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

April 4, 2017

Mr. Ron Halsey
Environmental Manager
Atlantic Richfield Company
4 Centerpointe Drive, LPR 4-435
La Palma, CA 90623-1066

Re: Remedial Investigation/Feasibility Study Schedule; Leviathan Mine Site, Alpine County, California

Dear Mr. Halsey,

The United States Environmental Protection Agency (EPA) appreciates Atlantic Richfield Company (ARC)'s willingness and effort to develop an agreed upon schedule for completing the Remedial Investigation/ Feasibility Study (RI/FS) for the Leviathan Mine Superfund Site. Over the past 8 years, we have made significant progress in completing field work and expediting the completion of the RI/FS. EPA concurs that the compilation of the 2016 sampling results, along with results from prior years and ongoing monitoring, is expected to provide sufficient information to prepare the RI/FS.

In a meeting on December 13, 2016 ARC and EPA discussed opportunities for reaching agreement on EPA's multiple earlier requests for a draft RI/FS by December 31, 2017 and a final RI/FS by June 30, 2018 (EPA letter dated January 15, 2015). ARC maintained that the most expeditious schedule it could meet would be to submit a partial draft RI/FS (without risk assessments) by December 31, 2018 and a final RI/FS sometime in 2019. EPA followed the meeting with detailed written comments dated December 22, 2016. ARC has not responded to EPA's December 22, 2016 comments. In the interim, ARC requested a January 17, 2017 meeting with EPA management, and initiated various phone conversations and emails with EPA management (February 1, 2017 and February 6, 2017). On March 3, 2017 ARC submitted a letter as follow-up to the January 17, 2017 management meeting regarding the Leviathan Mine Site RI/FS schedule. EPA has listened carefully to understand the work remaining and the time ARC has requested to complete that work, and has considered ARC's March 3, 2017 letter.

EPA has also expressed concern that that there could be further delays in the schedule. Consequently, EPA explained that acceptance of ARC's proposed schedule was conditional on ARC sending an update to the Notice of Intent to Comply with the 2008 Administrative Order for Remedial Investigation and Feasibility Study (Order), specifically committing to the agreed-upon schedule, so that there would be no further extensions except in compliance with the Order. To date, ARC has not provided an updated Notice of Intent to Comply with the Order.

ARC's March 3, 2017 letter clarified its proposed RI/FS delivery schedule and raised a number of other assumptions and discussion points. Subject to the condition outlined in this letter and its attachments, EPA

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supports and concurs with ARC's proposal to submit a final RI/FS by June 30, 2019, preceded by the submission of a "Draft Site Characterization Report" on December 30, 2017 and a "Draft RI Report" on June 30, 2018.

EPA agrees with ARC that it is important to focus on data evaluation. Consequently, it is critical to receive all 2016 data collected by June 30, 2017. This will support identification of any data gaps that may materially undermine the site characterization, baseline risk assessments, and the evaluation of remedial alternatives. Timely identification of any such data gaps is necessary to ensure that the final RI/FS is completed as an approvable document by June 30, 2019. The details of the format of those submittals are outlined in this letter and its associated attachments.

EPA agrees it is important to reach consensus on the adequacy of the RI dataset, completeness of the site characterization, and the development of Exposure Point Concentrations (EPCs) before the report preparation goes too far. EPA has worked with ARC over the last two years to ensure that interim deliverables and on-going tasks support preparation of a complete, responsive and approvable RI/FS report.

Unfortunately, to date, ARC's detailed Technical Data Summary Reports (TDSRs), which were designed to provide EPA with assurance of the quality and quantity of the data analysis for each media, have not provided the information outlined in the Quality Assurance Project Plan (QAPP). ARC has been slow to produce these TDSRs, and they are often lacking the required data quality assessment (DQA) and data usability analysis. Despite EPA's extensive comments on earlier TSDRs, ARC subsequently submitted TDSRs for mine waste, surface water, and groundwater data without adequate DQA and usability assessment. EPA finds ARC's turnaround of field sampling results to be unnecessarily lengthy. At other sites, parties implementing Remedial Investigations typically provide validated data with Quality Control Summary Report (QCSR) and Data Quality Analysis (DQA) within 6 to 8 months. Yet at Leviathan, the field data collected through October 2014 for the mine waste media is still incomplete and not in compliance with the approved QAPP more than 2 years later. Further, ARC took more than two years to finalize a complete and approvable QAPP, after EPA repeatedly provided input through written comments and meetings.

EPA has carefully considered ARC's March 3, 2017 letter, and detailed comments on that letter are included as Appendix A. EPA has also received and considered letters from the United States Forest Service dated March 20, 2017 and the Washoe Tribe of Nevada and California's consultant Dr. Fred Kirschner dated March 27, 2017. These letters are attached as Attachment D and E; for your full consideration.

The comments in Appendix A and the proposed timeline are consistent with EPA guidance and common practices at other Superfund sites. The RI/FS schedule and interim deliverables are based on: ensuring an agreed upon format, consolidated completion of field efforts, timely review, presentation and use of collected data, parallel completion of the Ecological and Human Health Risk Assessments, Remedial Investigation (RI) / Feasibility Study (FS), and final preparation of one approvable integrated final and complete RI/FS report. Please follow EPA's "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA, Interim Final" (October 1988 EPA/540/G-89/004).

The Technical Data Summary Reports (TDSRs) shall be modified to fully account for all comments and all technical input received from EPA on all of the RI/FS submittals or TDSRs thus far. All sampling data collected through the 2017 field season shall be included in the June 2018 RI Report.

The identification of Exposure Point Concentrations (EPCs) for the subject medium shall be included in the Draft Site Characterization Report. EPA agrees with ARC's statement that "Submitting the Draft Site

Characterization Report as a preliminary step will allow Atlantic Richfield and U.S. EPA to reach consensus on the adequacy of the RI dataset, completeness of the site characterization, and the development of Exposure Point Concentrations (EPCs) before the BHHRA and BERA advance too far."

ARC should proceed with EPA's request to continue the parallel preparation of the Feasibility Study (FS). While completing the Site Characterization, ARC should proceed with the multiple steps to begin the review of feasibility options for inclusion in the draft RI/FS to be completed December 31, 2018. EPA concurs with the request from the forest service to convene a meeting to discuss the FS screening process and directs ARC to set up a meeting by the end of May 2017.

In addition to the interim RI/FS deliverables described above, ARC is responsible for completing more than 35 other documents and workplans necessary to prepare to RI/FS. Refer to Appendix C: Master List of Documents for more detail. ARC should proceed to complete these documents, and make every effort to concur with and incorporate EPA comments as requested. EPA looks forward to ARC finalizing all of the documents on this list, within sufficient time, to ensure that the work will not delay the RI/FS.

EPA is proud of the progress that has recently been made at this Superfund mining site. The community and the Tribe are eager to complete the process that been ongoing since 2008.

Within 30 days, please provide a response to this letter as well as our December 22, 2016 letter; and please update the June 3, 2016 ARC schedule to include and incorporate the media specific TDSRs and all other remaining work submittals, in the delivery schedule as outlined above. ARC shall provide a *draft* Site Characterization Report (including EPCs for each medium) by December 31, 2017, an RI report including the Ecological and Human Health risk assessment by June 30, 2018, a draft final RI/FS Report by December 31, 2018, and a final approvable RI/FS Report by June 30, 2019.

As part of the response to this letter requested above, EPA requests ARC provide an updated Notice of Intent to Comply with the Order on the schedule outlined in this letter. Any further extension of the schedule must be pursuant to the Order, i.e., as modified by EPA under Paragraph 50 of the Order or pursuant to Section XIX (Delay of Performance). As noted above, EPA's acceptance of this schedule is conditioned upon receipt of such an updated Notice of Intent to Comply. Furthermore, if EPA finds that the December 31, 2017 submittal is incomplete or substantially unresponsive to previous EPA comments on workplans and TDSRs, or otherwise requires extensive revisions, EPA may conclude that it will be more efficient to take over the work of completing the Site Characterization Human Health and Ecological Risk Assessment.

EPA looks forward to finalizing this agreement for the RI/FS schedule. If you have any questions, please feel free to contact me at (415) 947-4183 or Deschambault.lynda@epa.gov.

Sincerely,

Dana Barton

Dana Barton
Assistant Deputy Director

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Cc by electronic mail:

Douglas Carey, California Regional Water Quality Control Board, Lahontan Region
Michelle Hochrein, 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
Neil Mortimer, Washoe Tribe of Nevada and California

Attachment A: EPA comments on ARC letter dated March 3, 2017
Attachment B: Annotated Table of Contents for the RIFS
Attachment C: Master List of Documents
Attachment D: Letter from the United States Forest Service dated March 20, 2017
Attachment E: Letter from Washoe Tribe of Nevada and California's consultant Dr. Fred Kirschner dated March 27, 2017.

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Appendix A: EPA comments on ARC letter Dated March 3, 2017

- **ARC Comment 1:** EPA requested the following interim reports within 90 days of completion of field sampling, or January 30, 2017, and these are now past due. It is unclear why ARC has suggested removing them as "not being informative". Quite to the contrary, EPA believes these documents will serve to ensure the site characterization report is complete, responsive and acceptable for approval. Please provide as originally requested memoranda summarizing the data (including preliminary data) available for:

  1. River Ranch; EPA comments dated 8/14/14; 9/17/14; 9/29/15; 5/18/16; 8/12/16
  2. Leviathan Mine Road; EPA comments 6/30/16; 8/18/16
  3. Geotechnical Focused Feasibility Study (FFS). EPA comments 7/8/16; emails 1/31/17; 3/20/17
  4. Fish investigations. EPA comments 10/13/15; 5/13/16; 8/12/16;

- **ARC Comment 2:** Groundwater TDSR – Rather than EPA's request for a revised Groundwater TDSR on or before June 30, 2017; ARC has offered an abbreviated groundwater technical memorandum focusing on the adequacy of the wells installed along the northeast of Aspen Creek for characterizing groundwater near the northeastern boundary of the site. Please ensure that the memo provides a full and complete evaluation of the need for the additional wells at the western and northeastern site boundary. This must be explicitly included as one of the purposes for this groundwater report. This must be proved in a timely manner, and ARC should be prepared to mobilize drillers and complete installation, development and initial sampling of any additional wells determined to be necessary during the 2017 field season.
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- **ARC Comment 3 and 4:** EPA notes that ARC has separated the EPA requested reports for stream sediment and floodplain soil into two deliverables. The sediment and floodplain soil data should be compared and submitted together, including all historical data. ARC stated at the December meeting that the data collected in 2016, will be validated by the second quarter 2017. All 2016 and prior data should be included in this submittal. See comments regarding TDSRs herein.

- **ARC Comment 5,6,7, 8: Various TDSRs:** ARC TDSR submittals have not been responsive to multiple EPA requests regarding content of data submittals (see G2: January 2015) and remain outstanding; and/or out of compliance with the RI/FS QAPP prepared by ARC in June, 2016. EPA appreciates ARC's understanding and agreement that the TDSRs allow for data quality review, data usability assessment and the completion of the Human Health and Ecological Risk Assessments in parallel to the RI/FS report; and at the same time, EPA agrees that multiple revisions of the same document should not be necessary. In order to streamline the process and still ensure that data quality assessment, usability evaluations and risk assessments are proceeding with some level of interim review; EPA provides the following compromise:

  - Mine Waste and Surface Water 2015 Reports: EPA agrees to accept ARC's offer to omit delivery of the two (2) 2016 data TDSRs, as long as final robust and complete reports with all data thru 2016 are included in the December 31, 2017 draft RI/FS and that ARC concurs and will include and address all previous EPA comments as requested:
    - Mine waste 2015: EPA comments last provided on date December 29, 2016
    - Surface water 2015: EPA comments last provided on date February 18, 2017

- Groundwater 2015 and 2016: EPA is in the process of responding to the latest ARC groundwater submittal. Although much improved, the draft groundwater chapter of the RI report (or TDSR) remains incomplete and unresponsive in many key areas. Please provide the revised groundwater report—with 2016 data within 8 months of the last sample collection, or by June 30, 2017. As noted in previous comments: *"The purpose for the media specific TDSRs is to identify, discuss and resolve any remaining technical issues; and assist in organizing the data evaluation, presentation and assessment in media specific data sets sufficient to complete the draft and final RI/FS report"* EPA continues to offer face to face meetings to discuss any outstanding questions or comments, to ensure that ARC concurs and will include and respond to previous EPA comments and requests on all previous TDSRs to ensure an acceptable and approvable site characterization document is delivered to EPA on June 30, 2017.

- Remaining TDSRs: As provided in previous EPA comments; within 8 months of the last sample collection, or by June 30, 2017, please prepare and submit these two (2) full complete and robust Technical Data Summary Reports (TDSR) to include all 2016 and earlier relevant historical data and concur and incorporate all EPA comments and requests on all previous TDSRs:

  - Stream Sediment and Floodplain Soil: EPA comments last provided during a face to face technical meeting held on December 13, 2016.
  - Reference materials: EPA comments last provided on the work/ workplan are dated February 16, 2017

EPA concurs that the 2016 sampling results are expected to be sufficient to support preparation of a robust and complete draft Site Characterization report by December 31, 2017. The report shall include the media specific risk evaluations and incorporate previous EPA comments and follow the procedures described in the Risk Assessment Work Plans EPA agrees with ARC's assessment that there has been excessive back and forth communications on documents and asks that ARC please provide these TDSRs in a format that is complete and responsive to all of EPA comments to avoid any further incomplete or unresponsive deliverables.

- **ARC Comment 9:** Annual database updates for 2016 and 2017. Please ensure that these submittals are complete and conform with the approved QAPP.

- **ARC Comment 10:** ARC indicates that EPA respond within 60 days

- **ARC Attachment A:** ARC identifies milestones and supporting assumptions for RI/FS reporting. EPA provides the following comments:

  - **ARC Assumption No. 2:.ARC Assumption No. 2** *The schedule for the Draft Site Characterization Report and the Draft RI Report (including baseline risk assessments) precludes the incorporation of any data obtained after December 2016. However, if additional sampling is performed, any new data will be presented in an appendix or supplement to the Draft Site Characterization and/or Draft RI Report, or in the Final RI/FS Report IF the data materially changes the findings of the RI/FS. Otherwise, the additional data can be submitted in a simple 2017 or 2018 "database update," consistent with Paragraph 64 of the UAO.*

    ARC has acknowledged that additional sampling during 2017 is necessary to complete the RI/FS and finds that this portion of the assumption is invalid. Assumption No. 2 also attempts to

preclude addition of any data from after December 2016 in the Site Characterization and RI/FS reports unless it "materially changes the findings of the RI/FS". While EPA understands the need to 'cut off' the date beyond which additional information will be considered to allow completion of the reporting documents. EPA suggests that documentation of the 'materialness' of any changes to RI/FS findings is necessary to determine if such information should be included. Thus, a brief memo or statement for each medium concerned should be provided *in addition to* the database updates that will state how the data do or do not materially change the findings of the RI/FS.

- **ARC Assumption No. 3:** *The proposed submittal dates shown above are dependent on expedited review times (60 days or less) by the U.S. EPA.*

  EPA will endeavor to provide comments as expeditiously as possible, but EPA cannot agree that the schedule provided is dependent upon any specific review time. The time needed for review is usually determined by the quality and completeness of the submittal. Also, EPA needs time to solicit, receive, and consider from other stakeholders, such as the Washoe Tribe, the UFWS, USFS, and NDEP. Moreover, EPA will generally endeavor to synthesize stakeholder comments into an integrated comment letter from EPA, although all of the stakeholders' comments will be included in the administrative record. Any extension of the schedule must be consistent with the Order.

- **ARC Assumption No. 4:** *TDSRs have been previously submitted for the mine waste, surface water, and groundwater media. Additional TDSRs will be completed for stream sediment and floodplain soil in the second quarter of 2017. Other media-specific TDSRs will be provided as appendices to the Draft Site Characterization Report at the end of 2017. In addition, a Technical Memorandum evaluating the adequacy of the wells installed at LOC-39 and LOC-40 will be prepared in Second Quarter 2017. A Technical Memorandum will also be prepared for the Reference Area data. This Technical Memorandum will be limited to maps showing sample locations, raw data tables (based on un-validated data), and tables presenting preliminary threshold reference concentrations to be calculated using the methodology described in the approved Reference Area Work Plan.* Please refer to the TDSR comments above. Please refer to previous comments on the Reference area workplan and the outline provided dated February 16, 2017

- **ARC Assumption No. 5:** *TSDRs and 90-day field investigation reports for other RI and FS tasks will not be submitted as interim deliverables. Consistent with the elimination of this 90-day reporting requirement, a report summarizing the results of the FFS Geotechnical Evaluation will not be submitted.* Please see EPA comments on TDSRs above. As noted, other deliverables are not impacted by this agreement. As far as geotechnical, please see EPA comments and various emails dated 7/8/16; 12/29/16; 1/31/17 and 3/20/17; and let's have a meeting to discuss and agree to a reasonable time frame for EPA comments dated July 8, 2016 to be addressed and completed

- **Assumption No. 6:** *The Draft Baseline Human Health Risk Assessment (BHHRA) and Draft Baseline Ecological Risk Assessment (BERA) will proceed contemporaneously with the completion of the Draft Site Characterization Report and will be incorporated into the Draft RI Report scheduled for completion by June 30, 2018. This will allow for U.S. EPA to review of the Draft Site Characterization Report and to evaluate the adequacy of the datasets and EPCs prior*

to the submittal of the baseline risk assessments in the Draft RI Report. This schedule is contingent upon receiving U.S. EPA comments and acceptance of the Draft Site Characterization Report within 60 days from the date of submittal. See comments on TDSRs above. See comments on schedule above. Please note, if EPA finds that the December 31, 2017 is incomplete or substantially unresponsive to previous EPA comments on workplans and draft chapters submitted as TDSRs, EPA may conclude that it will be more efficient to take over the work of completing the Site Characterization and/or the Risk Assessments.

- **Assumption No. 7:** *It is assumed that the U.S. EPA agrees with the FS approach as outlined in Atlantic Richfield's August 27, 2014 letter. Where possible, Atlantic Richfield will consider conducting certain FS activities in parallel with the RI. The level of effort to conduct the FS will be similar to that presented in the letter, including conducting supporting studies (i.e., several white paper evaluations, with limited data gap studies and treatability studies) to provide information about site specific conditions and performance data relating to the various remedial technologies under evaluation. The supporting studies are not intended to provide all of the data needed for detailed design of the remedy.* EPA comments on ARC's August 27, 2014 letter were provided on January 15, 2015 and remain unaddressed by ARC. While the general approach to the FS expressed in ARC's August 2014 letter appeared to be in accordance with NCP requirements, EPA did not agree with the screening results, or ARC's conceptualization of the various media.

- **ARC Attachment B:** ARC resubmitted their March 2016: Generalized Tables of Contents for the Draft Site Characterization Report, RI Report, and FS Reports as Attachment B. This is unresponsive and remains unresponsive to EPA comments that remain outstanding from nearly two years ago (G1; January 2015): *"Please provide a revised annotated Table of Contents for the RI/FS Report that identifies which of the various FRI work plans and associated addendums/amendments will support each section as outlined. Please include a paragraph under each heading and subheading to describe what information will be included in each section"* To help facilitate conversation and processes going forward, EPA has completed this task, and provides the attached annotated TOC in Appendix B. EPA has provided annotations in Italicized font. EPA directs ARC to have this serve as the template of our agreement on the format and contents to be included in the draft and final RI/FS. EPA has ensured that all of the workplans (associated addendums and amendments), technical data summary reports, and feasibility options are listed by title and number and date, and included in the annotated summary.

- **Schedule and Gantt Chart:** Please provide the requested updated schedule and Gantt chart. EPA understands that ARC's hesitation to provide the requested updated and accurate schedule was in part related to the need to reach agreement on the interim deliverables; however, it continues to limit our ability to reach full agreement. Please concur with these comments and incorporate them into a revised schedule and Gantt chart within 14 days.

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USDA United States Department of Agriculture | Forest Service | Humboldt-Toiyabe National Forest | 1200 Franklin Way
Sparks, NV 89431
775-331-6444

File Code: 2160
Date: MAR 10 2017

Lynda Deschambault
Remedial Project Manager, Superfund Division
75 Hawthorne Street, 10th Floor (SFD 7-1)
San Francisco, CA 94105

Dear Ms. Deschambault:

The USDA Forest Service has reviewed the follow-up letter dated March 3, 2017 prepared by Atlantic Richfield Company (ARC) regarding the Leviathan Mine site Remedial Investigation / Feasibility Study (RI/FS) schedule and table of content's outlines for the document. It is apparent that EPA is directing ARC to achieve certain milestones by a particular date, however ARC's schedule is contingent on many compromises that may undermine the efficacy of review and ability to identify and fix data gaps that could ultimately shape the remedial action. A significant amount of data was collected in 2016 and very important data is yet to be collected in 2017. Waiting until the end of calendar year 2017 to see all the analytical data incorporated into a draft site characterization report makes sense only if adequate time is allowed to identify important data gaps prior to the development of the human health and ecological risk assessments. By requiring these risk documents to be completed in mid-2018, it is quite possible that proper vetting will not have taken place. The biggest driver moving forward is the development of data evaluation units and exposure point concentrations for the various media that contribute to the site's overall character. The Technical Data Summary Reports prepared to date have not addressed these elements so they are still a huge mystery to interested stakeholders.

The Forest Service recognizes the focused feasibility studies being initiated by ARC. It is hoped that these studies do not represent all the remedial options being considered at the site that are not part of the interim, ongoing treatment. The Forest believes that important details regarding the subject matter addressed in section 6.0 of the feasibility study report are overlooked, details that may directly affect the technologies pursued in section 7.0 and 8.0. Specifically the FS wants to ensure the following technology types and process options are being considered:

- Year-round capture and adequate storage capacity available for all acid mine waters discharging from the site under normal and abnormal conditions
  Identify on site and off site water storage options and related infrastructure needs
- Ensure that emergency treatment operations will not be required long-term
- Year-round capture and treatment of all acid mine waters generated on site.
- Adequate power supply to support year-round operations (diesel and electric options)
- Backfilling of all mine waste into pit and capping

There are other treatment options that can be considered. The EPA should convene a technical discussion between US EPA, the Lahontan Water Board, ARC and the Forest Service to generate ideas to be considered in the FS. Up to now the majority of focus has concentrated on data

collection relevant to the RI. Now is the time to consider the feasibility study and ensure that no options are left out of the evaluation. Cost should not be relevant during the screening of options and development of alternatives at this early stage of the process.

That said, the FS requests that EPA schedule a focused meeting, similar to that convened in September 2016 over the beaver pond issue, before the 2017 field season commences to discuss these subjects. Thank you for the opportunity to comment.

Sincerely,

WILLIAM A. DUNKELBERGER
Forest Supervisor

cc: Ken Maas

PRELIMINARY DRAFT

Appendix A: Annotated Table of Contents
DRAFT ANNOTATED TABLE OF CONTENTS

REMEDIAL INVESTIGATION/FEASIBILITY STUDY REPORT VOLUME 1:
SITE CHARACTERIZATION REPORT
Leviathan Mine Site
Alpine County, California

EXECUTIVE SUMMARY

1.0 INTRODUCTION

1.1 PURPOSE OF SITE CHARACTERIZATION REPORT

This section describes the purpose of the Site Characterization Report in support of the RI. It also provides the purpose of the RI, typical components per EPA RI/FS guidance (list the main regulatory guidance), and the required components per Statement ofWork.

1.2 REPORT ORGANIZATION

This section should outline key sections of Site Characterization Report and summarize contents of each key section. *Mention that the remaining sections for the RI (risk assessments and feasibility study) will be added as additional volumes and identify their anticipated delivery dates.*

2.0 SITE BACKGROUND AND REGIONAL SETTING

2.1 SITE BACKGROUND

In the following subsections, describe the site background including the CERCLA definition of the site and the site history. *This information should be very similar to existing text from RI planning documents and TDSRs.*

2.1.1 Site Description

2.1.2 Site History

2.1.3 Previous investigations

Summarize pre-RI data sets for surface water (Hammermeister and Walmsley 1985; Thompson and Welsh 2000, Webster et al., 1994, Thomas and Lico, 2000, Regional Board 1994-2010), groundwater (Moore 1933, Siskon Mining Corporation 1946, Hammermeister and Walmsley 1985, Prudic and Hammermeister 1985, SRK 1998 and 1999), mine waste (Butterfield 1977, Sciacca 1984, Hammermeister and Walmsley 1985, Claasen and Hogan 1999, SRK 1999), sediment (Hammermeister and Walmsley 1985, Ball and Nordstrom 1985, Thomas and Lico 2000, EPA-Black unpublished data), floodplain soil (Evans and JBR 2004), River Ranch soil (REC 2008), and EFCR (Thomas and Lico, 2000). Include tabular data summaries for each matrix and figures showing study and sample (if available) locations.

2.2 REGIONAL SETTING

The following subsections will provide a summary of generalized regional conditions based on information available prior to the implementation of FRIs.

2.2.1 Human Populations and Land Use

2.2.2 Climate

2.2.3 Surface Features and Topography

2.2.4 Geology

2.2.5 Hydrogeology

2.2.6 Ecology

XXXXX

Commented [A1]: 1. Combined. ARC TOC has this as a separate section (Section 1.3

Commented [A2]: 2. ARC TOC doesn't have subsections

Commented [A3]: 3. In ARC TOC this is given a whole section with subsections (Section 3.0)

Commented [A4]: 4. ARC TOC doesn't have subsection

Commented [A5]: 5. ARC TOC has Section 2.3 which is a summary of interim response actions, if necessary this information may be more appropriately summarized section 2.1.2

3.0 REMEDIAL INVESTIGATION APPROACH AND STUDY AREA CHARACTERISTICS

3.1 FOCUSED RE MEDIAL INVESTIGATION APPROACH

Provide a brief introduction to the section and subsections and discuss the reasoning for the COPCs/COPECs list developed for the purposes FRI implementation (refer to the memo Proposed FRI Analyte List, July 26, 2010, include reference to subsequent discussions as necessary). Mention that this is a Site Characterization Report developed to support a full RI and FS once Risk Assessments are complete. Reference Appendices for FRI work plans

3.1.1 Stud y Area Characteristics

Summarize Study Area characteristics and provide list of media sampled in each study area.

3.1.1.1 On-Propert y Study Areas – Aspen Creek Study Area, Leviathan Creek Study Area, and Pit Study Area

3.1.1.2 Off-Propert y Study Areas- Downstream Study Area, River Ranch, East Fork Carson River, Leviathan Mine Road, Suspected Ore Piles

3.1.1.3 Referenc e Study Areas- On-Property, Upper Mountaineer, Lower Mountaineer, Cottonwood Creek, EFCR, Ore Pile reference soil (also refer to the Reference TDSR)

3.1.2 Preliminar y Site Conceptual Model

This section should describe preliminary chemical migration and exposure pathways used as the basis for FRI work plan development. *Refer to the Final Revised RI/FS Quality Assurance Project Plan, Revision No.2 dated January 27, 2017 or latest EPA approved version (QAPP).*

3.1.3 Data Qualit y Objectives

Summarize Data Quality Objectives for various media of interest as the basis for FRI work plan development. *Refer to the current QAPP (Final Revised RI/FS Quality Assurance Project Plan, Revision No.2 dated January 27, 2017 or latest EPA approved version).*

Commented [A6]: 6. Not included in 2017 ARC TOC, but included in 2015 ARC TOC

4.0 STUDY AREA INVESTIGATIONS

4.1 ON-PROPERTY STUDY AREA

The following subsections will summarize the investigations performed within the On-Property Study Areas.

