

ANTIDegradation REVIEW FORM

UTAH DIVISION OF WATER QUALITY

Instructions

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

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

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

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

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

Antidegradation Review Form

Part A: Applicant Information

Facility Name: East Culvert, Union Pacific Railroad Causeway, Great Salt Lake, UT

Facility Owner: Union Pacific Railroad

Facility Location: Union Pacific Causeway, Great Salt Lake, Box Elder County, UT

Form Prepared By: Union Pacific Railroad

Outfall Number: not applicable

Receiving Water: Great Salt Lake, Gilbert Bay (5A) and Gunnison Bay (5B)

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

Domestic Water Supply: None

Recreation: Primary and Secondary Contact

Aquatic Life: None

Agricultural Water Supply: None

Great Salt Lake: 5A- Gilbert Bay; 5B- Gunnison Bay

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

UPDES Permit Number (if applicable): Not applicable. This ADR is submitted to support a 401 Certification for a 404 permit for the temporary placement of fill material into the East Culvert of the Great Salt Lake Causeway.

Effluent Flow Reviewed: There is no discharge of effluent. This project involves the temporary, one time placement of fill, approximately 3,650 cubic yards of clean rock into the East Culvert, to prevent the collapse of the culvert and the closing of the railroad causeway to train traffic. The concrete culvert is failing, due to settlement and age (original construction in 1959) and is jeopardizing the structural integrity of the railroad causeway. Reference 401 certification application and attachments, including culvert inspection report and Army Corps of Engineers Nationwide 14 Permit dated December 6, 2013 (ACOE Emergency Closure Permit)(attached).

The East Culvert is about 15 feet wide and 23 feet tall and spans the width of the causeway. The invert of the East Culvert is at about elevation 4173 (NGVD 29), the top of the causeway is about 4216 (NGVD) and the Great Salt Lake is about 22 feet deep at the culvert location.

On December 6, 2013, the Army Corps of Engineers issued a provisional emergency temporary authorization pursuant to Nationwide Permit 14, subject to 401 certification by the Utah Division of Water Quality. The Corps permit stated:

“Based on the information you provided, the proposed activity, resulting in the temporary loss of approximately 0.17 -acre of waters of the United States and a temporary reduction of the circulation of flows between the North and South Arms of the Great Salt Lake, is authorized by Nationwide Permit Number 14, *Linear Transportation Projects*.

The Corps stated that its verification “does not address the permanent solution for maintaining train operations across the UPRR Causeway. Activities in waters of the United States proposed for a permanent solution, including whether to leave the East Culvert fill material in-place, will be evaluated under our standard individual permit procedures.” The verification explained that the disposition of the existing August 2012 NWP 14 Verification for Closure of the West Culvert and Construction of the Compensatory Mitigation bridge would be addressed in a standard individual permit process that would be publicly noticed in the near future..

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

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

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

Part B. Is a Level II ADR required?

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

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

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

No (Proceed to Part B2 of the Form)

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

Yes (Proceed to Part B3 of the Form)

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

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

Yes (Proceed to Part B4 of the Form)

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

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

Yes Identify the reasons used to justify this determination in Part B4.1 and proceed to Part G. No Level II ADR is required.

No A Level II ADR is required (Proceed to Part C)

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

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

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

- a) The length of time during which water quality will be lowered: The temporary filling of the East culvert will result in a temporary reduction in the causeway's ability to convey flow and transfer salt between Gilbert and Gunnison Bay. The temporary reduction in flow and salt transfer will be limited to the duration of the Corps temporary emergency closure permit (the permit expires on March 18, 2017) or until a long term compensatory mitigation plan is approved and implemented under a separate Standard Individual Permit; the estimated time for completing this permitting and construction of any compensatory mitigation is from 18 months to two years. During the period that the temporary closure is in effect, water flow and salt transfer through the causeway will continue through the existing 300-foot long bridge and the causeway fill. The only potential effect on beneficial uses and water quality of the Great Salt Lake during this time would be as a result of a temporary reduction in water flows and salt transfer between Gilbert and Gunnison Bay.
- b) The percent change in ambient concentrations of pollutants: There is no discharge of pollutants that would contribute to a percent change in ambient concentrations of pollutants in the Great Salt Lake-- only the temporary placement of fill material into the East Culvert. The closure of the culvert will temporarily reduce the water flow and salt transfer between the North and South arms of the Great Salt Lake. However, as explained in Union Pacific's November 27 response to questions by the Corps of Engineers (attached), flows through both culverts when they were fully functioning before West culvert closure was estimated to contribute less than a 0.3 percent increase in South Arm salinity annually . When combined with the permanent closure of the West culvert, a two-year temporary closure of the East culvert would, therefore, result in only a temporary 0.5 percent reduction in South Arm salinity, assuming similar hydrology. The flows and salt transfers through the culverts are small in magnitude compared to the overall flows and salt transfers through the

existing bridge and causeway, which will continue throughout the permit term. Therefore, the potential for short term impacts to GSL beneficial uses and water quality resulting from a temporary reduction in flow and salt transfer from the East culvert is very limited.

