PERMIT

The permit was altered to reflect changes in Utah rules for Antidegradation Review in Class 1C waters. A Level II Antidegradation Review was conducted for typical discharges lasting less than one year. Language was included to require a site specific Level II Antidegradation Review for projects discharging to Class 1C waters and lasting longer than one year.

Modeling of the discharge via the WLA process required the development of two sets of effluent limitations. One set of limitations and monitoring requirements for discharges to Waters of the State with Class 1C designated use and one set of limitations and monitoring requirements for Waters of the State without Class 1C designated use. The WLA process also required setting a flow rate for analysis. This flow rate was used to calculate assimilative capacity assigned to effluent limitations, thus a maximum daily effluent limitation for flow rate was added.

The WLA resulted in lowering of the total lead limitation and addition of a total dissolved solids limitation. In addition, clarification was added for the TDS limitation to waters within the Colorado River Basin. In addition, influent monitoring for TTOs was increased to quarterly to ensure that Class 1C waters are being protected. Also the ability to petition to substitute TPH monitoring for TTO monitoring was removed for discharges to Class 1C waters.

The batch discharge option was eliminated. However, language was added that if a one-time per project discharge not lasting longer than 48 hours was conducted that only the daily maximum effluent limitation would apply. This effectively is equivalent to the previous batch discharge option.

PERMIT DURATION

As stated in *UAC R317-8-5.1(1)*, UPDES permits shall be effective for a fixed term not to exceed five (5) years.

Drafted by:

Permit Writer	Ken Hoffman, P.E. 801-536-4313 (kenhoffman@utah.gov)
WLA	Nick Von Stackelberg, P.E.
Colorado Salinity	Matt Garn

PUBLIC COMMENT

Began: XXXXXXXXXXXX, 2016
Ended: XXXXXXXXXXXX, 2016
Public Noticed in the XXXXXXX.

During the public comment period provided under *UAC R317-8-6.5*, any interested person may submit written comments on the draft permit and may request a public hearing, if no hearing has already been scheduled. A request for a public hearing shall be in writing and shall state the nature of the issues proposed to be raised in the hearing. All comments will be considered in making the final decision and shall be answered as provided in *UAC R317-8-6.12*.

No comments were received during the public comment period.

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

Date: September 22, 2015

**Facility: General Permit for Discharge of Treated Groundwater
UPDES No. UTG790000**

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

The maximum daily design discharge is 0.144 MGD (100 gpm) for the facility under this permit.

Receiving Water

For the purposes of this WLA, two tiers of receiving waters were considered: one with and one without drinking water classification. The first tier of receiving water was assumed to be a cold water fishery with recreational and agricultural uses, with designated beneficial uses of 2B, 3A, and 4.

- *Class 2B - Protected for infrequent primary contact recreation. Also protected for secondary contact recreation where there is a low likelihood of ingestion of water or a low degree of bodily contact with the water. Examples include, but are not limited to, wading, hunting, and fishing.*
- *Class 3A - Protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in their food chain.*
- *Class 4 - Protected for agricultural uses including irrigation of crops and stock watering.*

The second tier of receiving water was assumed to be the same as the first tier, with the addition of designated beneficial use 1C for drinking water sources.

- *Class 1C - Protected for domestic purposes with prior treatment by treatment processes as required by the Utah Division of Drinking Water.*

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). For the purposes of this WLA, the critical low flow was assumed to be 1.0 cfs, based on the typical location of treated groundwater discharges downstream from headwaters in urban areas.

Utah Division of Water Quality
Wasteload Analysis
General Permit for Discharge of Treated Groundwater
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TMDL

If the receiving water or downstream waterbodies are listed as impaired for any parameters according to the most current approved 303(d) list, the effluent limit for that parameter will be the water quality criteria per UAC R317-2-14.

Mixing Zone

The maximum allowable mixing zone is 15 minutes of travel time for acute conditions, not to exceed 50% of stream width, and 2,500 feet for chronic conditions, per UAC R317-2-5. Water quality standards must be met at the end of the mixing zone.

The actual length of the mixing zone was not determined; however, it was presumed to remain within the maximum allowable mixing zone dimensions. Acute limits were calculated using 50% of the seasonal critical low flow.

Parameters of Concern

The potential parameters of concern identified for the discharge/receiving water were benzene, BTEX, MTBE, naphthalene, dissolved metals, volatile organic compounds (VOC), total toxic organics (TTO), total suspended solids (TSS), total dissolved solids (TDS), and pH, 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 LC₅₀ (lethal concentration, 50%) percent effluent for acute toxicity and the IC₂₅ (inhibition concentration, 25%) percent effluent for chronic toxicity, as determined by the WET test, needs to be below the WET limits, as determined by the WLA. The WET limit for LC₅₀ is typically 100% effluent and does not need to be determined by the WLA.

Table 1: WET Limits for IC₂₅

Season	Percent Effluent
Annual	18%

Wasteload Allocation Methods

Effluent limits were determined for conservative constituents using a simple mass balance mixing analysis (UDWQ 2012).

Certain dissolved metals standards and conversion factors to total recoverable metals standards are hardness dependent. For the purposes of this WLA, the hardness of the receiving water was assumed to be 200 mg/L (as CaCO₃).

**Utah Division of Water Quality
Wasteload Analysis
General Permit for Discharge of Treated Groundwater
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Effluent Limits

For receiving waters that are classified as drinking water sources (Class 1C), water quality based effluent limits are summarized below in Table 2 and the complete list of WQBELs is presented in Appendix A. For receiving waters without a drinking water classification, WQBELs are summarized below in Table 3 and the complete list of WQBELs is presented in Appendix B.

Table 2: Water Quality Based Effluent Limits Summary for Discharges to Drinking Water Sources

Effluent Constituent	Acute		Chronic	
	Limit	Averaging Period	Limit	Averaging Period
Flow (MGD)	0.144	Maximum	0.144	30 days
Benzene (µg/L)	3.8	Maximum	N/A	
Lead, Total Recoverable (µg /L)	37.8	Maximum	8.7	4 days

Table 3: Water Quality Based Effluent Limits for Discharges Without Drinking Water Classification

Effluent Constituent	Acute		Chronic	
	Limit	Averaging Period	Limit	Averaging Period
Flow (MGD)	0.144	Maximum	0.144	30 days
Benzene (µg/L)	127	Maximum	N/A	
Lead, Total Recoverable (µg /L)	360	Maximum	8.7	4 days

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.

