UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

December 29, 2016

Mr. Anthony R. Brown
Environmental Manager
Atlantic Richfield Company
4 Centerpointe Drive, LPR 4-435
La Palma, CA 90623-1066

Re: EPA Accepts ARC Response to EPA and LRWQCB Comments on the Final Baseline Human Health Risk Assessment Work Plan, Remedial Investigation and Feasibility Study, Leviathan Mine Site, Alpine County, California, Dated February 19, 2016; and Revised Tables 4.1 and 4.2 dated June 27, 2016

Dear Mr. Brown,

The US Environmental Protection Agency (EPA) has reviewed Atlantic Richfield Company's (ARC) Response to EPA and LRWQCB Comments on the Final Baseline Human Health Risk Assessment Work Plan, Remedial Investigation and Feasibility Study, Leviathan Mine Site, Alpine County, California, dated February 19, 2016; and Revised Tables 4.1 and 4.2 dated June 27, 2016. This work was submitted to EPA pursuant to Administrative Order for Remedial Investigation and Feasibility Study, Leviathan Mine, Alpine County, California (CERCLA Docket No. 2008-18, June 23, 2008).

Background: The Draft Baseline Human Health Risk Assessment Work Plan was delivered to EPA on November 20, 2009. On March 22, 2010 EPA provided a letter that noted the submittal was unsatisfactory. On June 16, 2010 Atlantic Richfield Company (ARC) provided a response to EPA's letter and requested that EPA resume review of the draft work plan. A September 9, 2010 conference call was held, and on December 15, 2010, ARC submitted a revised Baseline HHRA Work Plan.

EPA issued a conditional approval with comments and direction on March 10, 2011.
On May 19, 2011, ARC provided a response to EPAs conditional approval. On July 6, 2011 EPA provided comments to ARC. Face to face meetings were held on February 10, 2014, October 2, 2014 and on October 6, 2014 among the topics discussed were outstanding HHRA issues, particularly on exposure scenarios and risk screening levels.

On January 21, 2015 EPA participated with ARC in a meeting hosted by the Washoe Tribe of Nevada and California. On March 23, 2015, EPA provided written comments to clarify and document necessary next steps for a Revised Human Health Risk Assessment Work Plan. On April 24, 2015, ARC provided a Revised Final Baseline Human Health Risk Assessment Work Plan, Revision 1. EPA provided comments dated October 13, 2015, and ARC responded to those

comments in a letter dated December 4, 2015. EPA provided additional line-by-line comments to questions that still remain outstanding in a letter dated January 12, 2016. EPA and stakeholders still had significant concerns on certain aspects of the risk assessment plan, specifically the trespasser and Native American exposure scenarios, as well as the *a priori* assumptions of remedies in place. EPA suggested two additional meetings to resolve any remaining issues and requested a final HHRA to be submitted by February 20, 2016.

A meeting between the EPA and Atlantic Richfield was held on January 19, 2016. Atlantic Richfield issued responses to EPA and LRWQCB comments on February 19, 2016.

A meeting between EPA and Atlantic Richfield was held on meeting on June 13, 2016.

On June 27, 2016 ARC provided revised versions of Tables 4.1 and 4.2 from the Baseline Human Health Risk Assessment Work Plan, Revision 1 (BHHRA Work Plan); finalizing ARC's responses to EPA comments dated October 13, 2015, and January 12, 2016,

EPA has completed its review of:

- ARC Response to EPA and LRWQCB Comments on the Final Baseline Human Health Risk Assessment Work Plan dated February 19, 2016; and
- Revised Tables 4.1 and 4.2 , dated June 27, 2016

and provides a line by line time sequence response in Attachment 1 and below. Attachment 1 includes comments that have been adequately responded to by ARC. Note that ARC should consider additional discussion provided by EPA in Attachment 1. Remaining comments include:

Specific Comments

- **S7: Comment #7 from the March 23, 2015 letter: Gantt Chart for Revised RI/FS Schedule and Annotated Table of Contents:** EPA requested an outline to include a paragraph under each heading and subheading to describe what information will be included in each section. And that both the ERA and HHRA risk assessments be completed in parallel, for inclusion in the final RIFS Report. **EPA Response:** ARC did not provide an updated Table of Contents and continues to argue that a reasonable sequence for completion of RI/FS, and risk assessment reporting, as set forth in the 2009 schedule, would require submission of the draft RI report approximately 15 months after completion of data collection (completion of data collection is projected for Q4 2016), followed by submittal of the draft HHRA and ERA reports approximately six months later, followed by the draft FS report six months after that. **EPA January 12, 2016 Response**: EPA disagrees. EPA has provided comments under a separate submittal and has set up a meeting on January 19, 2015. EPA feels its approach is reasonable, used at other sites such as the Anaconda Site (Yerington, Nevada), and consistent with the 2009 Proposed Work plan. **ARC February 19, 2016 Response:** U.S. EPA's comments on the RI/FS schedule have been noted and are being addressed in other discussions and related correspondence. The BHHRA Work Plan will not be modified to address this comment. A revised outline has not been provided. **EPA Response:** ARC shall provide an updated

schedule, and annotated table of contents, per EPA comments on the RIFS TOC Format, Reporting and Schedule which were provided under separate cover.