The cause and effect relationship between temporary water flow and salt transfer changes and water quality have not been established. Nevertheless, any such changes in ambient water quality would be similar to temporary changes in relative salinity caused by the culvert closure. Because the potential for temporary culvert closure to impact the overall salt balance is so low during the period that the temporary fill is in place, the potential to adversely impact water quality and water chemistry is also very limited.

Please refer to Section II.B of the November 27 submission from UP to ACOE, which provides:

“B. ACOE QUESTION: *“Further, why does UP believe the loss of culvert flows for up to 2 years would not be significant?”*”

UPRR RESPONSE:

“Union Pacific’s intent is not to minimize the importance of replacing the aquatic functions that the culverts serve; that is the basis for UP’s proposal to replace the culverts with the 180-ft bridge. However, it is important not to exaggerate the overall change in bi-directional flows and salt transfer that would occur if during the time the culverts are closed and before the compensatory mitigation bridge is constructed. Of course, the modeling and impacts analyses that are underway will help identify more specifically the contribution that the culverts made to the water and salt balance between the two parts of the Great Salt Lake before the culverts were closed. However, our analyses so far indicate the following:

“UPRR has completed the first of its three-step modeling plan using the USGS Water and Salt Balance computer model. The first step was to rerun the existing model calibrated for the period from 1987 through 1998 (12 years). This step included modeling a hypothetical scenario with two unobstructed culverts as they existed in November 2012, using 1987-1998 hydrology. In fact, during that period, the culverts were plugged with rubble and ineffective for most of this time. At the end of the modeling period (1998), the simulation produced a South Arm salinity of 11.3%. The average South Arm salinity based on actual measurements was 8.9%, a difference of 2.4%. This suggests that the average effect of the two unobstructed culverts on South Arm salinity was limited to about 0.2% per year. In other words, during extended periods of high water levels, such as existed during the time period of 1987-1998, flows through the unobstructed culverts are estimated to contribute only about a 0.2% increase in South Arm salinity annually.

“Water and salt balance modeling has not yet been completed for the period from 1998 to 2012 (the second step of UPRR’s plan). However, salt transfers for the

period from spring 2004 to spring 2009—a period of lower but relatively stable water elevations—can be calculated and evaluated using three sets of interrelated data from that period:

- *Sampled North and South Arm salinities;*
- *Measured bidirectional flows through the culverts;*
- *Total salt load in the South Arm.*

“This period (spring 2004 to spring 2009) is the only one on record that is relevant for the purpose of this evaluation because it begins when UPRR removed all rubble from the culverts and constructed protective berms and ends with the latest known computation of salt load in the North and South Arms (Kidd M. Waddell, “The Potential Effects of the Proposed Great Salt Lake Minerals Project on the Water and Salt Balance of Great Salt Lake, Utah,” 2010).

“In spring 2009, total salt load in the South Arm was approximately 1.7 billion tons. Measured average South Arm salinity was 15.5%. Correlating the salinities and the bidirectional flows through the culverts, the net salt transfer through the two culverts (over a 5-year period ending spring 2009) was about 150 million tons north to south. Had the culverts been closed during that time, the estimated salt load in the South Arm in spring 2009 would therefore be 1.55 billion tons, or a salinity of 14.2%. This suggests that the average effect of the two culverts on South Arm salinity was limited to about 0.26% per year. In other words, during low water levels, such as existed at that time, flows through the unobstructed culverts are estimated to contribute about a 0.26% increase in South Arm salinity annually (although this might be partially offset by increased salt transfers through the causeway fill due to increased salinity differential). Lake elevations during this 2004 to 2009 period were similar to the current elevation.

“Therefore, using this data, which is currently the best available until the completion of modeling, the estimated impact on South Arm salinity due to closure of both culverts would be expected to be on the order of 0.2% to 0.25% per year. During the 2004-2009 time period, South Arm salinity varied 4.3% (between 11.9% and 16.2%), an order of magnitude greater than the estimated annual contribution of the culverts, confirming that other factors affect salinity much more than the culverts.”