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

Documents:

WLA Document: *treatedgw_wla_2015_final.docx*
Wasteload Analysis: *treatedgw_wla_2015.xlsm*

References:

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

Date: 9/21/2015

WASTELOAD ANALYSIS [WLA]
Appendix A: Mass Balance Mixing Analysis for Conservative Constituents
Applicable to Discharges to Class 1C Drinking Waters

Discharger:	Treated Groundwater from Petroleum Contaminated Sites	
Receiving Stream:	Various	
Stream Classification:	1C, 2B, 3A, 4	
Aquatic Life Class 3:	3A	
Agriculture Class 4:	Yes	
Direct Drinking Water Source:	Yes	
Fishery for Human Consumption:	Yes	
Season:	Annual	
Stream Flow:	1.00 cfs	
Stream Flow [Acute]:	0.50 cfs	
Stream Flow [Chronic]:	1.00 cfs	
Stream Hardness:	200 mg/l as CaCO3	
Effluent Flow:	0.144 MGD	
	0.22 cfs	
Effluent Hardness:	200 mg/l as CaCO3	
Mixed Flow:	1.22 cfs	Dilution Fact. 4.49
Mixed Flow [Acute]	0.72 cfs	
Mixed Flow [Chronic]	1.22 cfs	
Mixed Hardness:	200 mg/l as CaCO3	

Drinking Water (Class 1C Waters)

	Standard	Upstream Concentration	Acute Effluent Limitation
Dissolved Metals			
Arsenic (µg/L)	10.0	6.7	17.4
Barium (µg/L)	1000	670	1741
Beryllium (µg/L)	4.0	2.7	7.0
Cadmium (µg/L)	10.0	6.7	17.4
Chromium (µg/L)	50.0	33.5	87.0
Lead (µg/L)	15.0	10.1	26.1
Mercury (µg/L)	2.0	1.3	3.5
Selenium (µg/L)	50.0	33.5	87.0
Silver (µg/L)	50.0	33.5	87.0
Inorganics			
Bromate (µg/L)	10.0	6.7	17.4
Chlorite (mg/L)	1000	670	1741
Fluoride Min. (mg/L)	1.4	0.9	2.4
Fluoride Max. (mg/L)	2.4	1.6	4.2
Nitrates as N (mg/L)	10.0	6.7	17.4
Organics			
Chlorophenoxy Herbicides			
2,4-D (µg/L)	70.0	46.9	121.8
2,4,5-TP (µg/L)	10.0	6.7	17.4
Methoxychlor (µg/L)	40.0	26.8	69.6

Aquatic Wildlife Criteria (Class 3 Waters)

	Standard	Upstream Concentration	Effluent Limit
Physical			
Temperature (deg C) [Maximum]	20.0		20.0
Temperature Change (deg C) [Maximum]	2.0		2.0
pH [Minimum]	6.5		6.5
pH [Maximum]	9.0		9.0
Turbidity Increase (NTU)	10.0		10.0
Dissolved Oxygen (mg/L) [Minimum]	4.0		4.0
Dissolved Oxygen (mg/L) [7-day Average]	5.0		5.0
Dissolved Oxygen (mg/L) [7-day Average]	6.5		6.5
Inorganics, ug/L			
Hydrogen Sulfide (un-disassociated)	2.0		2.0
Phenol (Maximum)	0.10		0.10
Radiological pCi/l			
Gross Alpha	15.0		15.0
WET Limits			
Percent Effluent	Chronic 18%	Acute 100%	

Utah Division of Water Quality

Chronic Metals, µg/L	Total Recoverable Standard	Conversion Factor	Dissolved Standard ¹	Upstream Concentration ²	Dissolved Effluent Limit	Total Recoverable Effluent
Aluminum	87.00	1.000	87.00	58.29	216	216
Arsenic	150.00	1.000	150.00	100.50	372	372
Cadmium	0.45	0.880	0.40	0.30	0.8	0.9
Chromium III	152.04	0.860	130.75	101.86	260	303
ChromiumVI	11.00	1.000	11.00	7.37	27.3	27.3
Copper	16.87	0.960	16.19	11.30	38.2	39.7
Cyanide	5.20	1.000	5.20	3.48	12.9	12.9
Iron						
Lead	7.69	0.690	5.31	5.15	6.0	8.7
Mercury	0.012	1.000	0.012	0.01	0.030	0.030
Nickel	93.76	0.997	93.48	62.82	231	232
Selenium	4.600	1.000	4.60	3.08	11.4	11.4
Silver						
Tributyltin	0.072	1.000	0.072	0.05	0.18	0.18
Zinc	215.56	0.986	212.55	144.43	518	526

1: Based upon a hardness of 200 mg/l as CaCO₃
 2: Background concentration assumed 67% of chronic standard

Acute Metals, µg/L	Total Recoverable Standard	Conversion Factor	Dissolved Standard ¹	Upstream Concentration ²	Dissolved Effluent Limit	Total Recoverable Effluent Limit
Aluminum	750.00	1.000	750.00	58.29	3855	3855
Arsenic	340.00	1.000	340.00	100.50	1415	1415
Cadmium	4.32	0.915	3.95	0.30	20.3	22.2
Chromium III	3180.89	0.316	1005.16	101.86	5060	16013
ChromiumVI	16.00	1.000	16.00	7.37	54.7	54.7
Copper	26.90	0.960	25.82	11.30	91.0	94.8
Cyanide	22.00	1.000	22.00	3.48	105.1	105.1
Iron	1000.00	1.000	1000.00	500.00	3244	3244
Lead	197.31	0.690	136.14	5.15	724	1049
Mercury	2.40	1.000	2.40	0.01	13.1	13.1
Nickel	843.34	0.998	841.65	62.82	4338	4347
Selenium	18.40	1.000	18.40	3.08	87.2	87.2
Silver	12.47	0.850	10.60	5.30	34.4	40.4
Tributyltin	0.46	1.000	0.46	0.05	2.31	2.31
Zinc	215.56	0.978	210.82	144.43	509	520

1: Based upon a hardness of 200 mg/l as CaCO₃
 2: Background concentration assumed 67% of chronic standard