EPA has completed its review of the June 27, 2016 ARC revised versions of Tables 4.1 and 4.2 from the Baseline Human Health Risk Assessment Work Plan, Revision 1 (BHHRA Work Plan); and provides the following Additional Comments:

- EPA notes that the sediment ingestion rates may change depending on the extent of sediment contamination. The sediment and floodplain soil technical data summary report will be needed to determine this.

EPA provides the following Additional Comments:

- **Chemicals of Potential Concern (COPC):** EPA understands that the final COPC list considered data regarding organic compounds (e.g. PAHs, and PCBs) and uranium. These compounds, or any associated data gaps. should be addressed, at a minimum, in the uncertainties section of the risk assessment. Along with sound scientific rationale for why these are not included in the risk assessment.
- **Radiation Screening Survey:** EPA has reviewed and considered the Regional Board radiation survey document dated July 29, 2004. Although data seem to conclude that Naturally Occurring Radioactive Material (NORM) is likely not an issue at Leviathan; EPA requests ARC conduct a screening level survey to provide RI/FS data that can fully support that conclusion and include with scientific rationale for why it is not included in the risk assessment. This work should be completed in sufficient time for inclusion in a first Draft RI/FS December 31, 2017.
- **Figure 2 Assumption No.6** Please include and clarify why irrigation of plants for consumption excludes irrigation water from Bryant Creek.
- **Figure 2 Assumption No.7** This assumption appears to exclude plants sustained by groundwater, such as might be found at springs or seeps that are not adjacent to creeks. Current information suggests that such conditions exist. Please ensure the CSM includes plants that may be sustained by seep or groundwater until the pathway is considered incomplete.
- **Figure 2 Assumption No.8** Please clearly define and clarify the term "…in the vicinity of the ranch property".

EPA accepts the Human Health Risk Assessment workplan as outlined.

In the next 60 days, or by February 28, 2017 please provide a response to any remaining comments and provide the final revised Human Health Risk Assessment workplan. Please also fully consider and incorporate EPA comments on other documents, especially: Reference Area Workplan; RIFS TOC Format, Reporting and Schedule; and Draft Sections of the RIFS ("Technical data Summary Reports"). EPA provided those comments under separate cover. EPA directs ARC to ensure the risk assessments are sufficiently scheduled to ensure delivery of a first inclusive draft RI/FS by December 31, 2017 and a complete and final RI/FS by August 30, 2018.

If you have any questions, please feel free to contact me at (415) 947-4183 or Deschambault.lynda@epa.gov.

Sincerely,

Lynda Deschambault

Lynda Deschambault
Remedial Project Manager

Cc by electronic Email:

Douglas Carey, California Regional Water Quality Control Board, Lahontan Region
Lynelle Hartway, Washoe Tribe of Nevada and California
David Friedman, Nevada Department of Environmental Protection
Kenneth Maas, United States Forest Service
Tom Maurer, United States Fish and Wildlife Service
Toby McBride, United States Fish and Wildlife Service
Steve Hampton, California Department of Fish and Wildlife
Marc Lombardi, AMEC

Attachment I
Adequate Responses to Comments on the ARC Response to EPA and LRWQCB Comments on the Final Baseline Human Health Risk Assessment Work Plan, Remedial Investigation and Feasibility Study, Leviathan Mine Site, Alpine County, California, Dated February 19, 2016
(Page 1 of 12)

- **EPA Comment dated October 13, 2015 G1 Decision Units:** EPA requested a description of the exposure units for conducting the risk assessment using full characterization and meaningful exposure point concentrations. **ARC Response:** ARC notes that as complete data sets become available for individual exposure media (e.g., mine waste, surface water), including reference data, data evaluation units will be defined and proposed to EPA. **EPA January 12, 2016 Response**: EPA disagrees, receptors have been defined for the human health risk assessment. ARC is directed to define exposure units, based on collected samples and proposed sample locations, which represent how the data will be grouped to calculate exposure point concentrations (EPCs). **ARC February 19, 2016 Response**: Exposure units will be defined in interim RI data submittals for each exposure media. For example, exposure units will be defined and EPCs estimated in the mine waste, groundwater surface, soil sediment/floodplain data evaluation report. **EPA Response:** EPA finds that the ARC response is adequate.