4.1.1 Site Features and Facilities

Summarize the scope of investigations of mine site features and facilities – include location map(s). This section should include reference to the *On-Property FRI Work Plan (8/11/2010).*

4.1.2 Meteorological Data

Commented [A7]: 7. Not included in 2017 ARC TOC, but included in 2015 ARC TOC

Summarize meteorological investigations – include bcation map(s). This section should include reference to the *On-Property FRI Work Plan (8/11/2010).*

4.1.3 Acid Drainage

Summarize acid drainage investigations – include location map(s). This section should include reference to the *On-Property FRI Work Plan (8/11/2010), On-Property FRI Work Plan Amendment No. 1 (4/24/2012) – Acid Drainage Source Monitoring, On-Property FRI Work Plan Amendment No. 5 (6/7/2013) – Channel Underdrain, Pond 4, and Aspen Seep Gaging Stations.*

4.1.4 Surface Water

Summarize surface water investigations in On-Property Study area (include flow measurements, sample location map(s), # of samples, sample analytes). This section should include reference to *On-Property FRI Work Plan (8/11/2010), April 10, 2012 Letter – Approval of 2012 Surface Water Monitoring Program for Leviathan Mine, April 15, 2013 Letter, Surface Water Technical Data Summary Report (in preparation- previous versions reviewed by EPA)*

4.1.5 Storm Water and Snowmelt Runoff

Summarize storm water and snowmelt runoff investigations (include sample location map(s), # of samples, sample analytes). This section should include reference to *On-Property FRI Work Plan (8/11/2010), On-Property FRI Work Plan Amendment No. 3 (10/5/2013), Optimization of Select On-Property Monitoring Programs (2/4/2015), Storm Water/Snowmelt Technical Data Summary (in preparation – See Appendix C).*

4.1.6 Stream Sediment

Summarize stream sediment investigations (include sample location map(s), # of samples, sample

analytes). This section should include reference to *On-Property FRI Work Plan (8/11/2010), On-Property FRI Work Plan Amendment No. 8 (10/2/2014) – Detailed Stream Sediment and Floodplain Soil Investigations, Revised On-Property FRI Work Plan Amendment No. 10 (09/30/2015) – Stream Sediment and Floodplain Soil Characterization in Beaver Dam/Pond Complex, Stream Sediment Technical Data Summary Report (in preparation- See Appendix D).*

4.1.7 Floodplain Soil

Summarize floodplain soil investigations (include sample location map(s), # of samples, sample analytes). This section should include reference to the *On-Property FRI Work Plan (8/11/2010), On-Property FRI Work Plan Amendment No. 8 (10/2/2014) – Detailed Stream Sediment and Floodplain Soil Investigations, Revised On-Property FRI Work Plan Amendment No. 10 (09/30/2015) – Stream Sediment and Floodplain Soil Characterization in Beaver Dam/Pond Complex, Floodplain Soil Technical Data Summary Report (in preparation- See Appendix D).*

4.1.8 Mine Waste

Summarize mine waste investigations (include sample location map(s), # and location of samples, sample analytes). This section should include reference to the *On-Property FRI Work Plan (8/11/2010), On-Property FRI Work Plan Amendment No. 6, Revision No. 1 - Characterization of Mine Waste Using FPXRF Screening Survey (6/4/2014), On-Property FRI Work Plan Amendment No. 6, Revision No. 1 – Final TSAP for Phase 2 Mine Waste (11/28/2014), Mine Waste Technical Data Summary Report (in preparation- previous versions review by EPA).*

4.1.9 Groundwater

Summarize hydrogeological investigations (include test boring and monitoring well locations, aquifer testing, depth to groundwater measurements, drive point piezometer construction and monitoring, Upper Tributary monitoring data, groundwater sampling, # of samples, sample analytes). This section should include reference to the *On-Property FRI Work Plan (8/11/2010), informal submittals (e.g. emails, memos, etc), Groundwater Technical Data Summary Report (in preparation – previous versions reviewed by EPA).*

4.1.10 Plants

Summarize plant surveys, plant sampling, and related soil investigations (include sample location map(s), # of samples, sample analytes). This section should include reference to the *On-Property FRI Work Plan (8/11/2010), On-Property, Off Property, and Reference Area Focused Remedial Investigation Work Plan (4/8/2016) – Plant and Habitat-Related Soil Investigations, Soil-Plant Bioaccumulation Technical Data Summary Report (in preparation- See Appendix G).*

4.1.11 Benthic Macroinvertebrates

Summarize benthic macroinvertebrate investigations (include sample location map(s), # of samples, sample analytes). This section should include reference to the *On-Property FRI Work Plan (8/11/2010), On-Property FRI Work Plan Amendment No. 7 (6/14/2013) – Sediment Quality Triad Sampling in Aspen and Leviathan Creeks.*

Commented [A8]: 8. This section is lumped into Section 4.1.6 Stream Sediment in the ARC TOC

4.1.12 Fish

Summarize fish investigations (include sample location map(s), # of samples, sample analytes). This section should include reference to the *On-Property FRI Work Plan (8/11/2010), October 22, 2013 Letter (opportunistic sampling Aspen Creek), On-Property, Off-Property, and Reference Area Focused Remedial Investigation Work Plans (6/13/2016) – Task Sampling and Analysis Plan for Fish Investigation, Fish Surveys/Sampling Technical Data Summary Report (in preparation- See Appendix H).*

4.1.13 Upper Tributary Investigations

Summarize scope of investigations in the Upper Tributary area (surface water flow and groundwater elevation measurements, location map). This section should include reference to the *On-Property FRI Work Plan Amendment No. 2 (8/3/2012), Upper Tributary Report (in preparation).*

4.1.14 Geotechnical Investigations

Summarize scope of geotechnical investigations (include sample location map(s), # of samples, testing parameters). This section should include reference to the *On-Property FRI Work Plan (8/11/2010), Focused Feasibility Study TSAP March (Draft 3/31/2016)*

Commented [A9]: 9. Not included in 2017 ARC TOC, but included in 2015 ARC TOC

4.2 OFF-PROPERTY STUDY AREA

The following subsections will describe the scope of investigations performed within Off-Property Study Areas.

4.2.1 Downstream Study Area

4.2.1.1 Surface Water

Summarize scope of surface water investigations in DSA (include flow measurements, sample location map(s), # of samples, sample analytes). This section should include reference to the *April 10, 2012 Letter– Approval of 2012 Surface Water Monitoring Program for Leviathan Mine, Off-Property FRI Work Plan Revised Addendum No. 2 (6/28/2013), April 15, 2013 Letter, Surface Water Technical Data Summary Report (in preparation- previous versions reviewed by EPA).*

4.2.1.2 Stream Sediment

Summarize scope of stream sediment investigations in DSA (include sample location map(s), # of samples, sample analytes). This section should include reference to the *Off-Property FRI Work Plan Revised Addendum No. 2 (3/25/2016) – Task Sampling and Analysis Plan for Floodplain Sampling, Stream Sediment Technical Data Summary Report (in preparation- See Appendix D).*

4.2.1.3 Floodplain Soil

Summarize scope of floodplain soil investigations in DSA (include sample location map(s), # of samples, sample analytes). This section should include reference to the *Off-Property FRI Work Plan Revised Addendum No. 2 (6/28/2013), Off-Property FRI Revised Addendum No. 2, Amendment No. 1 (6/17/2014), Off-Property FRI Work Plan Revised Addendum No. 2 (3/25/2016) – Task Sampling and Analysis Plan for Floodplain Sampling, Floodplain Soil Technical Data Summary Report (in preparation- See Appendix D).*

4.2.1.4 Plants

Summarize scope of plant surveys, plant sampling, and related soil investigations in DSA (include sample location map(s), # of samples, sample analytes). This section should include reference to the *Off-Property FRI Work Plan Revised Addendum No. 2 (6/28/2013); On-Property, Off Property, and Reference Area Focused Remedial Investigation Work Plan (4/8/2016) – Plant and Habitat-Related Soil Investigations; Soil-Plant Bioaccumulation Technical Data Summary Report (in preparation- See Appendix G).*

4.2.1.5 Benthic Macroinvertebrates

Commented [A10]: 10. This section is lumped into Section 4.2.1.2 Stream Sediment in the 2017 ARC TOC

Summarize scope of benthic macroinvertebrate investigations in DSA (include sample location map(s), # of samples, sample analytes). This section should include reference to the *Off-Property FRI Work Plan Revised Addendum No. 2 (6/28/2013)*

4.2.1.6 Fish

Summarize scope of fish investigations in DSA (include sample location map(s), # of samples, sample analytes). This section should include reference to the *Off-Property FRI Work Plan Revised Addendum No. 2 (6/28/2013); October 22, 2013 Letter (opportunistic sampling in Leviathan/Bryant Creeks); On-Property, Off-Property, and Reference Area Focused Remedial Investigation Work Plans (6/13/2016) – Task Sampling and Analysis Plan for Fish Investigation; Fish Surveys/Sampling Technical Data Summary Report (in preparation- See Appendix H).*

4.2.2 River Ranch

4.2.2.1 Soil

Summarize scope of soil investigations on River Ranch (include sample location map(s), # of samples, sample analytes). This section should include reference to the *Reference Area FRI Work Plan Addendum No. 1 (9/11/2012), Off-Property FRI Work Plan Revised Addendum No. 2 (6/28/2013), Final Revised/Accelerated River Ranch Soil Investigation (8/28/2014), TSAP for Irrigation System and Soil Mapping (10/16/2014), River Ranch Technical Data Summary Report (in preparation- See Appendix I), TSAP for Detailed Sampling for Laboratory Analysis – in preparation*

4.2.3 East Fork Carson River

4.2.3.1 Surface Water

Summarize scope of surface water investigations in EFCR (include sample location map(s), # of samples, sample analytes). This section should include reference to the *Off-*

Property FRI Work Plan Addendum No. 1 (5/25/2012), Off-PropertyFRI Work Plan Revised Addendum No. 2 (6/28/2013), East Fork Carson River Technical Data Summary Report (in preparation- See Appendix K)

4.2.3.2 Stream Sediment

Summarize scope of stream sediment investigations in EFCR (include sample location map(s), # of samples, sample analytes). This section should include reference to the *Off-Property FRI Work Plan Addendum No. 1 (5/25/2012), Off-PropertyFRI Work Plan Revised Addendum No. 2 (6/28/2013), Off Property Focused Remedial Investigation Work Plan Addendum 4 (1/8/2016) – Task Sampling and Analysis Plan for Fluvial Deposits Sampling in the East Fork Carson River, East Fork Carson River Technical Data Summary Report (in preparation- See Appendix K)*

4.2.3.3 Benthic Macroinvertebrates

Summarize scope of benthic macroinvertebrate investigations in EFCR (include sample location map(s), # of samples, sample analytes). This section should include reference to the *Off-Property FRI Work Plan Addendum No. 1 (5/25/2012), Off-Property FRI Work Plan Revised Addendum No. 2 (6/28/2013), Technical Memorandum- East Fork Carson River Sediment Quality Triad Investigation (1/30/2015)*

Commented [A11]: 11. This section is lumped into Section 4.2.3.1 Stream Sediment in the ARC TOC

4.2.4 Leviathan Mine Road

Summarize scope of soil investigations along Leviathan Mine Road (include sample location map(s), # of samples, sample analytes). This section should include reference to the *Off-Property FRI Work Plan Revised Addendum No. 2 (6/28/2013).*

4.2.5 Suspected Ore Piles

Summarize scope of soil investigations at Suspected Ore Piles (include sample location map(s), # of samples, sample analytes). This section should include reference to the *Off-Property FRI Work Plan Revised Addendum No. 2 (6/28/2013)*

Commented [A12]: 12. These sections are combined in the 2017 ARC TOC

4.3 REFERENCE STUDY AREA

The following subsections will describe the scope of investigations performed within Reference Study Areas.

4.3.1 Terrestrial Soil

Summarize scope of reference soil investigations within On-Property Study Area and River Ranch (include sample location map(s), # of samples, sample analytes). This section should include reference to the Reference Area FRI Work Plan (01/19/2017), Reference Area Technical Data Summary Report (in preparation)

4.3.2 Groundwater

Summarize scope of *reference groundwater* investigations (include monitoring well location map(s), # of samples, sample analytes). This section should include reference to the *Reference Area FRI Work Plan (01/19/2017), Reference Area Technical Data Summary Report (in preparation)*

4.3.3 Surface Water

Summarize scope of surface water investigations in reference study areas (include sample location map(s), # of samples, sample analytes). This section should include reference to the *Reference Area FRI Work Plan, Addendum No. 1 (9/11/2012), Reference Area FRI Work Plan (2/28/2015), Reference Area Technical Data Summary Report (in preparation)*

4.3.4 Stream Sediment

Summarize scope of stream sediment investigations in reference study areas (include sample location map(s), # of samples, sample analytes). This section should include reference to the *Reference Area FRI Work Plan (01/19/2017), Reference Area Technical Data Summary Report (in preparation)*

4.3.5 Floodplain Soil

Summarize scope of floodplain soil investigations in reference study areas (include sample location map(s), # of samples, sample analytes). This section should include reference to the *Reference Area FRI Work Plan (01/19/2017), Reference Area Technical Data Summary Report (in preparation)*

4.3. 6 Plants

Summarize scope of plant surveys, plant sampling, and related soil investigations in reference study areas (include sample location map(s), # of samples, sample analytes). This section should include reference to the *On-Property, Off Property, and Reference Area Focused Remedial Investigation Work Plan (4/8/2016) – Plant and Habitat-Related Soil Investigations; Reference Area Technical Data Summary Report (in preparation); Soil-Plant Bioaccumulation Technical Data Summary Report (in preparation- See Appendix G)*

4.3.7 Benthic Macroinvertebrates

Commented [A13]: 13. This section is lumped into Section 4.3.4 Stream Sediment in the 2017 ARC TOC

Summarize scope of benthic macroinvertebrate investigations in reference study areas (include sample location map(s), # of samples, sample analytes). This section should include reference to the *Reference Area FRI Work Plan, Addendum No. 2 (6/14/2013), Reference Area FRI Work Plan (2/28/2015), Reference Area Technical Data Summary Report (in preparation)*

4.3.8 Fish

Summarize scope of fish investigations in reference study areas (include sample location map(s), # of samples, sample analytes). This section should include reference to the*Reference Area FRI Work Plan (2/28/2015); October 22, 2013 Letter (opportunistic sampling Mountaineer Creek); On-Property, Off-Property, and Reference Area Focused Remedial Investigation Work Plans (6/13/2016) – Task Sampling and Analysis Plan for Fish Investigation; Fish Surveys/Sampling Technical Data Summary Report (in preparation- See Appendix H); Reference Area Technical Data Summary Report (in preparation)*

5.0 DATA QUALITY ASSESSMENT SUMMARY

This section should describe the data used in the RI, how they were evaluated for quality, and whether or not they are suitable for use and related decision making in the RI, baseline risk assessments, and the FS.

5.1 REVIEW OF DATA QUALITY OBJECTIVES AND SAMPLING DESIGN

This section should reference the QAPP and should also present and describe the DQOs and sampling design.

5.2 DATA REVIEW

This section should describe the review process of the data summary reports and data validation reports and provide some examples from the process to illustrate how this contributes to the data usability assessment.

5.3 SELECT ANALYSES METHODS AND VERIFY ASSUMPTIONS

Describe the procedure for evaluating all data and what statistical methods, maps, graphs, tables are used to assess suitability for use in decision making. In addition, describe and assess the validity of the assumptions made to support these analyses.

5.4 DATA QUALITY CONCLUSIONS

This section will summarize the conclusions drawn about the data usability and quality. Summarize if the data can be used as intended and what are the implications of deviations and corrective actions.

6.0 NATURE AND EXTENT OF CONTAMINATION

6.1 EXTENT OF CONTAMINATION EVALUATION PROCEDURES

The following subsections will describe criteria and methods to be used in the evaluation of the extent of contamination in On-Property and Off-Property Study Areas

6.1.1 Indicator Contaminants

Describe the selection of indicator contaminants to be used to streamline and focus the evaluation of the extent of contamination

6.1.2 Spatial and Temporal Trends

Describe methods to be used for the evaluation of spatial and temporal trends in support of the evaluation of the extent of contamination

6.1.3 Comparison Criteria

6.1.3.1 Reference Concentrations

Briefly summarize the development of reference concentrations for various media of interest (techniques used for the comparison of reference concentrations to site data). *This section should also reference the Reference TDSR for the detailed*

evaluation

6.1.3.2 Chemical-Specific ARARs

Summarize methods used for the comparison of chemical-specific ARARs to site data in support of the evaluation of the extent of contamination for each matrix.

6.1.3.3 Risk-based Screening Levels

Briefly summarize methods used for the comparison of risk-based screening levels to site data in support of the evaluation of the extent of contamination for each matrix. This section should also reference appropriate TDSRs and Reports that calculated the risk-based screening levels in full

6.2 NATURE AND EXTENT OF CONTAMINATION

The following subsections will describe the nature and extent of contamination in the On-Property and Off-Property Study Areas including tabular statistical comparisons to reference concentrations, ARARs, and risk-based screening levels and graphical presentations of sampling data for each matrix/medium to illustrate the extent of contamination.

6.2.1 Acid Drainage Sources

Describe spatial locations of acid drainage sources and evaluate temporal trends in analytical results for acid drainage sources including tabular compilations and graphical presentations of sampling data

6.2.2 Surface Water

Present flow measurements and sampling results for surface water sampling locations (including EFCR) including tabular statistical comparisons and graphical presentations of sampling data (include flow hydrographs, mass loading results, and time-concentration plots)

6.2.2.1 Spatial and Temporal Trends

Present an evaluation of spatial and temporal trends in surface water flows, surface water quality, and *mass loading* estimates including tabular compilations and graphical presentations of sampling data. Reference Surface Water TDSR for details.

6.2.2.2 Comparison to Criteria

Present comparisons of surface water sampling data to reference concentrations, and risk-based screening levels and ARARs

Commented [A14]: 14. The ARC TOC does not have any reference to a Comparison to Criteria in the Nature and Extent section for any media. Instead the comparison to criteria comes in during the new section titled "Data Evaluation for Baseline Risk Assessments"

6.2.3 Storm Water and Snowmelt Runoff

Present sampling results for storm water and snowmelt runoff sampling locations including tabular statistical comparisons and graphical presentations of sampling data

6.2.3.1 Spatial and Temporal Trends

Present an evaluation of spatial and temporal trends in storm water and snowmelt runoff including tabular compilations and graphical presentations of sampling data. Reference the Storm Water and Snowmelt Report

6.2.3.2 Comparison to Criteria

Present comparisons of storm water and snowmelt runoff sampling data to reference concentrations, risk-based screening levels and ARARs

6.2.4 Stream Sediment and Floodplain

Present sampling results for stream sediment and floodplain activities (including East Fork Carson River) tabular statistical comparisons and graphical representations of stream sediment and floodplain sampling data.

6.2.4.1 Spatial and Temporal Trends

Present an evaluation stream sediment sampling (including sediment results from SQT analysis) and floodplain sampling results including tabular compilations and graphical presentations of sampling data. Reference the Sediment and Floodplain TDSR.

6.2.4.2 Comparison to Criteria

Present comparisons of sampling data to reference concentrations, risk-based screening levels and ARARs

6.2.5 Terrestrial Soil, Mine Waste, and Suspected Ore Piles

Present sampling results for terrestrial soil and mine waste sampling locations (on-property locations, off-property locations, River Ranch, Leviathan Mine Road, and Ore Piles) including tabular statistical comparisons and graphical representations of sampling data

6.2.5.1 Spatial Trends

Present an evaluation of spatial trends in terrestrial soil and mine waste at all locations including River Ranch, Suspected Ore Piles, and EFCR including tabular compilations and graphical presentations of sampling data

6.2.5.2 Comparison to Criteria

Present comparisons of terrestrial soil and mine waste sampling data to reference concentrations, risk-based screening levels and ARARs

6.2.6 Groundwater

Present boring logs, groundwater monitoring well construction details, aquifer testing results, groundwater elevations, and groundwater sampling results (include potentiometric maps, well hydrographs, time-concentrations plots, chemical distribution maps, tabular statistical comparisons, and other graphical presentations of sampling data).

6.2.6.1 Spatial and Temporal Trends

Present an evaluation of spatial and temporal trends in groundwater including tabular compilations and graphical presentations of sampling data.

6.2.6.2 Comparison to Criteria

Present comparisons of groundwater sampling data to reference concentrations, risk based screening levels and ARARs.

6.2.7 Plants

Present plant surveys and plant sampling results for plant sampling locations including tabular statistical comparisons and graphical presentations of sampling data

6.2.7.1 Spatial Trends

Present an evaluation of spatial trends in plant and related soil sampling data including tabular compilations and graphical presentations of sampling data

6.2.7.2 Plant Uptake Factors

Present the development of plant uptake factors with comparisons across and between study areas, habitat types, and plant types. Present recommended plant uptake factors

6.2.7.3 Comparison to Criteria

Present comparisons of plant and related soil sampling data to risk- based screening levels and reference concentrations

6.2.8 Fish

Present fish surveys and fish sampling results including tabular statistical comparisons and graphical presentations of sampling data

6.2.8.1 Spatial Trends

Present an evaluation of spatial trends in fish sampling data including tabular compilations and graphical presentations of sampling data

6.2.8.2 Comparison to Criteria

Present comparisons of fish sampling data to reference concentrations, risk-based screening levels, and ARARs

7.0 CONTAMINANT FATE AND TRANSPORT

7.1 SITE CONCEPTUAL MODEL

The following subsections will describe refinements in the site conceptual model based on information collected during FRI implementation

7.1.1 Acid Drainage Formation Mechanisms

Describe updated site conceptual model relative to acid drainage formation based on FRI results

7.1.2 Groundwater

Describe updated site conceptual model relative to hydrostratigraphy, groundwater flow conditions, and groundwater chemistry based on FRI results.

7.1.3 Groundwater-Surface Water Interactions

Describe site conceptual model relative to groundwater-surface water interactions based on FRI results

7.1.4 Surface Water

Describe site conceptual model relative to surface water flow and chemistry based on FRI results

7.1.5 Site Water Balance

Describe quantification of various inflow and outflow components to the site water balance including

Commented [A15]: 15. 2017 ARC TOC does not provide subsections. 2015 version had subsections

7.2 POTENTIAL ROUTES OF MIGRATION

The following subsections will describe potential routes of COPC/COPEC migration in media of interest

7.2.1 Groundwater

Describe potential migration of COPCs in groundwater

7.2.2 Surface Water

Describe potential migration of COPCs in surface water

7.2.3 Soil

Describe potential migration of COPCs in soil

7.2.4 Sediment

Describe potential migration of COPCs in sediment

7.2.5 Air

Describe potential migration of COPCs in air

7.2.6 Fish

Describe potential migration of COPCs to fish

7.2.7 Plants

Describe potential migration of COPCs to plants

Commented [A16]: 16. 2017 ARC TOC does not provide media subsections. 2015 version had subsections

7.3 CONTAMINANT FATE AND TRANSPORT SUMMARY

This subsection will summarize physical, chemical, and/or biological factors influencing the fate, transport, and persistence of COPC/COPECs in media of interest

7.4 EXPOSURE POINT CONCENTRATION CALCULATIONS

Summarize EPCs estimated for each of the media.

8.0 SUMMARY AND CONCLUSIONS

The following subsections will summarize the overall approach used to implement FRIs in the On-Property and Off-Property Study Areas, the characterization the nature and extent of contamination, refinement of the Site Conceptual Model, and key conclusions relative to the evaluation of remedial alternatives.

8.1 REMEDIAL INVESTIGATION APPROACH

Include next steps for risk assessment.

8.2 NATURE AND EXTENT OF CONTAMINATION

8.3 SITE CONCEPTUAL MODEL

8.4 CONCLUSIONS

8.5 DATA LIMITATIONS AND RECOMMENDATIONS

9.0 REFERENCES

APPENDICES

A. Water Budget TDSR
B. Surface Water TDSR
C. Storm Water/Snowmelt TDSR

D. Stream Sediment & Floodplain Soil TDSR
E. Mine Waste TDSR
F. Groundwater TDSR
G. Soil–Plant Bioaccumulation TDSR
H. Fish Surveys/Sampling TDSR
I. River Ranch TDSR
J. Leviathan Mine Road/Suspected Ore Piles TDSR
K. East Fork Carson River TDSR
L. Reference Area TDSR
M. Baseline Human Health Risk Assessment Work Plan
N. Baseline Ecological Risk Assessment Work Plan

VOLUME 2: BASELINE HUMAN HEALTH RISK ASSESSMENT Leviathan Mine Site
Alpine County, California

Commented [A17]: 17. In 2017 ARC TOC there is no TOC for the Human Health Risk Assessment. This TOC is modified from the 2015 ARC TOC.

EXECUTIVE SUMMARY

1.0 INTRODUCTION

1.1 PURPOSE OF BASELINE HUMAN HEALTH RISK ASSESSMENT

Describe purpose of BHHRA, typical components per EPA BHHRA guidance, required components per Statement of Work. List regulatory guidance documents used to develop the baseline BHHRA

1.2 REPORT ORGANIZATION

Provide an outline for the subsequent main sections of the report and summarizes contents of these sections

2.0 SITE BACKGROUND AND REGIONAL SETTING

2.1 SITE BACKGROUND AND REGIONAL SETTING

This section will BRIEFLY (1 - 3 paragraphs) describe a generalized regional setting and the site background including CERCLA definition of the site, site description, land ownership, and site history and future land use. It will include a figure showing the mine site

2.2 PREVIOUS MITIGATION AND RESPONSE ACTIONS

Describe ongoing mitigation activities.

2.3 PREVIOUS HUMAN HEALTH RISK EVALUATION

Describe the previous human health evaluation

3.0 CONTAMINATION IDENTIFICATION

Provide a brief summary of the contaminant identification process described in the Site Characterization Report. Data evaluation will be discussed by media and then by study area. Available data will be identified, and the rationale for selecting data for the risk assessment will be presented. This section will rely on the RI for much of this information. On-, off-property and reference data sets will be evaluated within each section. In some cases, study areas may be further divided into data evaluation units based on significant differences in concentration. Detailed written summaries of the data evaluation will be presented in appendixes to the risk assessment. Each subsection will address data usability, data adequacy, appropriateness of screening criteria, and COPC selection. Usable data will be summarized and statistical summaries will be presented in tables for each media within each study area or data evaluation unit. On-property and off-property concentrations will be compared to reference concentrations in each section. This section will refer to the RI report as appropriate for this information.

3.1 SURFACE WATER

3.2 STREAM SEDIMENT

3.3 FLOODPLAIN SOIL

3.4 FISH TISSUE

Discuss benthic macroinvertebrate as food source for fish species and potential influence of this source in

fish bioaccumulation

3.5 PLANTS

3.6 MINE WASTE/OVERBURDEN

3.7 RIVER RANCH SOIL

This section may only present a screening evaluation if area meets screening criteria. Identify the appropriateness of the screening criteria

3.8 SUSPECTED ORE PILES

This section may only present a screening evaluation if area meets screening criteria. Identify the appropriateness of the screening criteria

3.9 LEVIATHAN MINE ROAD

This section may only present a screening evaluation if area meets screening criteria. Identify the appropriateness of the screening criteria

3.10 EAST FORK CARSON RIVER

This section may only present a screening evaluation if area meets screening criteria. Identify the appropriateness of the screening criteria

4.0 EXPOSURE ASSESSMENT

Describe the exposure evaluation process.

4.1 CONCEPTUAL SITE MODEL FOR BASELINE HUMAN HEALTH RISK ASSESSMENT

Discuss the conceptual site model and site conditions affecting exposure scenarios/pathways. A figure showing the conceptual site model and tables summarizing the information will be presented.

