Antidegradation Review Form

Part A: Applicant Information

Facility Name: Deer Creek Mine

Facility Owner: PacifiCorp, Interwest Mining Company

Facility Location: South of Hwy 31 (8 miles northwest of Huntington)

Form Prepared By: Interwest Mining Company

Outfall Number: 003

Receiving Water: Huntington Creek

What Are the Designated Uses of the Receiving Water (R317-2-6)?
Domestic Water Supply: 1C
Recreation: 2B - Secondary Contact
Aquatic Life: 3A - Cold Water Aquatic Life
Agricultural Water Supply: 4
Great Salt Lake: None

Category of Receiving Water (R317-2-3.2, -3.3, and -3.4): Category 3

UPDES Permit Number (if applicable): UT0023604

Effluent Flow Reviewed: 0.72 mgd average, 0.72 mgd maximum
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 <u>or</u> 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 <u>no need to proceed further with review questions</u>.

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 <u>no need to proceed further with review questions</u>.

B4. Are water quality impacts of the proposed project temporary <u>and</u> 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 <u>and</u> 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: *Attachment A - Supplemental to Approved Antidegradation Review and Statement of Social, Environmental, and Economic Importance: Deer Creek Mine*

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.

See Attachment A

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

See Attachment A

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

See Attachment A

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

See Attachment A

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

See Attachment A

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	Iron	0.0152 mg/L dissolved	<2.65 mg/L total, <0.03 dissolved Outfall 003
2	Total dissolved solids	254 mg/L	542 mg/L Outfall 003
3	pH	8.4	7.2 - 7.5 Outfall 003
4	Dissolved Oxygen	7.64 mg/L	7.45 mg/L ave. Outfall 003
5	Temperature	5.6 Deg C ave, 1 - 12 Deg C Range	13.9 Deg C Outfall 003

Pollutants Evaluated that are not Considered Parameters of Concern:

Pollutant	Ambient Concentration	Effluent Concentration	Justification
Oil and grease	No data	Not detected in historical monitoring	Not detected in historical monitoring
Arsenic, cadmium, chromium, lead, mercury, etc.	See Attachment A	See Attachment A	Effluent is below ambient concentrations or not detected

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: *Supplemental to Approved Antidegradation Review and Statement of Social, Environmental, and Economic ImportanceAntidegradation Review and Statement of Social, Environmental, and Economic Importance: Deer Creek Mine*

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	TDS Offset Credits if necessary for discharge
Water Recycling/Reuse	No	Mine facility will be closed and reclaimed
Land Application	No	Suitable land is not available near the mine
Connection to Other Facilities	No	Mine facility will be closed and reclaimed
Upgrade to Existing Facility	No	Mine is closing, facilities will be reclaimed
Total Containment	No	Containment bulkheads denied by MSHA
Improved O&M of Existing Systems	No	Mine is closing, facilities will be reclaimed
Seasonal or Controlled Discharge	No	Mine operation requires year round discharge
New Construction	Yes	Treatment facility to remove iron can be constructed if necessary after power plant closure
No Discharge	No	Mine closure requires water discharge (MSHA and UDOGM)

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

Outfall 003 in-mine sedimentation, transport via pipeline to Huntington Power Plant through pipeline for consumption. Discharge into Huntington Creek after Power Plant closure or if water quality meets permit standards.

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: KENNETH S. FLECK

Signature: Kenneth S. Fleck

Date: APRIL 25, 2017

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: NICHOLAS VON STACKELBERG

Signature: Nicholas v Stackelberg

Date: 4/25/2017

Attachment A Supplemental

Supplemental to Approved Antidegradation Review and Statement of Social, Environmental, and Economic Importance: Deer Creek Mine

Deer Creek Mine UPDES Permit No. UT0023604

Approved Date January 2015

Submitted to

Utah Division of Water Quality by

PacifiCorp / Interwest Mining Company

August 2016

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Acronyms and Abbreviations

µg/L	microgram per liter
ADR	antidegradation review
C&D	construction and demolition
CFR	*Code of Federal Regulations*
CWA	Clean Water Act
EPA	U.S. Environmental Protection Agency
ft^3	cubic feet
kW	kilowatt
lb/d	pound per day
lb/yr	pound per year
lb-eq/yr	pound equivalent per year
LS	lump sum
mg/L	milligram per liter
mgd	million gallons per day
MW	megawatt
NAAQS	National Ambient Air Quality Standards
O&M	operation and maintenance
POC	parameter of concern
POTW	publicly owned treatment works
RO	reverse osmosis
SEEI	Social, Environmental, and Economic Importance
TDS	total dissolved solids
TRC	total residual chlorine
TSS	total suspended solids
TWF	toxic weighting factor
UAC	Utah Administrative Code
UDWQ	Utah Division of Water Quality
UPDES	Utah Pollutant Discharge Elimination System
ZLD	zero liquid discharge

1.0 Introduction and Purpose

Interwest Mining Company (Interwest), a subsidiary of PacifiCorp, operated the Deer Creek Mine, located about 8 miles northwest of Huntington, Utah. Deer Creek, an underground coal mine produced up to 4 million tons of coal yearly, but terminated production on January 7, 2015 and is in the process of being permanently sealed and closed.

Deer Creek Mine has two sets of main access portals – one located in Deer Creek Canyon (south half of mine), and one at Rilda Canyon (north half of mine). Deer Creek Mine currently has two permitted Utah Pollution Discharge Elimination System (UPDES) outfalls: 001) sediment pond; and 002) mine discharge. Both of these outfalls are located in Deer Creek Canyon.

Deer Creek Canyon portals are within a drainage defined as Category 2 waters, whereas Rilda Canyon portals are within Category 1 waters per UAC R317-2. Definitions of these categories are as follows:

- Category 1 Waters: Waters which have been determined by the Board to be of exceptional recreational or ecological significance or have been determined to be a State or National resource requiring protection, shall be maintained at existing high quality through designation, by the Board after public hearing, as Category 1 Waters. **New point source discharges of wastewater, treated or otherwise, are prohibited in such segments after the effective date of designation.**
- Category 2: Waters are designated surface water segments which are treated as Category 1 Waters except that a point source discharge may be permitted provided that the discharge does not degrade existing water quality.

Since the announcement of the Deer Creek Mine closure in December 2014, PacifiCorp has designed and applied for mine closure approval from various government agencies to prevent a non-approved post-mine gravity discharge of water from the portals located in Rilda Canyon. The original plan was to build water-retaining bulkheads to contain all of the intercepted groundwater in the underground mine workings in perpetuity. Numerous efforts undertaken since late 2014 to obtain permission from the MSHA and the UDOGM to permanently retain intercepted groundwater underground with massive concrete bulkheads and possibly to direct overflow water to the Deer Creek Canyon were finally denied in April of 2016—MSHA and UDOGM will not allow any water retention as part of the Deer Creek closure plans. Intercepted groundwater must now be directed to the portals to flow unimpeded out of the mine. In this case, post-mine discharge will occur at Rilda Canyon. As explained below, the State of Utah and Forest Service anti-degradation policies prohibit new water discharges within the National Forest Boundaries, so the water that flows by gravity to the Rilda Canyon portals must be transferred outside of the Forest lands. The only way to accomplish this is to install a pipeline to at least the Forest boundary, where discharge can take place (with a valid discharge permit).

The last day of production at Deer Creek Mine was January 7, 2015. Efforts began immediately to prepare the mine for closure, including mining equipment removal. By mid-April of 2015, nearly all of the mining equipment, including conveyor belt lines, had been removed, and permission had been granted by the lease holder (BLM), enabling permanent sealing of the south half and northwest quadrants of the mine. The remaining workings of the Rilda Canyon section of the mine are still open with intact power, ventilation, and water systems, pending final resolution of the post-mining water drainage issue.

Compounding the situation of un-approved post-mine discharge of intercepted groundwater at the Rilda Canyon portals is the fact that mining in the northwest quadrant of the mine encountered an elevated sulfur zone in the form of pyrite (FeS_2) in the lower portion of the coal seam. Water accumulating in the northwest quadrant of the mine comes in contact with a high-sulfur/high-iron zone that causes the water to dissolve elevated in total iron above background levels. Based on samples collected of the water that will discharge from the Rilda Canyon portals, the level of total iron in the groundwater will dissipate over a period of time to background levels of the intercepted groundwater. The volume of the intercepted groundwater will follow a similar trend, slowly dissipating due to the lack of recharge from the initial projection of approximately 600 gallons per minute (gpm) to 200 gpm.

To prevent a non-approved post-mine gravity discharge of water from the portals located in Rilda Canyon, PacifiCorp proposes to construct 5.6 miles of a 10-inch high-density polyethylene (HDPE) gravity flow water pipeline from the Deer Creek Mine 1st Right portals to the raw water - settling pond facility at Huntington Power Plant. The pipeline would be constructed within the Emery County Road #306 right-of-way and within the SR-31 right-of-way. Water from the 1st Right portals will not be allowed to discharge into Rilda Creek; rather this water will be transferred via the buried pipeline out of the U.S Forest lands to the Huntington Power Plant where it will be consumed during electric power generation. Governmental agencies requested that PacifiCorp evaluate a potential Deer Creek Mine UPDES outfall for the mine discharge from 1st Right portals directly to the receiving drainage (Huntington Creek) in the event the Huntington Power Plant ceases operation. Even though this scenario is not anticipated in the foreseeable future, PacifiCorp presented this scenario to the Department of Environmental Quality (DWQ). During the discussions, PacifiCorp and DWQ discussed the recently approved Deer Creek Mine UPDES permit (January 2015).

As function of the UPDES renewal process 2012, PacifiCorp completed an Antidegradation review (ADR) in accordance with UAC R317-2-3. The ADR analysis evaluated the discharging intercepted groundwater from the Deer Creek Mine at a single location at the Deer Creek Canyon portals (Outfall 002). Gravity flow drainage form the 1st Right Rilda Canyon portals as a result of MSHA's recent decision not allowing water retention in a mine closure scenario will divide the amount of intercepted groundwater to two separate locations. Groundwater in the southern portion of the mine will accumulate over time and gravity discharge from the portals located in Deer Creek canyon designated as Outfall 002. Groundwater in the northern portion of the mine will be diverted by gravity to the 1st Right Rilda Canyon portals. French drains will be installed at the portals to collect the intercepted groundwater routing the outfall to a buried HDPE pipeline.

As a part of the overall mine closure process and to comply with governmental agencies request, PacifiCorp proposes to amend the approved permit to include an additional outfall to allow intercepted groundwater that will gravity flow from the 1st Right portals in Rilda Canyon to be discharged into Huntington Creek near PacifiCorp's Huntington Power Plant. DWQ recommended that PacifiCorp modify the currently approved UPDES permit to include an additional outfall.

In accordance with 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. It is considered one of the first steps in obtaining a new or revised UPDES permit. In this case, PacifiCorp does not anticipate such an increase for its upcoming permit reissuance. However, the additional discharge (proposed Outfall 003) into Huntington Creek, classified as a 1C water body, from Deer Creek Mine, was not anticipated until April 12, 2016. Mine closure plans for diverting all mine water underground to the Deer Creek portals outfall was denied by the Mine Safety and Health Administration (MSHA) and the Utah Division of Oil, Gas, and Mining (DOGM). MSHA and DOGM required that intercepted groundwater from the north portion of the mine be allowed to gravity discharge at the 1st Right portals in Rilda Canyon. Water from the 1st Right portals will not be allowed to discharge into Rilda Creek located within the U.S. Forest Service boundary; rather this water will be transferred via a buried pipeline out of the U.S Forest lands to the Huntington Canyon power plant where it will be consumed during electric power generation. DWQ has requested that PacifiCorp prepare an amendment to the Level II ADR evaluation completed and approved January 2015 for use during the permitting process. A Level II evaluation is also required due to the possibility that consumptive use at the Huntington Canyon Plant may cease at some point in the future and the discharge would be routed directly into Huntington Creek. Existing Outfall 001 is a grandfathered flow, since the outfall was initially permitted in the fall of 1980, before the rule establishing Category 1 waters was promulgated in February 1994. Existing Outfall 002 was authorized as an emergency discharge in 1990 to prevent flooding in the mine and was permitted as a UPDES outfall in 1995. Existing Outfall SUM-A was created as a mechanism for measuring the combined flows of 001 (sediment pond outflow) and 002 (Deer Creek portals discharge) to moderate occasional spikes of TDS from 001 with lower TDS in 002. The new outfall from the Rilda Canyon portals (003) will be a separate outfall consisting of a fraction of the intercepted groundwater that would have been discharged from 002 had the original closure plan been approved.