Organics (µg/L)	Chronic Standard	Acute Standard	Upstream Concentration ¹	Chronic Effluent Limit	Acute Effluent Limit
Acrolein	3.00	3.00	1.50		6.4
Aldrin		1.50	0.75		3.2
Chlordane	0.0043	1.20	0.0022	0.0140	3.9
Chlorpyrifos	0.041	0.083	0.02		0.22
DDT, DDE	0.0010	0.55	0.0005	0.0032	1.78
Diazinon	0.17	0.17	0.09		0.36
Dieldrin	0.056	0.24	0.028	0.182	0.72
Alpha-Endosulfan	0.056	0.11	0.028	0.182	0.29
Beta-Endosulfan	0.056	0.11	0.028	0.182	0.29
Endrin	0.036	0.086	0.018	0.117	0.239
Heptachlor	0.0038	0.26	0.0019	0.0123	0.84
Heptachlor epoxide	0.0038	0.26	0.0019	0.0123	0.84
Lindane	0.08	1.00	0.04	0.26	3.15
Methoxychlor		0.03	0.02		0.06
Mirex		0.001	0.0005		0.002
Nonylphenol	6.6	28.00	3.30		83.4
Parathion	0.013	0.066	0.007		0.20
PCB's	0.014		0.007	0.045	
Pentachlorophenol (varies with pH)	15.00	19.00	7.50	48.7	44.8
Toxaphene	0.0002	0.73	0.0001	0.0006	2.37

1: Background concentration assumed 67% of chronic standard

Numeric Criteria for the Protection of Human Health from Consumption of Fish			
Parameter	Maximum Conc., µg/L	Class 1C (Water and Organism)	
	Standard	Upstream Concentration	Acute Effluent Limitation
Toxic Organics			
Antimony		5.6	3.8
Arsenic			9.7
Beryllium			
Cadmium			
Chromium III			
Chromium VI			
Copper	1300	871	2263
Lead			
Mercury			
Nickel	100	67	174
Selenium			
Silver			
Thallium	0.24	0.16	0.42
Zinc	7400	4958	12881
Cyanide	140	94	244
Asbestos (million fibers/L)	7.0	4.7	12.2
2,3,7,8-TCDD Dioxin	5.00E-09	3.35E-09	8.70E-09
Acrolein	6.0	4.0	10.4
Acrylonitrile	0.051	0.034	0.089
Alachlor	2.0	1.3	3.5
Atrazine	3.0	2.0	5.2
Benzene	2.2	1.5	3.8
Bromoform	4.3	2.9	7.5
Carbofuran	40.0	26.8	69.6
Carbon Tetrachloride	0.23	0.15	0.40
Chlorobenzene	100	67	174
Chlorodibromomethane	0.40	0.27	0.70
Chloroethane			
2-Chloroethylvinyl Ether			
Chloroform	5.7	3.8	9.9
Dalapon	200	134	348
Di(2ethylhexyl)adipate	400	268	696
Dibromochloropropane	0.20	0.13	0.35
Dichlorobromomethane	0.55	0.37	0.96
1,1-Dichloroethane			
1,2-Dichloroethane	0.38	0.25	0.66
1,1-Dichloroethylene	7.0	4.7	12.2
Dichloroethylene (cis-1,2)	70	47	122
Dinoseb	7.0	4.7	12.2
Diquat	20.0	13.4	34.8
1,2-Dichloropropane	0.50	0.34	0.87
1,3-Dichloropropene	0.34	0.23	0.59
Endothall	100	67	174
Ethylbenzene	530	355	923
Ethylene Dibromide	0.05	0.03	0.09
Glyphosate	700	469	1218
Haloacetic acids	60	40	104
Methyl Bromide	47.0	31.5	81.8
Methyl Chloride			
Methylene Chloride	4.6	3.1	8.0
Ocamyl (vidate)	200	134	348
Picloram	500	335	870
Simazine	4.0	2.7	7.0
Styrene	100	67	174
1,1,2,2-Tetrachloroethane	0.17	0.11	0.30
Tetrachloroethylene	0.69	0.46	1.20
Toluene	1000	670	1741
1,2 -Trans-Dichloroethyle	100	67	174
1,1,1-Trichloroethane	200	134	348
1,1,2-Trichloroethane	0.59	0.40	1.03
Trichloroethylene	2.5	1.7	4.4
Vinyl Chloride	0.025	0.017	0.044
Xylenes	10000	6700	17407
2-Chlorophenol	81	54	141
2,4-Dichlorophenol	77	52	134
2,4-Dimethylphenol	380	255	661
2-Methyl-4,6-Dinitrophenol	13.0	8.7	22.6
2,4-Dinitrophenol	69	46	120
2-Nitrophenol			
4-Nitrophenol			
3-Methyl-4-Chlorophenol			
Penetachlorophenol	0.27	0.18	0.47