4.1.1 Chemical Sources and Locations

Use RI for discussion in this section

4.1.2 Fate and Transport

Describe fate and transport mechanisms, the information in the RI relevant to these mechanisms, and relevance of the mechanisms to the human health risk assessment. These mechanisms include Fugitive Dust Generation, Leaching (Infiltration), Groundwater Transport, Surface Water Runoff, Erosion, Deposition of Sediment, and Biotic Uptake.

4.1.3 Potential Receptors and Exposure Points and routes

Provide a narrative description of these receptors and explain the exposure media and relevant routes for each receptor. The receptors encompass the following: Current/Future Trespasser, Current/Future Recreational Visitor, Current/Future Off-Site Rancher, Current/Future Off-Site Resident, Current/Future Foraging Washoe Tribe Member, and Future Subsistence Washoe Tribe Member.

4.1.4 Exposure Pathways

Describe the potential exposure pathways for current and future land use at the site by each identified receptor (Current/Future Trespasser, Current/Future Recreational Visitor, Current/Future Off-Site Rancher, Current/Future Off-Site Resident, Current/Future Foraging Washoe Tribe Member, and Current/Future Subsistence Washoe Tribe Member.

4.1.5 Exposure Scenarios by Study Area and Data Evaluation Unit

Describe relationship of study areas (including reference areas) or data evaluation units to receptors to create complete exposure scenarios with a physical location. Some receptors may have more than one exposure scenario/location (e.g., recreational use will occur in all four study areas.)

Provide figures to show receptors locations and exposure pathways relevant to each study area and/or data evaluation unit.

4.1.5.1 Study Areas

4.1.5.1.1 Pit Study Area

4.1.5.1.2 Leviathan Creek Study Area

4.1.5.1.3 Aspen Creek Study Area

4.1.5.1.4 Downstream Study Area

4.1.5.1.5 Reference Study Area

4.1.5.1.6 Supplemental Study Areas – These study areas will be included in the HHRA based on the results of the screening evaluation.

4.1.5.2 Data Evaluation Units

This subsection will describe the data evaluation units and provide tables summarizing relevant data. Compare COPC concentrations within study areas to appropriate reference concentrations and evaluate spatial variability in COPC concentrations. If there is significant variation in COPC concentrations within a study area, the study area may be subdivided into discrete data evaluation units for consideration in the HHRA.

4.2 EXPOSURE QUANTIFICATION

Describe how exposure will be quantified for the exposure scenarios for the site.

4.2.1 Exposure Point Concentrations

Describe the calculation of exposure point concentrations for all 3 study areas and/or data evaluation units by media. Tables summarizing the results will be presented.

4.2.2 Exposure Equations

Describe the equations used to quantify exposure, which will be summarized in tables.

4.2.3 Exposure Parameters

Describe the equations used to quantify exposure, which will be summarized in tables.

4.2.4 Absorption and Bioavailability

Describe assumptions regarding absorption and bioavailability. Information will be summarized in tables.

5.0 TOXICITY ASSESSMENT

Summarize the toxicity criteria to be used in the HHRA, including references.

5.1 NONCARCINOGENIC HEALTH EFFECTS

Summarize non-cancer toxicity criteria will be described and summarized in tables.

5.2 Carcinogenic Health Effects

Summarize carcinogenic toxicity criteria will be described and summarized in tables.

5.3 EVALUATION OF LEAD

Evaluate lead for non-cancer health effects will be summarized.

6.0 RISK CHARACTERIZATION

Combine the exposure and toxicity assessment to quantify risk in this section.

6.1 NONCARCINOGENIC HEALTH EFFECTS

Present the methods for assessing noncarcinogenic health effects.

6.2 CARCINOGENIC HEALTH EFFECTS

Present the methods for assessing carcinogenic health effects.

6.3 HEALTH EFFECTS FROM LEAD

Present the methods for assessing potential noncancer health effects from lead exposure.

6.4 SUMMARY OF RISK CHARACTERIZATION

Present the results of the risk assessment for each receptor as appropriate to each data evaluation unit, receptor, and study area. Tables summarizing the risk characterization will be presented with a comparison of on-property and off-property risk estimates to reference area risk estimates. Figures may be used to demonstrate the results.

6.5 UNCERTAINTIES AND LIMITATIONS IN RISK ASSESSMENT

Summarize the uncertainties and limitations in the HHRA. A qualitative discussion and semi-quantitative tabular summary will be presented.

7.0 CONCLUSIONS

Summarize the conclusions of the HHRA.

8.0 REFERENCES

TABLES

To Be Determined

FIGURES

To Be Determined

APPENDICES

PRELIMINARY DRAFT

VOLUME 3: ECOLOGICAL RISK ASSESSMENT Leviathan Mine Site
Alpine County, California

Commented [A18]: 18. In ARC TOC there is no TOC for the Eco Risk Assessment

EXECUTIVE SUMMARY

1.0 INTRODUCTION

1.1 PURPOSE OF ECOLOGICAL RISK ASSESSMENT IN THE CERCLA RI/FS PROCESS

Describe purpose of ERA, typical components per EPA ERA guidance, required components per Statement of Work. List regulatory guidance documents used to develop the baseline ERA

1.2 REPORT ORGANIZATION

Outline key sections of ERA Report and summarize contents of each key section

2.0 SITE BACKGROUND AND REGIONAL SETTING

This section will BRIEFLY (1 - 3 paragraphs) describe a generalized regional setting and the site background including CERCLA definition of the site, site description, and site history. It willinclude a figure showing the mine site

3.0 CONTAMINANT IDENTIFICATION

Data evaluation will be discussed by media and then study area. Available data will be identified, and the rationale for selecting data for the risk assessment will be presented. This section will rely on the RI for much of this information. On-, off-property and reference data sets will be evaluated within each section. COPEC concentrations within study areas will be compared to appropriate reference concentrations and the spatial variability in COPEC concentrations will be evaluated. If there is significant variation in COPEC concentrations within a study area, the study area may be subdivided into discrete data evaluation units for consideration in the ERA. Detailed summaries of the data evaluation will be presented in appendixes to the risk assessment. Each subsection will address data usability, data adequacy, and COPEC selection. Usable data will be summarized and statistical summaries will be presented in tables for each media within each study area or data evaluation unit. This section will refer to the RI report as appropriate for this information.

3.1 SURFACE WATER

3.2 STREAM SEDIMENT

3.3 FLOODPLAIN SOIL

3.4 FISH TISSUE

3.5 PLANTS

3.6 MINE WASTE/OVERBURDEN

3.7 RIVER RANCH SOIL

This section may only present a screening evaluation if area meets screening criteria.

3.8 SUSPECTED ORE PILES

This section may only present a screening evaluation if area meets screening criteria.

3.9 LEVIATHAN MINE ROAD

This section may only present a screening evaluation if area meets screening criteria.

3.10 EAST FORK CARSON RIVER

This section may only present a screening evaluation if area meets screening criteria.

4.0 EXPOSURE ASSESSMENT

4.1 ECOLOGICAL RECEPTORS

The following subsections will describe the selection of ecological receptors, exposure pathways, calculation of exposure point concentrations, calculation of exposure dose, and exposure scenarios

4.1.1 Terrestrial Receptors

Describe the selection of terrestrial receptors and their habitat preferences

4.1.2 Aquatic Receptors

Describe the selection of aquatic receptors and their habitat preferences

4.1.3 Conceptual Site Model Summary

BRIE FLY s umm ari ze the CSM and provide a figure showing it.

4.2 EXPOSURE PATHWAYS

Describe potential exposure pathways and pathways considered to be complete

4.2.1 Sources, Mechanisms of Release, and Mechanisms of Transport

4.2.2 Exposure Points, Routes, and Pathways

4.2.3 Complete Exposure Pathways

Reference and summarize surrogate receptors identified in the Ecological Assessment Work Plan.

4.3 EXPOSURE POINT CONCENTRATIONS

Description of how EPCs were calculated and presentation of the results for the different media being evaluated (soil, sediment, water, plants, fish, and small mammals). Compare EPCs for study areas to appropriate reference concentrations.

4.4 EXPOSURE DOSE CALCULATION

Description of equations and exposure parameters used to calculate COPEC dose for ecological receptors

4.5 EXPOSURE SCENARIOS

Description of exposure scenarios for each ecological receptor evaluated in the ERA

5.0 TOXICITY ASSESSMENT

Description of the dose-based toxicity reference values (TRVs) and concentration-based TRVs used in the ERA

5.1 DOSE-BASED TRVS

5.2 CONCENTRATION-BASED TRVS

Will be used for terrestrial plant and soil invertebrate community and aquatic plant and benthic communities

6.0 RISK CHARACTERIZATION

Presentation of the risk screening results and calculation of risk for all receptor categories. Tables summarizing the risk characterization will be presented with a comparison of on-property and off-property risk estimates to reference area risk estimates.

6.1 SCREENING ASSESSMENT

This section will come from the RI. Presentation of COPECs that do anddo not exceed media-specific screening values

6.2 PLANT COMMUNITY

Presentation of Plant Community HQ values

6.1.1 Terrestrial Plants

6.1.2 Aquatic Plants

6.3 SOIL INVERTEBRATE COMMUNITY

Presentation of Soil Invertebrate Community HQ values

6.4 BENTHIC INVERTEBRATE COMMUNITY

Presentation of Benthic Invertebrate Community HQ values

6.5 TERRESTRIAL WILDLIFE

Presentation of HQ values for birds, mammals and reptiles

6.6 AQUATIC RECEPTERS

Presentation of HQ values for amphibians and fish

7.0 UNCERTAINTY ANALYSIS

7.1 EXPOSURE ASSESSMENT UNCERTAINTIES

Discussion of uncertainties associated with the exposure assessment

7.1.1 Pathways Not Evaluated

7.1.2 Exposure Point Concentration Values

7.1.3 Receptor Exposure Factors

7.1.4 COPEC Bioavailability

7.2 TOXICITY ASSESSMENT UNCERTAINTIES

Discussion of uncertainties associated with the toxicity assessment

7.2.1 Representativeness of Receptors Evaluated

7.2.2 Extrapolation of Toxicity Data Between Receptors

7.2.3 Extrapolation of Toxicity Data Across Dose or Exposure Duration

7.2.4 Extrapolation of Toxicity Data From Laboratory to Field Conditions

7.2.4 Chemical Synergism and Antagonism

7.3 RISK CHARACTERIZATION UNCERTAINTIES

Discussion of overall conclusions regarding uncertainty associated with risk estimates presented in the ERA

8.0 CONCLUSIONS

Summary of the main conclusions of the ERA

9.0 REFERENCES

TABLES

To Be Determined

FIGURES

To Be Determined

APPENDICES

To Be Determined

PRELIMINARY DRAFT

VOLUME 4: FEASIBILITY STUDY
Leviathan Mine Site
Alpine County, California

EXECUTIVE SUMMARY

1.0 INTRODUCTION

1.1 PURPOSE OF FEASIBILITY STUDY

Describe purpose of FS, typical components per EPA RI/FS guidance, list the main regulatory documents, required components per UAO Statement of Work

1.2 REPORT ORGANIZATION

Describe key sections of FS Report and summarize contents of each key section

2.0 BACKGROUND INFORMATION

2.1 SITE DESCRIPTION & HISTORY (summarized from RI Report)

Brief regional setting, site description, and site history

2.2 CONCEPTUAL SITE MODEL

Provide visual and very brief description of CSM and Contaminant Fate and Transport referring to the RI section for more detail.

2.3 PHYSICAL HAZARDS

List the physical hazards associated with the site that are addressed or relevant to remedial alternatives evaluated in the FS. These physical hazards include Pit highwall and adjacent USFS road, mining infrastructure (ore loading facility), unstable ground at Leviathan Basin landslide – the main hazard is the effect of ground movement on infrastructure, and any other physical hazards identified in the RI.

2.4 NATURE AND EXTENT OF CONTAMINATION

Summarize nature and extent of contamination in each medium, and refer to RI report for more detailed information

2.5 BASELINE RISK ASSESSMENT

Summarize the RA findings with respect to complete exposure pathways and the COCs and COECs in each media. Summarize here, refer to the HHRA and ERA reports for more details. Identify the media-specific COCs that exceed HH or eco risk.

3.7.1 Potential Exposure Pathways

3.7.2 Human Health Risk Assessment

3.7.3 Ecological Risk Assessment

XXXXX

3.0 DEVELOPMENT OF REMEDIAL ACTION OBJECTIVES AND PRELIMINARY REMEDIATION GOALS

3.1 REMEDIAL ACTION OBJECTIVES

3.1.1 General RAOs

Describe the overarching RAOs

3.1.2 Specific RAOs

Describe the media-specific RAOs

3.1.2.1 Physical Hazards

3.1.2.2 Mine Waste, Overburden, and Terrestrial Soil

3.1.2.3 Groundwater and Acidic Discharge

Commented [A19]: 19. In ARC TOC there is a detailed account with multiple subsections

Commented [A20]: 20. In ARC TOC these subsection are all under Section 3.0 CSM. There is extensive discussion of the CSM inputs and factors as well as the nature and extent of contamination

Commented [A21]: 21. In ARC TOC there is a section for the summary of previous focused feasibility studies

Commented [A22]: 22. The first subsection in ARC TOC is "Summary of Risks to be Addressed by the Remedy"

3.1.2.4 Surface Water, Stormwater, and Snowmelt

3.1.2.5 Stream Sediment and Floodplain Soil

3.2 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) AND TO BE CONSIDERED (TBC) GUIDANCE

Summarize the ARARs and TBCs, and refer to appendix for more detail

3.2.1 Chemical-Specific ARARs and TBCs

For all constituents observed at site

3.2.2 Location-Specific ARARs and TBCs

ARARs tied to locations, such as wetlands or NHPA-significant areas

3.2.3 Action-Specific ARARs and TBCs

Pending identification of remedial alternatives

3.3 SITE-SPECIFIC PRELIMINARY CLEANUP GOALS

Numerical goals by medium based on a synthesis of ARARs, risk-based calculations, and reference concentrations. This focuses on COCs and COECs (which drive the site risks or which exceed established regulatory limits), not COPCs or COPECs (present at the site, but not significant risk drivers). "Preliminary" because finalization only occurs after everyone has concurred and it's documented in the approved ROD. The PCGs are developed in an appendix, and are summarized here. Although there are several potential sources for PCGs (ARARs, risk-based calculations, and reference concentrations), the goal of this section will be sort out all the numbers and derive a single cleanup goal for each COC/COEC.

3.3.1 Mine Waste, Overburden, and Terrestrial Soil

3.3.2 Groundwater and Acid Discharge

3.3.3 Surface Water, Stormwater, and Snowmelt

3.3.4 Stream Sediment and Floodplain Soil

3.4 IDENTIFICATION OF AREAS OR VOLUMES OF MEDIA TO BE ADDRESSED

This section will be the synthesis of the CSM (nature and extent, site risks) and the cleanup goals (RAOs, ARARs, and risk-based cleanup goals) to identify what needs to be done at the site. This focuses the remainder of the document on what needs to be done. "Preliminary" because finalization only occurs after everyone has concurred and it's documented in the approved ROD. This section is a critical link between the RI and RA results, and the remedial actions that are considered in this FS. For each medium, describe the area/volume that exceeds the cleanup criterion for each COC/COEC. Cleanup criteria developed in Section 4.3 consider ARARs, risk-based concentrations, and reference area concentrations

3.4.1 Mine Waste, Overburden, and Terrestrial Soil

3.4.2 Groundwater and Acidic Discharge

3.4.3 Surf ace Water, Stormwater, and Snowmelt

3.4.4 Stream Sediment and Floodplain Soil

4.0 IDENTIFICATION AND SCREENING OF REMEDIAL TECHNOLOGY TYPES AND PROCESS OPTIONS

4.1 INTRODUCTION

Identify affected media *(including in-situ mineralized rock, mine waste, acid drainage, storm water and snowmelt, groundwater, surface water, sediment [stream sediment and floodplain soil], terrestrial soil)* and screen applicable technologies. This starts with a general list *of technologies* and screens out technologies/process options on the basis of effectiveness, implementability, and relative cost. Define these criteria here in the Introduction section. Goal is to have representative technologies for different media that can be combined into comprehensive alternatives in the following section.

Provide a realistic context regarding general issues including year-round site access and reliable power supply and note that these factors will affect many of the technologies and will need to be fully considered in Section 6.

4.2 GENERAL RESPONSE ACTIONS

Identify a list of technologies, conduct initial screening, and end with a list of retained technologies. *Technologies requiring year round access and/or reliable power supply should not be removed from*

consideration until these factors are addressed in detail specifically for the site.

4.2.1 No Action

4.2.2 Institutional Controls

4.2.2.1 Land and Water Use Controls

4.2.2.2 Access Control

4.2.2.3 Permitting

4.2.2.4 Risk Communication

4.2.3 Containment

4.2.3.1 Capping and Covers

4.2.3.2 Gradient Controls

4.2.3.3 Sediment Control Features

4.2.4 Sou rce Control, Flow Control, Re-Routing

4.2.4.1 Surface Controls

4.2.4.2 Subsurface Drains

4.2.4.3 Slope Stabilization

4.2.4.4 Surface and Subsurface Diversions

4.2.4.5 Stream Rechannelization

4.2.5 Removal and/or Consolidation*(to include complete removal and encapsulization of all mine waste)*

4.2.5.1 Mine Waste

4.2.5.2 Sediment and Floodplain Soils

4.2.6 Treatment

4.2.6.1 Ex-situ Treatment *(to include increasing the on-site storage capacity to retain over-winter flows from all acid drainage sources and seasonal campaign treatment; to include piping water to a downstream treatment facility)*

4.2.6.2 In-situ Treatment

4.2.7 Summary of Retained Technologies and Process Options

4.2.7.1 In Situ Mineralized Rock

4.2.7.2 Mine Waste and Non-Floodplain Soil

4.2.7.3 Groundwater and Acidic Seeps

4.2.7.4 Surface Water and Stormwater/Snowmelt Runoff

4.2.7.5 Stream Sediment and Floodplain Soil

4.3 REMEDIAL TECHNOLOGY IDENTIFICATION AND SCREENING

Identify a list of technologies *relevant to each of the affected media*, conduct initial screening, and end with a list of retained technologies. Initial screening in this section will be on the basis of implementability, effectiveness, and relative cost; definitions to be provided at the start of this section.

4.3.1 Physical Hazards

4.3.2 Mine Waste, Overburden, and Soil

4.3.3 Groundwater and Acidic Discharge

4.3.4 Surface Water, Stormwater, and Snowmelt

4.3.5 Stream Sediment and Floodplain Soil

5.0 DEVELOPMENT OF REMEDIAL ACTION ALTERNATIVES

5.1 INTRODUCTION

Description of how alternatives are assembled, and then screened based on the implementability, effectiveness, and cost. Retain a subset for detailed evaluation in the next section. The alternatives will be identified during FS execution.

5.2 ALTERNATIVE 1 – NO ACTION

Provide a Description and the screening evaluation to assess this alternative.

5.3 ALTERNATIVES FOR PHYSICAL HAZARDS

Commented [A23]: 23. Not present in 2017 ARC TOC

Description

In Section 5, describe how the alternative would be used at a generic site. In Section 6, describe how it would be applied specifically at LMS.

Evaluation

In Section 5, conduct preliminary evaluation based on implementability, effectiveness, and cost. Screen out the lower-ranked alternatives, retain the higher-ranked ones for detailed evaluation in Section 6.

5.4 ALTERNATIVES FOR IN SITU MINERALIZED ROCK

Description

In Section 5, describe how the alternative would be used at a generic site. In Section 6, describe how it would be applied specifically at LMS.

Evaluation

In Section 5, conduct preliminary evaluation based on implementability, effectiveness, and cost. Screen out the lower-ranked alternatives, retain the higher-ranked ones for detailed evaluation in Section 6.

5.5 ALTERNATIVES FOR MINE WASTE, OVERBURDEN, AND SOIL *(to include complete removal and encapsulization of all mine waste)*

Description

In Section 5, describe how the alternative would be used at a generic site. In Section 6, describe how it would be applied specifically at LMS.

Evaluation

In Section 5, conduct preliminary evaluation based on implementability, effectiveness, and cost. Screen out the lower-ranked alternatives, retain the higher-ranked ones for detailed evaluation in Section 6.

5.6 ALTERNATIVES FOR GROUNDWATER AND ACIDIC DISCHARGE *(to include increasing the on-site storage capacity to retain over-winter flows from all acid drainage sources and seasonal campaign treatment; to include piping water to a downstream treatment facility)*

Description

In Section 5, describe how the alternative would be used at a generic site. In Section 6, describe how it would be applied specifically at LMS.

Evaluation

In Section 5, conduct preliminary evaluation based on implementability, effectiveness, and cost. Screen out the lower-ranked alternatives, retain the higher-ranked ones for detailed evaluation in Section 6.

5.7 ALTERNATIVES FOR SURFACEWATER, STORMWATER, AND SNOWMELT

Description

In Section 5, describe how the alternative would be used at a generic site. In Section 6, describe how it would be applied specifically at LMS.

Evaluation

In Section 5, conduct preliminary evaluation based on implementability, effectiveness, and cost. Screen out the lower-ranked alternatives, retain the higher-ranked ones for detailed evaluation in Section 6.

5.8 ALTERNATIVES FOR STREAM SEDIMENT AND FLOODPLAIN SOIL

Description

In Section 5, describe how the alternative would be used at a generic site. In Section 6, describe how it would be applied specifically at LMS.

Evaluation

In Section 5, conduct preliminary evaluation based on implementability, effectiveness, and cost. Screen out the lower-ranked alternatives, retain the higher-ranked ones for detailed evaluation in Section 6.

6.0 DETAILED ANALYSIS OF ALTERNATIVES

6.1 DEFINITION OF EVALUATION CRITERIA

This section will discuss the 9 NCP Criteria

Threshold Criteria

These criteria include the Overall Protection of Human Health and the Environment and Compliance with ARARs. The Overall Protection of Human Health and the Environment includes the evaluation of alternatives with information from assessments under other evaluation criteria (especially long-term effectiveness and permanence, short term effectiveness, and compliance with ARARs. Also examines any unacceptable cross-media impacts. Compliance with ARARS describes how the alternatives meet the ARARs.

Primary Balancing Criteria

These criteria include Long-Term Effectiveness and Permanence; Reduction of Toxicity, Mobility, or Volume through Treatment; Short-Term Effectiveness; Implementability; and Cost. Long-Term Effectiveness and Permanence addresses the risk remaining on site after the response objectives have been met. Reduction of Toxicity, Mobility, or Volume through Treatment requires statutory preference for remedial actions that permanently and significantly reduce toxicity, mobility, or volume of hazardous substances as the principal element. Short-Term Effectiveness addresses the effects of the alternative during construction and implementation until clean up target has been met. Implementability requires assessment of technical and administrative feasibility to implement an alternative and the availability of services and materials. Cost can be used to assess alternatives.

Modifying Criteria

These criteria include State Acceptance and Community Acceptance. State acceptance can be considered in the FS if the state provides input during the FS. If input is provided only afterwards, then this criterion will be addressed in the ROD. Community acceptance is not addressed in the FS. Instead, it will be addressed in the ROD based on public comment on the Proposed Plan.

Commented [A24]: 24. The 9 NCP criteria are not specified in this section of the 2017 ARC TOC.

6.2 ALTERNATIVE 1 – NO ACTION

Description - In Section 6, describe how alternative it would be applied specifically at LMS.
Evaluation - Evaluate using the 9 NCP criteria. Use a quantitative ranking system.

6.3 ALTERNATIVES FOR PHYSICAL HAZARDS

Commented [A25]: 25. No Alternatives for Physical Hazards are given in the 2017 ARC TOC.

6.3.1 Pit highwall and adjacent USFS road

Description - In Section 6, describe how alternative it would be applied specifically at LMS.
Evaluation - Evaluate using the 9 NCP criteria. Use a quantitative ranking system.

6.3.2 Mining infrastructure (ore loading facility)

Description - In Section 6, describe how alternative it would be applied specifically at LMS.
Evaluation - Evaluate using the 9 NCP criteria. Use a quantitative ranking system.

6.3.3 Unstable ground at Leviathan Basin landslide – the main hazard is the effect of ground movement on infrastructure

Description - In Section 6, describe how alternative it would be applied specifically at LMS.
Evaluation - Evaluate using the 9 NCP criteria. Use a quantitative ranking system.

6.3.4 Any other physical hazards identified in the RI

Description - In Section 6, describe how alternative it would be applied specifically at LMS.
Evaluation - Evaluate using the 9 NCP criteria. Use a quantitative ranking system.

6.4 ALTERNATIVES FOR IN SITU MINERALIZED ROCK

6.4.1 On Property Study Area

Description - In Section 6, describe how alternative it would be applied specifically at LMS.
Evaluation - Evaluate using the 9 NCP criteria. Use a quantitative ranking system.

6.5 ALTERNATIVES FOR MINE WASTE, OVERBURDEN, AND TERRESTRIAL SOIL

Commented [A26]: 26. In 2017 ARC TOC Alternatives are not separated by location.

6.5.1 On Property Study Area

Description - In Section 6, describe how alternative it would be applied specifically at LMS.
Evaluation - Evaluate using the 9 NCP criteria. Use a quantitative ranking system.

6.5.2 River Ranch

Description - In Section 6, describe how alternative it would be applied specifically at LMS.

Evaluation - Evaluate using the 9 NCP criteria. Use a quantitative ranking system.

6.5.3 Leviathan Mine Road

Description - In Section 6, describe how alternative it would be applied specifically at LMS.

Evaluation - Evaluate using the 9 NCP criteria. Use a quantitative ranking system.

6.5.4 Suspected Ore Piles

Description - In Section 6, describe how alternative it would be applied specifically at LMS.

Evaluation - Evaluate using the 9 NCP criteria. Use a quantitative ranking system.

6.6 ALTERNATIVES FOR GROUNDWATER AND ACIDIC DISCHARGE

6.6.1 On-Propert y Study Area

Description - In Section 6, describe how alternative it would be applied specifically at LMS.

Evaluation - Evaluate using the 9 NCP criteria. Use a quantitative ranking system.

6.7 ALTERNATIVES FOR SURFACE WATER, STORMWATER, AND SNOWMELT

Commented [A27]: 27. In 2017 ARC TOC Alternatives are not separated by location

6.7.1 On-Property Study Area

Description - In Section 6, describe how alternative it would be applied specifically at LMS.

Evaluation - Evaluate using the 9 NCP criteria. Use a quantitative ranking system.

6.7.2 Downstream Study Area

Description - In Section 6, describe how alternative it would be applied specifically at LMS.

Evaluation - Evaluate using the 9 NCP criteria. Use a quantitative ranking system.

6.7.3 East Fork Carson River

Description - In Section 6, describe how alternative it would be applied specifically at LMS.

Evaluation - Evaluate using the 9 NCP criteria. Use a quantitative ranking system.

6.8 ALTERNATIVES FOR STREAM SEDIMENT AND FLOODPLAIN SOIL

Commented [A28]: 28. In 2017 ARC TOC Alternatives are not separated by location

6.8.1 On-Property Study Area

Description - In Section 6, describe how alternative it would be applied specifically at LMS.

Evaluation - Evaluate using the 9 NCP criteria. Use a quantitative ranking system.

6.8.2 Downstream Study Area

Description - In Section 6, describe how alternative it would be applied specifically at LMS.

Evaluation - Evaluate using the 9 NCP criteria. Use a quantitative ranking system.

6.8.3 East Fork Carson River

Description - In Section 6, describe how alternative it would be applied specifically at LMS.

Evaluation - Evaluate using the 9 NCP criteria. Use a quantitative ranking system.

7.0 COMPARATIVE ANALYSIS OF ALTERNATIVES

Commented [A29]: 29. In the 2017 ARC TOC addresses Threshold Criteria (Overall Protection of Human Health and the Environment and Compliance with ARARs) and Primary Balancing Criteria. The Comparative Analysis by media is not provided.