After the mine closure and sealing is completed (full reclamation anticipated to be completed in 2018), the outfall situation will be changed as follows: The sediment pond will have been reclaimed, eliminating Outfall 001. Outfall 002 will be discharging intercepted groundwater directly from the Deer Creek portals into Deer Creek drainage at the mine site. SUM-A, downstream from the Deer Creek portal reclamation, will no longer be required due to the reclamation of the sediment pond. After reclamation of the mine site including the sediment pond, PacifiCorp will formally request to terminate monitoring of SUM-A in writing to DEQ Water from Outfall 003, emanating from the Rilda Canyon portals, will be transferred through the buried pipeline directly to the settling-raw water pond for the Huntington Plant. This water

will be consumed at the plant. At some future date if consumption ends, this outfall will be directed into Huntington Creek.

A Level II ADR review is intended to review the permitted discharge to ensure that the project is both economically and socially important to local and regional communities and that feasible treatment alternatives have been analyzed. This Antidegradation Review and Statement of Social, Environmental, and Economic Importance: Deer Creek Mine Rilda Canyon Outfall (Attachment A) is intended to supplement the information being provided by PacifiCorp in the Level II ADR application. Specifically, it identifies the parameters of concern (POCs) for the mine effluent, identifies and analyzes treatment alternatives, and provides a justification for the determination that the facility is socially and economically necessary for the local and regional communities.

2.0 Project Description

2.1 Site and Facility Description

The Deer Creek Mine is located in Emery County, about 8 miles northwest of Huntington, Utah. Deer Creek, an underground coal mine had produced coal continuously for over seventy years. On December 15, 2014 PacifiCorp formally announced the closure of the Deer Creek.

The UPDES permit for the Deer Creek Mine authorizes discharge from two outfalls: 1) Outfall 001 is a discharge from a sedimentation pond which treats surface water runoff from the mine site, and 2) Outfall 002 intercepted groundwater discharged by gravity flow out of the mine. After the December 15, 2014 closure announcement, efforts began immediately to prepare the mine for closure, including mining equipment removal. By mid-April of 2015, nearly all of the mining equipment, including conveyor belt lines, had been removed, and permission had been granted by the lease holder (BLM), enabling permanent sealing of the south half and northwest quadrants of the mine. The remaining workings of the Rilda Canyon section of the mine are still open with intact power, ventilation, and water systems, pending final resolution of the post-mining water drainage issue. Groundwater in the southern portion of the mine will accumulate over time and gravity discharge from the portals located in Deer Creek canyon designated as UPDES outfall 002. French drains were installed as part of the approved final portal sealing at the portals. Groundwater in the northern portion of the mine will be diverted by gravity flow to the 1st Right Rilda Canyon portals. French drains will be installed at the portals to collect the intercepted groundwater routing the portal discharge to a buried HDPE pipeline.

Deer Creek Canyon

Two UPDES outfalls; (1) Outfall 001 – Sediment Pond and 2) Outfall 002 – Deer Creek Mine Discharge) discharge to Deer Creek upstream of its confluence with Huntington Creek. The Deer Creek drainage above the mine is an ephemeral stream. The Deer Creek Mine discharge drainage

pre-mine closure resulted in perennial stream below the mine, which supported year-round aquatic life and increased vegetation along the stream banks. Since the portal sealing in Deer Creek Canyon, April 2015, no water has discharged from the southern portion of the mine. PacifiCorp projects post-closure flow for the southern portion of the mine at approximately 100 to 300 gallons per minute (gpm). Water quality characteristics of the discharges relative to background quality in Deer Creek and Huntington Creek are diminished quality due to their total dissolved solids concentration. The mines in the coal fields of the Wasatch Plateau tend to act as interceptor drains. The groundwater that is brought to the surface has a lower dissolved solids content than would have occurred were the water to continue its downward movement through the shale layers, dissolving increased amounts of salt with distance (Danielson, 1981)[1].

Deer Creek Mine 1st Right Rilda Canyon

Water from the 1st Right portals will not be allowed to discharge into Rilda Creek; rather this water will be transferred via a buried pipeline out of the U.S Forest lands to the Huntington Canyon power plant where it will be consumed during electric power generation. In the event the Huntington Canyon Plant ceases operations at some point in the future, discharge from the northern portion of the mine (Rilda Canyon portals) would be routed directly into Huntington Creek near the raw water pond.

As stated in the approved 2015 ADR, the effluent discharges from Deer Creek Mine (Deer Creek Canyon) outfall 002 increase the flow in Huntington Creek that is available to irrigation users along the creek. The flow added to Deer Creek is more beneficial to the stream segment than removing the discharge from the stream. Because of the improvement in Deer Creek water quality and flow resulting from the outfalls, it has been determined[2] that degradation of Deer Creek water quality will not occur with continued discharge, and therefore, the 2015 ADR POC analysis and subsequent ADR should be focused on water quality in Huntington Creek. With the proposed Rilda Canyon portals (northern district) discharging directly to Huntington Creek, the approved ADR focusing on Huntington Creek is applicable to this site in Huntington Creek. The proposed Rilda Canyon to Huntington Creek discharge location is approximately 0.85 miles upstream from the confluence of Deer Creek and Huntington Creek.

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[1] Danielson, T.W., Remillard, M.D., Fuller, R.H., Hydrology of the Coal Resource Areas in the Upper Drainages of Huntington and Cottonwood Creeks, Central Utah, U.S. Geological Survey Water Resource Investigations, Open-file Report 81-539.

[2] This was determined in the September 13, 2012 ADR meeting between Energy West and DWQ in DWQ's Salt Lake City office.

3.0 Identification of the Parameters of Concern

As per Utah Administrative Code (UAC) R317-2.3.5, the 2015 approved ADR reviewed both Level I and Level II on a "parameter-by-parameter basis." Utah Division of Water Quality (UDWQ) provided guidance on the parameters of concern (POCs) for a wastewater discharge. The following technical memorandum provides a list of the parameters that were considered as potential POCs for the Deer Creek Mine and the screening process that was used to select the POCs for the Deer Creek Mine ADR analysis. The analysis conducted during 2013 – 2015 ADR review are applicable to the proposed Rilda Canyon discharge site. The approved 2015 ADR analyzed the pre-closure operations and discharge volumes from the entire Deer Creek Mine complex. The post-closure ADR supplement will analyze the project discharge volumes and quality from Deer Creek Mine from two separate outfalls both reporting to Huntington Creek.

3.1.1 Selection of Potential POCs – Approved 2015 ADR Revised to Include the Proposed Rilda Canyon Outfall

Section 4.0 of the Utah Antidegradation Review Implementation Guidance, Version 2.0 (dated December 2015) (ADR Implementation Guidance, 4.0 Level II ADR: Parameters of Concern) provides considerations that should be addressed when an applicant is considering what pollutants to consider as potential POCs. According to section 4.1, Selecting the Parameters of Concern, the primary group of pollutants that must be considered is the list of priority pollutants provided in the EPA Form 2C – Application for Permit to Discharge Wastewater. In addition to the EPA Form 2C – Application for Permit to Discharge Wastewater submitted as part of the 2013 – 2015 permit renewal process (entire mine complex discharging to the Deer Creek drainage), the 2016 Supplemental document includes a separate EPA Form 2C – Application for Permit to Discharge Wastewater for the Rilda Canyon/Huntington Creek discharge. Based on the nature of operations at underground coal mines such as Deer Creek Mine, the underground mine workings have the potential to discharge priority pollutants in its effluent. Applicable technology based standards for Coal Mining-Alkaline Mine Drainage are found in 40 CFR 434 Subpart D, and establish effluent limits for pH, total iron, and total suspended solids (TSS). These parameters have been included in the list of potential POCs to be considered for the Deer Creek Mine Rilda Canyon ADR analysis. In addition to using the list of priority pollutants, the ADR Implementation Guidance also recommends that the following factors be considered when selecting pollutants to screen as potential POCs:

4.1.1 Characterizing the Effluent

Effluent characteristics have been determined by multiple repeated sampling of water being pumped underground from the area from which the discharge will originate. Effluent characteristics are detailed in Table 3-1-B, and Exhibits 1, 2, and 3.

4.1.2 Characterizing the Ambient Condition of the Receiving Water

The ambient characteristics of the receiving water have been determined by multiple repeated sampling of the water in Huntington Creek upstream from the proposed 003 discharge point. Table 3-1-B and Exhibit 3 show ambient characteristics of the receiving water compared to the effluent characteristics.

4.1.3 Selection Considerations

1. *Is the parameter already included in an existing permit?* The existing Deer Creek Mine UPDES permit contains limits for the following parameters:

    a. Outfall 001 – pH, total iron, oil & grease, total suspended solids (TSS), and total dissolved solids (TDS). With the announcement of the closure of the Deer Creek Mine, Outfall 001 – Sediment Pond, will be removed as a function of the reclamation process scheduled for 2017 – 2018.

    b. Outfall 002 - pH, total iron, oil & grease, total suspended solids (TSS), and total dissolved solids (TDS). Deer Creek portals were completely sealed and backfilled as part of the approved mine closure process. French drains were installed in the main portals to allow for post mine gravity discharge. Deer Creek portals were sealed April 2015.

    c. *c. Proposed Outfall 003 – Temperature, dissolved oxygen, pH, total iron, oil & grease, total suspended solids (TSS), and total dissolved solids (TDS)*Ambient water quality data for Huntington Creek upstream of the confluence with Deer Creek that was collected within the past 10 years was reviewed. These data are compared to Deer Creek Mine - Rilda Canyon effluent data in Table 3-1-B.

    d.

2. *Are there any parameters in the effluent, or expected to be in the effluent, that exceed ambient concentrations in the receiving water? In cases when the available data are limited, comparisons between effluent/permitted and ambient concentrations may be conducted using methods that minimize type II errors, i.e., erroneously concluding that a pollutant will not degrade water quality.* Wastewater effluent from the Deer Creek Mine – Deer Creek Canyon is not expected to exceed the current permit limits. As detailed presentations to UDWQ and previously in the ADR document, mining in the northwest quadrant of the mine encountered an elevated sulfur zone in the form of pyrite (FeS2) in the lower portion of the coal seam. Water accumulating in the northwest quadrant of the mine comes in contact with a high-sulfur/high-iron zone in the coal that causes the water to dissolve elevated in total iron above background levels. Based on samples collected of the water that will discharge from the Rilda Canyon portals, the level of total iron in the groundwater will dissipate over a period of time to background levels of the intercepted groundwater. PacifiCorp proposes to pipe the Rilda Canyon mine discharge to the Huntington Power Plant raw water pond for consumption. PacifiCorp will consume or

treat the water if it is discharged so that the discharge to Huntington Creek is in compliance with limitations set forth by UDWQ.

3. *Are there any parameters that are considered to be important by UDWQ or the general public? For instance, nutrients or bioaccumulative compounds may be of concern for some surface waters. For discharges to Class 1C drinking water sources, any substances potentially deleterious to human health may be considered.* To PacifiCorp's knowledge, there are no parameters/pollutants that have been identified as "important" through public comment or other public input forums for discharges to Huntington Creek. TDS is a POC under the Colorado River Salinity Control Forum.