- c) Pollutants affected:
- d) Likelihood for long-term water quality benefits:
- e) Potential for any residual long-term influences on existing uses: There will be no long-term impacts on existing uses, as the Corps authorization to place fill in East culvert and reduce water flows and salt transfers through that Culvert is temporary. Determination of whether temporary fill placed in the East culvert will remain in place, and any permanent solution for maintaining causeway structural integrity and conveyance of water and salt through the causeway will be made in a separate Standard Individual Permit process.

f) Impairment of fish spawning, survival and development of aquatic fauna excluding fish removal efforts: Any impacts associated with the project will be temporary during the time the temporary fill is in place and the water flow and salt transfer are temporarily reduced. The survival and development of aquatic fauna (brine shrimp) are dependent on a range of lake salinity and other ecological conditions. North and South arm salinities are a result of hydrologic inflows and water flows and salt transfer through the causeway fill and openings. As discussed in b) and in Union Pacific's November 26 submission to the ACOE, any reduction in flows and salt transfer related to the temporary closing the East culvert will themselves be temporary and minimal. Further, given current salinity levels in the South arm, such a temporary and minimal change will not adversely affect overall south arm salinity ranges or brine shrimp survival and development. Therefore, such impacts will be temporary and limited.

Additional justification, as needed: The emergency placement of fill material into the East Culvert is temporary. Based on the best information available to date, its potential to impact the salt balance and GSL beneficial uses and water quality, is also very limited. As described in the Corps authorizing the temporary emergency closure of the East culvert, any permanent authorization to maintain the fill material in that culvert, as well as any accompany authorization to compensate for any permanent loss of water flow and salt transfer associated with the East and West culvert, will be analyzed and authorized under the Standard Individual Permit process.

Level II ADR

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

Optional Report Name:

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

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

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

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

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

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

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

Parameters of Concern:

Rank	Pollutant	Ambient Concentration	Effluent Concentration
1			
2			
3			
4			
5			

Pollutants Evaluated that are not Considered Parameters of Concern:

Pollutant	Ambient Concentration	Effluent Concentration	Justification

Part E. Alternative Analysis Requirements of a Level II

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

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

Yes (Proceed to Part F)

No or Does Not Apply (Proceed to E2)

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

Report Name:

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

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

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

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

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

Yes

No

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

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

Part F. Optional Information

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

No

Yes

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

No

Yes

Report Name:

Part G. Certification of Antidegradation Review

G1. Applicant Certification

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

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

Print Name: Mark L. McCune _____

Signature:  _____

Date: December 10, 2013 _____

G2. DWQ Approval

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

Water Quality Management Section

Print Name: _____

Signature: _____

Date: _____



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO CA 95814-2922

December 6, 2013

Regulatory Division (SPK-2011-00755)

Mr. Mark L. McCune, P.E.
Director of Structures Design
Union Pacific Railroad
1440 Douglas Street, Stop 0910
Omaha, Nebraska 68179-0910

Dear Mr. McCune:

We are responding to your October 21, 2013 letter request for a Department of the Army permit for the Great Salt Lake Union Pacific Railroad (UPRR) Causeway East Culvert Closure project. This project involves discharging clean rock fill material into the Great Salt Lake, a water of the United States, to temporarily close the East Culvert which is in danger of failure. Filling the culvert is needed to prevent closure of the UPRR Causeway track across the Great Salt Lake. The East Culvert is located at Mile Post 750.53, in Section 23, Township 6 North, Range 6 West, Salt Lake Meridian, Latitude 41.22128°, Longitude -112.56051°, Box Elder County, Utah.

Based on the information you provided, the proposed activity, resulting in the temporary loss of approximately 0.17-acre of waters of the United States and a temporary reduction of the circulation of flows between the North and South Arms of the Great Salt Lake, is authorized by Nationwide Permit Number 14, *Linear Transportation Projects*. However, until Section 401 Water Quality Certification for the activity has been issued or waived, our authorization is denied without prejudice. Once you have provided us evidence of water quality certification, the activity the work may proceed subject to the conditions of the 401 certification and this Nationwide Permit 14 verification.

Your work must comply with the general terms and conditions listed on the enclosed Nationwide Permit 14 information sheets, the Utah Nationwide Permit Program Regional Conditions and the following special conditions:

Special Conditions

1. All equipment must work from existing causeway fill.
2. Within 90 days of the date of this verification, you shall submit to the Corps and the Utah Division of Water Quality an interim mitigation and monitoring plan to include identification of contingency measures to restore or mitigate for the loss of North Arm brine movement into the South Arm of the Great Salt Lake due to the closure of the East Culvert. Contingency measures are necessary due to the potential for adverse effects to the beneficial uses of the Great Salt Lake as a result of closure of East Culvert. The interim mitigation and monitoring plan may be superseded upon implementation of a final mitigation and monitoring plan approved by the Corps and Utah Division of Water Quality.

a. The interim mitigation and monitoring plan must address the collection and definition of 2012 baseline conditions, including defined and repeatable monitoring points for lake elevation levels and salinity gradients. Data collection is to capture temporary hydrologic impacts such as changes in salinity or water elevation gradients resulting from closure of the East Culvert. Monitoring sites will, at a minimum, be located on each side of the lake in the vicinity of the culverts as well as on the South Arm spillway to monitor changes to the deep brine layer.

b. Quarterly data collection and monitoring reports following closure of the East Culvert will be submitted to the Corps and the Utah Division of Water Quality. The first report is due three months following submission of the interim mitigation and monitoring plan. The quarterly monitoring shall continue until the Corps determines, for two consecutive years, that no adverse environmental effects have occurred as a result of closure of the East Culvert, or until the monitoring is superseded by implementation of a Corps-approved final mitigation and monitoring plan.

c. If, as determined by the Corps, quarterly monitoring data indicates adverse effects have resulted from closure of the East Culvert, the Corps may require UPRR to implement the interim measure(s).