- **G2 Data Quality: Washoe Tribe of Nevada and California Exposure Scenarios**: EPA has clearly requested that the Washoe exposure assumptions and scenarios, and Reasonable Maximum Exposure (RME) estimated quantities be used to support the human health risk assessment, and that an iterative approach be taken to the Leviathan Mine risk assessment. **ARC Response:** ARC does do not believe that the applicability of the RME to certain exposure scenarios or the timing for completion of the BHHRA and RI/FS report are reasonable, necessary, or consistent with U.S. EPA guidance or other applicable requirements**. EPA January 12, 2016 Response**: EPA disagrees; The ARC approach is not reasonably protective for an RME and remains inconsistent with basic EPA Risk Guidance. (1989 Risk Assessment Guidance for Superfund, Part A). EPA notes the RI is not considered complete without the risk assessment and both the BHHRA and Eco Risk can and should be completed now prior to collection of definitive reference data. Thus, the FS comparison with reference risks can be used to assess site based hazards and risks. **ARC February 19, 2016 Response:** The risk assessment will be accomplished in a two-step process (i.e., iterative risk assessment). As the first step, in the data summary report for each exposure media, a screening risk evaluation of the available data will be performed to assist with the identification of data gaps and to focus discussion of results on key chemicals that are considered risk drivers. Both human health and ecological screening criteria will be applied. For the human health risk screening evaluation and as directed by U.S. EPA, U.S. EPA's regional screening levels (RSLs) for residential site use and other applicable regulatory or site-specific criteria (e.g., maximum contaminant levels) will be compared to site data. In the absence of site-specific reference data, other available reference data will be used for this screening evaluation (e.g., USGS

soil concentrations). The second step will be to perform the baseline human health and ecological risk assessments as described in the BHHRA and ERA work plans, which will incorporate the site-specific reference data. We concur that the RI will not be considered complete until baseline human health and ecological risk assessments are completed. **EPA Response:** The ARC response is adequate. EPA understands that no RI/FS metals will be excluded from the BHHRA based on the results of interim screening within the summary reports. See EPA comments on Format, Reporting and Schedule under separate cover.

Specific Comments

- **S1: Comment #1 from the March 23, 2015 letter: Reasonable Maximum Exposure (RME)**: EPA requested that the RME be used for an estimate of daily Quantity outlined in Table 1. For completing the Human Health Risk Assessment:

    - **Item 1**: EPA requested that the updated default exposure factors (OSWER, 6 February 2014) and updated the RME exposure scenario be used to support the BHHRA. **ARC Response:** ARC notes it is referenced. **EPA January 12, 2016 Response**: ARC included the reference citation but did not use default exposure factors. The most conservative exposure factor should be used when given more than one reference for a particular exposure factor or scenario. EPA directs ARC to apply the most conservative exposure factors for the RME risk evaluation in the BHHRA. **ARC February 19, 2016 Response:** Atlantic Richfield did not propose to change the exposure assumptions when the difference between the default and the proposed value was not significant. Atlantic Richfield will revise the exposure assumptions to be consistent with the more conservative exposure assumption will be used. The RME exposure assumptions for the Washoe Tribe will be applied to all areas of the site, and will not be limited to the Pine Nut Allotments. **EPA Response:** EPA finds that the ARC response is adequate.

    - **Item 2**: EPA requested the basis for the recommended exposure frequency of 7 days/year for the current trespasser. ARC refers to professional judgment as the basis for the exposure frequency, but it's not clear how the value was arrived at. **EPA January 12, 2016 Response** Please include the text presented in the response to comment as justification in the work plan for the 7 days/year exposure frequency **ARC February 19, 2016 Response**: Atlantic Richfield will add the text from Atlantic Richfield's December 4, 2015 Response to Comments to the discussion of the trespasser's exposure frequency in the BHHRA Work Plan text. This information also appears in Appendix B of the BHHRA Work Plan. The exposure frequency of 7 days per year will not change. **EPA Response:** EPA finds that the ARC response is adequate.

- **Item 7**: EPA requested a more detailed explanation of the ingestion rate for the trespasser and recreational visitor receptors, and how the 50 per cent factor originated. **ARC Response:** ARC notes that they assumed that trespassers and recreational visitors would not ingest 100 percent of their daily intake from the site, but rather that 50 percent of the total was more reasonable, assuming that some food is brought to the area from other sources. **EPA January 12, 2016 Response**: EPA requests that ARC include and define how multiple modifiers, such as the 50 percent factor for site sources (Fa), will be combined in the risk assessment. **ARC February 19, 2016 Response:** In this case, the trespasser and recreational visitors are assumed to bring some of their own food and to supplement any food they forage and consume from the area. For the purpose of the exposure parameters, 50 percent is assumed to be consumed from foraging activities and 50% is brought from offsite. Separately, foraging activities may occur within the mine site and outside the mine site, which is intended to be reflected in the fraction from the study area parameter (Fa). At this point, all fractions from the study area are set to 100%, which will be evaluated further as the data summary reports for each media are developed. As an example, the RME scenario implicitly includes a fraction of area modifier of 71% for fish consumption to account for the size and relative abundance of fish in the study area (use of 142 grams/day compared to 200 grams/day). **EPA Response:** EPA concurs and finds that the ARC response is adequate.