Relatively short narrative in this section. Use a numerical ranking scheme in a table to compare the alternatives to each other

7.1 APPROACH

Describe the comparison approach. All alternatives (except No Action) meet the threshold criteria (protectiveness and ARAR compliance); this section is a comparison based primarily on effectiveness, reduction via treatment, implementability, cost, and acceptability

7.2 COMPARATIVE ANALYSIS OF ALTERNATIVES FOR PHYSICAL HAZARDS

Include a narrative description of the relative ranking basis, and a summary table of alternatives for that medium.

7.3 COMPARATIVE ANALYSIS OF ALTERNATIVES FOR IN SITU MINERALIZED ROCK

Include a narrative description of the relative ranking basis, and a summary table of alternatives for that medium.

7.4 COMPARATIVE ANALYSIS OF ALTERNATIVES FOR MINEWASTE, OVERBURDEN, AND TERRESTRIAL SOIL

Include a narrative description of the relative ranking basis, and a summary table of alternatives for that

medium.

7.5 COMPARATIVE ANALYSIS OF ALTERNATIVES FOR GROUNDWATER AND ACIDIC DISCHARGE

Include a narrative description of the relative ranking basis, and a summary table of alternatives for that medium.

7.6 COMPARATIVE ANALYSIS OF ALTERNATIVES FOR SURFACEWATER, STORMWATER, AND SNOWMELT

Include a narrative description of the relative ranking basis, and a summary table of alternatives for that medium.

7.7 COMPARATIVE ANALYSIS OF ALTERNATIVES FOR STREAM SEDIMENT AND FLOODPLAIN SOIL

Include a narrative description of the relative ranking basis, and a summary table of alternatives for that medium.

8.0 PREFERRED ALTERNATIVE

8.1 INTRODUCTION

In contrast to the typical FS approach in which a preferred alternative is not identified, the UAO for RI/FS requires that the FS identify the preferred alternative. UAO (2008) Attachment 1, Statement of Work, page 15. II.:

The Feasibility Study shall include… D. Recommendation of a preferred remedial action plan for EPA approval.

The preferred alternative described here will include RA components for each medium and site area where remediation is needed, based on cleanup criteria established in Section 4.

8.2 DESCRIPTION OF THE RECOMMENDED ALTERNATIVE

Narrative description of the preferred alternative that includes RAs for some/all media, and some/all areas.

8.2.1 Recommended Alternative for Physical Hazards

8.2.1.1 Pit highwall and adjacent USFS road

Narrative description of the preferred alternative that includes RAs for some/all media, and some/all areas.

8.2.1.2 Mining infrastructure (ore loading facility)

Narrative description of the preferred alternative that includes RAs for some/all media, and some/all areas.

8.2.1.3 Unstable ground at Leviathan Basin landslide – the main hazard is the effect of ground movement on infrastructure

8.2.1.4 Any other physical hazards identified in the RI

8.2.2 Recommended Alternative for In Situ Mineralized Rock

Narrative description of the preferred alternative that includes RAs for the media and areas.

8.2.3 Recommended Alternative for Mine Waste, Overburden, and Terrestrial Soil

Narrative description of the preferred alternative that includes RAs for the media and areas.

8.2.4 Recommended Alternative for Groundwater and Acidic Discharge

Narrative description of the preferred alternative that includes RAs for the media and areas.

8.2.5 Recommended Alternative for Surface Water, Stormwater, and Snowmelt

Narrative description of the preferred alternative that includes RAs for the media and areas.

8.2.6 Recommended Alternative for Stream Sediment and Floodplain Soil

Narrative description of the preferred alternative that includes RAs for the media and areas.

9.0 REFERENCES

TABLES

Commented [A30]: 30. In ARC TOC this section is not broken up into subsections by media

To Be Determined

FIGURES

To Be Determined

APPENDICES

A – ARAR AND TBC IDENTIFICATION
B – RISK-BASED CLEANUP GOALS DEVELOPMENT
C - REMEDIAL ALTERNATIVE COST ESTIMATES
D- AQUATIC MACROINVERTEBRATE BIOASSESSMENT

Appendix C: Latest Master list of Documents.

RI/FS DOCUMENT / MEETING SUMMARY
Updated through December 16, 2016
Leviathan Mine Site
Alpine County, California

Date	Date Submitted by Atlantic Richfield	Date Submitted by EPA	EPA Requested Due Date	Atlantic Richfield Estimated Timeframe for Submittal	Work Plan / Document	Amendment / Addendum / Revision No.	Author	Recipient	Item	Atlantic Richfield Status	US EPA Status	US EPA Comment	Atlantic Richfield Comment
Administrative Order													
06/23/08					UAO	NA	US EPA	Atlantic Richfield	Administrative Order for RI/FS, Leviathan Mine, Alpine County, California, US EPA Region IX, CERCLA Docket No. 2008-18	Received			
Data Quality Objectives													
08/14/15	08/14/14		08/10/15		On-Property / Off-Property / Reference	NA	Atlantic Richfield	US EPA	Response to US EPA and LRWQCB Comments on the Revised Data Quality Objectives for the On-Property and Reference Study Areas and Updated Cross-Reference Matrix Table	Submitted			
07/10/15					On-Property / Off-Property / Reference	NA	US EPA	Atlantic Richfield	EPA Comments on Revised Data Quality Objectives for the On-Property and Reference Study Areas and Updated Cross-Reference Matrix Table	Received			Also requested response to US EPA's 12/26/12 and 11/14/14 letters.
02/28/15					On-Property / Off-Property / Reference	NA	Atlantic Richfield	US EPA	Revised Data Quality Objectives for the On-Property and Reference Area Study Areas and Updated Cross-Reference Matrix Table	Submitted			Response to US EPA 11/14/2014 comments
02/28/15					Reference	NA	Atlantic Richfield	US EPA	Revised Reference Area DQOs	Submitted			Submitted with Draft Final Reference Area FRI Work Plan
11/14/14					On-Property / Off-Property / Reference	NA	US EPA	Atlantic Richfield	Comments on Technical Memorandum: Current Data Quality Objectives and Leviathan Mine FRI Work Plan Cross Reference Matrix	Received			
09/05/14					On-Property / Off-Property / Reference	NA	Atlantic Richfield	US EPA	Technical Memorandum: Compilation of Data Quality Objectives and Cross Reference Matrix	Submitted			
06/28/13					Off-Property	NA	Atlantic Richfield	US EPA	Revised Off-Property DQOs	Submitted			Submitted with Revised Off-Property FRI Work Plan Addendum No. 2
12/26/12					Off-Property	NA	US EPA	Atlantic Richfield	Review and Comments on Draft DQOs Submittal dated November 19, 2012, Direction to Prepare and Submit Revised Off-Property FRI Work Plan	Received			
11/19/12					Off-Property / Reference	NA	Atlantic Richfield	US EPA	Revised DQO Summary Tables for On-Property and Reference Study Areas	Submitted			
09/05/12						NA	Atlantic Richfield	US EPA	Technical Workshop - DQOs	Conducted			September 5 and 6, 2012
05/13/10					DQO Report	NA	US EPA	Atlantic Richfield	Programmatic DQOs (transmitted with 5/13/10 approval of PWP)	Received			
04/23/09					DQO Report	NA	US EPA	Atlantic Richfield	Approval with Comments for Leviathan Mine DQOs Report Submitted October 2008, and Direction to Prepare RI/FS Work Plan Pursuant to Administrative Order for RI/FS	Received			
10/21/08					DQO Report	NA	Atlantic Richfield	US EPA	Draft Data Quality Objectives Report: RI/FS	Submitted			
Program Work Plan													
11/21/16		11/21/16			Program	QAPP	US EPA	Atlantic Richfield	EPA Comments on Atlantic Richfield Company (ARC) Final Revised RI/FS Quality Assurance Project Plan (QAPP), Revision 1 for the Leviathan Mine Site in Alpine County, California, dated June 17, 2016, Updated Project Database dated June 30, 2016, and the DQOs response from ARC dated August 14, 2015	Received; RTC and revised document in progress			EPA conditionally approved the QAPP dated June 17, 2016, provided EPA comments are addressed. A few of the comments remain unaddressed as outlined above. EPA's conditional approval remains in place. Within 60 days, or by January 21, 2017, EPA directs ARC to provide a line-by-line response to these comments and submit a revised Final Updated Quality Assurance Project Plan (QAPP) and Data Management Plan that incorporates the Database, the DQOs and the Conceptual Site Model incorporating these changes.
11/01/16	11/01/16				Program	QAPP	Atlantic Richfield	US EPA	Response to EPA comments on PE Samples	Submitted			Email; discussed with US. EPA via telephone on 11/8/16
10/24/16		10/24/16			Program	QAPP	US EPA	Atlantic Richfield	EPA comments on PE Samples	Received			Email
06/17/16	06/17/16		05/27/16		Program	QAPP	Atlantic Richfield	US EPA	Remedial Investigation/Feasibility Study Quality Assurance Project Plan, Revision No. 1 [Final]	Submitted	US EPA comments delivered 11/21/16		Includes line-by-line response to 04/28/16 comments. Includes complete set of DQOs as of submittal date.

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RI/FS DOCUMENT / MEETING SUMMARY
Updated through December 16, 2016
Leviathan Mine Site
Alpine County, California

Date	Date Submitted by Atlantic Richfield	Date Submitted by EPA	EPA Requested Due Date	Atlantic Richfield Estimated Timeframe for Submittal	Work Plan / Document	Amendment / Addendum / Revision No.	Author	Recipient	Item	Atlantic Richfield Status	US EPA Status	US EPA Comment	Atlantic Richfield Comment
04/28/16		04/28/16			Program	QAPP	US EPA	Atlantic Richfield	EPA Comments on Atlantic Richfield RI/FS Quality Assurance Project Plan (QAPP), Revision No. 1 for the Leviathan Mine Site in Alpine County, California, dated March 9, 2016	Received			Conditional approval of RI/FS Quality Assurance Project Plan, Revision No. 1. Within 30 days, requests line by line RTC and revised Final Updated Quality Assurance Project Plan and Data Management Plan along with updated schedule that incorporates the data usability process US EPA has outlined.
03/09/16	03/09/16		03/09/16		Program	QAPP	Atlantic Richfield	US EPA	RI/FS Quality Assurance Project Plan, Revision No. 1	Submitted			Includes line-by-line response to 02/09/16 comments.
02/09/16		02/09/16			Program	QAPP	US EPA	Atlantic Richfield	EPA Comments on Atlantic Richfield RI/FS Quality Assurance Project Plan (QAPP), Revision 1 for the Leviathan Mine Site in Alpine County, California	Received			
02/05/16	02/05/16				Program	QAPP	Atlantic Richfield	US EPA	Draft Annotated Revised QAPP TOC and Crosswalk	Submitted			Email; attached files are dated 01/27/16
01/14/16		01/14/16			Program	QAPP	US EPA	Atlantic Richfield	EPA initial comments on the QAPP and Data Quality Discussions	Received			Email
12/14/15	12/14/15				Program	QAPP	Atlantic Richfield	US EPA	Quality Assurance Project Plan, Revision 1	Submitted	US EPA preliminary comments delivered 01/14/15		Requested by US EPA in 04/01/15 technical meeting to discuss data usability.
05/13/10					Program	PWP	US EPA	Atlantic Richfield	Approval with Comments and Direction to Implement 2009 Draft Program Work Plan and Addendum for RI/FS	Received			
02/26/10					Program	PWP	US EPA	Atlantic Richfield	Schedule for US EPA Comments on 2009 Draft Program Work Plan and Addendum for RI/FS	Received			
11/16/09					Program	Addendum 1	Atlantic Richfield	US EPA	Addendum No. 1 to 2009 Draft Program Work Plan for RI/FS	Submitted			
07/10/09					Program	PWP	Atlantic Richfield	US EPA	Draft RI/FS Program Work Plan	Submitted			
On-Property Work Plan (includes Off-Property Surface Water Monitoring and Off-Property and Reference Plant and Fish Sampling)													
8/24/2016		8/24/2016			On-Property, Off-Property, and Reference	Fish TSAP	Atlantic Richfield	US EPA	Email FW: NED OK WITH THIS?EPA Conditional Approval on the Fish Sampling TSAP	Submitted			Concurs with ARC's proposed sampling (8/23/19 email), but notes that timing of sampling intended to ensure comparable results with previous event in October because fish feeding behaviours change with season.
8/23/2016	8/23/2016				On-Property, Off-Property, and Reference	Fish TSAP	Atlantic Richfield	US EPA	Email RE: EPA Conditional Approval on the Fish Sampling TSAP	Submitted			Responds to US EPA comments on sampling schedule. Response to reporting schedule submitted in a separate letter on 9/9/16.
08/12/16		08/12/16			On-Property, Off-Property, and Reference	Fish TSAP	US EPA	Atlantic Richfield	EPA Comments ARC Response to Comments (RTC) of Draft On-Property, Off-Property Area, and Reference Area FRI Work Plans - Task Sampling and Analysis Plan for Fish Investigation (Draft Final), Leviathan Mine Site, Alpine County, California. Leviathan Mine Site, Alpine County, California, Dated June 13, 2016 [sic]	Received			Conditional approval provided comments are addressed and incorporated as described. Indicates work outlined in TSAP should be completed during the 2016 field season. Requests that sampling be conducted in late September. Requests timely notification of anticipated completion of work. Requests written report within 90 days of completion of field work.
06/13/16	06/13/16		06/13/16		On-Property, Off-Property, and Reference	Fish TSAP	Atlantic Richfield	US EPA	On-Property, Off-Property Area, and Reference Area FRI Work Plans - Task Sampling and Analysis Plan for Fish Investigations [Draft Final]	Submitted	US EPA comments delivered 08/12/16		Before proceeding with specimen collection, Atlantic Richfield Company is requesting (in Appendix D, Section 4.0) that the U.S. EPA provide written confirmation that the work described in this TSAP is exempt from state and federal permit requirements under CERCLA § 121(e) and that no further consultation with the U.S. Fish and Wildlife Service is required under the Endangered Species Act.
05/13/16		05/13/16			On-Property, Off-Property, and Reference	Fish TSAP	US EPA	Atlantic Richfield	EPA comments on Draft On-Property, Off-Property, and Reference Area Focused Remedial Investigation Work Plans—Task Sampling and Analysis Plan for Fish Investigation, Leviathan Mine Site, Alpine County, California, dated February 5, 2016	Received			Requests line-by-line RTC and revised and updated SAP within 30 days.
02/05/16	02/05/16		11/13/15 01/29/16	01/29/16 per 11/13/16 extension request; 02/05/16 per 1/27/16 email	On-Property, Off-Property, and Reference	Fish TSAP	Atlantic Richfield	US EPA	On-Property, Off-Property, and Reference Area FRI Work Plans - Task Sampling and Analysis Plan for Fish Surveys and Sampling [Draft]	Submitted	US EPA comments delivered 05/13/16		11/13/16 letter to request extention to 01/29/16. 01/27/16 email to inform need additional week to 02/05/16.

Date	Date Submitted by Atlantic Richfield	Date Submitted by EPA	EPA Requested Due Date	Atlantic Richfield Estimated Timeframe for Submittal	Work Plan / Document	Amendment / Addendum / Revision No.	Author	Recipient	Item	Atlantic Richfield Status	US EPA Status	US EPA Comment	Atlantic Richfield Comment
12/08/15		12/08/15			On-Property, Off-Property, and Reference	Fish TSAP	Atlantic Richfield	US EPA	US EPA Response to Request for Schedule Extension for Fish Sampling Work Plan On-Property, Off-Property, and Reference Area Focused Remedial Investigation Work Plans	Received; responded via email on 12/10/15			US EPA indicates not opposed as long as does not impact RI/FS schedule and its RI and Risk Assessment. Atlantic Richfield responsed via email on 12/10/15 explaining rationale for timing of field activities and submittal date for work plan. Further discussed during 12/10/15 quarterly technical meeting.
11/13/15	11/13/15				On-Property, Off-Property, and Reference	Fish TSAP	Atlantic Richfield	US EPA	Request for Schedule Extension for Fish Sampling Work Plan On-Property, Off-Property, and Reference Area Focused Remedial Investigation Work Plans	Submitted	US EPA comments delivered 12/08/15		Requests extension to 1/29/16; need additional time to review and evaluate previous investigation results.
10/13/15		10/13/15	11/13/15	Requested extension to 01/29/16	On-Property, Off-Property, and Reference	Fish TSAP	US EPA	Atlantic Richfield	Request for Fish Sampling Work Plan On-Property, Off-Property, and Reference Area Focused Remedial Investigation Work Plans	Received			Requested in US EPA's 10/13/15 letter transmitting comments on the Final BHHRA Work Plan.
09/09/16	09/09/16				On-Property, Off-Property, and Reference	Plant/Soil TSAP	Atlantic Richfield	US EPA	Supplement Plant Data Collection	Submitted			Informed US EPA of additional plant data collection (mass and total/inorganic arsenic for three leafy greens) to be performed in late 2016.
04/08/16	04/08/16		04/09/16		On-Property, Off-Property, and Reference	Plant/Soil TSAP	Atlantic Richfield	US EPA	On-Property, Off-Property Area, and Reference Area FRI Work Plans – Plant and Habitat-Related Soil Investigations (Final)	Submitted	Pending US EPA review		Submitted with line-by-line response to 03/09/16 comments.
03/09/16		03/09/16			On-Property, Off-Property, and Reference	Plant/Soil TSAP	US EPA	Atlantic Richfield	EPA comments on the Progress Report and Response to Comments on the Draft Final On-Property, Off Property and Reference Area Focused Remedial Investigation (FRI) Work Plan – Plant and Habitat-Related Soil Investigations; Leviathan Mine Site, Alpine County, California; dated November 16, 2015	Received			Requests line-by-line RTC and revised and updated SAP by April 9, 2016. Directs works to proceed and be completed within 2016 field sampling season.
11/16/15	11/16/15		11/16/15		On-Property, Off-Property, and Reference	Plant/Soil TSAP	Atlantic Richfield	US EPA	Progress Report and Response to Comments on the Draft Final On-Property, Off Property and Reference Area Focused Remedial Investigation Work Plan – Plant and Habitat-Related Soil Investigations	Submitted			
10/16/15		10/16/15	RTC by 11/16/15		On-Property, Off-Property, and Reference	Plant/Soil TSAP	US EPA	Atlantic Richfield	EPA Comments on the June 19, 2015 Draft Final On-Property, Off-Property and Reference Area FRI Work Plan - Plant and Habitat-Related Soil Investigations	Received			RTC and associated revisions are accepted. Defers to the approved work plan and previous EPA comments and provides additional comment; makes several requests.
06/19/15	06/19/15				On-Property, Off-Property, and Reference	Plant/Soil TSAP	Atlantic Richfield	US EPA	Draft Final On-Property, Off-Property Area, and Reference Area FRI Work Plans – Plant and Habitat-Related Soil Investigations	Submitted			
06/02/15					On-Property, Off-Property, and Reference	Plant/Soil TSAP	Atlantic Richfield	US Forest Service	Notification of Plant Collection Activities Within the Humboldt-Toiyabe National Forest	Submitted			
05/18/15				US EPA requests written response within 30 days or by 6/19/15	On-Property & Off-Property	Plant/Soil TSAP	US EPA	Atlantic Richfield	EPA Comments on two separate submittals: the March 20, 2015 Technical Memorandum; Habitat Surveys, Plant Species, and Study Design for Plant Sampling; and the April 7, 2015 On Property FRI Work Plan and Off Property Area FRI Work Plan Plant and Habitat-Related Soil Investigations	Received			
04/07/15					On-Property & Off-Property	Plant/Soil TSAP	Atlantic Richfield	US EPA	On-Property FRI Work Plan and Off-Property Area FRI Work Plan - Plant and Habitat-Related Soil Investigations	Submitted			
02/08/16		02/08/16			On-Property	Optimization	US EPA	Atlantic Richfield	EPA comments on the Altantic Richfield Response to US EPA September 11, 2015 Comments on Optimization of Select On-Property Monitoring, dated October 12, 2015	Received			Concurrence
10/12/15	10/12/15		10/12/15		On-Property	Optimization	Atlantic Richfield	US EPA	Response to U.S. EPA September 11, 2015 Comments on Optimization of Select Monitoring Programs	Submitted			
09/11/15		09/11/15	RTC by 10/12/15		On-Property	Optimization	US EPA	Atlantic Richfield	EPA comments on the Atlantic Richfield Response to U.S. EPA Comments on Optimization of Select On-Property Monitoring, dated April 24, 2015	Received			
04/24/15					On-Property	Optimization	Atlantic Richfield	US EPA	Response to U.S. EPA Comments on Optimization of Select On-Property Monitoring Programs	Submitted			
03/26/15					On-Property	Optimization	US EPA	Atlantic Richfield	EPA comments on Proposed Optimization of Select On-Property Monitoring Programs, letter dated February 4, 2015	Received			
02/04/15					On-Property	Optimization	Atlantic Richfield	US EPA	Optimization of Select On-Property Monitoring Programs [in 2014]	Submitted			
06/17/14					On-Property	Optimization	Atlantic Richfield	US EPA	Technical Meeting: Optimization of Monitoring Programs and 2014 Field Priorities	Conducted			

Date	Date Submitted by Atlantic Richfield	Date Submitted by EPA	EPA Requested Due Date	Atlantic Richfield Estimated Timeframe for Submittal	Work Plan / Document	Amendment / Addendum / Revision No.	Author	Recipient	Item	Atlantic Richfield Status	US EPA Status	US EPA Comment	Atlantic Richfield Comment
10/13/15					On-Property	Drilling	Atlantic Richfield	US EPA	RE: EPA Comments to ARC request for US EPA to reconsider Letter of August 14, 2015 Requesting Continuation of RI/FS Drilling Program in 2015	Received			E-mail response to 10/06/15 letter: concurs that should proceed with both reference boreholes and complete LOC-34 as weather permits and drilling equipment is available.
10/06/15					On-Property	Drilling	Atlantic Richfield	US EPA	Response to US EPA Email Correspondence of September 28, 2015 Regarding Rationale for Proposed 2015 Modifications to RI/FS Drilling Program	Submitted			US EPA responded by e-mail on 10/13/15.
09/28/15					On-Property	Drilling	US EPA	Atlantic Richfield	EPA Comments to ARC Request for U.S. EPA to Reconsider Letter of August 14, 2015 Requesting Continuation of RI/FS Drilling Program in 2015	Received			E-mail
09/18/15					On-Property	Drilling	Atlantic Richfield	US EPA	Response to US EPA Letter of August 14, 2015 Regarding Rationale for Proposed 2015 Modifications to RI/FS Drilling Program	Submitted			E-mail
09/08/15					On-Property	Drilling	US EPA	Atlantic Richfield	EPA response to Atlantic Richfield's 8/28/15 email responding to Response to US EPA comments on Rationale for Proposed 2015 Modifications to RI/FS Drilling Program	Received			E-mail
08/28/15			08/28/15		On-Property	Drilling	Atlantic Richfield	U.S. EPA	Response to US EPA comments on Rationale for Proposed 2015 Modifications to RI/FS Drilling Program	Submitted			E-mail
08/14/15					On-Property	Drilling	US EPA	Atlantic Richfield	EPA Comments on Rationale for Proposed Modifications to RI/FS Drilling Program	Received			
06/26/15					On-Property	Drilling	Atlantic Richfield	US EPA	Rationale for Proposed 2015 Modifications to RI/FS Drilling Program	Submitted			
06/12/15					On-Property	Drilling	US EPA	Atlantic Richfield	Leviathan Mine - Drilling Program - EPA comments and request for additional information (email)	Received			E-mail
06/09/15					On-Property	Drilling	Atlantic Richfield	US EPA	Leviathan Mine - Drilling Program (email)	Submitted			Transmits table and figure showing proposed drilling locations for 2015. E-mail
12/18/14					On-Property	Drilling	Atlantic Richfield	US EPA	2014 Drilling Postponement Rationale	Submitted	No pending action. ARC requested response to June 17, 2014 discussion and December 18, 2014 from ARC	This ongoing discussion culminated in an August 14, 2015 email from Lynda to Tony agreeing that Pit wells are not currently needed and requesting that ARC go forward with two wells along the fault north of the Pit that ARC had requested to remove from the drilling program.	
08/01/13					On-Property	Drilling	Atlantic Richfield	US EPA	Technical Meeting: 2013 RI/FS Drilling Program	Conducted			
06/01/16	08/01/16		05/28/16		On-Property	Amendment 12	Atlantic Richfield	US EPA	On-Property FRI Work Plan Amendment No. 12 - TSAP for Hydrocarbon Investigation (Draft Final)	Submitted	Pending US EPA review		Submitted with line-by-line response to 04/29/16 comments.
04/29/16		04/29/16			On-Property	Amendment 12	US EPA	Atlantic Richfield	EPA Comments on Atlantic Richfield Draft On-Property Focused Remedial Investigation Work Plan Amendment No. 12 – Task Sampling and Analysis Plan for Hydrocarbon Investigation, Leviathan Mine Site, Alpine County, California; dated February 26, 2016	Received			Requests line-by-line RTC and revised SAP by 05/28/16. Directs works to proceed and be completed within 2016 field sampling season.
02/26/16	02/26/16		01/30/16		On-Property	Amendment 12	Atlantic Richfield	US EPA	On-Property FRI Work Plan Amendment No. 12 - TSAP for Hydrocarbon Investigation	Submitted			Atlantic Richfield agreed to prepare work plan during a 10/14/14 telephone call.
06/14/16		06/14/16			On-Property	Amendment 11	US EPA	Atlantic Richfield	Email FW: EPA Approval Amendment No. 11 Acid Ponding Near Leviathan Creek TSAP	Received; need to provide DPZ information			Requests information on the four drive-point piezometers that US EPA requested to be installed along the west bank of Leviathan Creek. No due date provided.
05/06/16	05/06/16		Not requested		On-Property	Amendment 11	Atlantic Richfield	US EPA	On-Property FRI Work Plan Amendment No. 11 - TSAP for Surface Water/Groundwater Interaction Investigation near Acidic Pond and Leviathan Creek [Final]	Submitted			No revision requested; however, submitted as final to include additional requested drive-point piezometer pairs and make correction regarding installation of data loggers/transducers.
02/26/16		02/26/16			On-Property	Amendment 11	US EPA	Atlantic Richfield	Draft Final Amendment No. 11 - TSAP for Investigation of Ponding Near Leviathan Creek, Leviathan Mine Site, Alpine, County, California, dated February 22, 2015 [sic]	Received			Approves Atlantic Richfield to proceed with the work as outlined and directs installation of drive-point piezometers pairs at four more locations.
02/22/16	02/22/16				On-Property	Amendment 11	Atlantic Richfield	US EPA	On-Property FRI Work Plan Amendment No. 11 - TSAP for Surface Water/Groundwater Interaction Investigation near Acidic Pond and Leviathan Creek [Draft Final]	Submitted			Submitted with line-by-line RTC to 01/22/16 comments.
01/22/16		01/22/16			On-Property	Amendment 11	US EPA	Atlantic Richfield	EPA Comments on Amendment No. 11 - TSAP for Investigation of Ponding Near Leviathan Creek, Leviathan Mine Site, Alpine County, California, dated September 20, 2015	Received			US EPA requests line-by-line response to comments and revised TSAP by 02/19/16.
09/20/15	09/20/15				On-Property	Amendment 11	Atlantic Richfield	US EPA	On-Property FRI Work Plan Amendment No. 11 - TSAP for Investigation of Ponding Near Levaithan Creek	Submitted	Comments delivered 01/22/16		