3. You shall implement and maintain appropriate construction best management practices to safeguard water quality to prevent grout or other pollutants from entering the open waters of the Great Salt Lake during closure of the culvert.

4. You are responsible for all work authorized herein and ensuring that all contractors and workers are made aware and adhere to the terms and conditions of this verification.

5. You shall submit an after-action report to include photographs documenting the East Culvert closure work in progress, BMPs implemented, and of the completion of culvert closure. This report shall be submitted within 30 days of completion of the authorized work.

6. Within 60 days of receipt of this permit, you shall provide the Corps a firm schedule for completion of the 3-step plan for the modeling update, recalibration and simulations analysis, identification of appropriate monitoring parameters with a cause-and-effect relationship to the overall UPRR culvert closure and bridge construction project, and the projected date for submission of your final mitigation and monitoring plan for Corps approval.

After completion of the authorized work, you must sign the enclosed Compliance Certification and return it to this office within 30 days.

This verification is valid until March 18, 2017, when the existing Nationwide Permits are scheduled to be modified, reissued, or revoked. Furthermore, if you commence or are under contract to commence this activity before the date that the relevant NWP is modified, reissued or revoked, you will have twelve (12) months from the date of the modification, reissuance or revocation of the NWP to complete the activity under the present terms and conditions. Failure to comply with the General and Regional Conditions of this NWP, or the project-specific Special Conditions of this authorization, may result in the suspension or revocation of your authorization.

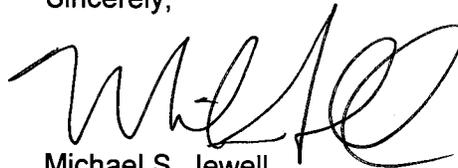
This NWP verification does not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law; do not grant any property rights or exclusive privileges, and do not authorize any injury to the property or rights of others.

This NWP 14 verification is only for the temporary filling of the East Culvert due to the potential for failure and does not address the permanent solution for maintaining train operations across the UPRR Causeway. Activities in waters of the United States proposed for a permanent solution, including whether to leave the East Culvert fill material in-place, will be evaluated under our standard individual permit procedures. A public notice describing your proposal for a permanent solution will be issued next week. With regard to the August 2012 NWP permit verification for the West Culvert, we will continue to informally consult with you to determine the final disposition of that verification during the standard individual permit process for the permanent project.

We would appreciate your feedback. At your earliest convenience, please tell us how we are doing by completing the customer survey from the lower link on our District website.

Please refer to identification number SPK-2011-00755 in any correspondence concerning this project. If you have any questions, please contact Kathleen Anderson at our Utah-Nevada Regulatory Branch, 533 West 2600 South, Suite 150, Bountiful, Utah 84010-7744, by email at Kathleen.Anderson@usace.army.mil, or telephone at 801-295-8380 extension 10. For more information regarding our program, please visit our District website at www.spk.usace.army.mil/Missions/Regulatory.aspx.

Sincerely,



Michael S. Jewell
Chief, Regulatory Division
Sacramento District

Enclosures

cc: (w/o encls)

Ms. Debra Schafer, General Director, Maintenance of Way-Environmental, Union Pacific Railroad, debralschafer@up.com

Mr. Stephen Cheney, Project Manager, Union Pacific Railroad, scheney@up.com

Mr. Robert Blysmas, Counsel, Union Pacific Railroad, rblysmas@up.com

Mr. Wayne Whitlock, Pillsbury Winthrop Shaw Pittman LLP, wayne.whitlock@pillsburylaw.com

Mr. William Damery, Utah Division of Water Quality, wdamery@utah.gov

Mr. Walt Baker, Utah Division of Environmental Quality, wbaker@utah.gov

Ms. Laura Ault, Utah Division of Forestry, Fire and State Lands, lauraault@utah.gov



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November 27, 2013

Via Electronic Mail

Mr. Jason A. Gipson
Branch Chief, Regulatory Division
Kathleen Anderson
Regulatory Assistant, Nevada-Utah
Regulatory Branch
U.S. Army Corps of Engineers,
Sacramento District
Nevada-Utah Regulatory Branch
533 West 2600 South, Suite 150
Bountiful, Utah 84010