- **Item 12**: EPA requested a PEF of 3.4E-06, (http://www.atsdr.cdc.gov/HAC/pha/StandardMine051508/StandardMineHC050808.pdf) as a better value to use for the recreational user. Also, since they won't be using an ATV 24 hours a day this higher value would not be used to evaluate the inhalation for 24 hours per day. **ARC Response:** ARC is suggesting that a less protective modeled PEF should be accepted for the four hours of ATV use in the BHHRA. **EPA January 12, 2016 Response**: EPA directs ARC to use the PEF of 3.4 E-06 to evaluate a separate 4 hour/day ATV rider. **ARC February 19, 2016 Response:** Atlantic Richfield will add a new receptor to the site conceptual model to address exposure by an ATV rider. The ATV rider will be exposed to soil for 4 hours per day and 1 day per week and the particulate emission factor will be 3.4x10-6 kg/m3 for those 4 hours. **EPA Response:** EPA finds that the ARC response is adequate.

- **Item 13**: EPA requested the basis for the 10% value for sediment ingestion for all receptors. It's not clear how it was determined or what it is 10% of. **ARC Response:** ARC notes that sediment and floodplain soil sampling are conducted separately at Leviathan Mine, and cites a Virginia Department of Environmental Quality guidance document as the basis for the 10percent value to "account for the decreased exposure to sediments". **EPA January 12, 2016 Response:** EPA disagrees. The 10% value is arbitrary, used for screening purposes and not

reasonably protective. Use the soil ingestion rate as the sediment ingestion rate for the RME exposure scenario. **ARC February 19, 2016 Response**: Atlantic Richfield clarified the distinction between sediment and soil for this project. Sediment is defined as the material at the base of the creeks that is submerged for the majority of the time. Thus, contact with this sediment is likely to be low because it will be washed off by the surface water. Flood plain soil is the soil that is exposed above the water line the majority of the time and generally beyond the typical boundaries of the creeks. Soil ingestion and dermal contact with soil are intended to address contact with floodplain soil. Because floodplain soil and sediment exposure are assessed separately, Atlantic Richfield explained that assuming 100% soil exposure and 100% sediment exposure would be overestimating exposure by a factor of 2. **EPA Response:** EPA finds that the ARC response is adequate.

- **Item 14**: EPA requested a child receptor for the visitor and recreational scenarios. **EPA Response:** ARC notes that an adult trespasser scenario and recreational visitor scenario are assumed to be applicable to a 6-year-old through adulthood. Inclusion of young children from infancy to <6 years old for this receptor does not seem reasonable nor likely for this remote, mountainous area **EPA January 12, 2016 Response:** EPA disagrees. Not evaluating a child as part of the recreational scenario is not reasonably protective. EPA directs ARC to include a child recreational receptor in the risk assessment. **ARC February 19, 2016 Response:** Atlantic Richfield will include a child as part of the recreational exposure scenario. **EPA Response:** EPA finds that the ARC response is adequate.

- **S2: Comment #2 from the March 23, 2015 letter: Exposure Assumptions.** EPA requested that the foraging exposure assumptions utilize the Washoe RME assumptions as presented in Table 1. Atlantic Richfield has excluded the Washoe exposure parameters for the foraging receptor. **ARC Response:** ARC argues that they have been consistent in their position that the RME exposure assumptions are not applicable or appropriate to the foraging scenario (as opposed to the subsistence scenario). ARC argues that the foraging scenario applies to areas owned and controlled by the State of California and subsistence use by Washoe Tribal members will not occur. Therefore, the RME does not apply. **EPA January 12, 2016 Response: EPA** disagrees: Since 2009 EPA has directed ARC to use the Washoe RME for all tribal pathways. EPA has not changed its position on this matter and continues to direct ARC to use the Washoe RME as the basis for exposure for all tribal pathways in the BHHRA. Tribal receptors are not limited to foraging outside the described Pine Nut allotments. Please include the foraging scenario in the tribal risk assessment using the RME exposure factors. USEPA notes that evaluation of a tribal forager as well as a non-tribal forager is appropriate. **ARC February 19, 2016 Response:** Atlantic Richfield will apply the subsistence RME exposure assumptions throughout the Leviathan Mine Site to account for higher levels of exposure than currently identified for the Washoe Foraging Scenario. However, rather than add a new

receptor, the areas where exposure may occur for the Subsistence Washoe Tribe Member receptor will be expanded beyond the Pine Nut Allotments to the entire Leviathan Mine Site. As discussed at the technical meeting on January 19, Atlantic Richfield plans to retain the Washoe Foraging Scenario as presented in the BHHRA to provide a more likely exposure under current conditions. **EPA Response:** Although Atlantic Richfield continues to maintain that tribal subsistence use is not a reasonably foreseeable land use for certain portions of the Site, including the Mine site and U.S. Forest Service; EPA notes that the subsistence RME exposure assumptions will be applied universally for purposes of assessing potential exposure and risk in the BHHRA, EPA finds that this is adequate.