Parameter	Maximum Conc., µg/L	Class 1C (Water and Organism)	
		Standard	Upstream Concentration
Toxic Organics			
Phenol	10000	6700	17407
2,4,6-Trichlorophenol	1.4	0.9	2.4
Acenaphthene	670	449	1166
Acenaphthylene			
Anthracene	8300	5561	14448
Benzidine	0.000086	0.000058	0.000150
Benzo(a)Anthracene	0.0038	0.0025	0.0066
Benzo(a)Pyrene	0.0038	0.0025	0.0066
Benzofluoranthene	0.0038	0.0025	0.0066
Benzophenanthrene			
Benzokfluoranthene	0.0038	0.0025	0.0066
Bis(2-Chloroethoxy)Methane			
Bis(2-Chloroethyl)Ether	0.03	0.02	0.05
Bis(2-Chloroisopropyl)Ether	1400	938	2437
Bis(2-Ethylhexyl)Phthalate	1.2	0.8	2.1
4-Bromophenyl Phenyl Ether			
Butylbenzyl Phthalate	1500	1005	2611
4-Chlorophenyl Phenyl Ether			
Chrysene	0.0038	0.0025	0.0066
Dibenz(a,h)Anthracene	0.0038	0.0025	0.0066
1,2-Dichlorobenzene	420	281	731
1,3-Dichlorobenzene	320	214	557
1,4-Dichlorobenzene	63	42	110
3,3-Dichlorobenzidine	0.021	0.014	0.037
Diethyl Phthalate	17000	11390	29592
Dimethyl Phthalate	270000	180900	469984
Di-n-Butyl Phthalate	2000	1340	3481
2,4-Dinitrotoluene	0.11	0.07	0.19
2,6-Dinitrotoluene			
DI-n-Octyl Phthalate			
1,2-Diphenylhydrazine	0.036	0.024	0.063
Fluoranthene	130	87	226
Fluorene	1100	737	1915
Hexachlorobenzene	0.00028	0.00019	0.00049
Hexachlorobutadiene	0.44	0.29	0.77
Hexachloroethane	1.4	0.9	2.4
Hexachlorocyclopentadiene	40	27	70
Ideno 1,2,3-cdPyrene	0.0038	0.0025	0.0066
Isophorone	35	23	61
Naphthalene			
Nitrobenzene	17	11	30
N-Nitrosodimethylamine	0.00069	0.00046	0.00120
N-Nitrosodi-n-Propylamine	0.005	0.003	0.009
N-Nitrosodiphenylamine	3.3	2.2	5.7
Phenanthrene			
Pyrene	830	556	1445
1,2,4-Trichlorobenzene	35	23	61
Aldrin	0.000049	0.000033	0.000085
alpha-BHC	0.0026	0.0017	0.0045
beta-BHC	0.0091	0.0061	0.0158
gamma-BHC (Lindane)	0.2	0.1	0.3
delta-BHC			
Chlordane	0.0008	0.0005	0.0014
4,4-DDT	0.00022	0.00015	0.00038
4,4-DDE	0.00022	0.00015	0.00038
4,4-DDD	0.00031	0.00021	0.00054
Dieldrin	0.000052	0.000035	0.000091
alpha-Endosulfan	62	42	108
beta-Endosulfan	62	42	108
Endosulfan Sulfate	62	42	108
Endrin	0.059	0.040	0.103
Endrin Aldehyde	0.029	0.019	0.050
Heptachlor	0.000079	0.000053	0.000138
Heptachlor Epoxide	0.000039	0.000026	0.000068
Polychlorinated Biphenyls	0.000064	0.000043	0.000111
PCB's			
Toxaphene	0.00028	0.00019	0.00049

Agricultural Criteria (Class 4 Waters) - Maximum

Pollutant	Standard	Upstream Concentration	Acute Effluent Limitation
Total Dissolved Solids (mg/L)	1200	804	2089
Arsenic (µg/L)	100	67	248
Boron (µg/L)	750	503	1861
Cadmium (µg/L)	10.0	6.7	24.8
Chromium (µg/L)	100	67	248
Copper (µg/L)	200	134	496
Lead (µg/L)	100	67	248
Selenium (µg/L)	50	34	124

Summary - Dissolved Metals(µg/L)

	Class 1C Human Health	Class 1C Human Health (Drinking Water + Organism)	Class 3 Acute Aquatic Wildlife	Class 4 Agricultural	Acute Most Stringent
Aluminum			3855		3855
Antimony		9.7			9.7
Arsenic	17.4		1415	248	17.4
Barium	1741				1741
Beryllium	7.0				7.0
Cadmium	17.4		20.3	24.8	17.4
Chromium (Total)	87			248	87
Chromium (III)			5060		5060
Chromium (VI)			55		55
Copper		12881	91	496	91
Cyanide		244	105		105
Iron			3244		3244
Lead	26.1		724	248	26
Mercury	3.5		13.1		3.5
Nickel		174	4338		174
Selenium	87.0		87.2	124	87.0
Silver	87.0		34.4		34.4
Thallium		0.4			0.4
Tributyltin			2.3		2.3
Zinc		12881	509		509

Summary - Total Recoverable Metals (µg/L)

	Chronic Total Recoverable Limits	Acute Most Stringent Dissolved Limits	Total Recoverable to Dissolved Fraction Conversion Factor	Acute Most Stringent Total Recoverable Limits
Aluminum	216	3855	1.000	3855
Antimony		9.7		9.7
Arsenic	372	17.4	1.000	17.4
Barium		1741	1.000	1741
Beryllium		7.0		7.0
Cadmium	0.9	17.4	0.915	19.0
Chromium (Total)		87		87
Chromium (III)	303	5060	0.316	16013
Chromium (VI)	27	55	1.000	54.7
Copper	40	91	0.960	95
Cyanide	12.9	105		105
Iron		3244	1.000	3244
Lead	8.7	26.1	0.690	37.8
Mercury	0.030	3.5	0.850	4.1
Nickel	231.8	174	0.998	174
Selenium	11.4	87.0	1.000	87.0
Silver		34.4	0.850	40.4
Thallium		0.42		0.42
Tributyltin	0.18	2.31		2.31
Zinc	526	509	0.978	520

**Total Recoverable to Dissolved Fraction Conversion Factor
 [Laboratory Correction Factor] EPA 823-B 96-007 June 1996**

	ACUTE FACTOR	CHRONIC FACTOR
Aluminum	1.000	1.000
Antimony		
Arsenic	1.000	1.000
Barium	1.000	1.000
Beryllium		
Cadmium	0.915	0.880
Chromium III	0.316	0.860
Chromium VI	1.000	1.000
Copper	0.960	0.960
Cyanide		
Iron	1.000	1.000
Lead	0.690	0.690
Mercury	0.850	1.000
Nickel	0.998	0.997
Selenium	1.000	1.000
Silver	0.850	1.000
Thallium		
Tributyltin		
Zinc	0.978	0.986

* Based upon a hardness of 200 mg/l as CaCO₃

Date: 9/21/2015

WASTELOAD ANALYSIS [WLA]
Appendix B: Mass Balance Mixing Analysis for Conservative Constituents
Applicable to Discharges without Drinking Water Classification

Discharger: Treated Groundwater from Petroleum Contaminated Site

Receiving Stream: Various
 Stream Classification: 2B, 3A, 4
 Aquatic Life Class 3: 3A
 Agriculture Class 4: Yes
 Direct Drinking Water Source: No
 Fishery for Human Consumption: Yes
 Season: Annual
 Stream Flow: 1.00 cfs
 Stream Flow [Acute]: 0.50 cfs
 Stream Flow [Chronic]: 1.00 cfs
 Stream Hardness: 200 mg/l as CaCO3

Effluent Flow: 0.144 MGD
 0.22 cfs
 Effluent Hardness: 200 mg/l as CaCO3

Mixed Flow: 1.22 cfs Dilution Fact. 4.49
 Mixed Flow [Acute]: 0.72 cfs
 Mixed Flow [Chronic]: 1.22 cfs
 Mixed Hardness: 200 mg/l as CaCO3