Date	Date Submitted by Atlantic Richfield	Date Submitted by EPA	EPA Requested Due Date	Atlantic Richfield Estimated Timeframe for Submittal	Work Plan / Document	Amendment / Addendum / Revision No.	Author	Recipient	Item	Atlantic Richfield Status	US EPA Status	US EPA Comment	Atlantic Richfield Comment
05/18/16		05/18/16			On-Property	Amendment 10	US EPA	Atlantic Richfield	EPA Approval of Atlantic Richfield's [sic] Company's On-Property FRI Work Plan Amendment No. 10, Revision 3 Final, dated September 30, 2015	Received			Approves the Revision 3 workplan with additional comments. Atlantic Richfield to provide an updated schedule and any final workplan modifications for the 2016 field season based the preliminary evaluation of stream sediment and floodplain soil sampling results. Indicates comments on the 04/15/16 submission will be provided under separate cover.
12/21/15		12/21/15			On-Property	Amendment 10	US EPA	Atlantic Richfield & Others	2015/2016 El Niño Contingency Plan [Final]	Received			
12/02/15	12/02/15				On-Property	Amendment 10	Atlantic Richfield	US EPA	Suggested edits to Final Draft El Niño Contingency Plan	Submitted			Discussed during 12/10/15 quarterly technical meeting; Greg Reiter and Bob Starr discussed criteria for changes in water quality after the meeting.
11/30/15		11/30/15			On-Property	Amendment 10	US EPA	Atlantic Richfield & Others	El Niño Contingency Plan [Final Draft]	Received			
11/23/15	11/23/15		11/23/15		On-Property	Amendment 10	Atlantic Richfield	US EPA	Response to US EPA comments on El Niño Contingency Plan provided by email on 11/23/15	Submitted	Comments delivered via email on 11/30/15		
11/17/15	11/17/15				On-Property	Amendment 10	Atlantic Richfield	US EPA	Comments on U.S. EPA's El Niño Contingency Plan	Submitted	Responded via email on 11/23/15		
10/20/15					On-Property	Amendment 10	US EPA	Atlantic Richfield	EPA Comments on Field Memorandum for Phase 2 Characterization of Beaver Dam Mud, On-Property Reach of Leviathan Creek, Dated October 13, 2015	Received			Approved; directs ARC to ensure sampling completed during 2015 season
10/19/15					On-Property	Amendment 10	Atlantic Richfield	US EPA	Winter Monitoring Plan for Beaver Dam/Pond Complex in the On-Property Reach of Leviathan Creek	Submitted			
10/13/15					On-Property	Amendment 10	Atlantic Richfield	US EPA	Field Memorandum for Phase 2 Characterization of Beaver Dam Mud, On-Property Reach of Leviathan Creek	Submitted			
09/30/15	09/30/15				On-Property	Amendment 10	Atlantic Richfield	US EPA	Amendment No. 10 Revision 3 Final	Submitted			Submitted with Response to U.S. EPA and LRWQCB Comments to On-Property Focused RI/FS Amendment No. 10 Revision 2 Final - Stream Sediment and Floodplain Soil Characterization in BD/PC Complex in On-Property Reach of Leviathan Creek
09/29/15					On-Property	Amendment 10	US EPA	Atlantic Richfield	Review of Atlantic Richfield Response to U.S. EPA Comments to Amendment 10, Revision 2	Received			E-mail
09/28/15					On-Property	Amendment 10	Atlantic Richfield	US EPA	Response to U.S. EPA and LRWQCB Comments to On-Property Focused RI/FS Amendment No. 10 Revision 2 Final - Stream Sediment and Floodplain Soil Characterization in BD/PC Complex in On-Property Reach of Leviathan Creek and Transmittal of Amendment No. 10 Revision 3 Final	Submitted			Transmitted only the RTC, but not the revised document. Full package submitted 09/30/15.
09/24/15					On-Property	Amendment 10	US EPA	Atlantic Richfield	EPA comments on the Atlantic Richfield Partial Response to EPA comments on Amendment 10 Revision 2 final dated September 23, 2015	Received			
09/23/15					On-Property	Amendment 10	Atlantic Richfield	US EPA	Partial Response to U.S. EPA Comments to On-Property Focused Remedial Investigation Work Plan Amendment No. 2, Revision 2 Final - Stream Sediment and Floodplain Soil Characterization in Beaver Dam/Pond Complex in On-Property Reach of Leviathan Creek	Submitted			
09/11/15					On-Property	Amendment 10	US EPA	Atlantic Richfield	EPA comments on Atlantic Richfield's [sic] Company's (ARC) Response to U.S. EPA's Comments to On-Property Focused Remedial Investigation Work Plan Amendment No. 10, Revision 2 - Stream Sediment and Floodplain Soil Characterization in Beaver Dam/Pond Complex in On-Property Reach of Leviathan Creek and Transmittal of Final Amendment No. 10 - Revision 2, Leviathan Mine Site, Alpine County, California dated August 14, 2015, and the Beaver Dam Pond and Debris Calculations, dated August 28, 2015	Received			US EPA notes that submittal of a complete and final revision should not delay the field work as approved the 9/4/15 letter. On 9/16/15 via email, requested in advance of 9/23/15 field visit.
09/03/15					On-Property	Amendment 10	US EPA	Atlantic Richfield	EPA Direction to Continue with Implementation of Amendment 10 and Exhibit D	Received			Letter dated 9/3/15, but file name dated 9/4/15 and sent on 9/4/15.
09/02/15					On-Property	Amendment 10	Atlantic Richfield	US EPA	Communication Plan	Submitted			

Date	Date Submitted by Atlantic Richfield	Date Submitted by EPA	EPA Requested Due Date	Atlantic Richfield Estimated Timeframe for Submittal	Work Plan / Document	Amendment / Addendum / Revision No.	Author	Recipient	Item	Atlantic Richfield Status	US EPA Status	US EPA Comment	Atlantic Richfield Comment
08/14/15					On-Property	Amendment 10	Atlantic Richfield	US EPA	On-Property FRI Work Plan Amendment No. 10 Revision 2 Final - Stream Sediment and Floodplain Soil Characterization in Beaver Dam/Pond Complex in On-Property Reach of Leviathan Creek	Submitted			Revised document
08/14/15					On-Property	Amendment 10	Atlantic Richfield	US EPA	Response to US EPA and LRWQCB Comments to On-Property Focused Remedial Investigation Work Plan Amendment No. 10, Revision 2 - Stream Sediment and Floodplain Soil Characterization in Beaver Dam/Pond Complex in On-Property Reach of Leviathan Creek and Transmittal of Final Amendment No. 10 - Revision 2	Submitted			RTC and transmittal letter that accompanied the revised document
07/10/15					On-Property	Amendment 10	US EPA	Atlantic Richfield	EPA Comments on Sampling Floodplain Soils and the Draft Final On-Property Focused Remedial Investigation Work Plan Amendment No. 10, Revision 2 - Stream Sediment and Floodplain Soil Characterization in Beaver Dam/Pond Complex in On-Property Reach of Leviathan Creek, Leviathan Mine Site, Alpine County, California, dated June 19, 2015.	Received			
06/19/15					On-Property	Amendment 10	Atlantic Richfield	US EPA	On-Property FRI Work Plan Amendment No. 10, Revision 2 – Stream Sediment and Floodplain Soil Characterization in Beaver Dam/Pond Complex in On-Property Reach of Leviathan Creek: Transmittal of Response to Review Comments and Transmittal of Draft Final Amendment No. 10 - Revision 2	Submitted			
05/19/15					On-Property	Amendment 10	US EPA	Atlantic Richfield	EPA Comments on two separate submittals: The April 10, 2015, Exhibit D to On-Property FRI Work Plan Amendment No. 10 Revision 2 AND The April 24, 2015, Response to US EPA and LRWQCB Comments On-Property FRI Work Plan Amendment No. 10, Revision 2	Received			
04/24/15					On-Property	Amendment 10	Atlantic Richfield	US EPA	Response to U.S. EPA and LRWQCB Comments, On-Property FRI Work Plan Amendment No. 10 Revision No. 2 – Stream Sediment and Floodplain Soil Characterization in Beaver Dam/Pond Complex in On-Property Reach of Leviathan Creek	Submitted			
04/10/15					On-Property	Amendment 10	Atlantic Richfield	US EPA	On-Property FRI Work Plan Amendment No. 10 Revision No. 2 – Stream Sediment and Floodplain Soil Characterization in Beaver Dam/Pond Complex in On-Property Reach of Leviathan Creek – Attachment D – Access Approach to Support Remedial Investigation Activities Within Leviathan Creek	Submitted			
04/03/15					On-Property	Amendment 10	US EPA	Atlantic Richfield	EPA comments on Atlantic Richfield's Response to Comments on the On-Property Amendment No. 10 Revision No. 2, dated March 19, 2015	Received			
03/20/15					On-Property	Amendment 10	Atlantic Richfield	US EPA	Response to U.S. EPA and LRWQCB Comments and Submittal of On-Property FRI Work Plan Amendment No. 10 Revision No. 2 – Stream Sediment and Floodplain Soil Characterization in Beaver Dam/Pond Complex in On-Property Reach of Leviathan Creek	Submitted			
02/20/15					On-Property	Amendment 10	US EPA	Atlantic Richfield	EPA comments on Atlantic Richfield November 7, 2014 Response to EPA September 30, 2014 comments on the On-Property FRI Work Plan Amendment No. 10 Stream Sediment and Floodplain Soil Characterization in Beaver Dam and Pond Complex in the On-Property Reach of Leviathan Creek, Leviathan Mine Site, Alpine County California (work plan).	Received			Conditional approval
11/07/14					On-Property	Amendment 10	Atlantic Richfield	US EPA	Revised On-Property FRI Work Plan Amendment No. 10 - Stream Sediment and Floodplain Soil Characterization in Beaver Dam/Pond Complex in On-Property Reach of Leviathan Creek	Submitted			
10/17/14					On-Property	Amendment 10	US EPA	Atlantic Richfield	Comments on On-Property FRI Work Plan Amendment No. 10 - Stream Sediment and Floodplain Soil Characterization in Beaver Dam/Pond Complex in On-Property Reach of Leviathan Creek	Received			
10/07/14					On-Property	Amendment 10	Atlantic Richfield	US EPA	Revised On-Property FRI Work Plan Amendment No. 10 - Stream Sediment and Floodplain Soil Characterization in Beaver Dam/Pond Complex in On-Property Reach of Leviathan Creek	Submitted			

Date	Date Submitted by Atlantic Richfield	Date Submitted by EPA	EPA Requested Due Date	Atlantic Richfield Estimated Timeframe for Submittal	Work Plan / Document	Amendment / Addendum / Revision No.	Author	Recipient	Item	Atlantic Richfield Status	US EPA Status	US EPA Comment	Atlantic Richfield Comment
09/30/14					On-Property	Amendment 10	Atlantic Richfield	US EPA	On-Property FRI Work Plan Amendment 10 - Stream Sediment and Floodplain Soil Characterization in Beaver Dam and Pond Complex in the On-Property Reach of Leviathan Creek	Submitted			
04/16/15					On-Property	Amendment 9	US EPA	Atlantic Richfield	Concurrence on Revised On-Property FRI Work Plan Final Amendment No. 9 - Beaver Pond Surface Water Monitoring	Received			Email: Instructs Atlantic Richfield to incorporate information into other discussions as appropriate, the master site database, and into the Draft RI/FS due January 1, 2017.
01/30/15					On-Property	Amendment 9	Atlantic Richfield	US EPA	On-Property FRI Work Plan Final Amendment No. 9 - Beaver Pond Surface Water Monitoring	Submitted			
12/05/14					On-Property	Amendment 9	US EPA	Atlantic Richfield	Comments on On-Property FRI Work Plan Amendment No. 9 - Beaver Pond Surface Water Monitoring Program	Received			
09/30/14					On-Property	Amendment 9	Atlantic Richfield	US EPA	On-Property FRI Work Plan Amendment No. 9 - Beaver Pond Surface Water Monitoring	Submitted			
08/16/16	08/16/16				On-Property	Amendment 8	Atlantic Richfield	US EPA	Supplement to On-Property Focused Remedial Investigation Work Plan Amendment No. 8, Detailed Stream Sediment and Floodplain Soil Investigations	Submitted			Deeper floodplain sampled to be collected consistent with DSA and reference area investigations.
03/23/15					On-Property	Amendment 8	US EPA	Atlantic Richfield	EPA Approval: On-Property FRI Work Plan Amendment No. 8 – Detailed Stream Sediment and Floodplain Soil Investigations	Received			
03/13/15					On-Property	Amendment 8	Atlantic Richfield	US EPA	Response to U.S. EPA Comments and Submittal of Draft Final On-Property FRI Work Plan Amendment No. 8, Detailed Stream Sediment and Floodplain Soil Investigations	Submitted			
02/25/15					On-Property	Amendment 8	Atlantic Richfield	US EPA	Request for Extension for Response to Comments on the On-Property FRI Work Plan Amendment No. 8	Submitted			
01/28/15					On-Property	Amendment 8	US EPA	Atlantic Richfield	Comments on On-Property FRI Work Plan Amendment No. 8 - Detailed Stream Sediment and Floodplain Soil Investigations	Received			
10/02/14					On-Property	Amendment 8	Atlantic Richfield	US EPA	On-Property FRI Work Plan Amendment No. 8 - Detailed Stream Sediment and Floodplain Soil Investigations	Submitted			
06/26/13					On-Property	Amendment 7	US EPA	Atlantic Richfield	Approval of On-Property FRI Work Plan Amendment No. 7 - Sediment Quality Triad Sampling in Aspen and Leviathan Creeks	Received			
06/14/13					On-Property	Amendment 7	Atlantic Richfield	US EPA	On-Property FRI Work Plan Amendment No. 7 - Sediment Quality Triad Sampling in Aspen and Leviathan Creeks	Submitted			
05/01/15	05/01/15		05/01/15		On-Property	Amendment 6 / Revision 1	Atlantic Richfield	US EPA	Response to U.S. EPA Comments on the November 28, 2014 On-Property FRI Work Plan Amendment No. 6, Revision No. 1 – Final Task Sampling and Analysis Plan for Phase 2 Mine Waste Characterization	Submitted			U.S. EPA responded to this submittal on December 16, 2015, see below in RI/FS Reporting (Mine Waste).
04/03/15					On-Property	Amendment 6 / Revision 1	US EPA	Atlantic Richfield	EPA comments on the November 28, 2014 On Property FRI Work Plan Amendment No. 6, Revision 1 – Final Task Sampling and Analysis Plan for Phase 2 Mine Waste Characterization, Leviathan Mine Site, Alpine County, California	Received			Requests additional information including summary report and interpretation of mine waste characterization data.
11/28/14					On-Property	Amendment 6 / Revision 1	Atlantic Richfield	US EPA	Response to Comments and On-Property FRI Work Plan, Amendment No. 6, Revision No. 1, Final Task Sampling and Analysis Plan for Phase 2 Mine Waste Characterization	Submitted			
11/04/14					On-Property	Amendment 6 / Revision 1	US EPA	Atlantic Richfield	Comments on On-Property FRI Work Plan, Amendment No. 6, Revision No. 1, Task Sampling and Analysis Plan for Phase 2 Mine Waste Characterization	Received			
11/03/14					On-Property	Amendment 6 / Revision 1	US EPA	Atlantic Richfield	Comments on On-Property FRI Work Plan, Amendment No. 6, Revision No. 1, Task Sampling and Analysis Plan for Phase 2 Mine Waste Characterization	Received			
10/24/14					On-Property	Amendment 6 / Revision 1	Atlantic Richfield	US EPA	On-Property FRI Work Plan, Amendment No. 6, Revision No. 1, Task Sampling and Analysis Plan for Phase 2 Mine Waste Characterization	Submitted			
10/24/14					On-Property	Amendment 6 / Revision 1	US EPA	Atlantic Richfield	Preliminary comments on Compilation of Mine Waste Characterization Statistical Supporting Documentation	Received			
10/13/14					On-Property	Amendment 6 / Revision 1	Atlantic Richfield	US EPA	Compilation of Mine Waste Characterization Statistical Supporting Documentation	Submitted			
10/02/14					On-Property	Amendment 6 / Revision 1	Atlantic Richfield	US EPA	Technical Meeting: Mine Waste DUs and Final Sampling Plan	Conducted			

Date	Date Submitted by Atlantic Richfield	Date Submitted by EPA	EPA Requested Due Date	Atlantic Richfield Estimated Timeframe for Submittal	Work Plan / Document	Amendment / Addendum / Revision No.	Author	Recipient	Item	Atlantic Richfield Status	US EPA Status	US EPA Comment	Atlantic Richfield Comment
09/09/14					On-Property	Amendment 6 / Revision 1	Atlantic Richfield	US EPA	DU Meeting and Next Steps (email): On-Property Characterization of Mine Waste	Submitted			
08/20/14					On-Property	Amendment 6 / Revision 1	US EPA	Atlantic Richfield	Conditional Approval of On-Property FRI Work Plan Amendment No. 6, Revision 1 - Characterization of Mine Waste Using FPXRF Screening Survey	Received			Conditional approval
06/04/14					On-Property	Amendment 6 / Revision 1	Atlantic Richfield	US EPA	On-Property FRI Work Plan Amendment No. 6, Revision 1 - Characterization of Mine Waste Using FPXRF Screening Survey	Submitted			
02/10/14					On-Property	Amendment 6	Atlantic Richfield	US EPA	Technical Meeting - Waste Pile Characterization Strategy	Conducted			
09/05/13					On-Property	Amendment 6	US EPA	Atlantic Richfield	Approval of Extension Request Response to US EPA Comments on On-Property FRI Work Plan, Amendment No. 6, Characterization of Mine Waste Using FPXRF and ISM	Received			
08/29/13					On-Property	Amendment 6	Atlantic Richfield	US EPA	Webinar: Waste Pile Characterization Strategy	Conducted			
08/08/13					On-Property	Amendment 6	US EPA	Atlantic Richfield	Partial Approval and Comments of On-Property FRI Work Plan Amendment No. 6 - Characterization of Mine Waste Using FPXRF and ISM	Received			
06/07/13					On-Property	Amendment 6	Atlantic Richfield	US EPA	On-Property FRI Work Plan Amendment No. 6 - Characterization of Mine Waste Using FPXRF and ISM	Submitted			
07/23/13					On-Property	Amendment 5	US EPA	Atlantic Richfield	Approval of On-Property FRI Work Plan Amendment No. 5 - Channel Underdrain, Pond 4, and Aspen Seep Gaging Stations	Received			
06/07/13					On-Property	Amendment 5	Atlantic Richfield	US EPA	On-Property FRI Work Plan Amendment No. 5 - Channel Underdrain, Pond 4, and Aspen Seep Gaging Stations	Submitted			
10/19/12					On-Property	Amendment 4 / Revision 1	Atlantic Richfield	US EPA	On-Property FRI Work Plan Amendment No. 4 Revision 1 - Preliminary Investigation of Mine Waste Using X-Ray Fluorescence	Submitted			
09/26/12					On-Property	Amendment 4	US EPA	Atlantic Richfield	Approval On-Property FRI Work Plan Amendment No. 4 Preliminary Investigation of Mine Waste Using X-Ray Fluorescence	Received			
09/18/12					On-Property	Amendment 4	Atlantic Richfield	US EPA	On-Property FRI Work Plan Amendment No. 4 - Preliminary Investigation of Mine Waste Using X-Ray Fluorescence	Submitted			
11/14/12					On-Property	Amendment 3	US EPA	Atlantic Richfield	Approval of On-Property FRI Work Plan Amendment No. 3 - Storm Water Monitoring Stations Aspen Creek Study Area	Received			
10/05/12					On-Property	Amendment 3	Atlantic Richfield	US EPA	On-Property FRI Work Plan Amendment No. 3 - Storm Water Monitoring Stations Aspen Creek Study Area	Submitted			
09/10/12					On-Property	Amendment 2	US EPA	Atlantic Richfield	Approval of Additional Characterization of the Upper Tributary Area On-Property FRI Work Plan Amendment No. 2	Received			
08/03/12					On-Property	Amendment 2	Atlantic Richfield	US EPA	On-Property FRI Work Plan Amendment No. 2 - Additional Characterization of the Upper Tributary Area	Submitted			
04/25/12					On-Property	Amendment 1	US EPA	Atlantic Richfield	Approval of On-Property FRI Work Plan Amendment No. 1 - Amendments to 2012 Surface Water Monitoring Program	Received			
04/24/12					On-Property	Amendment 1	Atlantic Richfield	US EPA	On-Property FRI Work Plan Amendment No. 1 - Acid Drainage Source Monitoring -	Submitted			
05/18/16		05/18/16			On-Property / Off-Property	Surface Water	US EPA	Atlantic Richfield	EPA Approval of Atlantic Richfield's [sic] Company's Modifications to 2016 Surface Water Monitoring Program, Leviathan Mine Site, Alpine County, California [sic] dated May 6, 2015 [sic]	Received			Approves proposed modification. Indicates that US EPA is continuing review of the Surface Water TDSR and will provide comments under separate cover.
05/06/16	05/06/16				On-Property / Off-Property	Surface Water	Atlantic Richfield	US EPA	Modifications to 2016 Surface Water Monitoring Program	Submitted			Requested expedited approval of recommended changes.
06/19/15	06/19/15				On-Property / Off-Property	Surface Water	Atlantic Richfield	US EPA	Modifications to 2015 Surface Water Monitoring Program	Submitted			During 8/18/15 monthly call, US EPA requested updated information on the surface water monitoring that was performed. Atlantic Richfield provided update on 2015 activities during 12/10/15 Quarterly Meeting.
08/12/14					On-Property / Off-Property	Surface Water	US EPA	Atlantic Richfield	Concurrence on Clarification to Approval of Modifications to 2014 Surface Water Monitoring Program (e-mail)	Submitted			E-mail
08/11/14					On-Property / Off-Property	Surface Water	Atlantic Richfield	US EPA	Clarification to Approval of Modifications to 2014 Surface Water Monitoring Program (e-mail)	Submitted			E-mail
08/07/14					On-Property / Off-Property	Surface Water	Atlantic Richfield	US EPA	Technical Meeting: Surface Water Evaluation	Conducted			

Date	Date Submitted by Atlantic Richfield	Date Submitted by EPA	EPA Requested Due Date	Atlantic Richfield Estimated Timeframe for Submittal	Work Plan / Document	Amendment / Addendum / Revision No.	Author	Recipient	Item	Atlantic Richfield Status	US EPA Status	US EPA Comment	Atlantic Richfield Comment
07/28/14					On-Property / Off-Property	Surface Water	US EPA	Atlantic Richfield	Approval of Modifications to 2014 Surface Water Monitoring Program	Received			
06/25/14					On-Property	Surface Water	Atlantic Richfield	US EPA	Modifications to 2014 Surface Water Monitoring Program	Submitted			
04/22/13					On-Property / Off-Property	Surface Water	US EPA	Atlantic Richfield	Partial Approval of Request for Approval of Change in Surface Water Monitoring Program for On-Property and Off-Property FRIs	Received			
04/15/13					On-Property / Off-Property	Surface Water	Atlantic Richfield	US EPA	Request for Approval of Change in Surface Water Monitoring Program for On-Property and Off-Property FRIs	Submitted			
04/10/12					On-Property / Off-Property	Surface Water	US EPA	Atlantic Richfield	Approval of 2012 Surface Water Monitoring Program for Leviathan Mine	Received			
04/10/12					On-Property / Off-Property	Surface Water	Atlantic Richfield	US EPA	Request for Approval of 2012 Surface Water Monitoring Program, On-Property and Off-Property FRIs	Submitted			
12/23/11					Subsurface Barrier Treatability Study	Upper Tributary	Atlantic Richfield	US EPA	Development of a Treatability Study Work Plan to Examine the Feasibility of a Subsurface Barrier at the Upper Tributary	Submitted			
12/09/10					On-Property	NA	US EPA	Atlantic Richfield	Approval to Implement On-Property FRI Work Plan	Received			
08/11/10					On-Property	NA	Atlantic Richfield	US EPA	On-Property FRI Work Plan	Submitted			
10/01/09					On-Property	Mapping	US EPA	Atlantic Richfield	Comments, Approval and Direction to Implement 2009 Work Plan for FRI Mapping	Received			
06/19/09					On-Property	Mapping	Atlantic Richfield	US EPA	FRI Mapping Work Plan	Submitted			
10/01/09					On-Property	Groundwater	US EPA	Atlantic Richfield	Comments, Approval and Direction to Implement 2009 Work Plan for FRI Well Location, Rehabilitation and Groundwater Monitoring	Received			
06/19/09					On-Property	Groundwater	Atlantic Richfield	US EPA	FRI Well Location, Rehabilitation, and Groundwater Monitoring Work Plan	Submitted			
Off-Property Work Plan (includes River Ranch Reference Area and Leviathan Mine Road)													
10/20/16	10/20/16				Off-Property	Addendum 4	Atlantic Richfield	US EPA	Supplement to Off-Property Area FRI Work Plan Addendum No. 4 - TSAP for Fluvial Deposits and Surface Water in the East Fork Carson River	Submitted			Informed US EPA of additional sampling and luminescence dating of fluvial deposits.
05/18/16	05/18/16				Off-Property	Addendum 4	Atlantic Richfield	US EPA	Off-Property Area FRI Work Plan Addendum No. 4 - TSAP for Fluvial Deposits Sampling in the East Fork Carson River [Draft Final]	Submitted	Pending US EPA review		Submitted with line-by-line response to 04/18/16 comments.
04/18/16		04/18/16			Off-Property	Addendum 4	US EPA	Atlantic Richfield	EPA comments on Atlantic Richfield (ARC) Draft Off-Property Area FRI Work Plan Addendum No. 4 - TSAP for Fluvial Deposits Sampling in the East Fork Carson River, Leviathan Mine Site, Alpine County, California, dated January 8, 2016	Received			Requests line-by-line RTC and revised TSAP with in 30 days, directs Atlantic Richfield to proceed with sample collection in 2016 field season.
01/08/16	01/08/16		10/19/15		Off-Property	Addendum 4	Atlantic Richfield	US EPA	Off-Property Area FRI Work Plan Addendum No. 4 - TSAP for Fluvial Deposits Sampling in the East Fork Carson River [Draft]	Submitted	Comments delivered 04/18/16		
07/05/16		07/05/16			Off-Property	Addendum 3	US EPA	Atlantic Richfield	EPA Approval of Draft Final Off-Property FRI Work Plan Addendum No. 3 - TSAP for Supplemental Investigation of Bryant Creek, Leviathan Mine Site, Alpine County, California, dated May 16, 2016; and Sampling Locations for Supplemental Investigation of Bryant Creek Leviathan Mine Site, Alpine County, California, dated June 10, 2016	Received			Approves the Draft Final TSAP and directs Atlantic Richfield to complete the field work in the 2016 field season. Indicates that Atlantic Richfield shall integrate the collected information into the Surface Water Technical Memorandum that is currently undergoing review and preparation.
06/10/16	06/10/16		Prior to collecting samples		Off-Property	Addendum 3	Atlantic Richfield	US EPA	Sampling Locations for Supplemental Investigation of Bryant Creek	Submitted	Comments delivered 07/05/16		Provides revised map showing the proposed sample locations identified based on the mapping and a supplemental table summarizing the locations selected for sampling.
05/16/16	05/16/16		05/16/16		Off-Property	Addendum 3	Atlantic Richfield	US EPA	Off-Property Area FRI Work Plan Addendum No. 3 - TSAP for Supplemental Investigation of Bryant Creek [Draft Final]	Submitted	Comments delivered 07/05/16		Submitted with Response to Comments
04/16/16		04/16/16			Off-Property	Addendum 3	US EPA	Atlantic Richfield	EPA comments on Draft Off-Property Area FRI Work Plan Addendum No. 3 - TSAP for Supplemental Investigation of Bryant Creek, Leviathan Mine Site, Alpine County, California, dated January 8, 2016	Received			Requests line by line RTC and revised TSAP with in 30 days, and prior to collecting samples provide revised map showing sample locations based on proposed mapping.
01/08/15	01/08/15		12/15/15		Off-Property	Addendum 3	Atlantic Richfield	US EPA	Off-Property Area FRI Work Plan Addendum No. 3 - TSAP for Supplemental Investigation of Bryant Creek [Draft]	Submitted	Comments delivered 04/18/16		