- **S3: Comment #3 from the March 23, 2015 letter: Exposure Scenarios.** EPA directed that potential current receptors and potential future receptors must be applied to media as outlined in Figure 2 Human Health Site Conceptual Model (ARC Revised Baseline HHRA Work plan December 15, 2010) and utilizing the Washoe RME assumptions for the foraging receptors. **ARC Response:** ARC references its response to S2 and notes that it has requested a meeting with U.S. EPA. **EPA January 12, 2016 Response:** EPA and ARC met on February 10, 2014. At that meeting the EPA clearly stated its position, and directed ARC to use the Washoe RME for all tribal pathways. EPA has not changed its position on this matter, as discussed in the 10 February 2014 meeting, Tribal receptors are not limited to foraging outside the described Pine Nut allotments. ARC shall include the foraging scenario in the tribal risk assessment using the RME exposure factors. **ARC February 19, 2016 Response:** See response to S2 above which agrees to the use of subsistence RME exposure assumptions to assess potential exposure for foraging activities throughout the Leviathan Mine Site. Atlantic Richfield is evaluating these as future scenarios only since this level of exposure is not currently occurring. **EPA Response:** EPA finds that the ARC response is adequate.

- **S6: Comment #6 from the March 23, 2015 letter: Iterative Approach to the Risk Assessments**: EPA understands that the Residential Regional Screening Levels (Residential RSL) will be used for conducting a screening risk assessment for all areas and media as appropriate. **ARC Response:** ARC notes that residential RSLs will be used as a screening tool for the purpose of initial data evaluation. However, initial screening results will not determine the final results of the BHHRA or remedial decisions. **EPA January 12, 2016 Response**: There are currently no use restrictions on the properties evaluated during the RI/FS. Implementing land use restrictions or institutional controls will likely be evaluated in the Feasibility Study, and the residential screening evaluation will inform that remedial decision. EPA directs ARC to evaluate cumulative risks during the residential screen by summing hazard quotients to derive a hazard index. Also, ARC shall derive a cumulative cancer risk by summing the carcinogenic risk estimates for each COPC. **ARC February 19, 2016 Response:** At the technical meeting with U.S. EPA on January 19, 2016, Atlantic Richfield proposed to use the residential RSLs based on a

target risk of 1x10-6 and a hazard index of 0.1 to address potential cumulative exposure to multiple chemicals. Using these values allows for up to 10 chemicals to be present at the screening level before a target risk of 1x10-5 or a hazard index of 1 is exceeded. This will allow the screening evaluation to remain a simple, straightforward comparison process that addresses the potential for cumulative exposure, but does not require adding across chemicals. Atlantic Richfield does not agree with U.S. EPA's statement that "there are currently no use restrictions on the properties evaluated during the RI/FS." The LRWQCB maintains site security at the Mine site, which is fenced and posted with no trespassing signs. Public access for recreational or residential use is thus prohibited. Use of adjacent U.S. Forest Service lands is governed by the Toiyabe National Forest Land and Resource Management Plan (USDA,1986), which severely limits the issuance of special use permits for any new residential use within the National Forest. **EPA Response:** Although there may be current physical or administrative barriers, it is important to clarify that there are currently no use institutionalized restrictions required through the CERCLA process (e.g., deed restrictions, dig restrictions, etc.). As noted, ARC will evaluate cumulative risks during the residential screen by summing hazard quotients to derive a hazard index. Also, ARC shall derive a cumulative cancer risk by summing the carcinogenic risk estimates for each COPC. **EPA Response:** EPA finds that the ARC response is adequate.

- **S8: Page 8, Section 1.4, first paragraph following bulleted section** – Lahontan Water Board comment as stated in a letter dated January 19, 2010, and provided, below:

  > Page 2, Section 1.1 Regulatory Guidance, last paragraph: "Additional guidance that addresses site specific issues and chemical constituents will also be consulted, including relevant guidance published by California's Environmental Protection Agency (Cal-EPA) through the Office Environmental Health Hazard Assessment (OEHHA) and the Department of Toxic Substance Control (DTSC)." The specific State guidance documents should also be cited in the text. It is also not clear what is meant by the text statement that these guidance documents will be "consulted". More specifically, consultation means compliance with their requirements.

ARC notes that specific references are provided in the text and tables for all guidance documents consulted during the preparation of the BHHRA work plan. ARC notes that EPA has directed ARC to use the value provided in the RME for the Washoe Tribal exposures (AESE, 2005). The Karl Ford, February 29, 2009 reference was provided to EPA to substantiate this assumption **EPA January 12, 2016 Response**: BLM does not currently support the Karl Ford guidance used and DTSC requests in their Comment 13 that ARC provide additional information to justify the soil ingestion values for the trespasser and recreational visitor. The reference from Karl Ford doesn't provide sufficient information to determine whether these soil ingestion values are appropriate for these receptors. After reviewing the Karl Ford memo, we repeat our original comment because the Karl Ford memo doesn't provide any information to back up this assumption.