4. *Is the receiving water listed as impaired for any parameters? Parameters for which the receiving water is listed as impaired and have an ongoing or approved TDML are not considered as part of the ADR and are addressed through the TMDL program.* A downstream segment of Huntington Creek (from Highway 10 to the confluence with Cottonwood Creek) has a site specific TDS criterion of 4,800 mg/L from the 2004 TMDL study and was listed as impaired due to selenium in 2010.Yes, there are several parameters in the Deer Creek Mine effluent discharge that have the potential to degrade the existing beneficial uses of Huntington Creek, including TSS, TDS and Total Iron. However, the post mine gravity discharge (Outfall 002) into Deer Creek will result in a perennial stream downstream of the mine and also increases the flow available to irrigation users located along Huntington Creek. Discharge at the proposed site (Outfall 003) will contribute flow to the Huntington Creek drainage. Post mine closure groundwater gravity discharge from the mine also has a lower TDS concentration than would occur were the water to continue down through the Mancos shale layers and eventually discharge to the surface.

5. *Is the discharge of the parameter temporary and limited?* Water accumulating in the northwest quadrant of the mine comes in contact with a high-sulfur/high-iron zone in the coal that causes the water to dissolve elevated in total iron above background levels. Based on samples collected of the water that will discharge from the Rilda Canyon portals, the level of total iron in the groundwater will dissipate over a period of time to background levels of the intercepted groundwater.

6. *Is the discharge directly to a terminal lake or adjacent tributary water? Additional analysis is required to evaluate the degradation and accumulation of the parameter in the lake environment.* No. The discharge is not into a terminal lake or an adjacent tributary water.

7. *Is the discharge directly to the Great Salt Lake or adjacent tributary water? Parameters of concern will be determined on a case-by-case basis using the best available information regarding ambient conditions and assimilative capacity.* No. The discharge is not into the Great Salt Lake or adjacent tributary water.

Based on the above-referenced considerations, the following list of parameters/pollutants was established as potential POCs for further consideration in the Deer Creek Mine 2015 approved ADR analysis:

1) Total Suspended Solids

2) Totals Dissolved Solids
3) Oil & Grease
4) Iron
5) pH
6) Temperature
7) Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Se, Zn)
8) Dissolved Oxygen (DO)

3.1.2 Selection of Final POCs for ADR Analysis

The criteria listed in Section 3.1 of the *ADR Implementation Guidance* are used to screen the large number of potential parameters/pollutants that may be present in the facility's wastewater effluent to develop a preliminary list of potential POCs that must be considered for the Deer Creek Mine ADR analysis. To select the final POCs to be incorporated into the Deer Creek Mine ADR analysis from the list of potential parameters listed above, Section 4.0 of the *ADR Implementation Guidance* indicates that "only parameters in the discharge effluent that exceed, or potentially exceed, ambient concentrations [in the receiving water body] should be considered". To assist in the POC's ADR analysis, PacifiCorp sampled water from the northern district of the mine which will contribute to the post mine gravity discharge at the Rilda Canyon portals for the following:

- EPA Priority Pollutant List (40 CFR Part 423, Appendix A)
- Baseline solute

Table 3-1 below provides a summary of the preliminary list of POCs that were considered and whether or not each potential POC was selected as a final POC for the Deer Creek Mine ADR analysis. The final POCs identified in Table 3-1 will be used to aid in the selection of effluent treatment and discharge alternatives that will be analyzed in detail in the final ADR analysis. In addition, the POCs will also be used by UDWQ as a factor in evaluating the potential effects on Huntington Creek from the discharge and in their analysis for permitting an additional outfall for the UPDES permit for the facility.

TABLE 3-1-A
Summary of Final POCs for the Deer Creek Mine ADR Analysis
*PacifiCorp **Deer Creek Mine – Deer Creek Canyon** (Table 3-1 from approved 2015 ADR, revised to reflect current monitoring data)*

Potential POC Being Considered	Huntington Creek above HPP Diversion (average 2002 – 2008)[1]	Huntington Creek above Deer Creek (average 2002 – 2016)[2]	Outfall 001 – Sedimentation Pond (average 2008 – 2012)[7]	Outfall 002 – Mine Discharge (average 2002 – 2016)	Final Parameter of Concern (Yes/No)	Rationale
1. Total Suspended Solids (mg/L)	12.8[3]	56	11	3.7	**Yes**	Current permit limit
2. Total Dissolved Solids (mg/L)	236	265	1600	498	**Yes**	Current permit limit
3. Oil & Grease	No data[4]	Non-detect	No visible sheen	No visible sheen	No	Not detected by historical effluent monitoring.
4. pH	7.8 – 8.7	8.0 – 8.6	7.8 – 8.4	7.0 – 8.1	No	Effluent within permit limits and meet WQ criterion
5. Iron (mg/L)	0.013[5]	0.55	0.16	0.61	**Yes**	Current permit limit
6.Temperature (°C)	8.0	8.0 (8.6 below Deer Creek)	8.9	13.1	No	<1° C temperature delta in Huntington Creek
7. Arsenic (mg/L)	0.002[5]	<0.01	No data[4]	0.0006[6]	No	Below ambient concentration
8. Cadmium (mg/L)	0.0003[5]	<0.001	No data[4]	<0.0005[6]	No	Below ambient concentration
9. Chromium (mg/L)	0.005[5]	No data[4]	No data[4]	0.004[6]	No	Below ambient concentration
10. Copper (mg/L)	0.004[5]	<0.01	No data[4]	0.008[6]	**Yes**	Outfall 002 above ambient
11. Lead (mg/L)	0.001[5]	<0.01	No data[4]	0.0006[6]	No	Below ambient concentration
12. Mercury (mg/L)	0.0001[5]	No data[4]	No data[4]	<0.0002[6]	No	Below ambient concentration
13. Nickel (mg/L)	0.0025[5]	No data[4]	No data[4]	0.034[6]	**Yes**	Outfall 002 above ambient
14. Selenium (mg/L)	0.0005[5]	No data[4]	No data[5]	0.0026[6]	**Yes**	Outfall 002 above ambient
15. Zinc (mg/L)	0.013[5]	0.004	No data[4]	No data[4]	No	No data

1. Utah DWQ Station ID 4930530
2. PacifiCorp surface water monitoring location, revised to reflect current data
3. Average of reported values and half of the reporting limit for non-detect results.
4. No monitoring data within the last 10 years.
5. Results are for dissolved metals. Average uses half the reporting limit for non-detect values.
6. Data for Deer Creek Mine potable water supply (2008 – 2011).

TABLE 3-1-A
Summary of Final POCs for the Deer Creek Mine ADR Analysis
*PacifiCorp **Deer Creek Mine – Deer Creek Canyon** (Table 3-1 from approved 2015 ADR, revised to reflect current monitoring data)*

Potential POC Being Considered	Huntington Creek above HPP Diversion (average 2002 – 2008)[1]	Huntington Creek above Deer Creek (average 2002 – 2016)[2]	Outfall 001 – Sedimentation Pond (average 2008 – 2012)[7]	Outfall 002 – Mine Discharge (average 2002 – 2016)	Final Parameter of Concern (Yes/No)	Rationale

7. Sediment pond scheduled for reclamation 2017-2018

TABLE 3-1-B
Summary of Final POCs for the Deer Creek Mine ADR Analysis
PacifiCorp ***Deer Creek Mine – Projected Rilda Canyon Water Quality – Requested Outfall 003, Huntington Creek Near Power Plant***

Potential POC Being Considered	Huntington Creek above HPP Diversion (average 2002 – 2008)[1]	Huntington Creek above Deer Creek (average 2002 – 2016)[2]	Outfall 003 – Mine Discharge (average 2012 – 2016)	Final Parameter of Concern (Yes/No)	Rationale
1. Total Suspended Solids (mg/L)	12.8[3]	56	NA	**Yes**	Sampled intercepted groundwater
2. Total Dissolved Solids (mg/L)	236	265	542[6]	**Yes**	Current permit limit
3. Oil & Grease	No data[4]	Non-detected	No visible sheen	No	No visible sheen detected during sampling
4. pH	7.8 – 8.7	8.0 – 8.6	7.2 – 7.5	No	Effluent within permit limits and meet WQ criterion
5. Iron (mg/L)	0.013[5]	0.55	2.65[6]	**Yes**	Current permit limit for Outfall 001, 1.0 mg/L
6.Temperature (°C)	8.0	8.0 (8.6 below Deer Creek)	13.0	No	<1° C temperature delta in Huntington Creek
7. Arsenic (mg/L)	0.002[5]	<0.01	<0.01	No	Not detected within lab limits
8. Cadmium (mg/L)	0.0003[5]	<0.001	<0.001	No	Not detected within lab limits
9. Chromium (mg/L)	0.005[5]	No data[4]	0.0045	No	Below ambient concentration
10. Copper (mg/L)	0.004[5]	<0.01	<0.01	No	Not detected within lab limits
11. Lead (mg/L)	0.001[5]	<0.01	<0.01	No	Not detected within lab limits
12. Mercury (mg/L)	0.0001[5]	No data[4]	<0.0002	No	Not detected within lab limits
13. Nickel (mg/L)	0.0025[5]	No data[4]	0.0365	**Yes**	Outfall 003 above ambient
14. Selenium (mg/L)	0.0005[5]	No data[4]	<0.002	**Yes**	Not detected within lab limits
15. Zinc (mg/L)	0.013[5]	0.004	<0.004	No	Not detected within lab limits

1. Utah DWQ Station ID 4930530
2. PacifiCorp surface water monitoring location, revised to reflect current data
3. Average of reported values and half of the reporting limit for non-detect results.
4. No monitoring data within the last 10 years.
5. Results are for dissolved metals. Average uses half the reporting limit for non-detect values.
6. Continuing to trend lower

4.0 Alternatives Analysis

As detailed in the 2015 approved ADR, the intent of the Alternative Analysis section is to evaluate whether there are any reasonable nondegrading or less degrading alternatives when compared with the discharge alternative for handling of water from the Deer Creek Mine. The section provided an initial screening of potential alternatives based on their feasibility followed by a detailed screening of those alternatives deemed feasible based on their total financial costs, pollution/POC reduction, and performance based on several criteria, including reliability, operability, maintainability, sustainability, and adaptability to future regulatory changes. The analysis is followed by identification of PacifiCorp's preferred treatment alternative and the justification for selection of that treatment alternative (refer to approved 2015 ADR).

PacifiCorp has submitted a request to supplement the 2015 approved UPDES permit for the Deer Creek Mine to include a secondary outfall for the mine discharge. On December 15, 2014 PacifiCorp announced permanent closure of the Deer Creek Mine. Efforts began immediately to prepare the mine for closure, including mining equipment removal. By mid-April of 2015, nearly all of the mining equipment, including conveyor belt lines, had been removed, and permission had been granted by the lease holder (BLM), enabling permanent sealing of the south half and northwest quadrants of the mine. Formerly, prior to mine closure, Outfall 002 discharged groundwater pumped out of the entire mine complex. Closure of the mine has separated the mine into two distinct; Southern District - Outfall 002, Northern District – Proposed Outfall 003. Groundwater in the southern portion of the mine will accumulate over time and gravity discharge from the portals located in Deer Creek canyon designated as UPDES Outfall 002. French drains were installed as part of the approved final portal sealing at the portals.

The proposed Outfall 003 will be for discharge of intercepted groundwater from the northern portion of the Deer Creek Mine discharging directly to the Huntington Power Plant raw water pond for consumption. In the event of future plant closure, PacifiCorp proposes to install valves in the pipeline to allow for direct division of mine water to Huntington Creek.

Post mine closure ADR analysis, including the request for an additional mine discharge outfall (Proposed Outfall 003), does not alter the conclusions of the 2015 Alternative Analysis section for groundwater discharged from the mine. Addition of the proposed Outfall 003 does not increase the total potential discharge from the mine; simply MSHA's ruling denying water retention in the mine, fractionally distributes the mine discharge at two separate locations.