Mr. Michael S. Jewell
Chief, Regulatory Division
Mr. Michael G. Nepstad
Deputy Chief, Regulatory Division
U.S. Army Corps of Engineers,
Sacramento District
1325 J Street
Sacramento, CA 95814

Re: Union Pacific Railroad – Great Salt Lake Causeway – East Culvert
Closure - Response to U.S. Army Corps of Engineers Questions
Regarding Emergency Determination

Dear Messrs. Jewell, Nepstad and Gipson and Ms. Anderson:

This letter transmits the responses of Union Pacific Railroad (“Union Pacific”) to questions regarding the Army Corps of Engineers (the “Corps”) emergency determination that Kathleen Anderson sent by email to Union Pacific yesterday, November 26, 2013, on behalf of the Corps’ Nevada-Utah Regulatory Branch. Union Pacific believes that some of the questions are not pertinent to the Corps’ emergency determination under the Corps’ regulations and that we have already responded adequately to others. Nevertheless, Union Pacific is providing a response to all questions in an effort to facilitate timely completion of the Corps’ review.

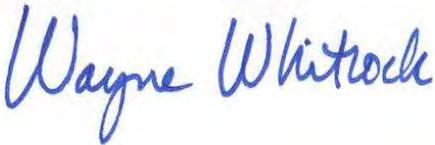
On November 21, Union Pacific submitted its Request for Reconsideration of Regulatory Branch Chief Gipson’s initial determination that the imminent failure of the East culvert is not an “Emergency Situation” under 33 CFR 325.2(e)(4). The November 21 submission documents the loss of property and immediate, unforeseen and significant economic hardship that would result if corrective action requiring a permit is not undertaken immediately. It supplements the record and provides over a

dozen pages of information regarding the hardship the public, Union Pacific, its customers and interstate commerce will suffer if the culvert is not closed. In these circumstances, the potential loss of property and economic hardship are the sole criteria upon which an "Emergency Situation" determination rests under 33 CFR 325.2(e)(4).

Union Pacific has worked diligently to provide requested information to the Nevada-Utah Regulatory Branch since first notifying the Corps of the East culvert's imminent failure on October 21, 2013. We have continued our cooperative efforts through significant, unexpected changes of the Corps' position regarding permit processing. However, Union Pacific remains very concerned about the imminent failure of the East culvert and the safety of rail operations. Union Pacific is also very concerned about the economic hardship that will result if the Great Salt Lake Causeway and the interstate rail line it supports are forced to be shut down and rail traffic rerouted through Salt Lake City. Therefore, we ask that the Corps focus with us on reviewing the information necessary to make the emergency determination and issue the East culvert closure authorization as soon as possible.

We will check again with you on Monday regarding the status of your review. Please feel free to call me over the holiday weekend with any questions. I will be monitoring my voicemail and have provided you with my cell phone number.

Sincerely,



Wayne M. Whitlock
Counsel for Union Pacific Railroad

Enclosure

cc: Mr. Mark L. McCune
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UNION PACIFIC RAILROAD RESPONSE TO ARMY CORPS OF ENGINEERS UTAH-
NEVADA REGULATORY BRANCH QUESTIONS RELATING TO EMERGENCY
DETERMINATION

UNION PACIFIC RAILROAD – GREAT SALT LAKE CAUSEWAY
PROPOSED EMERGENCY CLOSURE OF EAST CULVERT

November 27, 2013

This document sets out the questions raised by Kathleen Anderson's email of November 26, 2013, followed by Union Pacific Railroad's ("Union Pacific" or "UPRR") response. Ms. Anderson's email included questions on five different subjects, with a number of individual questions asked in each paragraph. Where one or more questions are interrelated, they are grouped and answered together. Questions are answered individually where appropriate.

Please note that UPRR has responded to many of these questions already and UPRR requests that the Army Corps review those responses—particularly the November 21 request for reconsideration and supporting documents—together with its review of UPRR's response below. This document references but does not repeat those responses, except where helpful for context, and supplements prior submissions where appropriate.

**I. ACOE QUESTIONS REGARDING TEMPORARY STRUCTURAL
ALTERNATIVES TO CLOSING THE CULVERT**

- A. ACOE QUESTIONS: We are still awaiting a detailed response to our question as to the potential of spanning the east culvert with a steel plate as an interim measure to help increase the life of the east culvert and maintain some flow between the N and S arms. Please provide a written response for our record that supports your decision as to whether or not this alternative would be feasible. If it is not feasible, what has changed since the 2011 PCN proposal?

UPRR RESPONSE:

Section IV of Union Pacific's November 21 request for reconsideration outlined Union Pacific's general concerns about the various proposals the Corps' Regulatory Branch has advanced. As explained therein, Union Pacific believes that it is neither feasible nor safe to attempt to place a steel plate or concrete slab over the top of the existing failing culvert or in the unstable substrate.