Aquatic Wildlife Criteria (Class 3 Waters)

Physical	Standard	Upstream Concentration	Effluent Limit
Temperature (deg C) [Maximum]	20.0		20.0
Temperature Change (deg C) [Maximum]	2.0		2.0
pH [Minimum]	6.5		6.5
pH [Maximum]	9.0		9.0
Turbidity Increase (NTU)	10.0		10.0
Dissolved Oxygen (mg/L) [Minimum]	4.0		4.0
Dissolved Oxygen (mg/L) [7-day Average]	5.0		5.0
Dissolved Oxygen (mg/L) [7-day Average]	6.5		6.5

Inorganics, ug/L	Standard	Effluent Limit
Hydrogen Sulfide (un-disassociated)	2.0	2.0
Phenol (Maximum)	0.10	0.10

Radiological pCi/l	Standard	Effluent Limit
Gross Alpha	15.0	15.0

WET Limits	Chronic	Acute
Percent Effluent	18%	100%

Chronic Metals, ug/L	Total Recoverable Standard	Conversion Factor	Dissolved Standard ¹	Upstream Concentration ²	Dissolved Effluent Limit	Total Recoverable Effluent
Aluminum	87.00	1.000	87.00	58.29	216	216
Arsenic	150.00	1.000	150.00	100.50	372	372
Cadmium	0.45	0.880	0.40	0.30	0.8	0.9
Chromium III	152.04	0.860	130.75	101.86	260	303
ChromiumVI	11.00	1.000	11.00	7.37	27.3	27.3
Copper	16.87	0.960	16.19	11.30	38.2	39.7
Cyanide	5.20	1.000	5.20	3.48	12.9	12.9
Iron						
Lead	7.69	0.690	5.31	5.15	6.0	8.7
Mercury	0.012	1.000	0.012	0.01	0.030	0.030
Nickel	93.76	0.997	93.48	62.82	231	232
Selenium	4.600	1.000	4.60	3.08	11.4	11.4
Silver						
Tributyltin	0.072	1.000	0.072	0.05	0.18	0.18
Zinc	215.56	0.986	212.55	144.43	518	526

1: Based upon a hardness of 200 mg/l as CaCO3
 2: Background concentration assumed 67% of chronic standard

Utah Division of Water Quality

Acute Metals, µg/L	Total Recoverable Standard	Conversion Factor	Dissolved Standard ¹	Upstream Concentration ²	Dissolved Effluent Limit	Total Recoverable Effluent Limit
Aluminum	750.00	1.000	750.00	58.29	3855	3855
Arsenic	340.00	1.000	340.00	100.50	1415	1415
Cadmium	4.32	0.915	3.95	0.30	20.3	22.2
Chromium III	3180.89	0.316	1005.16	101.86	5060	16013
ChromiumVI	16.00	1.000	16.00	7.37	54.7	54.7
Copper	26.90	0.960	25.82	11.30	91.0	94.8
Cyanide	22.00	1.000	22.00	3.48	105.1	105.1
Iron	1000.00	1.000	1000.00	500.00	3244	3244
Lead	197.31	0.690	136.14	5.15	724	1049
Mercury	2.40	1.000	2.40	0.01	13.1	13.1
Nickel	843.34	0.998	841.65	62.82	4338	4347
Selenium	18.40	1.000	18.40	3.08	87.2	87.2
Silver	12.47	0.850	10.60	5.30	34.4	40.4
Tributyltin	0.46	1.000	0.46	0.05	2.31	2.31
Zinc	215.56	0.978	210.82	144.43	509	520

1: Based upon a hardness of 200 mg/l as CaCO₃

2: Background concentration assumed 67% of chronic standard

Organics (µg/L)	Chronic Standard	Acute Standard	Upstream Concentration ¹	Chronic Effluent Limit	Acute Effluent Limit
Acrolein	3.00	3.00	1.50		6.4
Aldrin		1.50	0.75		3.2
Chlordane	0.0043	1.20	0.0022	0.0140	3.9
Chlorpyrifos	0.041	0.083	0.02		0.22
DDT, DDE	0.0010	0.55	0.0005	0.0032	1.78
Diazinon	0.17	0.17	0.09		0.36
Dieldrin	0.056	0.24	0.028	0.182	0.72
Alpha-Endosulfan	0.056	0.11	0.028	0.182	0.29
Beta-Endosulfan	0.056	0.11	0.028	0.182	0.29
Endrin	0.036	0.086	0.018	0.117	0.239
Heptachlor	0.0038	0.26	0.0019	0.0123	0.84
Heptachlor epoxide	0.0038	0.26	0.0019	0.0123	0.84
Lindane	0.08	1.00	0.04	0.26	3.15
Methoxychlor		0.03	0.02		0.06
Mirex		0.001	0.0005		0.002
Nonylphenol	6.6	28.00	3.30		83.4
Parathion	0.013	0.066	0.007		0.20
PCB's	0.014		0.007	0.045	
Pentachlorophenol (varies with pH)	15.00	19.00	7.50	48.7	44.8
Toxaphene	0.0002	0.73	0.0001	0.0006	2.37