One facet of the Alternative Analysis review has changed with closure of the mine. Demolition and final reclamation of the disturbed lands in Deer Creek Canyon commencing in 2017 will remove Outfall 001 - Sediment Pond. After the pond is reclaimed, discharge monitoring report SUM-A will no longer be applicable.

As demonstrated in the approved 2015 ADR, providing additional treatment to remove POCs provides limited improvement in the effluent quality and has a high incremental annual cost. The

current in-mine sedimentation alternative more than meets the State's guidance for cost effective treatment and is the recommended treatment approach for the Deer Creek Mine Outfall 002 based on costs considerations. If a 1 tpd TDS limit is established for the site, salinity offset credits are the recommended alternative to reduce the TDS discharged from the site. PacifiCorp has a salinity agreement in place for the Deer Creek Mine. The agreement will expire at the end of 2017.

4.1 Initial Screening of Alternatives –refer to 2015 ADR

The 2015 approved ADR evaluated the requirements found in UAC R317-2-3.5, which stipulates the following alternatives should be considered, evaluated, and implemented to the extent feasible:

a) Innovative or alternative treatment options

b) More effective treatment options or higher treatment levels

c) Connection to other wastewater treatment facilities

d) Process changes or product or raw material substitution

e) Seasonal or controlled discharge options to minimize discharging during critical water quality periods

f) Pollutant trading

g) Water conservation

h) Water recycle and reuse

i) Alternative discharge locations or alternative receiving water bodies

j) Land application

k) Total containment

l) Improved operation and maintenance (O&M) of existing treatment systems

m) Other appropriate alternatives

Section 5.2 of the Implementation Guidance indicates that the feasibility of all treatment alternatives should be examined before the alternatives are included for further consideration as part of the ADR analysis. Based on this requirement, many of the alternatives listed in UAC R317-2-3.5 can be excluded from further consideration as part of this ADR analysis based on their impracticality or inability to be implemented at the Deer Creek Mine. The following are treatment alternatives from the above list that are excluded from further consideration along with the justifications for exclusion:

- **Alternative B – Higher treatment levels**: Ion exchange and reverse osmosis are demonstrated treatment processes for removing TDS from effluent. However, these processes concentrate the salt ions into a reverse osmosis membrane reject stream or an ion

exchange resin regeneration brine, and do not reduce the mass of TDS requiring discharge to surface or disposal by other methods. Due the cost and complexity of managing reject and regeneration wastes, higher level treatment processes were not considered further.

- ***Post Mine Closure:***
  - *In addition, recent testing conducted by PacifiCorp indicates that TDS of the intercepted groundwater (post closure gravity drainage from the mine) is trending below 500 mg/L, fresh water limitation.*

- **Alternative C—Connection to other wastewater treatment facilities:** The Castle Valley Special Service District operates a sanitary wastewater treatment facility near Huntington, UT, which is the only wastewater treatment works facility located in proximity to the Deer Creek Mine. The District's treatment system does not have the capacity or the treatment technology to effectively handle the flow volume from Deer Creek Mine.

- **Alternative D—Process changes or product or raw material substitution:** The Deer Creek Mine is an underground coal mine.
  - ***Post Mine Closure:***
    - *Numerous efforts undertaken since PacifiCorp's announcement to permanently close the Deer Creek Mine in late 2014 to obtain permission from the MSHA and the UDOGM to permanently retain intercepted groundwater underground with massive concrete bulkheads and possibly to direct overflow water to the Deer Creek Canyon were finally denied in April of 2016—MSHA and UDOGM will not allow any water retention as part of the Deer Creek closure plans. Intercepted groundwater must now be directed to the portals to flow unimpeded out of the mine. In this case, post-mine discharge will occur at Deer Creek Canyon (approved Outfall 001) and Rilda Canyon (proposed Outfall 003).*

- **Alternative E—Seasonal or controlled discharge options:** Water cannot be stored within the mine. Water must be allowed to gravity flow from the mine and not be artificially impounded. *Refer to post mine closure update in Alternative D.*

- **Alternative G—Water conservation:** The discharges result from surface runoff and groundwater intercepted by the underground mine workings. Neither source of discharge is controllable. There are no practical options for further water conservation at the mine. *Refer to post mine closure update in Alternative D.*

- **Alternative I—Use of alternative discharge locations or alternative receiving water bodies:** The only receiving water body in proximity to the Deer Creek Mine is Huntington Creek.

- **Alternative J—Land application:** The facility is located in a relatively narrow canyon and property suitable for an effluent storage pond and land application spray fields are not available.

- **Alternative L—Improved operation and maintenance of existing treatment systems:** Not applicable. Outfall 002 relies on sedimentation in mine pools to remove TSS and iron, and does not have the capability to remove TDS.

After excluding these treatment alternatives deemed infeasible from further consideration, the following alternatives listed in UAC R317-2-3.5 are being carried forward for further analysis as part of this ADR:

- **Outfall 001 – Sedimentation Pond – Baseline alternatives for comparison purposes for Outfall remain as documented in the 2015 ADR.**
    - ***Post Mine Closure:*** **Outfall 001 is scheduled for reclamation/restoration in 2017 – 2018.**

Outfall 002 – Mine Discharge

- **Baseline Alternative for Comparison Purposes (hereafter referred to as Outfall 002 Alternative 1):** The existing in-mine sedimentation is the baseline alternative for comparison and evaluation of feasible treatment alternatives.
    - ***Post Mine Closure:***
        - In-mine sedimentation and French drain structures will treat post mine closure gravity drainage from the mine portals.
- **Alternative A – Alternative treatment option (hereafter referred to as Outfall 002 Alternative 2):**
    - ***Post Mine Closure:***
        - Greensand media filtration evaluated in 2015 ADR is applicable in post mine closure scenario (refer to 2015 ADR)
- **Alternative B – Higher treatment option (hereafter referred to as Outfall 002 Alternative 3):**
    - ***Post Mine Closure:***
        - Greensand media filtration followed by enhanced alumina adsorptive media evaluated in 2015 ADR is applicable in post mine closure scenario (refer to 2015 ADR).
- **Alternative F—Pollutant trading (hereafter referred to as Outfall 002 Alternative 4):** The discharge is located within the Colorado River basin and is subject to the Colorado River Basin Salinity Control Forum's policies for TDS. The Forum policy allows permitting authorities to allow industrial sources of salinity to conduct or finance salinity offset projects. Purchasing salinity offsets is a potential alternative to reduce the TDS discharge from the facility.
    - ***Post Mine Closure:***
        - Pollutant trading evaluated in 2015 ADR is applicable in post mine closure scenario (refer to 2015 ADR).

- **Alternative K—Total containment (hereafter referred to as Outfall 002 Alternative 5):** As evaluated in the 2015 ADR options for total containment including an evaporation pond, deep well injection, and thermal evaporation using a mechanical concentrator and crystallizer are not feasible options at the Deer Creek Mine.

As outlined in the 2015 ADR, the four alternatives listed above were analyzed and compared in detail in Section 4.2 based on several criteria, including the following:

- Construction and O&M costs
- Ability to minimize degradation and increase pollutant reduction
- Several performance criteria, including reliability, maintainability, operability, sustainability, and adaptability

4.2 Detailed Analysis of Feasible Alternatives Outfall 001 – refer to 2015 ADR (Analysis applicable until final reclamation/restoration of the Sediment Pond scheduled for 2017 - 2018)

4.3 Detailed Analysis of Feasible Alternatives Outfall 002 – refer to 2015 ADR (Addition of the proposed Outfall 003 does not increase the total potential discharge from the mine. MSHA's ruling denying water retention in the mine, fractionally distributes the mine discharge at two separate locations)

4.4 Cost of Achieving Effluent Reduction – refer to 2015 ADR

4.5 Performance Criteria Analysis – refer to 2015 ADR

4.6 Preferred Treatment Alternative

Based on the analysis evaluated in the 2015 ADR, PacifiCorp's preferred alternatives remain the Outfall 001 sedimentation basin and in-mine sedimentation for Outfall 002 which are the current processes at the Deer Creek Mine.

- ***Post Mine Closure:***
  - Outfall 001 – preferred alternative is constant with the 2015 ADR analysis
    - Sediment pond is scheduled for reclamation/restoration in 2017 – 2018.
  - Outfall 002 and Proposed 003 - – preferred alternative is constant with the 2015 ADR analysis

4.6.1 Outfall 001

Based on the comparison of the four treatment alternatives for Outfall 001 against the performance criteria, Alternative 1, the sedimentation basin, is rated as more favorable than the three other alternatives in overall performance—particularly in reliability, maintainability, operability, and sustainability. The incremental annualized cost of the treatment options is 105 (basin liner) to 2,970 percent (ZLD) higher than the annualized cost of the existing sedimentation basin and would remove <1,000 lb/day of TDS and other POCs. The incremental cost of the treatment options exceeds the 20 percent threshold established by Utah regulation. Given that Alternative 1 is the most cost-effective alternative, Alternative 1 (sedimentation basin) is the recommended treatment alternative for Outfall 001 at the Deer Creek Mine until reclamation.

4.6.2 Outfall 002 and Proposed Outfall 003

Based on the comparison of the five treatment alternatives for Outfall 002 against the performance criteria, Alternative 1, in-mine sedimentation, is rated as more favorable than the four other alternatives in overall performance—particularly in reliability, maintainability, operability, and sustainability. The incremental annualized cost of the treatment options is 33 (salinity offsets) to 4,900 percent (ZLD) higher than the operating cost of the existing in mine sedimentation system. The incremental cost of the treatment options exceeds the 20% threshold established by Utah regulation. Given that Alternative 1 is the most cost-effective alternative, Alternative 1 (in-mine sedimentation) is the recommended treatment alternative for Outfall 002 and proposed Outfall 003 at the Deer Creek Mine. If a 1 tpd TDS limit is established for the site, salinity offset credits are the recommended alternative to reduce the TDS discharged from the site. As dissolved oxygen (DO) is one of the parameters of concern identified in the Waste Load Analysis (February 28, 2017), an aeration structure will be included if needed at the end of the outfall 003 pipeline to ensure that the discharge will be oxygenated to the acceptable level prior to entering Huntington Creek.

5.0 Statement of Social, Environmental, and Economic Importance

The requirement for applicants to complete a Statement of Social, Environmental, and Economic Importance (SEEI) originates in the Code of Federal Regulations, Chapter 40, Part 131.12(a)(2) [40 CFR 40.131.12(a)(2)]. It requires applicants to demonstrate that allowing lower water quality is necessary to accommodate social or economic development in the area in which the waters to be degraded are located. In UAC R317-2-3.5(c)(4), the State of Utah defines the minimum information that an applicant must provide to demonstrate that degradation is necessary, which includes the following:

- Impacts on employment

- Increases in production
- Improved community tax base
- Impacts on housing
- Correction of an environmental or public health problem

In addition, the Implementation Guidance further clarifies these minimum considerations as well as further considerations that should be included in an applicant's SEEI analysis, including the following:

- Effects on public and social services, including the identification of public or social services that would be provided to the community or required of the community in the affected area as well as effects on health/nursing care, police/fire protection, infrastructure, housing, and public education
- Effects on public health and safety, including any health and safety services that will be provided or required in the affected areas as well as identification of potential project benefits that will enhance food or drinking water quality, control disease vectors, or improve air quality, industrial hygiene, occupational health, and public safety
- Effects on quality of life of residents of affected area, including educational, cultural, and recreational opportunities, daily life experience (in regards to dust, noise, traffic, etc.), and aesthetics (views cape)
- Effects on employment and tax revenues in the affected areas
- Effects on tourism, including the creation or enhancement of tourist attractions or impacts resulting from elimination or reduction of existing tourist attractions
- The pros and cons of preserving assimilative capacity for future industry and development in the affected areas (which is to include the approval/disapproval of local communities for the proposed project)

The purpose of this section is to provide an SEEI that addresses the requirements provided in state and federal regulations as well as the recommendations provided in the ADR Implementation Guidance in an effort to demonstrate that potential degradation, however minor, of Huntington Creek from the Deer Creek Mine operations is necessary to accommodate economic and social development.