To review the critical facts, the most recent inspection found that the culvert has severely deteriorated to the point that it is beyond repair and there is a great deal of concern about its stability. Union Pacific and its professional engineers believe there is a significant and imminent risk that the East culvert will fail completely if not closed. Divers cannot safely reenter the culvert for any purpose, and surface inspections have shown that surface material around the culvert is falling into it.

Furthermore, in light of the ongoing failure of the culvert, it is unclear just how much, if any, the remaining culvert is functioning in terms of maintaining the contribution to flow and salt transfer that was occurring when the culverts were open and flowing. Accordingly, circumstances have changed significantly since the March 2011 PCN was submitted—at a time when the culvert was

relatively stable and was functioning in terms of water flow and salt transfer. Union Pacific no longer believes that alternatives considered then are feasible or that there is any likely short term aquatic benefit of pursuing them in light of the failing condition of the culvert.

Regarding the steel plate question, UPRR has not suggested nor entertained a temporary repair alternative using a steel plate. (The 2011 PCN mentioned a "concrete slab or deck.") A steel plate of a thickness that could be reasonably handled and utilized for this purpose could span only a few feet under railroad loading without excessive stress and deflection, and even less with any fill material above it. In contrast, the potential slip surfaces from a culvert failure, i.e., the surfaces that would be displaced by failure, would extend over 100 feet longitudinally at track level. The use of a steel plate or any other similar structural alternative would simply not extend far enough to cover potential slip surfaces without excessive instability.

All of the alternatives listed in the 2011 PCN were considered for stable culverts with intact structural integrity. This is no longer the case with the East culvert. It has completely separated into two pieces, which are offset from each other. The culvert is unstable, and failure would likely undermine fill material both above it and alongside it. There is nothing stable on which to support a plate, slab or deck, a necessity for placing something like this between the tracks and the culvert. It is simply not practical to construct anything stable on this unstable substrate.

Under the circumstances as they have developed here, Union Pacific strongly believes that there is no feasible alternative to closing the culvert as soon as possible. Further, Union Pacific is increasingly concerned that further delay of culvert closure would be counterproductive and would expose railroad operations to additional undue risk.

- B. ACOE SUBQUESTIONS: Also, in removing the ballast from above the culvert, it may necessary to buttress the walls using a structure similar to a trench wall support system. Would this type of structure help stabilize the walls of the ballast above the culvert and alleviate stability concerns?

UPRR RESPONSE:

We are uncertain as to the meaning of this question. Removing the ballast above the culvert would render the causeway inoperable for railroad transportation. There is approximately 15 feet of fill and ballast between the top of the failed box culvert and the track.

Perhaps the reference is to a temporary excavation as part of one of the impractical structural alternatives referenced by the Corps. Assuming this is the case, "buttressing" the culvert walls by such a method is also impractical and of dubious benefit. Shoring systems for trenching work, such as Trench Boxes, are generally used for shallow excavations like utility installations and always use struts of some kind to brace the two opposing walls. Even if the causeway were excavated to the top of the culvert, a 25-ft deep wall would be required and would only partially relieve the culvert wall of soil pressure. And the presence of the culvert precludes the use of struts. So, walls would have to be laterally supported by some type of tie-back requiring a specialty geotechnical contractor. These activities would necessitate shutdown of rail operations for at least several weeks. The result would be a failed culvert surrounded by extensive new

infrastructure, at least partially dependent on the culvert for its support, in an unstable and highly corrosive environment.

II. ACOE QUESTIONS REGARDING OTHER INTERIM MEASURES AND SHORT TERM IMPACTS OF CULVERT CLOSURE

- A. ACOE QUESTION: Also, please provide any further information to document why you believe other interim measures are not practical - i.e., pumping or some other method to maintain some connectivity between the arms.

UPRR RESPONSE:

UPRR has responded to these questions previously in our responses of November 1 and 8 and documents referenced therein. Our prior submissions discussed other methods as well as pumping.

Union Pacific continues to believe that a pumping project would be infeasible and would provide very limited benefit.

First, as discussed in our November 21 submission, connectivity between the two parts of the Great Salt Lake will not be discontinued by closure of the culvert as implied by the question. In fact, water flow and salt transfer continues through the causeway itself and through the existing Rambo Bridge. As discussed in Response II.B below the actual contribution of the culverts to South Arm salinity is relatively small in relation to that of the causeway, particularly under current lake levels. Given the volume of salt transfer through the causeway, any contribution by pumping would be small in relation to those volumes.

Second, with regard to interim pumping of brine from North to South, it is not clear at this point in the modeling and impacts analysis being conducted pursuant to Union Pacific's September 25 letter to the Army Corps of Engineers how much brine was being transferred North to South and South to North through the East and West culverts. While USGS periodic spot estimates of these flows are available, they are inconsistent and show no apparent correlation to lake elevations or salinities. Even if the lower limits of USGS measured flows were used to set pumping targets, our calculations of pumping capacity even for a system as large as that of Great Salt Lake Minerals is that it could at best pump only about one third of the brine required to replace net North to South salt transfer through the culverts. Therefore, such a pumping station's best case annual contribution to the salinity of the South Arm would be only a few hundredths of a percent increase.