Date	Date Submitted by Atlantic Richfield	Date Submitted by EPA	EPA Requested Due Date	Atlantic Richfield Estimated Timeframe for Submittal	Work Plan / Document	Amendment / Addendum / Revision No.	Author	Recipient	Item	Atlantic Richfield Status	US EPA Status	US EPA Comment	Atlantic Richfield Comment
08/12/16		08/12/16			Off-Property & Reference	River Ranch	US EPA	Atlantic Richfield	EPA comments on Task Sampling and Analysis Plan, Final Revised/Accelerated River Ranch Soil Investigation Approach, Off Property and Reference Area FRI Work Plans [Revision No. 1], Leviathan Mine Site, Alpine County, California, Dated June 24, 2016	Received			Approves document and indicates work outlined in TSAP should be completed during the 2016 field season. Requests timely notification of when sampling will commence so that EPA and contractors can provide field oversight. Requests written report within 90 days of completion of field work.
06/24/16	06/24/16				Off-Property & Reference	River Ranch	Atlantic Richfield	US EPA	TSAP, Final Revised/Accelerated River Ranch Soil Investigation Approach, Off Property and Reference Area FRI Work Plans [Revision No. 1]	Submitted	Comments delivered 08/12/16		Provides point-by-point response to comments dated 05/18/16
05/18/16		05/18/16			Off-Property & Reference	River Ranch	US EPA	Atlantic Richfield	EPA comments on the Response to Comments and Transmittal of Final Task Sampling and Analysis [sic], Final Revised / Accelerated River Ranch Soil Investigation Approach, Off-Property and Reference Area FRI Work Plans, Leviathan Mine Site, Alpine County, California, Dated November 12, 2016	Received			Requests point-by-point RTC and final TSAP with the recommended changes; directs work to be completed during the 2016 field season. No specific due date given.
11/12/15	11/12/15		10/12/15	Requested extension to 11/12/15	Off-Property & Reference	River Ranch	Atlantic Richfield	US EPA	TSAP for FPXRF Surveys and Sampling for Laboratory Analysis, Final Revised/ Accelerated River Ranch Soil Investigation Approach [Final]	Submitted			Submitted with Response to Comments
10/09/15	10/09/15		10/12/15	Requested extension to 11/12/15	Off-Property & Reference	River Ranch	Atlantic Richfield	US EPA	Request for Schedule Extension for Response to Comments and Final TSAP for FPXRF Surveys and Sampling for Laboratory Analysis, Final Revised/ Accelerated River Ranch Soil Investigation Approach	Received			
09/29/15		09/29/15	10/12/15	Requested extension to 11/12/15	Off-Property & Reference	River Ranch	US EPA	Atlantic Richfield	EPA comments on the Atlantic Richfield Submittal of Sampling and Analysis Plan for FPXRF Surveys and Sampling for Laboratory Analysis, Final Revised/ Accelerated River Ranch Soil Investigation Approach	Submitted		Notify EPA 72 hours before starting field work	
08/28/15					Off-Property & Reference	River Ranch	Atlantic Richfield	US EPA	River Ranch Implementation Schedule and Request for Approval	Received			
07/17/15					Off-Property & Reference	River Ranch	Atlantic Richfield	US EPA	Request for Conditional Approval for TSAP for FPXRF Surveys and Soil Sampling for Laboratory Analysis, Final Revised/Accelerated River Ranch Soil Investigation Approach	Submitted			Submitted via email.
05/29/15					Off-Property & Reference	River Ranch	Atlantic Richfield	US EPA	TSAP for FPXRF Surveys and Soil Sampling for Laboratory Analysis	Submitted	Comments delivered 07/17/15		Resent on 6/24/15
10/16/14					Off-Property & Reference	River Ranch	Atlantic Richfield	US EPA	TSAP For Irrigation System and Soil Mapping, Final Revised/Accelerated River Ranch Soil Investigation Approach	Submitted			
09/17/14					Off-Property & Reference	River Ranch	US EPA	Atlantic Richfield	Response to Comments and Final Revised/Accelerated River Ranch Soil Investigation Approach	Received			Email, appears to be final approval with comment.
08/26/14					Off-Property & Reference	River Ranch	Atlantic Richfield	US EPA	Response to Comments and Final Revised/Accelerated River Ranch Soil Investigation Approach	Submitted			
08/14/14					Off-Property & Reference	River Ranch	US EPA	Atlantic Richfield	Draft Technical Review of July 1, 2014 Off-Property and Reference Area FRI Work Plans Revised/Accelerated River Ranch Soil Investigations	Received			
07/01/14					Off-Property & Reference	River Ranch	Atlantic Richfield	US EPA	Revised/Accelerated River Ranch Soil Investigations	Submitted			
08/18/16		08/18/16			Off-Property	Revised Addendum 2 Leviathan Mine Road	US EPA	Atlantic Richfield	EPA Comments on Revised Off-Property Focused Remedial Investigation Work Plan Addendum No. 2 – Leviathan Mine Road Task Sampling and Analysis Plan (Draft Final), Leviathan Mine Site, Alpine County, California, Dated August 12, 2016	Received			Finds that comments adequately addressed; directs fieldwork to be completed during the 2016 field season; requests memo documenting investigation results no later than 90 days after completion of fieldwork.
08/12/16	08/12/16		08/08/16		Off-Property	Revised Addendum 2 Leviathan Mine Road	Atlantic Richfield	US EPA	Revised Off-Property FRI Work Plan Addendum No. 2 – Leviathan Mine Road Task Sampling and Analysis Plan [Draft Final]	Submitted			Transmits point-by-point response to 06/30/16 comments.
06/30/16	06/30/16				Off-Property	Revised Addendum 2 Leviathan Mine Road	US EPA	Atlantic Richfield	EPA Comments on Revised Off-Property FRI Work Plan Addendum No. 2 – Leviathan Mine Road Task Sampling and Analysis Plan, Leviathan Mine Site, Alpine County, California, Dated April 4, 2016	Received			Directs Atlantic Richfield to proceed with the work outlined and to schedule a site visit to identify additional sample locations by the end of July. Requests point-by-point RTC and revised work plan by August 8, 2014 [sic] to ensure that all sampling in competed during 2015 [sic] field season

Date	Date Submitted by Atlantic Richfield	Date Submitted by EPA	EPA Requested Due Date	Atlantic Richfield Estimated Timeframe for Submittal	Work Plan / Document	Amendment / Addendum / Revision No.	Author	Recipient	Item	Atlantic Richfield Status	US EPA Status	US EPA Comment	Atlantic Richfield Comment
04/04/16	04/04/16		01/30/15	04/01/16	Off-Property	Revised Addendum 2 Leviathan Mine Road	Atlantic Richfield	US EPA	Revised Off-Property FRI Work Plan Addendum No. 2 – Leviathan Mine Road Task Sampling and Analysis Plan [Draft]	Submitted	Comments delivered 06/30/16		
05/17/16		05/17/16			Off-Property	Revised Addendum 2 Floodplain	US EPA	Atlantic Richfield	EPA Approval of Response to Comments and Revised Off-Property Area FRI Work Plan Addendum No. 2 - TSAP for Floodplain Sampling in Downstream Study Area (Final), Leviathan Mine Site, Alpine County, California, dated March 25, 2016	Received			Finds that majority of comments adequately addressed; work plan approved; directs off-property floodplain soils field work to be completed during the 2016 field season.
03/25/16	03/25/16		03/26/16		Off-Property	Revised Addendum 2 Floodplain	Atlantic Richfield	US EPA	Revised Off-Property Area FRI Work Plan Addendum No. 2 - TSAP for Floodplain Sampling in Downstream Study Area [Final]	Submitted			Requests line-by-line RTC and revised/updated SAP by 03/26/16. Directs field work to begin as soon as the 2016 field season can be underway.
02/26/16		02/26/16			Off-Property	Revised Addendum 2 Floodplain	US EPA	Atlantic Richfield	EPA comments on Revised Off-Property Area FRI Work Plan Addendum No. 2 - TSAP for Floodplain Sampling in Downstream Study Area, Leviathan Mine Site, Alpine County, California, dated January 15, 2016	Received			
01/15/16	01/15/16		9/14/15 9/30/15 10/16/15 01/01/16		Off-Property	Revised Addendum 2 Floodplain	Atlantic Richfield	US EPA	Revised Off-Property Area FRI Work Plan Addendum No 2 - TSAP for Floodplain Sampling in Downstream Study Area [Draft]	Submitted			
09/11/14					Off-Property	Revised Addendum 2 / Amendment 1	US EPA	Atlantic Richfield	EPA conditional approval of June 17, 2014 Revised Off-Property FRI Work Plan Addendum 2, Amendment 1 - Confirmation Sampling of Age-Category 3 Floodplain Soil	Received			Conditional approval. Atlantic Richfield to revise to reference original SAP; revise SOPs and QAPP accordingly; provide mapping of sampling locations a week in advance; and field schedule.
06/17/14					Off-Property	Revised Addendum 2 / Amendment 1	Atlantic Richfield	US EPA	Revised Off-Property FRI Work Plan Addendum No. 2, Amendment No. 1, Confirmation Sampling of Age-Category 3 Floodplain Soil	Submitted			
12/23/13					Off-Property	Revised Addendum 2	US EPA	Atlantic Richfield	Additional Comments, Response to Comments and Revised Off-Property FRI Work Plan, Addendum No. 2	Received			
08/05/13					Off-Property	Revised Addendum 2	US EPA	Atlantic Richfield	Approval with Comments, Response to Comments on Revised Off-Property FRI Work Plan Addendum No. 2	Received			
06/28/13					Off-Property	Revised Addendum 2	Atlantic Richfield	US EPA	Revised Off-Property Area FRI Work Plan Addendum No. 2 and Submittal of Response to Comments	Submitted			
06/20/13					Off-Property	Addendum 2	Atlantic Richfield	US EPA	Webinar: Discussion of US EPA Comments on Off-Property FRI Work Plan Addendum No. 2	Conducted			
06/10/13					Off-Property	Addendum 2	US EPA	Atlantic Richfield	Approval of Schedule Extension Request, Response to US EPA Comments on Off-Property FRI Work Plan Addendum No. 2	Received			
05/30/13					Off-Property	Addendum 2	Atlantic Richfield	US EPA	Schedule Extension Request, Response to US EPA Comments on Off-Property FRI Work Plan Addendum No. 2	Submitted			
05/15/13					Off-Property	Addendum 2	US EPA	Atlantic Richfield	Partial Approval and Comments Off-Property FRI Work Plan, Addendum No. 2	Received			
04/15/13					Off-Property	Addendum 2	Atlantic Richfield	Stakeholders	Webinar: Overview of Off-Property FRI Work Plan Addendum No. 2	Conducted			
02/28/13					Off-Property	Addendum 2	Atlantic Richfield	US EPA	Off-Property FRI Work Plan Addendum No. 2	Submitted			
08/15/12					Off-Property	Addendum 1	Atlantic Richfield	US EPA	Response to Conditional Approval of May 2012 Addendum No. 1 Off-Property FRI Work Plan	Submitted			
07/16/12					Off-Property	Addendum 1	US EPA	Atlantic Richfield	Review and Conditional Approval of May 2012 Addendum No. 1, Off-Property FRI Work Plan	Received			
05/25/12					Off-Property	Addendum 1	Atlantic	US EPA	Off-Property FRI Work Plan Addendum No. 1	Submitted			
04/04/12					Off-Property	Addendum 1	Atlantic Richfield	US EPA	Webinar: Off-Property FRI Work Plan Addendum No. 1	Conducted			
02/22/12					Off-Property	NA	Atlantic Richfield	US EPA	Webinar: Off-Property FRI Work Plan	Conducted			
02/08/12					Off-Property	NA	Atlantic Richfield	US EPA	Off-Property FRI Work Plan	Submitted			
Reference Area FRI Work Plan													
8/16/2016		8/16/2016			Reference	Drilling	US EPA	Atlantic Richfield	EPA Approval of the 2016 Drilling Work Plan (Final), Leviathan Mine Site, Alpine County, California, dated July 29, 2016	Submitted			Finds that responses to comments G1, S1 and S2 have been adequately addressed; approves the final 2016 Drilling Plan; and again directs completion of the installation of monitoring wells at Locations 34, 35, 36S, 37, 38S, 38D, 39S, 39D (optional), 40S, 40D (optional), and 41 during the 2016 field season.
7/29/2016	7/29/2016				Reference	Drilling	Atlantic Richfield	US EPA	2016 Drilling Work Plan [Final]	Submitted			Includes response to 05/17/16 conditional approval and comments.

Date	Date Submitted by Atlantic Richfield	Date Submitted by EPA	EPA Requested Due Date	Atlantic Richfield Estimated Timeframe for Submittal	Work Plan / Document	Amendment / Addendum / Revision No.	Author	Recipient	Item	Atlantic Richfield Status	US EPA Status	US EPA Comment	Atlantic Richfield Comment
05/17/16		05/17/16			Reference	Drilling	US EPA	Atlantic Richfield	EPA Conditional Approval of Draft Final 2016 Drilling Work Plan, Leviathan Mine Site, Alpine County, California, dated May 4, 2016	Received			Conditionally approves plan provided remaining comments are addressed; directs Atlantic Richfield to proceed with drilling to be completed during the 2016 field season. Requests point by point RTC and a final Drilling Plan with these recommended changes, but not by a specific date. Indicates US EPA will provide comments on the reference area wells under separate cover.
05/04/16	05/04/16				Reference	Drilling	Atlantic Richfield	US EPA	2016 Drilling Work Plan [Draft Final]	Submitted			Revised based on discussions with US EPA and LRWQCB in a technical meeting on March 28, 2016.
03/03/16	03/03/16		03/03/16	03/3/16 04/4/2016	Reference	Drilling	Atlantic Richfield	US EPA	2016 Drilling Work Plan [Draft]	Submitted			Submitted Draft 2016 Drilling Work Plan on 3/3/16 to facilitate discussion on 3/28/16 and submittal of final iteration on 4/4/16.
				01/18/17	Reference	NA	Atlantic Richfield	US EPA	Reference FRI Work Plan [Final]	In Progress			
12/12/16	12/12/16				Reference	NA	Atlantic Richfield	US EPA	Extension Request for Response to Comments and Final Reference Area Focused Remedial Investigation Work Plan, Leviathan Mine Site, Alpine County, California.	Submitted			Requested extension for submittal from 12/18/16 to 1/18/17.
11/18/16		11/18/16			Reference	NA	US EPA	Atlantic Richfield	EPA Comments on Atlantic Richfield Response to USEPA and LRWQCB Comments on Draft Final Reference Area Work Plan, dated March 3, 2016	Received			Includes LRWQCB comments dated 5/24/16. Requests line by line response to comments and final fully revised Reference Area Work Plan incorporating these comments within 30 days, or by 12/19/16.
03/21/16	03/21/16				Reference	NA	Atlantic Richfield	US EPA	Request for Technical Justification, Additional Reference Monitoring Well Locations	Submitted			U.S. EPA addressed this request in their conditional approval dated 05/17/16.
03/03/16	03/03/16		03/03/16	03/3/16 04/4/2016	Reference	NA	Atlantic Richfield	US EPA	Reference FRI Work Plan [Preliminary Final]	Submitted	Comments delivered to Atlantic Richfield 12/16/16		Submitted as preliminary final with response to 02/04/16 comments to facilitate discussion on 3/28/16 and in anticipation of submittal of final iteration on 4/4/16. However, during 3/28/16 meeting it was agreed that ARC would delay submitting final until US EPA provided comments on preliminary final.
02/04/16		02/14/16			Reference		US EPA	Atlantic Richfield	EPA Comments on Atlantic Richfield Response to USEPA and LRWQCB Comments on Draft Final Reference Area Workplan, dated August 14, 2015	Received			
08/14/15	08/14/15		08/08/15		Reference	NA	Atlantic Richfield	US EPA	Response to US EPA and LRWQCB Comments on Draft Final Reference FRI Work Plan and Technical Memorandum - Preliminary Investigations in Reference Study Area	Submitted	Responded 02/04/16		
07/10/15					Reference	NA	US EPA	Atlantic Richfield	EPA Comment on two Documents submitted for the Reference Area Work Plan: The Draft Final Reference Area Focused Remedial Investigation Work Plan, Leviathan Mine Site, Alpine County, California, dated February 28, 2015, and the Technical Memorandum - Preliminary Investigations in Reference Study Areas, Leviathan Mine Site, Alpine County, California, dated March 20, 2015.	Received			
02/28/15					Reference	NA	Atlantic Richfield	US EPA	Draft Final Reference Area FRI Work Plan	Submitted			
01/21/15					Reference	NA	Atlantic Richfield	US EPA	Meeting to review approach to evaluate hydraulic influence of pit and plant sampling	Submitted			
03/11/14					Reference	NA	Atlantic Richfield	US EPA	Technical Meeting: Revisions to the Reference Area FRI Work Plan	Submitted			
02/09/12					Reference	NA	US EPA	Atlantic Richfield	Response to Comments on the Reference Area FRI Work Plan	Received			
02/03/12					Reference	NA	Atlantic Richfield	US EPA	Response to Comments Reference Area FRI Work Plan	Submitted			
12/21/11					Reference	NA	US EPA	Atlantic Richfield	Extension of Schedule for Responding to Comments on the Reference Area FRI Work Plan	Submitted			
12/06/11					Reference	NA	Atlantic Richfield	US EPA	Extension Request for Response to US EPA Comments Reference Area FRI Work Plan	Submitted			

Date	Date Submitted by Atlantic Richfield	Date Submitted by EPA	EPA Requested Due Date	Atlantic Richfield Estimated Timeframe for Submittal	Work Plan / Document	Amendment / Addendum / Revision No.	Author	Recipient	Item	Atlantic Richfield Status	US EPA Status	US EPA Comment	Atlantic Richfield Comment
11/21/11					Reference	NA	US EPA	Atlantic Richfield	Comments on the Reference Area FRI Work Plan	Submitted			
10/31/11					Reference	NA	Atlantic Richfield	US EPA	Technical Meeting, Overview of Reference FRI Work Plan	Submitted			
09/21/11					Reference	NA	Atlantic Richfield	Atlantic Richfield	Reference Area FRI Work Plan	Submitted			
10/19/10					Reference	NA	US EPA	Atlantic	Acknowledgment of Initial Reference Study Activities	Submitted			
09/15/10					Reference	NA	Atlantic	US EPA	Initial Reference Study Activities	Submitted			
06/26/13					Reference	Addendum 2	US EPA	Atlantic Richfield	Approval of Reference Area FRI Work Plan Addendum No. 2 for Sediment Quality Triad Sampling in Mountaineer Creek	Submitted			
06/14/13					Reference	Addendum 2	Atlantic Richfield	US EPA	Reference Area FRI Work Plan Addendum No. 2 for Sediment Quality Triad Sampling in Mountaineer Creek	Submitted			
09/13/12					Reference	Addendum 1	US EPA	Atlantic Richfield	Approval of Preliminary Investigation Phase Activities Addendum No. 1, Reference Area FRI Work Plan	Submitted			
09/11/12					Reference	Addendum 1	Atlantic Richfield	US EPA	Reference Area FRI Work Plan Addendum No. 1	Submitted			
Human Health Risk Assessment Work Plan													
11/29/16	11/29/16				HHRA	NA	Atlantic Richfield	US EPA	Preliminary *In Vitro* Bioaccessibility Testing	Submitted			Testing of existing samples will be completed in December 2016. Prior to collecting and analyzing any additional samples as part of a broader program, Atlantic Richfield will submit a Task Sampling and Analysis Plan to U.S. EPA for review and approval in first quarter 2017.
06/27/16	06/27/16				HHRA	NA	Atlantic Richfield	US EPA	Revised Exposure Parameter Tables for Baseline Human Health Risk Assessment Work Plan	Submitted	Pending US EPA review		
02/19/16	02/19/16				HHRA	NA	Atlantic Richfield	US EPA	Response to U.S. EPA Comments on Atlantic Richfield Responses to U.S. EPA and LRWQCB Comments on the Final Baseline Human Health Risk Assessment Work Plan, Revision 1	Submitted	Discussed remaining issues during quarterly technical meeting on 06/13/16		Proposes follow-up call in March 2016 and submittal of revised work plan within 45 days of US EPA's concurrence with the resolution of remaining issues and responses provided.
12/21/15		1/17/2016	Formal RTC by 2/20/16		HHRA	NA	US EPA	Atlantic Richfield	Comments on Atlantic Richfield Company's Response to US EPA, LRWQCB, and DTSC Comments on Final Baseline Human Health Risk Assessment Work Plan Revision 1	Received			Letter from Assistant Executive Officer; EPA requests that these comments be fully considered as part of US EPA's comments on the BHHRA dated 1/12/16
01/12/16		01/13/16	Formal RTC by 2/20/16		HHRA	NA	US EPA	Atlantic Richfield	EPA comments on Atlantic Richfield (ARC) Response to US EPA, LRWQCB, and DTSC Comments on Final Baseline Human Health Risk Assessment Work Plan Revision 1 (work plan) dated December 4, 2015	Received			U.S. EPA comments dated 1/12/16 delivered 1/13/16; requested an additional meeting date for first week in March to discuss and resolved any remaining issues.
12/04/15	12/04/15		11/13/15 12/04/15		HHRA	NA	Atlantic Richfield	US EPA	Response to US EPA, LRWQCB, and DTSC Comments on Final Baseline Human Health Risk Assessment Work Plan Revision 1	Submitted	Responded 1/13/16		
11/13/15	11/13/15	10/13/15	11/13/15 12/04/15	Requested extension for BHHRA Work Plan to 12/04/15 Submitted separated extension requests to 01/29/15 for fish tissue sampling work plan and 12/04/15 for RI/FS schedule	HHRA	NA	Atlantic Richfield	US EPA	Request for Management Meeting and Schedule Extension for Responses to Comments on Final Baseline Human Health Risk Assessment Work Plan, Revision 1, Schedule Extension and Proposed Remedial Investigation/Feasibility Study Schedule	Extension requested; in progress for 12/04/15 submittal	US EPA responded on 11/17/15, meeting set for 12/11/15.	Requested work plan for Fish Tissue sampling by 11/13/15	Atlantic Richfield submitted separate extension requests for fish tissue sampling work plan (see On-Property Work Plan) and comments on RI/FS schedule (see RI Reporting).
10/21/15					HHRA	NA	US EPA	Atlantic Richfield	Clarification from EPA on the 10/13/15 HHRA comments	Received			
10/13/15		10/13/15			HHRA	NA	US EPA	Atlantic Richfield	Draft Technical Review of April 24, 2015 Final Baseline Human Health Risk Assessment Work Plan, Revision 1	Received			
04/24/15					HHRA	NA	Atlantic Richfield	US EPA	Final Baseline Human Health Risk Assessment Work Plan, Revision 1	Submitted	Comments delivered to Atlantic Richfield 10/13/15		
03/23/15					HHRA	NA	US EPA	Atlantic Richfield	EPA Comments on the HHRA	Received			Requests updated HHRA Work Plan
03/23/15					HHRA	NA	US EPA	Atlantic Richfield	Meeting notes from 1/21/15 Washoe Tribe meeting	Received			
03/17/15					HHRA	NA	US EPA	Atlantic Richfield	Washoe Tribe comments on Plant and Associated Soil Sampling Approach	Received			

Date	Date Submitted by Atlantic Richfield	Date Submitted by EPA	EPA Requested Due Date	Atlantic Richfield Estimated Timeframe for Submittal	Work Plan / Document	Amendment / Addendum / Revision No.	Author	Recipient	Item	Atlantic Richfield Status	US EPA Status	US EPA Comment	Atlantic Richfield Comment
02/18/15					HHRA	NA	Atlantic Richfield	Stakeholders	Webinar: Plant Sampling Approach	Conducted			U.S. EPA, Washoe Tribe, and LRWQCB
01/21/15					HHRA	NA	US EPA	Atlantic Richfield	Washoe Exposure Scenario Meeting	Conducted			
01/21/15					HHRA	NA	US EPA	Atlantic Richfield	Field Notes from Resource Walk	Received	EPA shared Washoe input on January 21.		
10/03/14					HHRA	NA	Atlantic Richfield	US EPA	Atlantic Richfield Field Notes from Resource Walk	Submitted			
07/16/14					HHRA	NA	US EPA	Atlantic Richfield	Resource Walk	Conducted			
10/15/14					HHRA	NA	Atlantic Richfield	US EPA	Copy of Table 2 (RI/FS Analyte List) from On-Property FRI Work Plan	Submitted			
10/06/14					HHRA	NA	Various	Various	Five documents in US EPA's files provided by US EPA to Atlantic Richfield on behalf of Lynelle Hartway, Washoe Tribe General Council	Received			
02/10/14					HHRA	NA	Atlantic Richfield	US EPA	Technical Meeting: HHRA & ERA Pending Issues	Conducted			
10/25/13					HHRA	NA	US EPA	Atlantic Richfield	USFWS Fish Assessment and Atlantic Richfield Fish Sampling	Received			E-mail
10/22/13					HHRA	NA	Atlantic Richfield	US EPA	USFWS Fish Community Assessment	Submitted			
10/06/13					HHRA	NA	Atlantic Richfield	US EPA	Technical Meeting: Use of reference area and screening level comparisons and outstanding Risk Assessment Issues	Submitted			
07/06/11					HHRA	NA	US EPA	Atlantic Richfield	Discussion of May 19, 2011, Response to Comments on Human Health Risk Assessment Work Plan	Received			
05/19/11					HHRA	NA	Atlantic Richfield	US EPA	Response to Comments Human Health Risk Assessment Work Plan	Submitted			
03/10/11					HHRA	NA	US EPA	Atlantic Richfield	Approval with Comments and Direction to Implement the Human Health Risk Assessment Work Plan	Received			
01/25/11					HHRA	NA	Atlantic Richfield	US EPA	Webinar: Human Health Risk Assessment Work Plan	Conducted			
12/15/10					HHRA	NA	Atlantic Richfield	US EPA	Baseline Human Health Risk Assessment Work Plan, RI/FS	Submitted			
07/26/10					HHRA	NA	Atlantic Richfield	US EPA	Proposed RI/FS Initial Analyte List	Submitted			
06/16/10					HHRA	NA	Atlantic Richfield	US EPA	Response to Discussion Points, Human Health Risk Assessment Work Plan	Submitted			
03/22/10					HHRA	NA	US EPA	Atlantic	Discussion Points for Baseline Human Health Risk	Received			
11/20/09					HHRA	NA	Atlantic Richfield	US EPA	Draft Baseline Human Health Risk Assessment Work Plan, Leviathan Mine Site, Alpine County, California	Submitted			
Ecological Risk Assessment Work Plan													
03/21/16		03/21/16			ERA	NA	US EPA	Atlantic Richfield	EPA Approval of the Final Baseline Ecological Risk Assessment Work Plan, Remedial Investigation and Feasibility Study, Leviathan Mine Site, Alpine County, California dated December 3, 2015	Received			Within 30 days or April 21, 2016, please provide an updated RI/FS schedule that includes media-specific screening assessments as they relate to early 2018 completion for the full RI/FS and please ensure the schedule outline incorporates specific dates for the data usability analysis for each media.
12/03/15	12/03/15		12/03/15		ERA	NA	Atlantic Richfield	US EPA	Final Baseline Ecological Risk Assessment Work Plan	Submitted	Comments delivered to Atlantic Richfield 3/21/16		
11/03/15		11/03/15	12/03/15	12/03/15	ERA	NA	US EPA	Atlantic Richfield	EPA Comments to ARC Response to Comments Dated June 5, 2015 on U.S. EPA and LRW QCB Comments on the Draft Final Baseline Ecological Risk Assessment Work Plan	In Progress		Requested revised final work plan by 12/03/15	
06/05/15					ERA	NA	Atlantic Richfield	US EPA	Response to U.S. EPA and LRWQCB Comments on the Draft Final Baseline Ecological Risk Assessment Work Plan	Submitted	Comments delivered to Atlantic Richfield 11/03/15		
05/06/15					ERA	NA	US EPA	Atlantic Richfield	EPA Comments on the Draft Final Baseline Ecological Risk Assessment Work Plan, Remedial Investigation and Feasibility Study, Leviathan Mine Site, Alpine County, California dated February 20, 2015	Received			Requests written response to address comments
02/20/15					ERA	NA	Atlantic Richfield	US EPA	Draft Final Baseline Ecological Risk Assessment Work Plan	Submitted			
01/13/15					ERA	NA	US EPA	Other Agencies	Conduct consultation for T&E species		Completed with 1/13/15 delivery of Ned Black's memo to Atlantic Richfield		