5.1 Description of Affected Communities

Deer Creek Mine is located in Emery County, Utah approximately eight miles northwest of Huntington, Utah. According to the U.S. Census Bureau 2010 census data, the total population of Huntington was 2,129 residents (www.city-data.com/city/Huntington-Utah.html). The 2009 median household income was $39,228. In August 2012, the unemployment rate within incorporated areas of Huntington was 7.5 percent (www.city-data.com/city/Huntington-Utah.html).

Huntington was established near Huntington Creek, which continues to supply irrigation water to the community. Agriculture and mining have been a large part of Huntington's history and the

local economy continues to reflect the trends of these industries. The mine discharge to Huntington Creek increases the quantity of irrigation water available to the community.

5.2 Effects on Community Resources from Deer Creek Mine

PacifiCorp announced permanent closure of the Deer Creek Mine on December 15, 2014. The last day of production at Deer Creek Mine was January 7, 2015. Efforts began immediately to prepare the mine for closure, including mining equipment removal. By mid-April of 2015, nearly all of the mining equipment, including conveyor belt lines, had been removed, and permission had been granted by the lease holder (BLM), enabling permanent sealing of the south half and northwest quadrants of the mine. The remaining workings of the Rilda Canyon area are still open with intact power, ventilation, and water systems, pending final resolution of the post-mining water drainage issue. After final mine closure, PacifiCorp will commence demolition and reclamation of the Deer Creek Mine.

- ***Post Mine Closure:***
  - Demolition and reclamation – three employees

Prior to mine closure, Deer Creek Mine supplied coal to the Huntington Power Plant, which also plays a significant role in the Emery County economy. PacifiCorp has approximately 160 direct employees and 134 contractor and vendor staff working at the Huntington Power Plant. The payroll for PacifiCorp staff is about $12.2 million per year (PacifiCorp, 2012). The wages paid by the utility services sector are significantly higher than Utah average wages (Perlich, Hogue, and Downen, 2010). In addition to direct employment, a power plant has an estimated total employment impact of 7.6 to 1 (Perlich, Hogue, and Downen, 2010). During calendar year 2011, the power plant had purchases of approximately $20,700,000, excluding coal, and paid approximately $1,200,000 in sales tax and $6,200,000 in property taxes (PacifiCorp, 2012). The pipeline will supply clean feed water to the Plant that has had Huntington Creek intake water quality problems since 2012 (the year of the Seely Fire). Water supplied to the Plant through the pipeline will substitute for a similar amount of water that will not be diverted from Huntington Creek, and remain in the Huntington Creek drainage for the benefit of aquatic life, recreation, and downstream water users. After the power plant shuts down permanently, the pipeline and water will be accepted for domestic use by the North Emery Water Users Special Service District, creating a benefit for local residential users.

Coal mining has occurred in Deer Creek Canyon for over 60 years and was an established part of Emery County. Demolition and reclamation operations of the mine is not expected to require additional community services, increase the workforce and place additional infrastructure and education demands on the community, or consume assimilative capacity in Huntington Creek that is needed for other projects. Demolition and reclamation operations of the mine are not expected to impact existing area tourism activities.

6.0 References (refer to 2015 ADR)

Exhibit 1

EPA Priority Pollutant List Sampling Results for Outfall 003

CHEMTECH-FORD
LABORATORIES

7/6/2016

Work Order: 16F0973
Project: Deer Creek Mine 11th-17th West

Pacificorp - Huntington Plant
Attn: Chuck Sembroski
P.O. Box 680
Huntington, UT 84528

Client Service Contact: 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags, or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.

Approved By:

Reed Hendricks, Senior Project Manager

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Certificate of Analysis

Pacificorp - Huntington Plant
Chuck Sembroski
P.O. Box 680
Huntington, UT 84528

PO#: **3000116067**
Receipt: **6/17/16 14:52 @ 10.60 °C**
Date Reported: 7/6/2016
Project Name: **Deer Creek Mine 11th-17th West**

Sample ID: **Deer Creek Mine 11th-17th West**
Matrix: **Water**
Date Sampled: **6/17/16 10:21**
Sampled By: **Chuck Sembroski**
Lab ID: **16F0973-01**

Parameter	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Pesticides							
4,4'-DDD	ND	ug/L	0.2	EPA 608	6/21/16	6/28/16	
4,4'-DDE	ND	ug/L	0.1	EPA 608	6/21/16	6/28/16	
4,4'-DDT	ND	ug/L	0.2	EPA 608	6/21/16	6/28/16	
alpha-Chlordane	ND	ug/L	0.1	EPA 608	6/21/16	6/28/16	
Aldrin	ND	ug/L	0.2	EPA 608	6/21/16	6/28/16	
alpha-BHC	ND	ug/L	0.05	EPA 608	6/21/16	6/28/16	
beta-BHC	ND	ug/L	0.1	EPA 608	6/21/16	6/28/16	
delta-BHC	ND	ug/L	0.1	EPA 608	6/21/16	6/28/16	
Dieldrin	ND	ug/L	0.1	EPA 608	6/21/16	6/28/16	
Endosulfan I	ND	ug/L	0.1	EPA 608	6/21/16	6/28/16	
Endosulfan II	ND	ug/L	0.2	EPA 608	6/21/16	6/28/16	
Endosulfan sulfate	ND	ug/L	0.2	EPA 608	6/21/16	6/28/16	
Endrin	ND	ug/L	0.1	EPA 608	6/21/16	6/28/16	
Endrin aldehyde	ND	ug/L	0.2	EPA 608	6/21/16	6/28/16	
gamma-Chlordane	ND	ug/L	0.1	EPA 608	6/21/16	6/28/16	
Heptachlor	ND	ug/L	0.1	EPA 608	6/21/16	6/28/16	
Heptachlor epoxide	ND	ug/L	0.1	EPA 608	6/21/16	6/28/16	
Lindane	ND	ug/L	0.05	EPA 608	6/21/16	6/28/16	
PCB-1016	ND	ug/L	2.0	EPA 608	6/21/16	6/28/16	
PCB-1221	ND	ug/L	2.0	EPA 608	6/21/16	6/28/16	
PCB-1232	ND	ug/L	2.0	EPA 608	6/21/16	6/28/16	
PCB-1242	ND	ug/L	2.0	EPA 608	6/21/16	6/28/16	
PCB-1248	ND	ug/L	2.0	EPA 608	6/21/16	6/28/16	
PCB-1254	ND	ug/L	2.0	EPA 608	6/21/16	6/28/16	
PCB-1260	ND	ug/L	2.0	EPA 608	6/21/16	6/28/16	
Toxaphene	ND	ug/L	2.0	EPA 608	6/21/16	6/28/16	
Semi-Volatile Compounds							
1,2,4-Trichlorobenzene	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
1,2-Dichlorobenzene	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
1,3-Dichlorobenzene	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
1,4-Dichlorobenzene	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
2,4,6-Trichlorophenol	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
2,4-Dichlorophenol	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
2,4-Dimethylphenol	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
2,4-Dinitrophenol	ND	ug/L	10	EPA 625	6/21/16	6/27/16	
2,4-Dinitrotoluene	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
2,6-Dinitrotoluene	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
2-Chloronaphthalene	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
2-Chlorophenol	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
2-Nitrophenol	ND	ug/L	10	EPA 625	6/21/16	6/27/16	
3,3'-Dichlorobenzidine	ND	ug/L	10	EPA 625	6/21/16	6/27/16	
4,6-Dinitro-2-methylphenol	ND	ug/L	10	EPA 625	6/21/16	6/27/16	
4-Bromophenyl phenyl ether	ND	ug/L	5	EPA 625	6/21/16	6/27/16	

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www.ChemtechFord.com

Certificate of Analysis

Pacificorp - Huntington Plant
Chuck Sembroski
P.O. Box 680
Huntington, UT 84528

PO#: **3000116067**
Receipt: **6/17/16 14:52 @ 10.60 °C**
Date Reported: **7/6/2016**
Project Name: **Deer Creek Mine 11th-17th West**

Sample ID: **Deer Creek Mine 11th-17th West (cont.)**
Matrix: **Water**
Date Sampled: **6/17/16 10:21**
Sampled By: **Chuck Sembroski**
Lab ID: **16F0973-01**

Parameter	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Semi-Volatile Compounds (cont.)							
4-Chloro-3-methylphenol	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
4-Chlorophenyl Phenyl Ether	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
4-Nitrophenol	ND	ug/L	10	EPA 625	6/21/16	6/27/16	
Acenaphthene	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Acenaphthylene	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Anthracene	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Azobenzene	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Benzidine	ND	ug/L	10	EPA 625	6/21/16	6/27/16	
Benzo (a) anthracene	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Benzo (a) pyrene	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Benzo (b) fluoranthene	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Benzo (g,h,i) perylene	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Benzo (k) fluoranthene	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Bis (2-chloroethoxy) Methane	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Bis (2-chloroethyl) Ether	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Bis (2-chloroisopropyl) Ether	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Bis (2-ethylhexyl) Phthalate	ND	ug/L	10	EPA 625	6/21/16	6/27/16	
Butylbenzylphthalate	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Chrysene	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Dibenzo (a,h) anthracene	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Diethylphthalate	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Dimethyl phthalate	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Di-n-butylphthalate	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Di-n-Octylphthalate	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Fluoranthene	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Fluorene	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Hexachlorobenzene	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Hexachlorobutadiene	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Hexachlorocyclopentadiene	ND	ug/L	10	EPA 625	6/21/16	6/27/16	
Hexachloroethane	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Indeno (1,2,3-cd) pyrene	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Isophorone	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Naphthalene	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Nitrobenzene	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
N-Nitrosodimethylamine	ND	ug/L	10	EPA 625	6/21/16	6/27/16	
N-Nitrosodi-n-propylamine	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
N-Nitrosodiphenylamine	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Pentachlorophenol	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Phenanthrene	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Phenol	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Pyrene	ND	ug/L	5	EPA 625	6/21/16	6/27/16	
Volatile Organic Compounds							
1,1,1,2-Tetrachloroethane	ND	ug/L	5	EPA 624	6/20/16	6/20/16	

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Date Reported: 7/6/2016
Project Name: **Deer Creek Mine 11th-17th West**

Sample ID: **Deer Creek Mine 11th-17th West (cont.)**
Matrix: **Water**
Date Sampled: **6/17/16 10:21**
Sampled By: **Chuck Sembroski**
Lab ID: **16F0973-01**

Parameter	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Volatile Organic Compounds (cont.)							
1,1,1-Trichloroethane	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
1,1,2-Trichloroethane	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
1,1-Dichloroethane	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
1,1-Dichloroethene	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
1,2-Dichlorobenzene	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
1,2-Dichloroethane	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
1,2-Dichloropropane	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
1,3-Dichlorobenzene	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
1,4-Dichlorobenzene	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
2-Chloroethyl vinyl ether	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
Acrolein	ND	ug/L	100	EPA 624	6/20/16	6/20/16	
Acrylonitrile	ND	ug/L	50	EPA 624	6/20/16	6/20/16	
Benzene	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
Bromodichloromethane	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
Bromoform	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
Bromomethane	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
Carbon Tetrachloride	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
Chlorobenzene	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
Chloroethane	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
Chloroform	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
Chloromethane	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
cis-1,3-Dichloropropene	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
Dibromochloromethane	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
Ethylbenzene	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
Methylene Chloride	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
Tetrachloroethene	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
Toluene	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
trans-1,2-Dichloroethene	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
trans-1,3-Dichloropropene	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
Trichloroethene	ND	ug/L	5	EPA 624	6/20/16	6/20/16	
Vinyl Chloride	ND	ug/L	5	EPA 624	6/20/16	6/20/16	

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PO#: **3000116067**
Receipt: **6/17/16 14:52 @ 10.60 °C**
Date Reported: **7/6/2016**
Project Name: **Deer Creek Mine 11th-17th West**

Report Footnotes

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit (MRL).
1 mg/L = one milligram per liter or 1 mg/kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/kg = one microgram per kilogram = 1 part per billion.
1 ng/L = one nanogram per liter or 1 ng/kg = one nanogram per kilogram = 1 part per trillion.