EPA contacted Karl Ford regarding rationale for the BLM exposure scenario. Dr. Ford replied with the following regarding the referenced document: "As you may know, I am retired from BLM and no longer support the document. With the advent of EPA's Risk Screening Table Values, state risk based criteria, and Ecological Soil Screening values, there is less need for this document." Thus, EPA directs ARC to select the most conservative exposure factors, given more than one reference for a particular exposure factor or scenario. Apply the most conservative exposure factors for the RME risk evaluation. The RME values should not be modified to reflect central tendency estimates prior to deriving a conservative estimate of risk to potential receptors. **ARC February 19, 2016 Response:** Atlantic Richfield will identify appropriate replacement values for the assumptions originally obtained from the Bureau of Land Management's Screening Level guidance for the recreational and trespasser scenarios. The most conservative assumptions that are reasonable for the exposure scenario will be proposed. For example, for dermal exposure, U.S. EPA does not recommend "that a high-end soil contact activity be used with a high end weighted AF [adherence factor] for that activity, as this use would not be consistent with the use of a reasonable maximum exposure (RME) scenario. Atlantic Richfield proposes to provide a tabular summary of exposure assumptions (Tables 4.1 and 4.2) for U.S. EPA to consider as a follow-up to this response. **EPA Response:** EPA finds that the ARC response is adequate.

- **S9: Page 8.** EPA requested that the statement "do not pose unacceptable risks to human health" be removed from the text. ARC notes The Revised BHHRA Work Plan is referencing conclusions drawn in a previous risk assessment prepared by Gradient Corporation and submitted to U.S. EPA in 2002. Noting that the conclusions from this previous risk assessment are accurately presented as general historical information for context in the Revised BHHRA Work Plan. **EPA January 12, 2016 Response**: Conclusions from a previous risk assessment that does not rely on current data should not be presented in the work plan since the conclusions do not inform the current plan. EPA directs ARC to remove this citation from the work plan and include in the RI/FS report as historical information. **ARC February 19, 2016 Response:** Atlantic Richfield will remove the conclusion, but will maintain the reference to the Gradient Corporation report in the discussion of previous risk evaluations in Section 1.5 of the BHHRA Work Plan. **EPA Response:** EPA finds that the ARC response is adequate.

- **S11: Page 8. Page 26, Section 3.2.3, second bullet** – EPA Requested that ARC clarify why it is assumed that this receptor will be at least 7 years old. Lahontan Water Board stated in a February 1, 2011 letter: Page 19, Current Recreational Visitor; page 21, Future Recreational Visitor. The planned risk assessment assumes exposure to persons seven years and older. It is likely that persons less than seven years old will be engaged in recreational activities in the area that could expose them to COPCs from the site. A more protective and realistic assessment would include children in the exposure scenario. ARC notes that "Inclusion of young children from infancy to <6 years old for this receptor does not seem reasonable nor likely for this remote, mountainous area. There are no

nearby hiking trails, facilities, or campgrounds that would make the site a likely location for children less than 6 years old. Inclusion of a young child in the tribal exposure scenarios is adequately protective of these other receptors at young ages". **EPA January 12, 2016 Response**: EPA directs ARC to include a child recreational receptor in the risk assessment. **ARC February 19, 2016 Response:** Atlantic Richfield will include a child receptor in the recreational exposure scenario. **EPA Response:** EPA finds that the ARC response is adequate.

- **S12: Pages 29, Section 3.2.4, second bullet** – EPA Requested that exposure scenarios relevant to the mine operations include groundwater wells. EPA comments regarding this topic go back to a letter dated January 19, 2010, and have yet to be addressed. ARC continues to argue that the mine site will not be available for unrestricted public use, including residential use, in the future. For this and other reasons, it is not reasonably foreseeable for a groundwater well to be installed at the Leviathan Mine site for the purpose of drinking water supplies. **EPA January 12, 2016 Response**: Both the EPA and the Water board considers it reasonable and necessary to look at on-site ground water as a source for drinking water. EPA considers this consistent with evaluating a potential residential exposure to evaluate the full array of alternatives in the Feasibility Study. EPA directs ARC to include a screening level drinking water evaluation in the risk assessment. **ARC February 19, 2016 Response:** Atlantic Richfield will add use of groundwater as a drinking water source for the RME scenarios for the Washoe Tribe Member for the on-property study areas. The recreational user and trespasser are assumed only to be exposed to surface water for the purpose of the BHHRA Work Plan. The RME scenario will consider water exposure in two ways – use of 100% groundwater or use of 100% surface water- but not both simultaneously. *See* prior responses to Comments S2 and S6 regarding current and future land use will include a child receptor in the recreational exposure scenario. **EPA Response:** EPA finds that the ARC response is adequate.