1: Background concentration assumed 67% of chronic standard

Numeric Criteria for the Protection of Human Health from Consumption of Fish Class 3 (Organism Only)				
Parameter	Maximum Conc., µg/L	Standard	Upstream Concentration	Acute Effluent Limitation
Toxic Organics				
Antimony		640	429	1588
Arsenic				
Beryllium				
Cadmium				
Chromium III				
Chromium VI				
Copper				
Lead				
Mercury				
Nickel		4600	3082	11414
Selenium		4200	2814	10422
Silver				
Thallium		0.47	0.31	1.17
Zinc		26000	17420	64515
Cyanide		140	94	347
Asbestos (million fibers/L)				
2,3,7,8-TCDD		5.10E-09	3.42E-09	1.27E-08
Dioxin				
Acrolein		9.0	6.0	22.3
Acrylonitrile		0.25	0.17	0.62
Alachlor				
Atrazine				
Benzene		51	34	127
Bromoform		140	94	347
Carbofuran				
Carbon Tetrachloride		1.60	1.07	3.97
Chlorobenzene		1600	1072	3970
Chlorodibromomethane		13.0	8.7	32.3
Chloroethane				
2-Chloroethylvinyl Ether				
Chloroform		470	315	1166
Dalapon				
Di(2ethylhexyl)adipate				
Dibromochloropropane				
Dichlorobromomethane		17.0	11.4	42.2
1,1-Dichloroethane				
1,2-Dichloroethane		37.0	24.8	91.8
1,1-Dichloroethylene		7100	4757	17618
Dichloroethylene (cis-1,2)				
Dinoseb				
Diquat				
1,2-Dichloropropane		15.0	10.1	37.2
1,3-Dichloropropene		21.0	14.1	52.1
Endothall				
Ethylbenzene		2100	1407	5211
Ethylene Dibromide				
Glyphosate				
Haloacetic acids				
Methyl Bromide		1500	1005	3722
Methyl Chloride				
Methylene Chloride		590	395	1464
Ocamyl (vidate)				
Picloram				
Simazine				
Styrene				
1,1,2,2-Tetrachloroethane		4.00	2.68	9.93
Tetrachloroethylene		3.30	2.21	8.19
Toluene		15000	10050	37220
1,2 -Trans-Dichloroethyle		10000	6700	24814
1,1,1-Trichloroethane				
1,1,2-Trichloroethane		16.0	10.7	39.7
Trichloroethylene		30.0	20.1	74.4
Vinyl Chloride		2.40	1.61	5.96
Xylenes				
2-Chlorophenol		150	101	372
2,4-Dichlorophenol		290	194	720
2,4-Dimethylphenol		850	570	2109
2-Methyl-4,6-Dinitrophenol		280	188	695
2,4-Dinitrophenol		5300	3551	13151
2-Nitrophenol				
4-Nitrophenol				
3-Methyl-4-Chlorophenol				
Penetachlorophenol		3.0	2.0	7.4

Parameter	Maximum Conc., µg/L	Class 3 (Organism Only)		
		Standard	Upstream Concentration	Acute Effluent Limitation
Toxic Organics				
Phenol	860000		576200	2133971
2,4,6-Trichlorophenol	2.40		1.61	5.96
Acenaphthene	990		663	2457
Acenaphthylene				
Anthracene	40000		26800	99254
Benzidine	0.000200		0.000134	0.000496
Benzo(a)Anthracene	0.018000		0.012060	0.044665
Benzo(a)Pyrene	0.018000		0.012060	0.044665
Benzofluoranthene	0.018000		0.012060	0.044665
Benzophenanthrene				
Benzokfluoranthene	0.018000		0.012060	0.044665
Bis(2-Chloroethoxy)Methane				
Bis(2-Chloroethyl)Ether	0.53		0.36	1.32
Bis(2-Chloroisopropyl)Ether	65000		43550	161289
Bis(2-Ethylhexyl)Phthalate	2.20		1.47	5.46
4-Bromophenyl Phenyl Ether				
Butylbenzyl Phthalate	1900		1273	4715
4-Chlorophenyl Phenyl Ether				
Chrysene	0.018000		0.012060	0.044665
Dibenz(a,h)Anthracene	0.018000		0.012060	0.044665
1,2-Dichlorobenzene	1300		871	3226
1,3-Dichlorobenzene	960		643	2382
1,4-Dichlorobenzene	190		127	471
3,3-Dichlorobenzidine	0.028000		0.018760	0.069478
Diethyl Phthalate	44000		29480	109180
Dimethyl Phthalate	1100000		737000	2729498
Di-n-Butyl Phthalate	4500		3015	11166
2,4-Dinitrotoluene	3.40		2.28	8.44
2,6-Dinitrotoluene				
Di-n-Octyl Phthalate				
1,2-Diphenylhydrazine	0.20		0.13	0.50
Fluoranthene	140		94	347
Fluorene	5300		3551	13151
Hexachlorobenzene	0.000290		0.000194	0.000720
Hexachlorobutadiene	18.00		12.06	44.66
Hexachloroethane	3.30		2.21	8.19
Hexachlorocyclopentadiene	1100		737	2729
Ideno 1,2,3-cdPyrene	0.018000		0.012060	0.044665
Isophorone	960		643	2382
Naphthalene				
Nitrobenzene	690		462	1712
N-Nitrosodimethylamine	3.00		2.01	7.44
N-Nitrosodi-n-Propylamine	0.51		0.34	1.27
N-Nitrosodiphenylamine	6.00		4.02	14.89
Phenanthrene				
Pyrene	4000		2680	9925
1,2,4-Trichlorobenzene	70		47	174
Aldrin	0.000050		0.000034	0.000124
alpha-BHC	0.004900		0.003283	0.012159
beta-BHC	0.017000		0.011390	0.042183
gamma-BHC (Lindane)	1.80		1.21	4.47
delta-BHC				
Chlordane	0.000810		0.000543	0.002010
4,4-DDT	0.000220		0.000147	0.000546
4,4-DDE	0.000220		0.000147	0.000546
4,4-DDD	0.000310		0.000208	0.000769
Dieldrin	0.000054		0.000036	0.000134
alpha-Endosulfan	89		60	221
beta-Endosulfan	89		60	221
Endosulfan Sulfate	89		60	221
Endrin	0.060000		0.040200	0.148882
Endrin Aldehyde	0.300000		0.201000	0.744409
Heptachlor	0.000079		0.000053	0.000196
Heptachlor Epoxide	0.000039		0.00002613	9.67731E-05
Polychlorinated Biphenyls	0.000064		0.000043	0.000159
PCB's				
Toxaphene	0.000280		0.000188	0.000695

Utah Division of Water Quality

Agricultural Criteria (Class 4 Waters) -	Standard	Upstream Concentration	Acute Effluent Limitation
Total Dissolved Solids (mg/L)	1200	804	2089
Arsenic (µg/L)	100	67	248
Boron (µg/L)	750	503	1861
Cadmium (µg/L)	10.0	6.7	24.8
Chromium (µg/L)	100	67	248
Copper (µg/L)	200	134	496
Lead (µg/L)	100	67	248
Selenium (µg/L)	50	34	124

Summary - Dissolved Metals(µg/L)