ICAL LABORATORY

CHAIN OF CUSTODY

CHEMTECH-FORD LABORATORIES

IEST MINING COMPANY
15 NORTH MAIN
JT 84528
FAX: 435-687-2695
PROJECT: DEEP CREEK MINE 11TH-17TH WEST
@PACIFICORP.COM

BILLING ADDRESS: 15 North Main Street
BILLING CITY/STATE/ZIP: Huntington UT 84528
PURCHASE ORDER #: 3000116067

TURNAROUND REQUIRED:* July 1, 2016
* Expedited turnaround subject to additional charge

CLIENT SAMPLE INFORMATION

ON	DATE	TIME	MATRIX	Field Residual Chlorine	TESTS REQUESTED	Bacteria: Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
[	6/17/16	10:21			SEE ATTACHED SHEET				

Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 10.6

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

	Date/Time	Received by: [signature]	Date/Time
	6/17/16 @ 11:25		6/17/16 11:25am
	6/17/16 @ 1452		6-17-16 14:52

801.262.7299 PHONE
866.792.0093 FAX
www.chemtechford.com

Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agrees to pay collection costs and attorney's fees.

Exhibit 2

Baseline Water Quality Sampling Results for Outfall 003

Analysis Report

August 16, 2016

PACIFICORP
FIELD OFFICE
PO BOX 1005
HUNTINGTON UT 84528

Client Sample ID:	11W-17W SEALS	Sample ID By:	PacifiCorp
Date Sampled:	Jul 12, 2016	Sample Taken By:	CAS KSF
Date Received:	Jul 12, 2016	Time Received:	1325
Product Description:	WATER	Time Sampled:	1021
		Location:	11W-17W SEALS
		Mine:	4
		Field - pH:	7.66 pH units
		Field - Conductivity:	929 UMHOS/CM
		Field - Temperature:	13.4 DEG. C

Comments: Dissolved Metals Filtered at Lab: Total Selenium 200.8 Analyzed at A.W.A.L.

SGS Minerals Sample ID: 782-1638403-001

TESTS	RESULT	UNIT	METHOD	REPORTING LIMIT	ANALYZED DATE	ANALYZED TIME	ANALYST
Hardness, mg equivalent CaCO3/L	304	mg/L	SM2340-B	1	2016-07-26	12:00:00	HF
Acidity	<5	mg/L	D1067	5	2016-06-30	15:00:00	MS
Anions	9.48	meq/L	SM1030E	0	2016-07-26	12:00:00	HF
Balance	-2.24	%	SM1030E	-10	2016-07-26	12:00:00	HF
Cations	9.07	meq/L	SM1030E	0	2016-07-26	12:00:00	HF
Alkalinity, mg CaCO3/L (pH 4.5)	362	mg/L	SM2320-B	5	2016-07-19	10:00:05	MS
Bicarbonate Alkalinity as CaCO3	362	mg/L	SM2320-B	5	2016-07-19	10:00:05	MS
Carbonate Alkalinity as CaCO3	<5	mg/L	SM2320-B	5	2016-07-19	10:00:05	MS
Nitrogen, Ammonia	3.9	mg/L	SM4500-B-D	0.1	2016-07-25	07:30:00	MS
pH	7.39		SM4500-H	0.01	2016-07-03	09:00:00	MS
pH Temperature	20.00	°C	SM4500-H	0.01	2016-07-03	09:00:00	MS
Conductivity	842	µmhos/cm	SM2510	0.1	2016-07-21	11:37:32	MS
Total Dissolved Solids	489	mg/L	SM2540-C	30	2016-07-14	14:30:00	MS
Nitrate	<0.05	mg/L	EPA 300.0	0.05	2016-07-13	12:00:00	HF
Nitrite	<0.05	mg/L	EPA 300.0	0.05	2016-07-13	12:00:00	HF
Chloride, Cl	11	mg/L	EPA 300.0	1	2016-07-13	12:00:00	HF
Sulfate, SO4	93	mg/L	EPA 300.0	1	2016-07-13	12:00:00	HF
Ortho-Phosphate-P	<0.05	mg/L	EPA 300.0	0.05	2016-07-13	12:00:00	HF
Mercury, Hg - Total	<0.2	µg/L	EPA 245.1	0.2	2016-08-04	07:00:00	HF

METALS BY ICP

Lab Supervisor

Domenic Ibanez
Lab Supervisor

SGS North America Inc. | Minerals Services Division
2035 North Airport Road Huntington UT 84528 t (435) 653-2311 f (435)-653-2436 www.sgs.com/minerals

Member of the SGS Group (Société Générale de Surveillance)

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SGS

Analysis Report

August 16, 2016

PACIFICORP
FIELD OFFICE
PO BOX 1005
HUNTINGTON UT 84528

Client Sample ID:	11W-17W SEALS	Sample ID By:	PacifiCorp
Date Sampled:	Jul 12, 2016	Sample Taken By:	CAS KSF
Date Received:	Jul 12, 2016	Time Received:	1325
Product Description:	WATER	Time Sampled:	1021
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		Mine:	4
		Field - pH:	7.66 pH units
		Field - Conductivity:	929 UMHOS/CM
		Field - Temperature:	13.4 DEG. C

Comments: Dissolved Metals Filtered at Lab: Total Selenium 200.8 Analyzed at A.W.A.L.

SGS Minerals Sample ID: 782-1638403-001

TESTS	RESULT	UNIT	METHOD	REPORTING LIMIT	ANALYZED DATE	ANALYZED TIME	ANALYST
METALS BY ICP (continued)							
Aluminum, Al - Dissolved	0.04	mg/L	EPA 200.7	0.03	2016-07-19	10:00:00	HF
Arsenic, As - Dissolved	<0.01	mg/L	EPA 200.7	0.01	2016-07-19	10:00:00	HF
Arsenic, As - Total	<0.01	mg/L	EPA 200.7	0.01	2016-08-03	10:23:19	HF
Boron, B - Total	0.22	mg/L	EPA 200.7	0.01	2016-08-03	10:23:19	HF
Cadmium, Cd - Dissolved	<0.001	mg/L	EPA 200.7	0.001	2016-07-19	10:00:00	HF
Cadmium, Cd - Total	<0.001	mg/L	EPA 200.7	0.001	2016-08-03	10:23:19	HF
Calcium, Ca - Dissolved	57.96	mg/L	EPA 200.7	0.03	2016-07-19	10:00:00	HF
Chromium, Cr - Total	0.005	mg/L	EPA 200.7	0.001	2016-08-03	10:23:19	HF
Copper, Cu - Dissolved	<0.01	mg/L	EPA 200.7	0.01	2016-07-19	10:00:00	HF
Copper, Cu - Total	<0.01	mg/L	EPA 200.7	0.01	2016-07-14	13:00:00	HF
Iron, Fe - Total	1.35	mg/L	EPA 200.7	0.05	2016-07-14	13:00:00	HF
Iron, Fe - Dissolved	<0.03	mg/L	EPA 200.7	0.03	2016-07-19	10:00:00	HF
Lead, Pb - Dissolved	<0.01	mg/L	EPA 200.7	0.01	2016-07-19	10:00:00	HF
Lead, Pb - Total	<0.01	mg/L	EPA 200.7	0.01	2016-07-14	13:00:00	HF
Magnesium, Mg - Dissolved	38.76	mg/L	EPA 200.7	0.01	2016-07-19	10:00:00	HF
Manganese, Mn - Total	0.020	mg/L	EPA 200.7	0.002	2016-07-14	13:00:00	HF
Manganese, Mn - Dissolved	0.018	mg/L	EPA 200.7	0.002	2016-07-19	10:00:00	HF
Molybdenum, Mo - Dissolved	0.011	mg/L	EPA 200.7	0.005	2016-07-19	10:00:00	HF
Nickel, Ni - Total	0.037	mg/L	EPA 200.7	0.001	2016-07-14	13:00:00	HF
Potassium, K - Dissolved	10.40	mg/L	EPA 200.7	0.14	2016-07-19	10:00:00	HF

Lab Supervisor

Domenic Ibanez
Lab Supervisor

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August 16, 2016

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Date Received:	Jul 12, 2016	Time Received:	1325
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		Field - pH:	7.66 pH units
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Comments: Dissolved Metals Filtered at Lab: Total Selenium 200.8 Analyzed at A.W.A.L.

SGS Minerals Sample ID: 782-1638403-001

TESTS	RESULT	UNIT	METHOD	REPORTING LIMIT	ANALYZED DATE	ANALYZED TIME	ANALYST
METALS BY ICP (continued)							
Selenium, Se - Total	<0.02	mg/L	EPA 200.7	0.02	2016-07-14	13:00:00	HF
Selenium, Se - Total	<0.002	mg/L	EPA 200.8	0.002	2016-08-05	13:24:00	DI
Silver, Ag - Total	<0.002	mg/L	EPA 200.7	0.002	2016-08-04	06:00:00	HF
Sodium, Na - Dissolved	62.50	mg/L	EPA 200.7	0.09	2016-07-19	10:00:00	HF
Zinc, Zn - Dissolved	<0.004	mg/L	EPA 200.7	0.004	2016-07-19	10:00:00	HF
Zinc, Zn - Total	<0.004	mg/L	EPA 200.7	0.004	2016-07-14	13:00:00	HF

Lab Supervisor

Domenic Ibanez
Lab Supervisor

SGS North America Inc. | Minerals Services Division
2035 North Airport Road Huntington UT 84528 t (435) 653-2311 f (435)-653-2436 www.sgs.com/minerals

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Analysis Report

September 03, 2016

PACIFICORP
FIELD OFFICE
PO BOX 1005
HUNTINGTON UT 84528

Client Sample ID:	11 W 17 W Seals	Sample ID By:	PacifiCorp
Date Sampled:	Aug 2, 2016	Sample Taken By:	CAS
Date Received:	Aug 2, 2016	Time Received:	1300
Product Description:	WATER	Time Sampled:	1119
		Location:	11W -17W Seals
		Mine:	4
		Field - pH:	7.57 pH units
		Field - Conductivity:	644 UMHOS/CM
		Field - Temperature:	13.9 DEG. C

Comments: Dissolved Metals Filtered at Lab: Total Selenium 200.8 Analyzed at A.W.A.L.