- **S13: Page 30, Section 3.2.5, third bullet** – EPA Requested that "Exposure to sediment and surface water in the irrigation ditches is not considered a significant exposure pathway... be verified during the assessment of this receptor, which may include collection of sediment samples from the ditch." And requested information on how the assumption be would verified. ARC notes that analysis of samples of soil in the irrigation ditch by FPXRF indicated that concentrations of arsenic in the Bryant Creek ditch sediment were less than or equal to those in Cottonwood ditch sediment and that accumulated sediments were historically removed from the irrigation ditches to promote flow and hence are not believed to be a significant source of exposure above background levels requiring exposure assessment. **EPA January 12, 2016 Response:** Sediment samples from the irrigation ditch should be collected to verify the applicability of the McGinley and Associates data. Please conduct this sampling in spring 2016. Upland sediment sampling should be conducted at the same time. These two comments, below,

from a Water Board comment letter dated February 1, 2011, related to the Current Off-Site Rancher have not been addressed:

> Page 19, Current Off-Site Rancher; Figure 1; Figure 2; Figure 6; various tables; Appendix B-3. The extent of the Downstream Study Area is arbitrarily and inappropriately terminated at the junction of Bryant Creek and Barney Riley Creek. For the Off-Site Rancher, exposures from ingestion and dermal contact with surface water, ingestion of aquatic organisms and wildlife, ingestion of aquatic and terrestrial plants, and ingestion of and dermal contact with sediment are removed for consideration as a result. Bryant Creek, which is affected by the Leviathan Mine, flows through the River Ranch Property, and is a potential source of exposure for the Off-Site Rancher. The Off-Site Rancher is highly likely to have contact with surface water, sediment, aquatic organisms, and wildlife from Bryant Creek. Surface water, sediment, and other potential exposure media should be evaluated for potential risk to the Off-Site Rancher.
> Page 23, Current Off-Site Rancher; Figure 2; Figure 6; various tables; Appendix B-3. The assumptions regarding exposure to surface water and aquatic organisms are based on water in irrigation diversion ditches. In addition to these features, Bryant Creek, which is affected by Leviathan Mine, flows through the River Ranch property, and is a potential source of exposure for the Off-Site Rancher. The Off-Site Rancher is highly likely to have contact with surface water, sediment, aquatic organisms and wildlife in or from Bryant Creek. Surface water, sediment, and other potential exposure media should be evaluated for potential risk to the Off-Site Rancher. Although the text indicates, "Other activities, such as ingestion of off-property plants and wildlife, are addressed by other receptors and are not included for this receptor," the cumulative effect of the potential exposures and associated risk to the Off-Site Rancher may not be represented by other receptors, as the Off-Site Rancher has unique potential exposures in addition to those of other receptors.

ARC's response stated "Other receptors, with more conservative exposure assumptions address exposure to the other media, including sediment, aquatic organisms, and wildlife from Bryant Creek." **EPA Response:** The off-site rancher has unique potential exposures and the cumulative effect for the rancher should be assessed. **ARC February 19, 2016 Response:** Subject to securing the necessary access, Atlantic Richfield will incorporate sampling of sediments from the irrigation ditches in the sampling plan for the River Ranch property for possible inclusion in the BHHRA. Sampling of sediments from upland catchment areas is currently planned for the 2016 field season. As requested, the rancher scenario will evaluate exposure to surface water, sediment, plants, fish, and wildlife. **EPA Response:** EPA finds that the ARC response is adequate.

- **S15: Page 35** Notes that a central tendency estimate (CTE) of risk will look at typical exposure only if RME requires action. The calculation of CTE risk is not required by the

SOW and management decisions will use the RME risk estimates. ARC notes that based on this comment CTE calculations will not be presented in the BHHRA. **EPA January 12, 2016 Response**: USEPA notes that ARC is intending to use several central tendency

values during the baseline risk assessment evaluation in lieu of RME values. The RME should provide a conservative estimate of risks and hazards. Therefore, the BHHRA should be conducted using RME scenarios in accordance with the Exposure Factors Handbook (EFH 2011), and Risk Assessment Guidance for Superfund (RAGS), Washoe Tribe RME guidance, and California DTSC risk assessment guidance. A central tendency evaluation may be conducted after the BHHRA based on the RME, using conservative factors, to establish a potential range for risk estimates, but should not be combined. **ARC February 19, 2016 Response:** In developing a RME scenario, it is important to consider that using the maximum exposure for all exposure assumptions "may be above the range of possible exposures." (U.S. EPA, 1989, Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A), December). "The intent of the RME is to estimate a conservative exposure case (i.e., well above the average) that is still within the range of possible exposures." (U.S. EPA, 1989). The use of these values also needs to be evaluated when combining multiple exposure pathways to insure that an overall RME is being maintained." (U.S. EPA, 2004, Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), July. Based on this U.S. EPA guidance and U.S. EPA's comments to the BHHRA Work Plan, Tables 4.1 and 4.2 will be updated to present the revised exposure assumptions that are proposed for use in the BHHRA. **EPA Response:** EPA finds that the ARC response is adequate.