	Class 3 Human Health (Organism Only)	Class 3 Acute Aquatic Wildlife	Class 4 Agricultural	Acute Most Stringent
Aluminum		3855		3855
Antimony	1588			1588
Arsenic		1415	248	248
Cadmium		20.3	24.8	20.3
Chromium (Total)			248	248
Chromium (III)		5060		5060
Chromium (VI)		54.7		54.7
Copper		91.0	496	91.0
Cyanide	347	105		105
Iron		3244		3244
Lead		724	248	248
Mercury		13.1		13.1
Nickel	11414	4338		4338
Selenium	10422	87.2	124	87.2
Silver		34.4		34.4
Tributyltin		2.31		2.31
Zinc		509		509

Summary - Total Recoverable Metals(ug/l)

	Chronic Total Recoverable Limits	Acute Most Stringent Dissolved Limits	Total Recoverable to Dissolved Fraction Conversion Factor	Acute Most Stringent Total Recoverable Limits
Aluminum	216	3855	1.000	3855
Antimony		1588		1588
Arsenic	372	248	1.000	248
Cadmium	0.9	20.3	0.915	22.2
Chromium (Total)		248		248
Chromium (III)	303	5060	0.316	16013
Chromium (VI)	27	55	1.000	54.7
Copper	40	91	0.960	94.8
Cyanide	12.9	105		105
Iron		3244	1.000	3244
Lead	9	248	0.690	360
Mercury	0.030	13.1	0.850	15.5
Nickel	231.8	4338	0.998	4,347
Selenium	11.4	87	1.000	87.2
Silver		34	0.850	40.4
Thallium		1.17		1.2
Tributyltin	0.18	2.31		2.3
Zinc	526	509	0.978	520

**Total Recoverable to Dissolved Fraction Conversion Factor
[Laboratory Correction Factor] EPA 823-B 96-007 June 1996**

	ACUTE FACTOR	CHRONIC FACTOR
Aluminum	1.000	1.000
Antimony		
Arsenic	1.000	1.000
Barium	1.000	1.000
Beryllium		
Cadmium	0.915	0.880
Chromium III	0.316	0.860
Chromium VI	1.000	1.000
Copper	0.960	0.960
Cyanide		
Iron	1.000	1.000
Lead	0.690	0.690
Mercury	0.850	1.000
Nickel	0.998	0.997
Selenium	1.000	1.000
Silver	0.850	1.000
Thallium		
Tributyltin		
Zinc	0.978	0.986

* Based upon a hardness of 200 mg/l as CaCO3

ANTIDEGRADATION REVIEW FORM

UTAH DIVISION OF WATER QUALITY

Instructions

The objective of antidegradation rules and policies is to protect existing high quality waters and set forth a process for determining where and how much degradation is allowable for socially and/or economically important reasons. In accordance with Utah Administrative Code (UAC R317-2-3), an antidegradation review (ADR) is a permit requirement for any project that will increase the level of pollutants in waters of the state. The rule outlines requirements for both Level I and Level II ADRs, as well as public comment procedures. This review form is intended to assist the applicant and Division of Water Quality (DWQ) staff in complying with the rule but is not a substitute for the complete rule in R317-2-3.5. Additional details can be found in the *Utah Antidegradation Implementation Guidance* and relevant sections of the guidance are cited in this review form.

ADRs should be among the first steps of an application for a UPDES permit because the review helps establish treatment expectations. The level of effort and amount of information required for the ADR depends on the nature of the project and the characteristics of the receiving water. To avoid unnecessary delays in permit issuance, the Division of Water Quality (DWQ) recommends that the process be initiated at least one year prior to the date a final approved permit is required.

DWQ will determine if the project will impair beneficial uses (Level I ADR) using information provided by the applicant and whether a Level II ADR is required. The applicant is responsible for conducting the Level II ADR. For the permit to be approved, the Level II ADR must document that all feasible measures have been undertaken to minimize pollution for socially, environmentally or economically beneficial projects resulting in an increase in pollution to waters of the state.

For permits requiring a Level II ADR, this antidegradation form must be completed and approved by DWQ before any UPDES permit can be issued. Typically, the ADR form is completed in an iterative manner in consultation with DWQ. The applicant should first complete the statement of social, environmental and economic importance (SEEI) in Part C and determine the parameters of concern (POC) in Part D. Once the POCs are agreed upon by DWQ, the alternatives analysis and selection of preferred alternative in Part E can be conducted based on minimizing degradation resulting from discharge of the POCs. Once the applicant and DWQ agree upon the preferred alternative, the review is considered complete, and the form must be signed, dated, and submitted to DWQ.

For additional clarification on the antidegradation review process and procedures, please contact Nicholas von Stackelberg (801-536-4374) or Jeff Ostermiller (801-536-4370).

Antidegradation Review Form

Part A: Applicant Information

Facility Name:

Facility Owner:

Facility Location:

Form Prepared By:

Outfall Number:

Receiving Water:

What Are the Designated Uses of the Receiving Water (R317-2-6)?

Domestic Water Supply: None

Recreation: None

Aquatic Life: None

Agricultural Water Supply: None

Great Salt Lake: None

Category of Receiving Water (R317-2-3.2, -3.3, and -3.4): Category 1

UPDES Permit Number (if applicable):

Effluent Flow Reviewed:

Typically, this should be the maximum daily discharge at the design capacity of the facility. Exceptions should be noted.

What is the application for? (check all that apply)

- A UPDES permit for a new facility, project, or outfall.
- A UPDES permit renewal with an expansion or modification of an existing wastewater treatment works.
- A UPDES permit renewal requiring limits for a pollutant not covered by the previous permit and/or an increase to existing permit limits.
- A UPDES permit renewal with no changes in facility operations.

Part B. Is a Level II ADR required?

This section of the form is intended to help applicants determine if a Level II ADR is required for specific permitted activities. In addition, the Executive Secretary may require a Level II ADR for an activity with the potential for major impact on the quality of waters of the state (R317-2-3.5a.1).

B1. The receiving water or downstream water is a Class 1C drinking water source.

Yes A Level II ADR is required (Proceed to Part C of the Form)

No (Proceed to Part B2 of the Form)

B2. The UPDES permit is new or is being renewed and the proposed effluent concentration and loading limits are higher than the concentration and loading limits in the previous permit and any previous antidegradation review(s).

Yes (Proceed to Part B3 of the Form)

No No Level II ADR is required and there is no need to proceed further with review questions.