SGS Minerals Sample ID: 782-1639055-001

TESTS	RESULT	UNIT	METHOD	REPORTING LIMIT	ANALYZED DATE	ANALYZED TIME	ANALYST
Hardness, mg equivalent CaCO3/L	314	mg/L	SM2340-B	1	2016-08-17	13:00:00	HF
Acidity	26	mg/L	D1067	5	2016-08-02	13:15:00	MS
Anions	9.26	meq/L	SM1030E	0	2016-08-17	13:00:00	HF
Balance	-0.31	%	SM1030E	-10	2016-08-17	13:00:00	HF
Cations	9.20	meq/L	SM1030E	0	2016-08-17	13:00:00	HF
Alkalinity, mg CaCO3/L (pH 4.5)	350	mg/L	SM2320-B	5	2016-08-15	12:00:00	HF
Bicarbonate Alkalinity as CaCO3	350	mg/L	SM2320-B	5	2016-08-15	12:00:00	HF
Carbonate Alkalinity as CaCO3	<5	mg/L	SM2320-B	5	2016-08-15	12:00:00	HF
Nitrogen, Ammonia	2.0	mg/L	SM4500-B-D	0.1	2016-08-25	08:00:00	MS
pH	7.40		SM4500-H	0.01	2016-08-02	13:15:00	MS
pH Temperature	16.00	°C	SM4500-H	0.01	2016-08-02	13:15:00	MS
Conductivity	785	µmhos/cm	SM2510	0.1	2016-08-02	13:15:00	MS
Total Dissolved Solids	499	mg/L	SM2540-C	30	2016-08-03	14:00:00	HF
Nitrate	0.05	mg/L	EPA 300.0	0.05	2016-08-02	21:47:00	HF
Nitrite	<0.05	mg/L	EPA 300.0	0.05	2016-08-02	21:47:00	HF
Chloride, Cl	11	mg/L	EPA 300.0	1	2016-08-02	21:47:00	HF
Sulfate, SO4	94	mg/L	EPA 300.0	1	2016-08-02	21:47:00	HF
Ortho-Phosphate-P	<0.05	mg/L	EPA 300.0	0.05	2016-08-02	21:47:00	HF
Mercury, Hg - Total	<0.2	µg/L	EPA 245.1	0.2	2016-08-04	07:00:00	HF

METALS BY ICP

Lab Supervisor

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September 03, 2016

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		Mine:	4
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		Field - Conductivity:	644 UMHOS/CM
		Field - Temperature:	13.9 DEG. C

Comments: Dissolved Metals Filtered at Lab: Total Selenium 200.8 Analyzed at A.W.A.L.

SGS Minerals Sample ID: 782-1639055-001

TESTS	RESULT	UNIT	METHOD	REPORTING LIMIT	ANALYZED DATE	ANALYZED TIME	ANALYST
METALS BY ICP (continued)							
Aluminum, Al - Dissolved	<0.03	mg/L	EPA 200.7	0.03	2016-08-16	17:00:00	HF
Arsenic, As - Total	<0.01	mg/L	EPA 200.7	0.01	2016-08-08	11:35:00	HF
Arsenic, As - Dissolved	<0.01	mg/L	EPA 200.7	0.01	2016-08-16	17:00:00	HF
Boron, B - Total	0.21	mg/L	EPA 200.7	0.01	2016-08-08	11:35:00	HF
Cadmium, Cd - Total	<0.001	mg/L	EPA 200.7	0.001	2016-08-08	11:35:00	HF
Cadmium, Cd - Dissolved	<0.001	mg/L	EPA 200.7	0.001	2016-08-16	17:00:00	HF
Calcium, Ca - Dissolved	59.54	mg/L	EPA 200.7	0.03	2016-08-16	17:00:00	HF
Chromium, Cr - Total	0.004	mg/L	EPA 200.7	0.001	2016-08-08	11:35:00	HF
Copper, Cu - Total	<0.01	mg/L	EPA 200.7	0.01	2016-08-08	11:35:00	HF
Copper, Cu - Dissolved	<0.01	mg/L	EPA 200.7	0.01	2016-08-16	17:00:00	HF
Iron, Fe - Total	1.48	mg/L	EPA 200.7	0.05	2016-08-08	11:35:00	HF
Iron, Fe - Dissolved	<0.03	mg/L	EPA 200.7	0.03	2016-08-16	17:00:00	HF
Lead, Pb - Total	<0.01	mg/L	EPA 200.7	0.01	2016-08-08	11:35:00	HF
Lead, Pb - Dissolved	<0.01	mg/L	EPA 200.7	0.01	2016-08-16	17:00:00	HF
Magnesium, Mg - Dissolved	40.04	mg/L	EPA 200.7	0.01	2016-08-16	17:00:00	HF
Manganese, Mn - Total	0.021	mg/L	EPA 200.7	0.002	2016-08-08	11:35:00	HF
Manganese, Mn - Dissolved	0.015	mg/L	EPA 200.7	0.002	2016-08-16	17:00:00	HF
Molybdenum, Mo - Dissolved	0.010	mg/L	EPA 200.7	0.005	2016-08-16	17:00:00	HF
Nickel, Ni - Total	0.036	mg/L	EPA 200.7	0.001	2016-08-08	11:35:00	HF
Potassium, K - Dissolved	10.12	mg/L	EPA 200.7	0.14	2016-08-16	17:00:00	HF

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SGS

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Comments: Dissolved Metals Filtered at Lab: Total Selenium 200.8 Analyzed at A.W.A.L.

SGS Minerals Sample ID: 782-1639055-001

TESTS	RESULT	UNIT	METHOD	REPORTING LIMIT	ANALYZED DATE	ANALYZED TIME	ANALYST
METALS BY ICP (continued)							
Selenium, Se - Total	<0.02	mg/L	EPA 200.7	0.02	2016-08-08	11:35:00	HF
Selenium, Se - Total	<0.002	mg/L	EPA 200.8	0.002	2016-08-05	13:24:00	DI
Silver, Ag - Total	<0.002	mg/L	EPA 200.7	0.002	2016-08-04	06:00:00	HF
Sodium, Na - Dissolved	61.54	mg/L	EPA 200.7	0.09	2016-08-16	17:00:00	HF
Zinc, Zn - Dissolved	0.012	mg/L	EPA 200.7	0.004	2016-08-16	17:00:00	HF
Zinc, Zn - Total	<0.004	mg/L	EPA 200.7	0.004	2016-08-08	11:35:00	HF

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Exhibit 3

Utah Division of Water Quality – Statement of Basis
ADDENDUM, Wasteload Analysis and Antidegradation Level I Review – PRELIMINARY, February 28, 2017

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

Date:	**February 28, 2017**
Prepared by:	**Dave Wham** **Standards and Technical Services**
Facility:	**Pacificorp Deer Creek Mine; Discharge 003** **UPDES No. UT0023604**
Receiving water:	**Huntington Creek (1C, 2B, 3A, 4)**

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

Discharge

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

Receiving Water

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

- *Class 1C – Protected for domestic purposes with prior treatment by treatment processes as required by the Utah Division of Drinking Water.*
- *Class 2B - Protected for infrequent primary contact recreation. Also protected for secondary contact recreation where there is a low likelihood of ingestion of water or a low degree of bodily contact with the water. Examples include, but are not limited to, wading, hunting, and fishing.*
- *Class 3A - Protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in their food chain..*
- *Class 4 - Protected for agricultural uses including irrigation of crops and stock watering.*

Typically, the critical flow for the wasteload analysis is considered the lowest stream flow for seven consecutive days with a ten year return frequency (7Q10). Due to a lack of flow records, the 20th percentile of available flow measurements was calculated for the period of record to approximate the 7Q10 low flow condition. Flow data for the receiving water was obtained from Emery Water Conservancy District for their site *Huntington River below Power Plant* from the period 2012-2017. This station is below the Power Plant diversion but above other significant diversions like Huntington Reservoir. Ambient water quality was characterized using data from DWQ station #4930530, Huntington Creek above UP&L Diversion from the period 2007-2013.

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

TMDL

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

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

Data from two monitoring stations above and below Deer Creek on Huntington Creek show impairments for pH and dissolved oxygen (DO). As a result, the proposed discharge must meet applicable Water Quality Standards (WQS) at end of pipe for these constituents (6.5 mg/l DO, and pH 7.5-9.0 pH).

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

Mixing Zone

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

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

Parameters of Concern

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

WET Limits

The percent of effluent in the receiving water in a fully mixed condition, and acute and chronic dilution in a not fully mixed condition are calculated in the WLA in order to generate WET limits. The LC_{50} (lethal concentration, 50%) percent effluent for acute toxicity and the IC_{25} (inhibition concentration, 25%) percent effluent for chronic toxicity, as determined by the WET test, needs to be below the WET limits, as determined by the WLA.

LC50 WET Limits for Outfall 003 should be based on 61.4% effluent.
IC25 WET limits for Outfalls 003 should be based on 8.4% effluent.

Wasteload Allocation Methods

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

The water quality standard for chronic ammonia toxicity is dependent on temperature and pH, and the water quality standard for acute ammonia toxicity is dependent on pH. The AMMTOX Model developed by University of Colorado and adapted by Utah DWQ and EPA Region VIII was used to determine ammonia effluent limits (Lewis et al. 2002). The analysis is summarized in the Wasteload Addendum.

Models and supporting documentation are available for review upon request.

Antidegradation Level I Review

The objective of the Level I ADR is to ensure the protection of existing uses, defined as the beneficial uses attained in the receiving water on or after November 28, 1975. No evidence is known that the existing uses deviate from the designated beneficial uses for the receiving water. Therefore, the beneficial uses will be protected if the discharge remains below the WQBELs presented in this wasteload.

An amended Level II Antidegradation Review (ADR) is required for this facility. The receiving stream for the proposed discharge is a Class 1C drinking water source.

Documents:

WLA Document: *DeerCk_003_WLADoc_2-27-17.docx*
Wasteload Analysis and Addendums: *DeerCk_003_WLA_2-27-17.xlsm*

References:

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

WASTELOAD ANALYSIS [WLA]
Addendum: Statement of Basis
SUMMARY

Discharging Facility:	**Deer Creek 003 Discharge**		
UPDES No:	UT-0023604		
Current Flow:	0.72	MGD	Design Flow
Design Flow	0.72	MGD	

Receiving Water:	**Huntington Creek**		
Stream Classification:	1C, 2B, 3A, 4		
Stream Flows [cfs]:	12.10	Summer (July-Sept)	20th Percentile
	12.10	Fall (Oct-Dec)	20th Percentile
	12.10	Winter (Jan-Mar)	20th Percentile
	12.10	Spring (Apr-June)	20th Percentile
	50.0	Average	
Stream TDS Values:	213.0	Summer (July-Sept)	Average
	265.0	Fall (Oct-Dec)	Average
	307.0	Winter (Jan-Mar)	Average
	230.0	Spring (Apr-June)	Average

Effluent Limits:				**WQ Standard:**
Flow, MGD:	0.72	MGD	Design Flow	
BOD, mg/l:	25.0	Summer	5.0	Indicator
Dissolved Oxygen, mg/l	5.5	Summer	6.5	30 Day Average
TNH3, Chronic, mg/l:	16.2	Summer	Varies	Function of pH and Temperature
TDS, mg/l:	11922.1	Summer	1200.0	

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

Level 1 Antidegradation Level Completed: Amended Level II Review required.

Date: 2/27/2017

Permit Writer: _____ _____

WLA by: _____ _____

WQM Sec. Approval: _____ _____

TMDL Sec. Approval: _____ _____

WASTELOAD ANALYSIS [WLA]
Addendum: Statement of Basis

27-Feb-17
4:00 PM

Facilities: **Deer Creek 003 Discharge** **UPDES No: UT-0023604**
Discharging to: **Huntington Creek**

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 interms of total ammonia), and dissolved oxygen.