Date	Date Submitted by Atlantic Richfield	Date Submitted by EPA	EPA Requested Due Date	Atlantic Richfield Estimated Timeframe for Submittal	Work Plan / Document	Amendment / Addendum / Revision No.	Author	Recipient	Item	Atlantic Richfield Status	US EPA Status	US EPA Comment	Atlantic Richfield Comment
10/03/14					ERA	NA	US EPA	Atlantic Richfield	Comments on Ecological Risk Assessment and request for revised ERA Work Plan	Received			
04/21/14					ERA	NA	Atlantic Richfield	US EPA	Table 2 (Updated April 21, 2014) - Animal Species Potentially Occurring in Alpine County and Their Preferred Habitat	Submitted			
02/10/14					ERA	NA	Atlantic Richfield	US EPA	Technical Meeting: HHRA & ERA Pending Issues	Submitted			
07/26/14					ERA	NA	Atlantic Richfield	US EPA	Webinar: Overview of ERA Work Plan	Submitted			
10/25/13					ERA	NA	US EPA	Atlantic Richfield	USFWS Fish Assessment and Atlantic Richfield Fish Sampling	Received			E-mail
10/22/13					ERA	NA	Atlantic Richfield	US EPA	USFWS Fish Community Assessment	Submitted			
07/30/12					ERA	NA	Atlantic Richfield	US EPA	ERA Draft Workplan Webinar	Conducted			
03/20/12					ERA	NA	Atlantic Richfield	US EPA	Baseline Ecological Risk Assessment Work Plan: RI/FS	Submitted			
11/07/11					ERA	NA	Atlantic Richfield	Stakeholders	Webinar: Ecological Risk Assessment Problem Formulation	Conducted			
10/26/11					ERA	NA	Atlantic	US EPA	Webinar: Ecological Risk Assessment Problem	Conducted			
RI Reporting (includes RI/FS Schedule)													
			90 days after completion of field work		SSA	River Ranch	Atlantic Richfield	US EPA	River Ranch Technical Data Summary Report	In Progress			
			NA		On-Property	Water Balance	Atlantic Richfield	US EPA	Water Balance Technical Data Summary Report [data through 2015]	In progress			
			NA		On-Property / Off-Property	Plants	Atlantic Richfield	US EPA	Plant Tissue/Soil Technical Data Summary Report [data through 2015]	In Progress			
			NA		On-Property	Storm Water	Atlantic Richfield	US EPA	Storm Water and Snowmelt Runoff Technical Data Summary Report [data through 2015]	QCSR in progress			
04/23/16	04/23/16		02/16/16	04/22/16	On-Property	Mine Waste	Atlantic Richfield	US EPA	Mine Waste Characterization Technical Data Summary Report [Draft]	Submitted	Pending US EPA review		
02/16/16	02/16/16				On-Property	Mine Waste	Atlantic Richfield	US EPA	(1) Response to U.S. EPA commentsn August 18, 2015 Webinar Summary and Annotated Outline for Mine Waste Technical Memorandum, and (2) Extension Request for submittal of Mine Waste Technical Data Summary Report	Submitted			Provided RTC and requests extension for TDSR to April 15, 2016
12/16/15		12/16/15	02/16/16		On-Property	Mine Waste	US EPA	Atlantic Richfield	EPA comments on Atlantic Richfield's Mine Waste Characterization - August 18, 2015 Webinar Summary and Annotated Outline for Technical Memorandum Leviathan Mine Site, Apline County, California, dated Swptember 16, 2015	Received			Requests technical data summary report by 02/16/16
09/18/15	09/18/15				On-Property	Mine Waste	Atlantic Richfield	US EPA	Mine Waste Characterization - August 18, 2015 Webinar Summary and Annotated Outline for Technical Memorandum	Submitted			Submitted annotated outline for review prior to preparation of full document
03/03/16	03/03/16		12/15/15	03/04/16	Off-Property	Ore Piles	Atlantic Richfield	US EPA	Status Update for Investigation of Suspected Ore Piles	Submitted			Indicates Atlantic Richfield will finish characterization in accordance with Revised Off-Property FRI Work Plan Addendum No. 2
			09/11/16		On-Property / Off-Property	Stream Sediment	Atlantic Richfield	US EPA	Stream Sediment Technical Data Summary Report [data through 2015]	In Progress			
			12/31/16		On-Property / Off-Property	Floodplain Soil	Atlantic Richfield	US EPA	Floodplain Soil Technical Data Summary Report [data through 2015]	QCSR in progress			
			09/11/16		On-Property	Amendment 10	Atlantic Richfield	US EPA	Beaver Dam / Pond Complex Technical Data Summary Report [data through 2015]	QCSR in progress			
09/09/16	09/09/16				On-Property	Amendment 10	Atlantic Richfield	US EPA	Response to U.S. EPA Partial Approval of Preliminary Evaluation of Results for Beaver Dam / Pond Complex	Submitted	Pending US EPA review		Proposes requested BD/PC report be submitted in Q1 2017 consistent with timing of media-specific TDSRs for stream sediment and floodplain soil provided at 6/3/16 RI/FS Schedule Update
07/11/16		07/11/16			On-Property	Amendment 10	US EPA	Atlantic Richfield	EPA Partial Approval of Atlantic Richfield Company's Preliminary Evaluation of Stream Sediment and Floodplain Soil Sampling Results for Beaver Dam/Pond Complex Sampling in the On-Property Reach of Leviathan Creek, Leviathan Mine Site, Alpine County, California dated April 15, 2016 (preliminary evaluation)	Received			Directs ARC to provide a full beaver pond area report along with the stream sediment media-specific report with the next 60 days or by September 11, 2016, and to provide the floodplain media specific report by December 31, 2016. Does not request RTC

Date	Date Submitted by Atlantic Richfield	Date Submitted by EPA	EPA Requested Due Date	Atlantic Richfield Estimated Timeframe for Submittal	Work Plan / Document	Amendment / Addendum / Revision No.	Author	Recipient	Item	Atlantic Richfield Status	US EPA Status	US EPA Comment	Atlantic Richfield Comment
06/03/16	06/03/16				On-Property	Amendment 10	Atlantic Richfield	US EPA	El Nino Contingency Plan, Summary of Observations Downstream of Beaver Dam/Pond Complex in the On-Property Reach of Leviathan Creek, October 2015 - May 2016	Submitted			
04/15/16	04/15/16		03/30/16		On-Property	Amendment 10	Atlantic Richfield	US EPA	Preliminary Evaluation of Stream Sediment and Floodplain Soil Sampling Results for Beaver Dam/Pond Complex Sampling in the On-Property Reach of Leviathan Creek	Submitted	US EPA Comments delivered 07/11/16		
02/26/16		02/26/16			On-Property	Amendment 10	US EPA	Atlantic Richfield	Analytical Results for Sampling of the BD/PC (Amendment 10)	Received			Email with attached excel file. Transmits tabulated results and comparison of materials in the dam and requests preliminary data summary for other results by March 30, 2016.
01/22/16	01/22/16				On-Property	Amendment 10	Atlantic Richfield	US EPA	Analtyical Results for Phase 2 Sampling of BD/PC in the On-Property Reach of Leviathan Creek	Submitted			
08/06/15					On-Property	Amendment 10	Atlantic Richfield	US EPA	Transmittal of Analytical Results and Water Quality Field Parameter Values for Phase 1 Sampling of the Beaver Dam/Pond Complex in the On-Property Reach of Leviathan Creek	Submitted			Atlantic Richfield transmitted results on a dry weight basis on 8/25/2015 via email
				01/25/16	On-Property & Reference	Groundwater	Atlantic Richfield	US EPA	Groundwater Technical Data Summary Report (draft final revised to include data through 2015)	In Progress			
11/04/16	11/04/16		10/27/16	Requested extension to 11/5/16 via email	On-Property & Reference	Groundwater	Atlantic Richfield	US EPA	Reponses to U.S. EPA and LRWQCB Comments on the draft Groundwater Technical Data Summary Report dated March 21, 2016	Submitted	Pending US EPA review		
09/27/16		09/27/16			On-Property & Reference	Groundwater	US EPA	Atlantic Richfield	EPA comments on Atlantic Richfield's Draft Groundwater Technical Data summary Report (TDSR) Leviathan Mine Superfund Site, Alpine County, California, dated March 21, 2016	Reserved			Requests a line by line RTC and agreement on a certain date for the next revised final groundwater TDSR that incorporates all of these changes, additional new data, and provides a full summary of QC and DQA consistent with the QAPP. Indicates that report should be provided no later than 120 days after field sampling is complete.
03/21/16	03/21/16		02/25/16	03/21/16	On-Property & Reference	Groundwater	Atlantic Richfield	US EPA	Groundwater Technical Data Summary Report [Draft]	Submitted	US EPA comments delivered via email on 07/11/16		
02/25/16	02/25/16				On-Property & Reference	Groundwater	Atlantic Richfield	US EPA	(1) Response to U.S. EPA and LRWQCB Comments on Groundwater Evaluation Summary and (2) Extension Request for Submittal of Groundwater Technical Data Summary Report	Submitted	US EPA comments on reporting schedule delivered via email on 03/04/16		
11/25/15		11/25/15	02/25/15	02/25/15	On-Property & Reference	Groundwater	US EPA	Atlantic Richfield	EPA comments on Atlantic Richfield's Groundwater Evaluation Summary Leviathan Mine Site, Alpine County California, dated June 30, 2015	Received	Missing attachment provided on 12/15/15		
06/30/15					On-Property & Reference	Groundwater	Atlantic Richfield	US EPA	Groundwater Evaluation Summary	Submitted	US EPA comments delivered 11/25/15	This was a compendium of slides presented during the April 30 technical meeting. Direct feedback was provided to ARC during the meeting and in subsequent e-mails.	Reposted to SharePoint site on 12/03/15 as requested by US EPA on 11/25/15.
04/30/15					On-Property & Reference	Groundwater	Atlantic Richfield	US EPA	Quarterly Technical Meeting: groundwater conceptual model	Conducted			Draft presentation to be provided on 4/27/15
					Surface Water	NA	Atlantic Richfield	US EPA	Surface Water Technical Data Summary Report (revised to include 2015 data)	DQA in progress			
03/14/16	03/14/16		03/14/16		Surface Water	NA	Atlantic Richfield	US EPA	Surface Water Technical Data Summary Report (Version No. 5)	Submitted	Pending US EPA review		Includes RTC to 12/04/15 comments
12/14/15		12/14/15			Surface Water	NA	US EPA	Atlantic Richfield	EPA Comments on the Evaluation of Historical and RI/FS Surface Water Data, Leviathan Mine Site, Alpine County, California, dated June 30, 2015	Received			RTC and Surface Water Technical Data Summary Report due March 14, 2016.
06/30/15	06/30/15		06/30/15		Surface Water	NA	Atlantic Richfield	US EPA	Evaluation of Historical and RI/FS Surface Water Data	Submitted	US EPA comments delivered 12/14/15		Reposed to SharePoint site on 12/03/15 as requested by US EPA on 11/25/15.
10/31/14					Surface Water	NA	Atlantic Richfield	US EPA	Evaluation of Historical and RI/FS Surface Water Data	Submitted			Superseded by 6/30/15 submittal.
08/07/14					Surface Water	NA	Atlantic Richfield	US EPA	Technical Meeting - Surface Water Evaluation	Conducted			Copy of presentation provided to US EPA on 8/28/14
03/20/15					Plants	NA	Atlantic Richfield	US EPA	Technical Memorandum – Habitat Surveys, Plant Species, and Study Design for Plant Sampling	Submitted			US EPA responded to this document in combination with the on- and off-property plant sampling approach. See 5/18/15 entry in On Property Work Plan.

Date	Date Submitted by Atlantic Richfield	Date Submitted by EPA	EPA Requested Due Date	Atlantic Richfield Estimated Timeframe for Submittal	Work Plan / Document	Amendment / Addendum / Revision No.	Author	Recipient	Item	Atlantic Richfield Status	US EPA Status	US EPA Comment	Atlantic Richfield Comment
03/20/15					Reference	NA	Atlantic Richfield	US EPA	Technical Memorandum – Preliminary Investigations in Reference Study Areas	Submitted			US EPA responded to this document in combination with the Reference Area FRI Work Plan. See 7/10/15 entry in Reference Work Plan.
09/09/16	09/09/16				RI/FS Report/Schedule	NA	Atlantic Richfield	US EPA	Reporting Options for Upcoming Interim RI Submittals	Submitted	Pending US EPA review		Presents four interim RI reporting options and proposes that these options be discussed in a conference call or at the upcoming quarterly technical meeting scheduled for September 29, 2016.
06/03/16	06/03/16			05/30/16	RI/FS Report/Schedule	NA	Atlantic Richfield	US EPA	RI/FS Schedule Update	Submitted	Pending US EPA review		Provides updated RI/FS schedule, key milestones for submittal of TDSRs, and key assumptions.
03/04/16		03/04/16			RI/FS Report/Schedule	NA	US EPA	Atlantic Richfield	Email FW: EPA Clarification on Agenda for March 28th	Received			Provides US EPA comments on schedule for submittal of various documents.
12/23/15	12/23/15				RI/FS Report/Schedule	NA	Atlantic Richfield	US EPA	Preliminary RI/FS 2016 Field Schedule and Remedial Investigation Data Collection Status	Submitted			Discussed at 01/19/16 management meeting. Atlantic Richfield to prepare more detailed schedule.
12/22/15		12/22/15			RI/FS Report/Schedule	NA	US EPA	Atlantic Richfield	EPA comments on Atlantic Richfield Company's (ARC) December 4, 2015 Response to US EPA Comments on the Proposed Remedial Investigation/Feasibility Study Schedule	Received, to be discussed during 01/19/16 management meeting			Requests that attached agenda be fully incorporated and that Atlantic Richfield consider these comments in preparation for 01/19/16 management meeting.
12/04/15	12/04/15		11/18/15 12/04/15		RI/FS Report/Schedule	NA	Atlantic Richfield	US EPA	Response to Comments on Proposed Remedial Investigation / Feasibility Study Schedule	Submitted	US EPA comments delivered 12/22/15		
11/13/15	11/13/15	11/04/15	11/18/15 12/04/15	Extension requested for comments on RI/FS schedule to 12/04/15	RI/FS Report/Schedule	NA	Atlantic Richfield	US EPA	Request for Management Meeting and Schedule Extension for Responses to Comments on Final Baseline Human Health Risk Assessment Work Plan, Revision 1, Schedule Extension and Proposed Remedial Investigation/Feasibility Study Schedule	Comments on RI/FS schedule submitted 12/04/15	US EPA responded on 11/17/15, meeting set for 12/11/15. Meeting to be rescheduled in January 2016.		Atlantic Richfield prepared response to US EPA comments on RI/FS schedule separately from response to comments on BHHRA.
11/04/15		11/04/15	11/18/15 12/04/15	Requested extension to 12/04/15	RI/FS Report/Schedule	NA	US EPA	Atlantic Richfield	EPA comments on Atlantic Richfield's Response to US EPA Comments on the Proposed RI/FS Schedule	Received			Response sent on 11/13/15 (combined with HHRA response) requesting management meeting
08/24/15					RI/FS Report/Schedule	NA	Atlantic Richfield	US EPA	RI/FS Schedule	Submitted			Response to EPA Big Picture Comments on RI/FS Schedule
08/21/15					RI/FS Report/Schedule	NA	US EPA	Atlantic Richfield	EPA Big Picture Comments on RI/FS Schedule	Received			E-mail
03/13/15			11/18/15		RI/FS Report/Schedule	NA	Atlantic Richfield	US EPA	Response to U.S. EPA Comments on the Proposed Remedial Investigation/Feasibility Study Schedule	Submitted	US EPA comments delivered 11/04/15	Requested response by November 18, 2015	
01/15/15					RI/FS Report/Schedule	NA	US EPA	Atlantic Richfield	Comments on the Proposed RI/FS Schedule	Received			
12/12/14					RI/FS Report/Schedule	NA	Atlantic Richfield	US EPA	Summary Table of Contents and Approximate Schedule for Remedial Investigation/Feasibility Study	Submitted	TOC Comments delivered in January 15, 2015. letter regarding FS Approach		
09/08/14					RI/FS Report/Schedule	NA	US EPA	Atlantic Richfield	Request for TOC for RI/FS Document and approximate schedule for RI/FS completion (to include timeline for data usability reports)	Received			
10/19/15	10/19/15		10/19/15	01/08/16 (update schedule via email) 12/31/15 (requested extension to late December)	Off-Property	EFCR	Atlantic Richfield	US EPA	Request for Schedule Extension for Response to Comments, Geomorphic Analysis, and Recommendations for Sampling, East Fork Carson River Sediment Quality Triad Investigation	Submitted			Submitted updated schedule via email on 12/31/15. TSAP submitted 01/08/16 see Off-Property Work Plans.
08/19/15			10/19/15		Off-Property	EFCR	US EPA	Atlantic Richfield	EPA Comments on Draft Technical Review of January 30, 2015, East Fork Carson River Sediment Quality Triad Investigation and Response to Request for Sediment Quality Triad Memorandum	Received			Letter dated 8/19/15 sent on 8/20/15, requested written RTC, geomorphic analysis, and recommendation for sampling.
01/30/15					Off-Property	EFCR	Atlantic Richfield	US EPA	Technical Memorandum – East Fork Carson River Sediment Quality Triad Investigation and Response to Request for Sediment Quality Triad Memorandum	Submitted		EPA sent comments to Atlantic Richfield on August 20, 2015	Atlantic Richfield proposed evaluation of SQT in other areas as data become available.

Date	Date Submitted by Atlantic Richfield	Date Submitted by EPA	EPA Requested Due Date	Atlantic Richfield Estimated Timeframe for Submittal	Work Plan / Document	Amendment / Addendum / Revision No.	Author	Recipient	Item	Atlantic Richfield Status	US EPA Status	US EPA Comment	Atlantic Richfield Comment
11/19/14					Off-Property	SQT	US EPA	Atlantic Richfield	Request for submittal of SQT Memo	Received			Geomorphic analysis and TSAP for EFCR submitted 01/09/16, see Off-Property Work Plans
			Within 90 days of completion of field work	Q2 2017	On-Property / Off-Property	Fish	Atlantic Richfield	US EPA	Fish Surveys & Tissue Technical Data Summary Report (2016 Data)	Laboratory analysis in progress			
12/05/14					On-Property / Off-Property	Fish	Atlantic Richfield	US EPA	Transmittal of excel file for Fish Tissue Data	Submitted			
11/07/14					On-Property / Off-Property	Fish	US EPA	Atlantic Richfield	Request for excel file for Fish Tissue Data	Received			
04/17/14	04/21/14				On-Property / Off-Property	Fish	Atlantic Richfield	US EPA	Whole Body, Offal, and Filet Fish Tissue Metal Concentrations (mg/kg wet weight), Leviathan Mine Site	Submitted			Table finalized 4/17/14 for internal use, submitted to EPA 4/21/14
11/02/16	11/02/16		07/29/16	10/31/16	Interim Report Subsurface Barrier Treatability Study	Upper Tributary	Atlantic Richfield	US EPA	Interim 2015-2016 Upper Tributary Report	Submitted	Pending US EPA comments		
09/28/16	09/28/16				Interim Report Subsurface Barrier Treatability Study	Upper Tributary	Atlantic Richfield	US EPA	Extension Request for Sumittal of the Upper Tributary Report	Submitted			Email to request extension for report submittal from 9/30/16 to 10/31/16.
07/14/16	07/14/16				Interim Report Subsurface Barrier Treatability Study	Upper Tributary	Atlantic Richfield	US EPA	Current Conditions and Reporting Extension Request for Upper Tributary Area Subsurface Flow Barrier Treatability Study	Submitted			Requests the submittal date for an updated Upper Tributary report be postponed until 9/30/16 so that it may include a more complete data set and evaluation.
03/21/16		03/21/16			Interim Report Subsurface Barrier Treatability Study	Revsion 2	US EPA	Atlantic Richfield	Atlantic Richfield Response to Comments on the Interim 2012-2013 Report for Upper Tributary Area, Revision No 2, Subsurface Flow Barrier Treatability Study, Leviathan Mine Site, Alpine County, California, dated November 20, 2015.	Received			ARC to submit report within 60 days after spring snowmelt and no later than 7/29/16.
11/20/15	11/20/15		10/14/15	Requested extension to 11/20/15	Interim Report Subsurface Barrier Treatability Study	Revision 2	Atlantic Richfield	US EPA	Response to Comments, Interim 2012-2013 Report for Upper Tributary Area, Revision No. 2, Subsurface Flow Barrier Treatability Study	Submitted	US EPA comments delivered 3/21/16		
10/14/15	10/14/15			Requested extension to 11/20/15	Interim Report Subsurface Barrier Treatability Study	Revision 2	Atlantic Richfield	US EPA	Request for Schedule Extension for Response to Comments, Interim 2012-2013 Report for Upper Tributary, Revision No. 2, Subsurface Flow Barrier Treatability Study	Submitted			
09/14/15			10/14/2015 11/20/15	Requested extension to 11/20/15	Interim Report Subsurface Barrier Treatability Study	Revision 2	US EPA	Atlantic Richfield	EPA Comments on the Atlantic Richfield Submittal of the Interim 2012-2013 Report for Upper Tributary Area, Revision No. 2, Subsurface Flow Barrier Treatability Study, Leviathan Mine Site, Alpine County, dated March 31, 2015	Received	US EPA comments delivered 09/14/15		
03/31/15					Interim Report Subsurface Barrier Treatability Study	Revision 2	Atlantic Richfield	US EPA	Interim 2012-2013 Report for Upper Tributary Area, Revision No. 2, Subsurface Flow Barrier Treatability Study	Submitted			
02/26/15					Interim Report Subsurface Barrier Treatability Study	Revision 1	Atlantic Richfield	US EPA	Extension for Response to U.S. EPA's February 4, 2015 Comments on Atlantic Richfield's November 10, 2014 Response to U.S. EPA's Comments on the Interim 2012-2013 Report for Upper Tributary Area, Revision No. 1, Subsurface Flow Barrier Treatability Study	Submitted			
02/05/15					Interim Report Subsurface Barrier Treatability Study	Revision 1	US EPA	Atlantic Richfield	Comments on Interim 2012-2013 Report for Upper Tributary Area, Revision No. 1	Received			Also requests 2012-2014 Report by 6/15/15
11/10/14					Interim Report Subsurface Barrier Treatability Study	Revision 1	Atlantic Richfield	US EPA	Response to US EPA Comments, Interim 2012-2013 Report for Upper Tributary Area, Revision No. 1	Submitted			
10/08/14					Interim Report Subsurface Barrier Treatability Study	Revision 1	US EPA	Atlantic Richfield	Comments on Interim 2012-2013 Report for Upper Tributary Area, Revision No. 1	Received			Comments provided 10/10/14, but letter is dated 10/8/14.
07/09/14					Interim Report Subsurface Barrier Treatability Study	Revision 1	Atlantic Richfield	US EPA	Interim 2012-2013 Report for Upper Tributary Area Subsurface Flow Barrier Treatability Study, Revision 1	Submitted			

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06/16/14					Interim Report Subsurface Barrier Treatability Study	NA	US EPA	Atlantic Richfield	Review of Interim 2012-2013 Report for Upper Tributary Area Subsurface Flow Barrier Treatability Study	Received			
03/18/14					Interim Report Subsurface Barrier Treatability Study	NA	Atlantic Richfield	US EPA	Interim 2012-2013 Report for Upper Tributary Area Subsurface Flow Barrier Treatability Study	Submitted			
10/18/16		10/18/16			Annual	2013 and 2014 QCSR	US EPA	Atlantic Richfield	EPA Comments on Atlantic Richfield's revised QCSR for 2013 RI/FS Annual Summary Report; and QCSR for 2014 RI/FS Annual Summary Report, Leviathan Mine Site, Alpine County, California. The 2013 and 2014 QCSRs were provided in Appendix 1-A to each Annual Summary Report, dated April 8, 2016 and March 21, 2016 respectively	Received			Not necessary to provide a line by line respons to these comments; however, US EPA does ask that ARC please insure all of these comments and previous EPA comments are incorporated and addressed in future data deliverables and that all deliverables are consistent with the June 17, 2016, approved QAPP and associated US EPA comments.
03/21/16	03/21/16		03/19/16	03/19/16	Annual	2014 Report	Atlantic Richfield	US EPA	2014 RI/FS Data Summary Report [Draft]	Submitted			
02/19/16		02/19/16			Annual	2014 QCSR	US EPA	Atlantic Richfield	EPA Comments on Atlantic Richfield's partial response to 2014 Data Quality Control Summary Report, Leviathan Mine Site, dated January 18, 2016	Received			Requests line by line RTC, final 2014 annual report, and final 2013 annual report within 30 days or by March 19, 2016.
12/23/15	12/13/15				Annual	2014 Report	Atlantic Richfield	US EPA	Updated Schedule for Submittal of 2014 RI/FS Data Summary Report	Submitted			
01/19/16	01/19/16				Annual	2014 Report	Atlantic Richfield	US EPA	Quality Control Summary Report for 2014 RI/FS Data Summary Report	Submitted w/Database			During 12/10/15 quarterly technical meeting, EPA requested by 01/13/15 so that can be discussed during technical meeting in January 2016.
04/08/16	04/08/16				Annual	2013 Report	Atlantic Richfield	US EPA	2013 RI/FS Data Summary Report [Final]	Submitted			Dated 04/08/16; submitted 04/09/16
12/09/15		12/09/15			Annual	2013 Report	US EPA	Atlantic Richfield	US EPA response to Atlantic Richfield Response to US EPA comments on the 2013 RI/FS Data Summary Report	Received			
06/30/15	06/30/15				Annual	2013 Report	Atlantic Richfield	US EPA	Response to US EPA comments on the 2013 RI/FS Data Summary Report	Submitted	Comments delivered 12/09/15		
04/02/15					Annual	2013 Report	US EPA	Atlantic Richfield	EPA comments on Atlantic Richfield's 2013 Remedial Investigation/ Feasibility Study Data Summary Report, dated October 31, 2015	Received			Requests DQA or QCSR within 60 days
10/31/14					Annual	2013 Database	Atlantic Richfield	US EPA	2013 Leviathan Site Database	Submitted	Requested additional copies for distribution on 12/02/15 and 13/03/15		In 12/02/15 email, ARC suggested US EPA wait and distribute updated 2014 database to be competed by December 31, 2015. Three additional copies of 2013 Leviathan Site Database provided to US EPA and one copy provided to Lynelle Hartway, Cory Kroger, and Greg Reller on
10/31/14					Annual	2013 Report	Atlantic Richfield	US EPA	2013 RI/FS Data Summary Report	Submitted			
05/16/14					Annual	2012 Database	Atlantic Richfield	US EPA	2012 Update to Leviathan Project Database	Submitted			
04/21/14					Annual	2011 2012 Report	Atlantic Richfield	US EPA	Response to US EPA Comments on 2011 and 2012 RI/FS Data Summary Reports	Submitted			
04/07/14					Annual	2012 2012 Report	US EPA	Atlantic Richfield	Comments on 2011 and 2012 RI/FS Data Summary Reports	Received			
01/20/14					Annual	2012 Report	Atlantic Richfield	US EPA	2012 RI/FS Data Summary Report	Submitted			
08/03/12					Annual	2011 Report	Atlantic Richfield	US EPA	2011 RI/FS Data Summary Report	Submitted			
01/25/11					Mapping	NA	Atlantic Richfield	US EPA	Mapping FRI Report	Submitted			
12/22/10					Wells	NA	Atlantic Richfield	US EPA	Well Location, Rehabilitation, and Groundwater Monitoring FRI Report	Submitted			
National Historic Preservation Act													
12/1/16		12/1/16			NHPA	Expanded APE Monthly Reporting	US EPA	CA and NV SHPOs, Washoe THPO	Submittal of September and October 2016 Reports of Cultural Resource Monitoring for Expanded Area of Potential Effects	Received			Per the NHPA Protocol dated April 19, 2016, Atlantic Richfield has submitted to the US EPA, two monthly cultural resource monitoring reports for the 2016 field season.
11/25/16	11/25/16				NHPA	Expanded APE Monthly Reporting	Atlantic Richfield	US EPA	October 2016 Report of Cultural Resource Monitoring for Expanded Area of Potential Effects	Submitted	US EPA submitted to CA and NV SHPOs and Washoe THPO on 12/1/16		