B3. Will any pollutants use assimilative capacity of the receiving water, i.e. do the pollutant concentrations in the effluent exceed those in the receiving waters at critical conditions? For most pollutants, effluent concentrations that are higher than the ambient concentrations require an antidegradation review? For a few pollutants such as dissolved oxygen, an antidegradation review is required if the effluent concentrations are less than the ambient concentrations in the receiving water. (Section 3.3.3 of Implementation Guidance)

Yes (Proceed to Part B4 of the Form)

No No Level II ADR is required and there is no need to proceed further with review questions.

B4. Are water quality impacts of the proposed project temporary and limited (Section 3.3.4 of Implementation Guidance)? Proposed projects that will have temporary and limited effects on water quality can be exempted from a Level II ADR.

- Yes** Identify the reasons used to justify this determination in Part B4.1 and proceed to Part G. No Level II ADR is required.
- No** A Level II ADR is required (Proceed to Part C)

B4.1 Complete this question only if the applicant is requesting a Level II review exclusion for temporary and limited projects (see R317-2-3.5(b)(3) and R317-2-3.5(b)(4)). For projects requesting a temporary and limited exclusion please indicate the factor(s) used to justify this determination (check all that apply and provide details as appropriate) (Section 3.3.4 of Implementation Guidance):

- Water quality impacts will be temporary and related exclusively to sediment or turbidity and fish spawning will not be impaired.

Factors to be considered in determining whether water quality impacts will be temporary and limited:

- a) The length of time during which water quality will be lowered:
- b) The percent change in ambient concentrations of pollutants:
- c) Pollutants affected:
- d) Likelihood for long-term water quality benefits:
- e) Potential for any residual long-term influences on existing uses:
- f) Impairment of fish spawning, survival and development of aquatic fauna excluding fish removal efforts:

Additional justification, as needed:

Level II ADR

Part C, D, E, and F of the form constitute the Level II ADR Review. The applicant must provide as much detail as necessary for DWQ to perform the antidegradation review. Questions are provided for the convenience of applicants; however, for more complex permits it may be more effective to provide the required information in a separate report. Applicants that prefer a separate report should record the report name here and proceed to Part G of the form.

Optional Report Name:

Part C. Is the degradation from the project socially and economically necessary to accommodate important social or economic development in the area in which the waters are located? *The applicant must provide as much detail as necessary for DWQ to concur that the project is socially and economically necessary when answering the questions in this section. More information is available in Section 6.2 of the Implementation Guidance.*

C1. Describe the social and economic benefits that would be realized through the proposed project, including the number and nature of jobs created and anticipated tax revenues.

C2. Describe any environmental benefits to be realized through implementation of the proposed project.

C3. Describe any social and economic losses that may result from the project, including impacts to recreation or commercial development.

C4. Summarize any supporting information from the affected communities on preserving assimilative capacity to support future growth and development.

C5. Please describe any structures or equipment associated with the project that will be placed within or adjacent to the receiving water.

Part D. Identify and rank (from increasing to decreasing potential threat to designated uses) the parameters of concern. *Parameters of concern are parameters in the effluent at concentrations greater than ambient concentrations in the receiving water. The applicant is responsible for identifying parameter concentrations in the effluent and DWQ will provide parameter concentrations for the receiving water. More information is available in Section 3.3.3 of the Implementation Guidance.*

Parameters of Concern:

Rank	Pollutant	Ambient Concentration	Effluent Concentration
1			
2			
3			
4			
5			

Pollutants Evaluated that are not Considered Parameters of Concern:

Pollutant	Ambient Concentration	Effluent Concentration	Justification

Part E. Alternative Analysis Requirements of a Level II

Antidegradation Review. *Level II ADRs require the applicant to determine whether there are feasible less-degrading alternatives to the proposed project. More information is available in Section 5.5 and 5.6 of the Implementation Guidance.*

E1. The UPDES permit is being renewed without any changes to flow or concentrations. Alternative treatment and discharge options including changes to operations and maintenance were considered and compared to the current processes. No economically feasible treatment or discharge alternatives were identified that were not previously considered for any previous antidegradation review(s).

Yes (Proceed to Part F)

No or Does Not Apply (Proceed to E2)

E2. Attach as an appendix to this form a report that describes the following factors for all alternative treatment options (see 1) a technical description of the treatment process, including construction costs and continued operation and maintenance expenses, 2) the mass and concentration of discharge constituents, and 3) a description of the reliability of the system, including the frequency where recurring operation and maintenance may lead to temporary increases in discharged pollutants. Most of this information is typically available from a Facility Plan, if available.

Report Name:

E3. Describe the proposed method and cost of the baseline treatment alternative. The baseline treatment alternative is the minimum treatment required to meet water quality based effluent limits (WQBEL) as determined by the preliminary or final wasteload analysis (WLA) and any secondary or categorical effluent limits.

E4. Were any of the following alternatives feasible and affordable?

Alternative	Feasible	Reason Not Feasible/Affordable
Pollutant Trading	Yes	
Water Recycling/Reuse	Yes	
Land Application	Yes	
Connection to Other Facilities	Yes	
Upgrade to Existing Facility	Yes	
Total Containment	Yes	
Improved O&M of Existing Systems	Yes	
Seasonal or Controlled Discharge	Yes	
New Construction	Yes	
No Discharge	Yes	

E5. From the applicant's perspective, what is the preferred treatment option?

E6. Is the preferred option also the least polluting feasible alternative?

Yes

No

If no, what were less degrading feasible alternative(s)?

If no, provide a summary of the justification for not selecting the least polluting feasible alternative and if appropriate, provide a more detailed justification as an attachment.

Part F. Optional Information

F1. Does the applicant want to conduct optional public review(s) in addition to the mandatory public review? Level II ADRs are public noticed for a thirty day comment period. More information is available in Section 3.7.1 of the Implementation Guidance.

No

Yes

F2. Does the project include an optional mitigation plan to compensate for the proposed water quality degradation?

No

Yes

Report Name:

Part G. Certification of Antidegradation Review

G1. Applicant Certification

The form should be signed by the same responsible person who signed the accompanying permit application or certification.

Based on my inquiry of the person(s) who manage the system or those persons directly responsible for gathering the information, the information in this form and associated documents is, to the best of my knowledge and belief, true, accurate, and complete.

Print Name: _____

Signature: _____

Date: _____

G2. DWQ Approval

To the best of my knowledge, the ADR was conducted in accordance with the rules and regulations outlined in UAC R-317-2-3.

Water Quality Management Section

Print Name: _____

Signature: _____

Date: _____