Finally, while it might be technically possible to construct a pumping station similar to the existing Great Salt Lake Mineral facility, it would be a significant project in its own right. Pumps would not be readily available and would have to be custom built. Power would have to come either from a new 3-phase electrical line or from a generator (more likely multiple generators in parallel). Estimated lead time for pumps and power equipment (procurement only) is six months minimum. Furthermore, Great Salt Lake Minerals' experience indicates that pumping during the

winter months is impractical. Therefore, any small contribution to salt transfer would be further reduced by a long delay (perhaps up to a year) before a pump station could actually go on line.

B. ACOE QUESTION: “Further, why does UP believe the loss of culvert flows for up to 2 years would not be significant?”

UPRR RESPONSE:

Union Pacific’s intent is not to minimize the importance of replacing the aquatic functions that the culverts serve; that is the basis for UP’s proposal to replace the culverts with the 180-ft bridge. However, it is important not to exaggerate the overall change in bi-directional flows and salt transfer that would occur if during the time the culverts are closed and before the compensatory mitigation bridge is constructed. Of course, the modeling and impacts analyses that are underway will help identify more specifically the contribution that the culverts made to the water and salt balance between the two parts of the Great Salt Lake before the culverts were closed. However, our analyses so far indicate the following:

UPRR has completed the first of its three-step modeling plan using the USGS Water and Salt Balance computer model. The first step was to rerun the existing model calibrated for the period from 1987 through 1998 (12 years). This step included modeling a hypothetical scenario with two unobstructed culverts as they existed in November 2012, using 1987-1998 hydrology. In fact, during that period, the culverts were plugged with rubble and ineffective for most of this time. At the end of the modeling period (1998), the simulation produced a South Arm salinity of 11.3%. The average South Arm salinity based on actual measurements was 8.9%, a difference of 2.4%. This suggests that the average effect of the two unobstructed culverts on South Arm salinity was limited to about 0.2% per year. In other words, during extended periods of high water levels, such as existed during the time period of 1987-1998, flows through the unobstructed culverts are estimated to contribute only about a 0.2% increase in South Arm salinity annually.

Water and salt balance modeling has not yet been completed for the period from 1998 to 2012 (the second step of UPRR’s plan). However, salt transfers for the period from spring 2004 to spring 2009—a period of lower but relatively stable water elevations—can be calculated and evaluated using three sets of interrelated data from that period:

- *Sampled North and South Arm salinities;*
- *Measured bidirectional flows through the culverts;*
- *Total salt load in the South Arm.*

This period (spring 2004 to spring 2009) is the only one on record that is relevant for the purpose of this evaluation because it begins when UPRR removed all rubble from the culverts and constructed protective berms and ends with the latest known computation of salt load in the North and South Arms (Kidd M. Waddell, “The Potential Effects of the Proposed Great Salt Lake Minerals Project on the Water and Salt Balance of Great Salt Lake, Utah,” 2010).

In spring 2009, total salt load in the South Arm was approximately 1.7 billion tons. Measured average South Arm salinity was 15.5%. Correlating the salinities and the bidirectional flows through the culverts, the net salt transfer through the two culverts (over a 5-year period ending

spring 2009) was about 150 million tons north to south. Had the culverts been closed during that time, the estimated salt load in the South Arm in spring 2009 would therefore be 1.55 billion tons, or a salinity of 14.2%. This suggests that the average effect of the two culverts on South Arm salinity was limited to about 0.26% per year. In other words, during low water levels, such as existed at that time, flows through the unobstructed culverts are estimated to contribute about a 0.26% increase in South Arm salinity annually (although this might be partially offset by increased salt transfers through the causeway fill due to increased salinity differential). Lake elevations during this 2004 to 2009 period were similar to the current elevation.

Therefore, using this data, which is currently the best available until the completion of modeling, the estimated impact on South Arm salinity due to closure of both culverts would be expected to be on the order of 0.2% to 0.25% per year. During the 2004-2009 time period, South Arm salinity varied 4.3% (between 11.9% and 16.2%), an order of magnitude greater than the estimated annual contribution of the culverts, confirming that other factors affect salinity much more than the culverts.

- C. ACOE QUESTION: Why would pumping not be a viable option? Why would it not be a reasonable assumption to replicate the lower limits of the USGS measured north/south flows?

UPRR RESPONSE:

See Response to Question II.A above regarding the viability of pumping and using the USGS measured flows to set pumping targets.