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

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

II. Receiving Water and Stream Classification

Huntington Creek :	1C, 2B, 3A, 4
Antidegradation Review:	Level I review completed. Amended Level II review 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)	6.50 mg/l (30 Day Average) 5.00 mg/l (7Day Average) 4.00 mg/l (1 Day Average
Maximum Total Dissolved Solids	1200.0 mg/l

Acute and Chronic Heavy Metals (Dissolved)

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

* Allowed below discharge

**Chronic Aluminum standard applies only to waters with a pH < 7.0 and a Hardness < 50 mg/l as $CaCO_3$

Metals Standards Based upon a Hardness of 242.57 mg/l as $CaCO_3$

Organics [Pesticides]

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

IV. Numeric Stream Standards for Protection of Agriculture

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

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

	4 Day Average (Chronic) Standard		1 Hour Average (Acute) Standard	
Metals	Concentration	Load*	Concentration	Load*
Arsenic			50.0 ug/l	3.561 lbs/day
Barium			1000.0 ug/l	71.223 lbs/day
Cadmium			10.0 ug/l	0.712 lbs/day
Chromium			50.0 ug/l	3.561 lbs/day
Lead			50.0 ug/l	3.561 lbs/day
Mercury			2.0 ug/l	0.142 lbs/day
Selenium			10.0 ug/l	0.712 lbs/day
Silver			50.0 ug/l	3.561 lbs/day
Fluoride (3)			1.4 ug/l	0.100 lbs/day
to			2.4 ug/l	0.171 lbs/day
Nitrates as N			10.0 ug/l	0.712 lbs/day
Chlorophenoxy Herbicides				
2,4-D			100.0 ug/l	7.122 lbs/day
2,4,5-TP			10.0 ug/l	0.712 lbs/day
Endrin			0.2 ug/l	0.014 lbs/day
ocyclohexane (Lindane)			4.0 ug/l	0.285 lbs/day
Methoxychlor			100.0 ug/l	7.122 lbs/day
Toxaphene			5.0 ug/l	0.356 lbs/day

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

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

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

Phenol	2.10E+04 ug/l	1.50E+03 lbs/day	4.6E+06 ug/l	3.28E+05 lbs/day
Bis(2-ethylhexyl)phthala	1.80 ug/l	0.13 lbs/day	5.9 ug/l	0.42 lbs/day
Butyl benzyl phthalate	3000.00 ug/l	213.67 lbs/day	5200.0 ug/l	370.36 lbs/day
Di-n-butyl phthalate	2700.00 ug/l	192.30 lbs/day	12000.0 ug/l	854.67 lbs/day
Di-n-octyl phthlate				
Diethyl phthalate	23000.00 ug/l	1638.12 lbs/day	120000.0 ug/l	8546.71 lbs/day
Dimethyl phthlate	3.13E+05 ug/l	2.23E+04 lbs/day	2.9E+06 ug/l	2.07E+05 lbs/day
Benzo(a)anthracene (P/	0.0028 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Benzo(a)pyrene (PAH)	0.0028 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Benzo(b)fluoranthene (F	0.0028 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Benzo(k)fluoranthene (F	0.0028 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Chrysene (PAH)	0.0028 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Acenaphthylene (PAH)				
Anthracene (PAH)	9600.00 ug/l	683.74 lbs/day	0.0 ug/l	0.00 lbs/day
Dibenzo(a,h)anthracene	0.0028 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Indeno(1,2,3-cd)pyrene	0.0028 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Pyrene (PAH)	960.00 ug/l	68.37 lbs/day	11000.0 ug/l	783.45 lbs/day
Tetrachloroethylene	0.80 ug/l	0.06 lbs/day	8.9 ug/l	0.63 lbs/day
Toluene	6800.00 ug/l	484.31 lbs/day	200000 ug/l	14244.52 lbs/day
Trichloroethylene	2.70 ug/l	0.19 lbs/day	81.0 ug/l	5.77 lbs/day
Vinyl chloride	2.00 ug/l	0.14 lbs/day	525.0 ug/l	37.39 lbs/day
			0.0	0.00 lbs/day
Pesticides			0.0	0.00 lbs/day
Aldrin	0.0001 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Dieldrin	0.0001 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Chlordane	0.0006 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
4,4'-DDT	0.0006 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
4,4'-DDE	0.0006 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
4,4'-DDD	0.0008 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
alpha-Endosulfan	0.9300 ug/l	0.07 lbs/day	2.0 ug/l	0.14 lbs/day
beta-Endosulfan	0.9300 ug/l	0.07 lbs/day	2.0 ug/l	0.14 lbs/day
Endosulfan sulfate	0.9300 ug/l	0.07 lbs/day	2.0 ug/l	0.14 lbs/day
Endrin	0.7600 ug/l	0.05 lbs/day	0.8 ug/l	0.06 lbs/day
Endrin aldehyde	0.7600 ug/l	0.05 lbs/day	0.8 ug/l	0.06 lbs/day
Heptachlor	0.0002 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Heptachlor epoxide				
PCB's				
PCB 1242 (Arochlor 124	0.000044 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1254 (Arochlor 125	0.000044 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1221 (Arochlor 122	0.000044 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1232 (Arochlor 123	0.000044 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1248 (Arochlor 124	0.000044 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1260 (Arochlor 126	0.000044 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
PCB-1016 (Arochlor 10'	0.000044 ug/l	0.00 lbs/day	0.0 ug/l	0.00 lbs/day
Pesticide				
Toxaphene	0.000750 ug/l	0.00	0.0 ug/l	0.00 lbs/day
Dioxin				
Dioxin (2,3,7,8-TCDD)	1.30E-08 ug/l	0.00 lbs/day	1.40E-08	0.00

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

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

VII. Mathematical Modeling of Stream Quality

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

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

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

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

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

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

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

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

(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 cfs	Temp. Deg. C	pH	T-NH3 mg/l as N	BOD5 mg/l	DO mg/l	TRC mg/l	TDS mg/l
Summer (Irrig. Season)	12.10	12.0	8.5	0.01	0.05	7.64	0.00	213.0
Fall	12.10	2.1	8.4	0.01	0.05	—	0.00	265.0
Winter	12.10	1.0	8.3	0.01	0.05	—	0.00	307.0
Spring	12.10	7.3	8.4	0.01	0.05	—	0.00	230.0

Dissolved Metals	Al ug/l	As ug/l	Cd ug/l	CrIII ug/l	CrVI ug/l	Copper ug/l	Fe ug/l	Pb ug/l
All Seasons	13.67	0.50	0.06	1.77	3.975*	0.95	15.2	0.35

Dissolved Metals	Hg ug/l	Ni ug/l	Se ug/l	Ag ug/l	Zn ug/l	Boron ug/l
All Seasons	0.0000	2.50	0.92	0.25	7.12	20.1

* ~80% MDL

Projected Discharge Information

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

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

IX. Effluent Limitations

Current State water quality standards are required to be met under a variety of conditions including in-stream flows targeted to the 7-day, 10-year low flow (R317-2-9).

Other conditions used in the modeling effort coincide with the environmental conditions expected at low stream flows.

Effluent Limitation for Flow based upon Water Quality Standards

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

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

Flow Requirement or Loading Requirement

The calculations in this wasteload analysis utilize the maximum effluent discharge flow of 0.72 MGD. If the discharger is allowed to have a flow greater than 0.72 MGD during 7Q10 conditions, and effluent limit concentrations as indicated, then water quality standards will be violated. In order to prevent this from occuring, the permit writers must include the discharge flow limititation 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 segements if the values below are met.

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

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

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

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

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

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

Season	**Concentration**
Summer	5.00
Fall	5.00
Winter	5.00
Spring	5.00

Effluent Limitation for Total Ammonia based upon Water Quality Standards

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

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

Acute limit calculated with an Acute Zone of Initial Dilution (ZID) to be equal to 50.%.

Effluent Limitation for Total Residual Chlorine based upon Water Quality Standards

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

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

Effluent Limitations for Total Dissolved Solids based upon Water Quality Standards

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

Colorado Salinity Forum Limits — Determined by Permitting Section

Effluent Limitations for Total Recoverable Metals based upon Water Quality Standards

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

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

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

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

Effluent Limitations for Heat/Temperature based upon Water Quality Standards

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

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

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

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

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	30.1 lbs/day
Nitrates as N	4.0 mg/l	24.1 lbs/day
Total Phosphorus as P	0.05 mg/l	0.3 lbs/day
Total Suspended Solids	90.0 mg/l	541.4 lbs/day

Note: Pollution indicator targets are for information purposes only.

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

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

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

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

Pyrene (PAH)	1.14E+04 ug/l	6.84E+01 lbs/day
Tetrachloroethylene	9.49E+00 ug/l	5.70E-02 lbs/day
Toluene	8.07E+04 ug/l	4.84E+02 lbs/day
Trichloroethylene	3.20E+01 ug/l	1.92E-01 lbs/day
Vinyl chloride	2.37E+01 ug/l	1.42E-01 lbs/day
Pesticides		
Aldrin	1.54E-03 ug/l	9.26E-06 lbs/day
Dieldrin	1.66E-03 ug/l	9.97E-06 lbs/day
Chlordane	6.76E-03 ug/l	4.06E-05 lbs/day
4,4'-DDT	7.00E-03 ug/l	4.20E-05 lbs/day
4,4'-DDE	7.00E-03 ug/l	4.20E-05 lbs/day
4,4'-DDD	9.85E-03 ug/l	5.91E-05 lbs/day
alpha-Endosulfan	1.10E+01 ug/l	6.62E-02 lbs/day
beta-Endosulfan	1.10E+01 ug/l	6.62E-02 lbs/day
Endosulfan sulfate	1.10E+01 ug/l	6.62E-02 lbs/day
Endrin	9.02E+00 ug/l	5.41E-02 lbs/day
Endrin aldehyde	9.02E+00 ug/l	5.41E-02 lbs/day
Heptachlor	2.49E-03 ug/l	1.50E-05 lbs/day
Heptachlor epoxide		
PCB's		
PCB 1242 (Arochlor 1242)	5.22E-04 ug/l	3.13E-06 lbs/day
PCB-1254 (Arochlor 1254)	5.22E-04 ug/l	3.13E-06 lbs/day
PCB-1221 (Arochlor 1221)	5.22E-04 ug/l	3.13E-06 lbs/day
PCB-1232 (Arochlor 1232)	5.22E-04 ug/l	3.13E-06 lbs/day
PCB-1248 (Arochlor 1248)	5.22E-04 ug/l	3.13E-06 lbs/day
PCB-1260 (Arochlor 1260)	5.22E-04 ug/l	3.13E-06 lbs/day
PCB-1016 (Arochlor 1016)	5.22E-04 ug/l	3.13E-06 lbs/day
Pesticide		
Toxaphene	8.66E-03 ug/l	5.20E-05 lbs/day
Metals		
Antimony	166.09 ug/l	1.00 lbs/day
Arsenic	587.73 ug/l	3.53 lbs/day
Asbestos	8.30E+07 ug/l	4.99E+05 lbs/day
Beryllium		
Cadmium		
Chromium (III)		
Chromium (VI)		
Copper	15422.32 ug/l	92.59 lbs/day
Cyanide	8304.32 ug/l	49.86 lbs/day
Lead	0.00	0.00
Mercury	1.66 ug/l	0.01 lbs/day
Nickel	7236.63 ug/l	43.45 lbs/day
Selenium	0.00	0.00
Silver	0.00	0.00
Thallium	20.17 ug/l	0.12 lbs/day
Zinc		

Dioxin

Dioxin (2,3,7,8-TCDD)	1.54E-07 ug/l	9.26E-10 lbs/day

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

	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		4749.5				4749.5	N/A
Antimony			166.1	51012.3		166.1	
Arsenic	1186.3	2184.0	587.7		0.0	587.7	2248.6
Barium					11863.3	11863.3	
Beryllium						0.0	
Cadmium	118.0	33.5			0.0	33.5	5.5
Chromium (III)		23952.1			0.0	23952.1	2093.3
Chromium (VI)	1167.2	81.3			0.0	81.32	87.31
Copper	2362.4	202.4	15422.3			202.4	225.7
Cyanide		141.5	2609930.3			141.5	61.7
Iron		7072.1				7072.1	
Lead	1182.6	1620.5			0.0	1182.6	112.9
Mercury		15.44	1.7	1.78	0.0	1.66	0.142
Nickel		6372.5	7236.6	54571.3		6372.5	1282.5
Selenium	583.2	123.7			0.0	123.7	44.6
Silver		110.4			0.0	110.4	
Thallium			20.2	74.7		20.2	
Zinc		1594.1				1594.1	2934.3
Boron	8679.1					8679.1	
Sulfate	23726.6					23726.6	

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

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

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

Other Effluent Limitations are based upon R317-1.

E. coli	126.0	organisms per 100 ml

X. Antidegradation Considerations

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

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

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

XI. Colorado River Salinity Forum Considerations

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

XII. Summary Comments

The mathematical modeling and best professional judgement indicate that violations of receiving water beneficial uses with their associated water quality standards, including important downstream segments, will not occur for the evaluated parameters of concern as discussed above if the effluent limitations indicated above are met.