- **S16: Page 35** Use of a Fraction from study area (Fa) other than 100% must be vetted and agreed to by EPA and other stakeholders prior to the calculation of risk. ARC notes that the Fraction from Study Area (Fa) parameter will be determined based on site-specific factors and presented to US EPA at the time the exposure point concentrations are proposed. **EPA January 12, 2016 Response**: EPA strongly disagrees and directs ARC to use a Fa of 100 percent in the BHHRA. **ARC February 19, 2016 Response:** As discussed with U.S. EPA at the technical meeting on January 19, 2016, Atlantic Richfield will default to using 100% for the fraction from study area (Fa) for the BHHRA unless there is a compelling reason to use an alternative value that is approved by the U.S. EPA. **EPA Response:** EPA finds that the ARC response is adequate.

Below are the December, 2015 comments provided by the California Regional Water Quality Control Board—Lahontan Region (Regional Board) and ARC responses.

- **Comment 1:** The response provided in Table 1, Comment S8, page 7 of 10, does not address previous Water Board comments (January 19, 2010 Water Board letter and June 23, 2015 Water Board letter) regarding which regulatory requirements AR is complying with or just consulting. The Water Board acknowledges that there can be differences

among California regulatory agency and U.S. EPA guidance documents and requirements. However, the Human Health Risk Assessment Work Plan still needs to include a statement that state requirements, such as the Water Board's Water Quality Control Plan for the Lahontan Region (Basin Plan), will be complied with, as required by CERCLA. **ARC February 19, 2016 Response:** Compliance with the Basin Plan will be addressed in the Applicable, Relevant and Appropriate Requirements portion of the Feasibility Study. As discussed at the technical meeting on January 19, 2016, and consistent with the designated beneficial use of groundwater at the site in the Basin Plan, groundwater use and consumption will be added to the site conceptual model. The Basin Plan will be cited in the BHHRA Work Plan as the basis for including this exposure pathway.

EPA finds that the ARC response adequately addresses LRWQCB's December 4, 2015 comment.

- **Comment 2:** The response provided in Table 1, Comment S12, page 8 of 10, does not adequately address previous Water Board comments (January 19, 2010 Water Board letter and June 23, 2015 Water Board letter) requesting inclusion within the Human Health Risk Assessment Work Plan, the scenario where a groundwater well is placed on the mine site at some time in the future. Nothing in Water Board staff comments referenced in AR's response or in any other Water Board staff comments precludes locating a groundwater well on the mine site or on surrounding properties in close proximity to the mine site. Doing so could create a complete exposure pathway for humans and needs to be evaluated in the Baseline Human Health Risk Assessment.

  The Water Board continues to request the analysis of a potential on-site groundwater well and its corresponding complete exposure pathway in the Baseline Human Health Risk Assessment Work Plan. It is premature to believe that the future fate and uses of the mine site and of the surrounding property are clearly known, or known to the extent that the potential for locating a groundwater well at or near the mine site can be eliminated from such analysis. There have been numerous contaminated sites where involved and knowledgeable parties did not believe development creating complete exposure pathways would ever occur, only to see such sites developed with complete public access and corresponding exposure pathways within a number of years.

  Additionally, the Baseline Human Health Risk Assessment must also recognize that the Basin Plan has designated beneficial uses and established corresponding water quality objectives for the groundwater underlying and surrounding the mine site.

  The Basin Plan has designated the following beneficial uses for groundwater underlying and surrounding the mine site:

  Municipal and Domestic Supply (MUN) Agricultural Suppl y (AGR)

Industrial Service Supply (IND) Freshwater Replenishment (FRSH)

Additionally, the Basin Plan states, "… all waters are designated MUN unless they have been specifically exempted by the Regional Board through adoption of a Basin Plan amendment after consideration of substantial evidence to exempt such waters…" The Water Board has not taken such action for the groundwater underlying and surrounding the mine site, and doing so would also require approval by the State Water Resources Control Board.

The Water Board's position on this matter is supported by CERCLA Guidance, highlighting that compliance with state regulatory requirements are to be included and evaluated (Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA, 1988).

ARC February 19, 2016 Response: As indicated in response to Comment 1 above, a hypothetical on-site groundwater well and domestic use of the groundwater will be added to the site conceptual model for the Subsistence Washoe Tribe Member. This exposure will be assessed separately from surface water since assuming 100% use of both simultaneously would over-represent water use.

EPA finds that the ARC response adequately addresses LRWQCB's December 4, 2015 comment.