III. ACOE QUESTIONS REGARDING IMPACTS OF CAUSEWAY SHUTDOWN ON UPRR OPERATIONS (Grouped together for response):

If it becomes necessary to use the Shafter route, what would be the effect in terms of hours of operation to that route? Jason understood the 16 Causeway trains would become 24-26 trains due to train length limitations on the Shafter route, making 40 in total when added to the Shafter average 16 daily trains. Do the 16 normal Shafter trains operate at varying hours or mostly in the day time? Would the majority of train traffic operate during primarily daytime hours or night time - or would UPRR need to basically use the Shafter route around the clock to handle and appropriately space 40 trains on a daily basis? Are we talking a train every half hour? How long does it take the average train to clear a grade crossing?

UPRR RESPONSE:

The following discussion further supplements the information provided in Union Pacific's November 21 submission.

- As discussed in Union Pacific's November 21 letter, Section II.C., shifting an average of 16 trains per day to the Shafter route would require breaking those trains up into 22-24

trains per day to accommodate the 5700 ft. limit on train lengths for this route. For a portion of the Shafter route, from just west of the downtown Salt Lake City area out to the Magna area, this would increase the average total trains per day to 38-40, including at-grade crossings at 800 West, 900 West, and 1000 West. Significantly, some of the greatest impacts on Salt Lake City traffic would be at three other at-grade locations in downtown Salt Lake City (see footnote 16 in the November 21 submission; these at-grade crossings are located at 600 West, 300 North, and 400 North), where the current average number of trains per day is 28. The increase in train traffic at those three downtown Salt Lake City at-grade crossings (as well as all the way north to Ogden) would result in a total of 50-52 trains per day.

- *Trains on the Shafter route operate on a 24-hour/day 7 days/week schedule and that would necessarily continue if the Causeway were shut down and its traffic shifted on to the Shafter Route. As noted in Union Pacific's November 21 letter, all components of the Shafter route would be loaded above fluid capacity, removing any option other than running trains as frequently as the system will allow. The average time between trains would be 36-38 minutes on the western portion of the downtown area, and 28-29 minutes in the downtown area itself and north to Ogden.*
- *For the six at-grade crossings in the downtown Salt Lake City area, maximum allowable train speed is 40 mph due to curvature. In reality, most trains transit the area at 20 mph or less and, in congested circumstances, could end up stopped in one or more crossings. Assuming a constant 20 mph, a crossing would be blocked for about 4 minutes per train. This could easily extend to 10 minutes or more due to congestion.*

IV. ACOE QUESTIONS REGARDING DIRECT COSTS OF CAUSEWAY SHUTDOWN

Also, there was not a response to our question if the \$258,000 per day associated with moving Causeway trains to the Shafter route could/would be mitigated by passing some or all of this cost on to your customers, similar to a fuel surcharge that might be used to offset rising fuel costs? Would this amount in fact be a cost UP would incur directly? Would you have recourse to recoup some of the additional costs? (grouped together)

UPRR RESPONSE:

As described in the Corps' regulations, the test of emergency conditions is associated with "economic hardship." 33 CFR 325.2(e)(4). Union Pacific's submittal described economic hardship that would arise from a Corps refusal to utilize emergency procedures, including hardships to the public, interstate commerce, Union Pacific's customers and Union Pacific itself.

In terms of Union Pacific's estimate of \$258,000/day discussed in the November 21 submission, that estimate was only for the direct costs of shutting down the Causeway and rerouting trains and freight over the Shafter route as defined in the November 21 request for reconsideration. As to passing on costs to customers, the freight transportation business is highly competitive and prices are controlled by market conditions; raising prices to recoup the costs of rerouting trains

(as described in our request for recirculation), even if it were possible under existing contracts, would risk loss or reduction of business to competitors that do not incur these costs.

Furthermore, to the extent that Union Pacific's customer costs would increase as a result of rerouting of trains, such increased costs would still constitute an "economic hardship" under the Corps' regulations at 33 CFR 325.2(e)(4).

V. ACOE ADDITIONAL QUESTIONS REGARDING SHORT TERM IMPACTS OF CAUSEWAY SHUTDOWN

Also we want to clarify that the 0.2% average salinity change per year that Karen and Mark spoke about relates to the percentage of current salinity, i.e., if the south arm salinity were 8% this year, closure of both culverts for 2014 with precipitation similar to this year, the model would predict that south arm salinity would decrease from 8% to 7.8%?

UPRR RESPONSE:

In principle, this is a correct interpretation, but the 0.2% contribution was based on modeling at higher lake elevations. Furthermore, it is doubtful that there has ever been a time when salinity has been the same in two successive years. As noted in previous discussion, other factors account for much greater swings in salinity.

Additionally, we note that, at current lake levels, South Arm salinity is likely in the 14 to 15% range, or very near causeway-era highs. A minor (on the order of 0.5%), temporary, reduction in salinity, as estimated to result here, is clearly more tolerable under these conditions than if current South Arm salinity were lower.