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10/26/16		10/26/2016			NHPA	Expanded APE Monthly Reporting	US EPA	CA and NV SHPOs, Washoe THPO	Submittal of August and September 2016 Reports of Cultural Resource Monitoring for Expanded Area of Potential Effects	Received			Per the NHPA Protocol dated April 19, 2016 Atlantic Richfield has submitted to the US EPA, two monthly cultural resource monitoring reports for the 2016 field season. [September report not attached]
10/25/16	10/25/16				NHPA	Expanded APE Monthly Reporting	Atlantic Richfield	US EPA	September 2016 Report of Cultural Resource Monitoring for Expanded Area of Potential Effects	Submitted	US EPA submitted to CA and NV SHPOs and Washoe THPO on 10/26/16 and/or 12/1/16		
9/19/16		9/19/16			NHPA	Expanded APE Monthly Reporting	US EPA	CA and NV SHPOs, Washoe THPO	Submittal of May, June, and July 2016 Reports of Cultural Resource Monitoring for Expanded Area of Potential Effects	Received			
8/4/16	8/4/16				NHPA	Addendum 3	Atlantic Richfield	US EPA	Humboldt-Toiyabe National Forest, Cultural Resource Narrative Report for the Leviathan Mine Site Cultural Resources Inventory, Addendum No. 3 – Class I Literature Review for Expanded Area of Potential Effects, Alpine County, California, and Douglas County, Nevada [Draft]	Submitted	Pending US EPA review		Literature review is being used by archeological and tribal monitors in the field to inform sampling location decisions within the expanded APE following the 2016 Leviathan NHPA Section 106 Protocol
9/26/16	9/26/16				NHPA	Expanded APE Monthly Reporting	Atlantic Richfield	US EPA	August 2016 Report of Cultural Resource Monitoring within the Expanded Area of Potential Effects	Submitted	US EPA submitted to CA and NV SHPOs and Washoe THPO on 10/26/16		
8/25/16	8/25/16				NHPA	Expanded APE Monthly Reporting	Atlantic Richfield	US EPA	July 2016 Report of Cultural Resource Monitoring within the Expanded Area of Potential Effects	Submitted	US EPA submitted to CA and NV SHPOs and Washoe THPO on 9/19/16		
7/26/16	7/26/16				NHPA	Expanded APE Monthly Reporting	Atlantic Richfield	US EPA	June 2016 Report of Cultural Resource Monitoring within the Expanded Area of Potential Effects	Submitted	US EPA submitted to CA and NV SHPOs and Washoe THPO on 9/19/16		
6/24/16	6/24/16				NHPA	Expanded APE Monthly Reporting	Atlantic Richfield	US EPA	May 2016 Report of Cultural Resource Monitoring within the Expanded Area of Potential Effects	Submitted	US EPA submitted to CA and NV SHPOs and Washoe THPO on 9/19/16		
5/19/16	5/19/16				NHPA	2016 Protocol	Atlantic Richfield	US EPA	Leviathan NHPA Protocol	Submitted	No response received		Requested clarification via email regarding the need for tribal and achaelogical monitoring within previously surveyed areas of the existing APE. Requested notification immediately if US EPA disagrees with approach.
05/19/16	05/19/16				NHPA	Addendum 2	Atlantic Richfield	US EPA	Humboldt-Toiyabe National Forest Cultural Resources Narrative Report for the Leviathan Mine Site Cultural Resources Inventory, Addendum No. 2 – Cultural Resources Monitoring Report for 2014-2015 [Draft]	Submitted	Pending US EPA review		Also provided to USFS for review because requirement of ARPA permit
04/19/16		04/19/16			NHPA	2016 Protocol	US EPA	CA and NV SHPOs, Washoe THPO	2016 Leviathan NHPA Section 106 Protocol	Received			No title or subject line on document. On May 9, 2016, received additional direction that ARC should proceed with all sampling and follow the protocol as outlined.
03/23/16		03/23/16			NHPA	2016 Protocol	US EPA	CA and NV SHPOs, Washoe THPO	2016 Leviathan NHPA Section 106 Protocol [Draft]	Received			No title or subject line on document
03/18/16		03/18/16			NHPA	2016 Protocol	US EPA	CA and NV SHPOs, Washoe THPO	Meeting with U.S. EPA, SHPOs, THPO, and other stakeholders to review RI/FS activities and compliance with NHPA	Attended			
11/19/15					NHPA	NA	Atlantic Richfield	US EPA	Conference call to discuss US EPA 11/18/15 RTC and US EPA discussions with CA and NV SHPOs on Programmatic Agreement	Conducted			
11/06/15	11/06/15				NHPA	NA	Atlantic Richfield	US EPA	Response to EPA Comments on NHPA and next steps for defining Project APE and Record Searches and surveys	Submitted	US EPA comments delivered 11/18/15		E-mail
08/25/15	08/25/15		08/28/15		NHPA	NA	Atlantic Richfield	US EPA	Final Draft Historic Properties Management Plan	Submitted			Revised document
08/25/15	08/25/15		08/28/15		NHPA	NA	Atlantic Richfield	US EPA	Response to US EPA Comments to Draft Historic Properties Management Plan and Transmittal of Final Historic Properties Management Plan	Submitted			RTC and transmittal letter that accompanied revised document.
08/21/15					NHPA	NA	US EPA	NV SHPO	Letter transmitting draft Programmatic Agreement	NA			

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08/14/15					NHPA	NA	US EPA	Atlantic Richfield	Revised Draft Historic Properties Management Plan and Programmatic Agreement	Received			E-mail: comments on draft Historic Properties Management Plan dated July 29, 2015
07/29/15					NHPA	NA	Atlantic Richfield	US EPA	Expanded APE Revisions	Submitted			Proposed revisions to US EPA's July 1, 2015 expanded APE maps
07/29/15					NHPA	NA	Atlantic Richfield	US EPA	Draft Historic Properties Management Plan	Submitted			
07/17/15					NHPA	NA	Atlantic Richfield	US EPA	Figure showing surveyed portions of the on-property APE and description of surveyed area from Cultural Resources Narrative Report	Submitted			
07/01/15					NHPA	NA	US EPA	Atlantic Richfield	EPA Comments on Draft Historic Properties Treatment Plan for Draft Programmatic Agreement	Received			E-mail
06/12/15					NHPA	NA	Atlantic Richfield	US EPA	Revised project description for programmatic agreement; draft Historic Properties Treatment Plan	Submitted			
06/21/15		06/21/15			NHPA	NA	US EPA	CA and NV SHPOs	Programmatic Agreement		Submitted		
04/24/15					NHPA	NA	Atlantic Richfield	US EPA	Response to comments on APE map and revised Programmatic Agreement	Submitted			
04/16/15					NHPA	NA	US EPA	Atlantic Richfield	Comments on APE map and draft revised Programmatic Agreement	Received			
04/10/15					NHPA	NA	Atlantic Richfield	US EPA	Revised APE map and draft revised Programmatic Agreement	Submitted			
04/03/15					NHPA	NA	Atlantic Richfield	US EPA	Draft APE map and tasks requiring Programmatic Agreement	Submitted			
03/17/15					NHPA	NA	US EPA	Atlantic Richfield	Comments on March 2013 Draft Programmatic Agreement	Received			
12/09/14					NHPA	NA	NV SHPO	US EPA	Concurrence Letter from NV SHPO		Received		
11/25/14					NHPA	NA	USFS	Atlantic Richfield	ARPA Permit	Received			
11/04/14					NHPA	NA	Atlantic Richfield	US EPA	Copies of Cultural Monitoring Field Forms for weeks of 10/21/14 and 10/27/14	Submitted			
11/04/14					NHPA	NA	Atlantic Richfield	US EPA	Revised Errata Sheet for Cultural Resources Narrative Report	Submitted			
10/27/14					NHPA	NA	Atlantic Richfield	US EPA	Response to NV SHPO Comments on the Cultural Resources Narrative Report	Submitted			
10/09/14					NHPA	NA	NV SHPO	US EPA	NV SHPO Comments on Cultural Resources Narrative Report	Submitted			
10/06/14					NHPA	NA	CA SHPO	US EPA	Concurrence Letter from CA SHPO	Submitted			
10/27/14					NHPA	NA	Atlantic Richfield	US EPA	Response to Nevada State Historic Preservation Office Comments on the Cultural Resource Narrative Report	Submitted			
09/09/14					NHPA	NA	US EPA	CA and NV SHPOs	US EPA shipped letters and packages to initiate consultation with CA and NV SHPOs		Submitted		
08/28/14					NHPA	NA	Atlantic Richfield	US EPA	Revised Draft Consultation Letters for CA and NV SHPOs	Submitted			
08/14/14					NHPA	NA	Atlantic Richfield	US EPA	Cultural Resource Narrative Report for the Leviathan Mine Cultural Resources Inventory [Revised]	Submitted			Date on file path not correct.
08/14/14					NHPA	NA	Atlantic Richfield	US EPA	Draft Consultation Letters for CA and NV SHPOs	Submitted			Date on file path not correct.
08/05/14					NHPA	NA	US EPA	Atlantic Richfield	Review Comments on Cultural Resource Narrative Report for the Leviathan Mine Cultural Resources Inventory	Received			
06/03/14					NHPA	Addendum 1	Atlantic Richfield	US EPA	Addendum No. 1, Humboldt-Toiyabe National Forest Cultural Resource Narrative Report for the Leviathan Mine Cultural Resources Inventory	Submitted			
03/17/14					NHPA	NA	Atlantic Richfield	US EPA	Humboldt-Toiyabe National Forest: Cultural Resource Narrative Report for the Leviathan Mine Cultural Resources Inventory	Submitted			
10/28/13					NHPA	NA	CA SHPO	US EPA	Concurrence Letter from CA SHPO for Drill Locations and Surface Water Monitoring Station		Received		
09/20/13					NHPA	NA	US EPA	CA SHPO	Consultation Letter for Drill Locations and Surface Water Monitoring Station		Submitted		
09/16/14					NHPA	NA	Atlantic Richfield	US EPA	Revised Humboldt-Toiyabe National Forest Cultural Resources Narrative Report of Leviathan Mine Locations DB-08D/DB-06S, LOC-10, and ST-09	Submitted			
08/28/14					NHPA	NA	Atlantic Richfield	US EPA	Humboldt-Toiyabe National Forest Cultural Resources Narrative Report of Leviathan Mine Locations DB-06D/DB-06S, LOC-10, and ST-09	Submitted			
05/13/14					NHPA	NA	Atlantic	US EPA	Revised Supporting Materials	Submitted			

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05/03/13					NHPA	NA	Atlantic Richfield	US EPA	Supporting Materials	Submitted			
02/18/13					NHPA	NA	Atlantic Richfield	US EPA	Draft Programmatic Agreement	Submitted			
Feasibility Study Work Plans													
			12/22/16	03/21/2017 (tentative)	FS	BD/PC	Atlantic Richfield	US EPA	Focused Feasibility Study Work Plan - Evaluation of Management Alternatives for Potentially Impacted Water and Sediments within the Leviathan Creek Beaver Dam/Pond Complex. [DRAFT]	In Progress			
11/22/16		11/22/16	12/22/16		FS	BD/PC	US EPA	Atlantic Richfield	EPA Comments on Atlantic Richfield's Outline for a Focused Feasibility Study Work Plan, Evaluation of Management Alternatives for Potentially Impacted Water and Sediments, dated October 7, 2016, and the revised Gantt chart dated November 7, 2016; Leviathan Mine Site, Alpine County, California.	Received, RTC and Work Plan in progress.			Within 30 days, or by December 22, 2016 please provide the Focused Feasibility Work Plan and revised schedule incorporating these comments. Per recent discussions we look forward to a plan that will be implemented during the 2017 season to reduce the threat of a sudden release of the seasonally occurring low pH water or sediment containing elevated metals (i.e. arsenic, nickel, and thallium). If the work plan can achieve the goals outlined above, EPA will approve the proposed FFS approach. If the work plan cannot achieve these goals, EPA will consider initiating an EE/CA and a new removal action focused on addressing the dam situation
11/07/16	11/07/16				FS	BD/PC	Atlantic Richfield	US EPA	Revised Outline and Gantt Chart for Focused Feasibility Study Work Plan for Evaluation of Management Alternatives for Potentially Impacted Water and Sediments within the Leviathan Creek Beaver Dam/Pond Complex	Submitted	US EPA comments delivered 11/22/16		
07/08/16		07/08/16			FS	Geotechnical	US EPA	Atlantic Richfield	EPA Comments on Focused Feasibility Study Geotechnical Evaluation Task Sampling and Analysis Plan, Leviathan Mine Site, Alpine County, California. Leviathan Mine Site, Alpine County, California [sic]. Dated March 31, 2016	Received, RTC in progress			Directs ARC to implement the lead tasks identified in this TSAP and provide a point-by-point RTC and a final TSAP with recommended changes. Requests a report within 90 days of the field work completion that addresses all items in Attachments A, B, and C. EPA notes that additional geotechnical investigations will likely be necessary to complete the FS
03/31/16	03/31/16		01/10/16		FS	Geotechnical	Atlantic Richfield	US EPA	Focused Feasibility Study Geotechnical Evaluation Task Sampling and Analysis Plan [Draft]	Submitted	Comments delivered 07/08/16		
09/09/16	09/09/16				FS	Revegetation	Atlantic Richfield	US EPA	Focused Feasibility Study Revegetation Treatability Study Work Plan [Final]	Submitted	Pending US EPA review		Submitted with response to US EPA, LRW QCB, and USFS comments provided in a letter dated July 7, 2016. Also provides final Work Plan incorporating responses to comments.
07/07/16		07/07/16	Not requested		FS	Revegetation	US EPA	Atlantic Richfield	EPA Comments on Focus Feasibility Study Revegetation Treatability Study Work Plan, Leviathan Mine Site, Alpine County, California Leviathan Mine Site, Alpine County, California [sic], dated June [sic] March 31, 2016	Received			Provides comments from USFS and LRW QCB for full consideration and incorporation. Conditionally approves and directs ARC to complete field work during the 2016 field season per the comments provided. Requests June [sic], August, and September monitoring reports to EPA with any updates and recommended corrective measures. ARC shall integrate the collected information into the Draft RIFS. Does not request RTC.
03/31/16	03/31/16		01/10/16		FS	Revegetation	Atlantic Richfield	US EPA	Focus Feasibility Study Revegetation Treatability Study Work Plan [Draft]	Submitted	Comments delivered 07/07/16		
02/15/16	02/15/16				FS	Geotechnical Revegetation	Atlantic Richfield	US EPA	Updated Schedule for Submittal of Feasibility Study Work Plans	Submitted			
01/15/15					FS	NA	US EPA	Atlantic Richfield	Request for RI/FS schedule and TOC, and a conference call to discuss RI/FS approach	Submitted			Conference call held on 2/9/15
10/14/14					FS	Amendment 2014-01	Atlantic Richfield	US EPA	Received verbal approval of Interim Combined AD Treatability Investigation Work Plan Amendment No. 2014-01	Submitted			
09/26/14					FS	Amendment 2014-01	Atlantic Richfield	US EPA	Interim Combined AD Treatability Investigation Work Plan Amendment No. 2014-01	Submitted			
08/27/14					FS	NA	Atlantic Richfield	US EPA	Leviathan Mine Site Feasibility Study Approach	Submitted			
07/23/14					FS	NA	Atlantic Richfield	US EPA	Response to US EPA Comments on Interim Combined AD Treatability Investigation Work Plan	Submitted			
06/18/14					FS	NA	US EPA	Atlantic	Approval with Comments - Interim Combined AD	Received			

Date	Date Submitted by Atlantic Richfield	Date Submitted by EPA	EPA Requested Due Date	Atlantic Richfield Estimated Timeframe for Submittal	Work Plan / Document	Amendment / Addendum / Revision No.	Author	Recipient	Item	Atlantic Richfield Status	US EPA Status	US EPA Comment	Atlantic Richfield Comment
03/28/14					FS	NA	Atlantic	US EPA	Interim Combined AD Treatability Investigation Work Plan	Submitted			
Feasibility Study Reports													
11/01/16	11/01/16				FS	Revegetation	Atlantic Richfield	US EPA	Revegetation Study October Status Update	Submitted			Email
10/03/16	10/03/16				FS	Revegetation	Atlantic Richfield	US EPA	Revegetation Study September Status Update	Submitted			Email
09/01/16	09/01/16				FS	Revegetation	Atlantic Richfield	US EPA	Revegetation Study August Status Update	Submitted			Email
07/26/16	07/26/16				FS	Revegetation	Atlantic Richfield	US EPA	Revegetation Study July Status Update	Submitted			Email. Includes revised field implementation schedule
03/14/16		03/14/16			FS	US EPA	US EPA	Atlantic Richfield	Draft Technical Review of Interim Combined AD Treatability Investigation Report, Leviathan Mine Site, Alpine County, California	Received	Pending further US EPA review		Conditional approval. Indicates design criteria are not necessarily appropriate or approved for use in remedy selection and design. Also indicates US EPA's concurrence with the attachments (particularly B,C, and D) is pending detailed review by US EPA.
12/18/15	12/18/15		12/30/15		FS	NA	Atlantic Richfield	US EPA	Interim Combined Acid Drainage Treatability Investigation Report	Submitted			
Community Involvement													
01/28/16					Community	TAC	US EPA	Atlantic Richfield	2015 TAC Meeting	Attended			Transmitted final version of TAC slides to US EPA on 2/25/16
06/09/15					Community	Washoe	US EPA	US EPA	Washoe Community Meetings	Attended			Two meetings 6/9/15 and 6/10/15
01/30/15					Community	TAC	Atlantic Richfield	US EPA	TAC Meeting slides	Submitted			
01/30/15					Community	Washoe	Atlantic Richfield	US EPA	Washoe Community Meeting slides	Submitted			
12/03/14					Community	TAC	US EPA	Atlantic Richfield	Request for Slides for TAC Meeting scheduled for January 20, 2015	Received			email?
Other													
9/29/2016					Multiple	Groundwater	Atlantic Richfield	US EPA	Quarterly Technical Meeting	Conducted			
8/29/2016					Multiple	BD/PC	Atlantic Richfield	US EPA	Technical Meeting: Beaver Dam / Pond Complex Contingency Planning and Restoring Flows to Leviathan Creek	Conducted			Sign-in sheet and presentation materials uploaded to SharePoint on 9/1/16.
8/17/2016	8/7/2016				Reference	Drilling	Atlantic Richfield	US Forest Service	Plant Reconnaissance for 2016 Drill Locations on U.S. Forest Service-Managed Lands, Leviathan Mine Site, Alpine County, California	Submitted	Pending US Forest Service review		No plants identified in the area are included on the Carson Rapid Assessment Chart.
06/24/16	06/24/16				Multiple	NA	Atlantic Richfield	US EPA	Updated Prioritization List of Work Plans and Document Approvals Needed for 2016 Field Program	Submitted			
06/23/16	06/23/16				NA	NA	Atlantic Richfield	US Forest Service	2016 Ground Disturbance Plan for Well Installation	Submitted			
06/13/16					Multiple	NA	Atlantic Richfield	US EPA	Quarterly Technical Meeting	Conducted			
03/28/16					Multiple	NA	Atlantic Richfield	US EPA	Quarterly Technical Meeting	Conducted			Data discussion in morning, drilling discussion in afternoon
01/19/16					Multiple	NA	Atlantic Richfield	US EPA	Quarterly Technical Meeting and Management Meeting	Conducted			US EPA provided presentation materials on 1/18/19
12/10/15					Multiple	NA	Atlantic Richfield	US EPA	Quarterly Technical Meeting	Conducted & post-meeting documents uploaded			Proposed agenda and draft presentation material sent on 12/4/15. Post-meeting upload of meeting notes, agenda, attendance list, and presentation materials on 01/09/15.
09/22/15					Multiple	NA	Atlantic Richfield	US EPA	Technical Meeting: site conceptual model, groundwater and surface water reports, lower Bryant Creek investigation, acidic pond investigation, mine waste characterization	Conducted & post-meeting documents uploaded			Post-meeting upload of meeting documents on 11/02/15.
08/28/15					Multiple	NA	Atlantic Richfield	US EPA	Notification of Plans for Macroinvertebrate Community Monitoring, September 2015 Sampling Event	Submitted			EPA acknowledged via email on 9/15/15.
08/18/15					On-Property	NA	Atlantic Richfield	US EPA	Technical Webinar: Mine Waste Data Evaluation	Submitted			Pre-meeting submittal sent on 8/18/15. Atlantic Richfield to provide meeting summary.
08/14/15					NA	NA	Atlantic Richfield	US EPA	Notification of New SharePoint Site	Submitted			
08/07/15					Multiple	NA	Atlantic Richfield	US EPA	Request for Submittal Date Extensions [DQOs/Cross-Reference Matrix, On-Property FRI Work Plan Amendment No. 10 Revision 2, Reference Area Work Plan]	Submitted			

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07/13/15	08/19/15				Multiple	NA	Atlantic Richfield	US EPA	Quarterly Technical Meeting: mine waste characterization, surface water evaluation, groundwater evaluation	Submitted			Pre-meeting submittal sent on 7/10/15. Post-meeting submittal of meeting notes, agenda, attendance list, and presentation materials provided on 8/19/15.
07/27/15					Multiple	NA	Atlantic Richfield	US EPA	Updated 2015 RI/FS Field Schedule	Submitted			
05/29/15					On-Property	NA	USACE	Atlantic Richfield	USACE response to Notification of Flow Monitoring Equipment Installation Under CERCLA Permit Exemption	Received			
05/14/15					On-Property	NA	Atlantic Richfield	US Forest Service	Ground Disturbance Plan for Well Installation	Submitted			
05/14/15					On-Property	NA	Atlantic Richfield	USACE	Notification of Flow Monitoring Equipment Installation Under CERCLA Permit Exemption	Submitted			
05/08/15					Multiple	NA	Atlantic Richfield	US EPA	Simplified and Updated RI/FS Schedules for 2015	Submitted			
04/01/15					Multiple	NA	Atlantic Richfield	US EPA	Technical Meeting: data usability	Submitted			
02/12/15					RI/FS	NA	Atlantic Richfield	US EPA	Request for Extension to Deliverables Identified in Two January 15, 2015 U.S. EPA letters	Submitted			
01/26/15					Multiple	NA	US EPA	Atlantic Richfield	EPA comments on the Request for Submittal Date Extensions, dated December 12, 2014	Received			Regarding ERA work plan, DQOs, Ref work plan, EFCR memo, Amendment 9
01/21/15					Multiple	NA	Atlantic Richfield	US EPA	Quarterly Technical Meeting: plant sampling approach, pit hydraulic evaluation, SQT approach and objectives, data evaluation strategy	Submitted			Presentation materials and sign-in sheet submitted to U.S. EPA on 1/30/15
12/12/14					Multiple	NA	Atlantic Richfield	US EPA	Status of U.S. Environmental Protection Agency Document Requests and Request for Submittal Date Extensions	Submitted			
11/17/14					Multiple	NA	US EPA	Atlantic Richfield	Sign-in sheet and notes from October 6, 2014, Quarterly Technical Meeting	Received			
10/06/14					Multiple	NA	Atlantic Richfield	US EPA	Quarterly Technical Meeting: reference area work plan, reference area and screening level comparisons, further discussion of mine waste characterization, other administrative issues, outstanding risk assessment issues	Submitted			
10/03/14					Multiple	NA	Atlantic Richfield	US EPA	Pre-brief materials for October 6, 2014, Quarterly Technical Meeting	Submitted			
09/22/14					NA	NA	US EPA	Atlantic Richfield	Request for additional analysis of hydrocarbon-like containing materials	Received			E-mail
08/07/14					NA	NA	Atlantic Richfield	US EPA	RI/FS Review and Technical Meeting				Copy of presentation provided to EPA on 8/28/14
07/10/14					On-Property	NA	US EPA	Atlantic Richfield	Landslide Walk	Attended			
03/20/13					Multiple	NA	US EPA	Atlantic Richfield	RI/FS Review and Technical Meeting				
05/25/12					Multiple	NA	Atlantic Richfield	US EPA	Leviathan Mine FRI Work Plan Cross Reference Matrix				Attachment A to Off-Property FRI Work Plan Amendment No. 1

= Recent activity; no action pending
= Pending by Atlantic Richfield
= Pending by US EPA
= Line to be hidden

Note(s)
Entries may not represent exact name of document.

Abbreviation(s)
AD = Acid Drainage
APE = Area of Potential Effects
ARC = Atlantic Richfield Company
ARPA = Archaeological Resources Protection Act
Atlantic Richfield = Atlantic Richfield Company
BERA = Baseline Ecological Risk Assessment
BHHRA = Baseline Human Health Risk Assessment
CA = California
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act

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DPZ = drive-point piezometer
DQO = Data Quality Objective
DSA = Downstream Study Area
DU = Decision Unit
EFCR = East Fork Carson River
ERA = Ecological Risk Assessment
EPA = U.S. Environmental Protection Agency
FPXRF = Field-Portable X-Ray Fluorescence
FRI = Focused Remedial Investigation
FS = Feasibility Study
HHRA = Human Health Risk Assessment
HPMP = Historic Properties Management Plan
HPTP = Historic Properties Treatment Plan
ISM = Incremental Sampling Methodology
LRWQCB = Lahontan Regional Water Quality Control Board
NA = Not Applicable
NHPA = National Historic Preservation Act
NV = Nevada
QTM = Quarterly Technical Meeting
PWP = Program Work Plan
RI = Remedial Investigation
RI/FS = Remedial Investigation/Feasibility Study
RTC = response to comments
SHPO = State Historic Preservation Officer
SQT = Sediment Quality Triad
TDSR = Technical Data Summary Report
T&E = Threatened and Endangered
TAC = Technical Advisory Committee
TBD = To Be Determined
TOC = Table of Contents
TSAP = Task Sampling and Analysis Plan
UAO = Unilateral Administrative Order
US EPA = U.S. Environmental Protection Agency
USACE = U.S. Army Corps of Engineers
USFWS = U.S. Fish & Wildlife Service