



## United States Department of the Interior



### FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office  
2800 Cottage Way, Room W-2605  
Sacramento, California 95825-1846

In Reply Refer To:

JAN 6 2010

Mr. Kevin Mayer  
U.S. Environmental Protection Agency, Region IX  
75 Hawthorne Street (Mail code SFD-7-2)  
San Francisco, California 94105-3901

Subject: Comments on Atlantic Richfield Company's (ARCO) Program Work Plan (PWP) for the Leviathan Mine Remedial Investigation/Feasibility Study (RI/FS), in Alpine County, California

The U.S. Fish and Wildlife Service (Service) appreciates the opportunity to review and comment on the PWP for the Leviathan Mine RI/FS submitted to the U.S. Environmental Protection Agency (USEPA) by ARCO on July 10, 2009. The attached comments are based on a review of the PWP and addendums to the PWP submitted by ARCO to USEPA on November 16, 2009. In addition to reviewing the recent documents produced by ARCO and comments produced by the various parties, the Service also attended the Technical Advisory Committee (TAC) meeting held in Carson City on December 1, 2009.

The Service's interest is to ensure that actions taken at the site to control and prevent discharge of acid mine drainage from Leviathan Mine to Leviathan Creek and the surrounding habitat are fully protective of natural resources including the Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*), listed as threatened under the Federal Endangered Species Act. In addition, we anticipate completing a Natural Resource Damage Assessment (NRDA) with our fellow natural resource trustees (Trustees) including the USDA Forest Service, Bureau of Indian Affairs, California Department of Fish and Game (CDFG) and the Washoe Tribe for the necessary compensatory restoration. Data collected during the RI/FS and NRDA can be useful to both processes and we wish to coordinate these efforts as much as possible. In addition, the degree of protectiveness of any remedy at the site and the amount of time prior to full implementation of any remedy directly impacts the size of claim the Trustees may make for the Natural Resources Damage (NRD) case.

Through the TAC meetings we have heard anecdotal statements regarding the presence of fish in creeks downstream from Leviathan Mine. While we appreciate any potential improvements in the water quality or habitat quality in the creeks receiving releases from Leviathan Mine, the Service is concerned that casual observations not supported by scientific information and studies can be misleading. Fish surveys were conducted by the CDFG as part of the Leviathan Mine NRDA in October, 1998 (Lehr, 2000) and October, 2006 (Hanson, 2007). The same reaches of upper Leviathan and lower Leviathan Creek, Aspen Creek, Bryant Creek and Mountaineer Creek surveyed in 1998 were also surveyed in 2006. During these surveys no fish were observed in Aspen Creek and in the middle portion of Bryant Creek. The report for the fish survey

conducted in 1998 indicates that stream reaches not affected by the releases from Leviathan Mine had very high densities of fish relative to those reaches that were influenced by the mine releases. The report for the fish survey conducted in 2006 concluded that the densities of fish in reaches affected by the releases from the mine site were low relative to those reaches not affected by releases from the mine. The report on the 2006 survey also stated that the increases in rainbow trout (*Oncorhynchus mykiss*) and brook trout (*Salvelinus fontinalis*) in the portion of Bryant Creek immediately downstream from Mountaineer Creek may indicate that rainbow and brook trout are moving from Mountaineer Creek into Bryant Creek. The same report also stated that the single rainbow trout and single brook trout captured in lower Leviathan Creek immediately upstream from Mountaineer Creek most likely moved out of Mountaineer Creek. As you know, Mountaineer Creek is not suspected of being directly influenced by releases from Leviathan Mine.

Scientific information regarding the health of the biota is critical to the NRD claim. Data on improvements to the health of the ecosystem will be used specifically to calculate the amount of compensatory restoration required for the NRDA. Data to document the time when improvement begins and the degree of that improvement over time would be useful to the NRDA. In addition, information regarding untreated releases which may degrade any improvement would be useful to the NRDA.

The Service appreciates the significant work ARCO is doing at the Leviathan Mine site under order from USEPA. In general, we agree with the interim actions taken recently at the site to extend the season during which controls of Acid Mine Drainage (AMD) to Leviathan Creek are in place and the actions to plan and complete the RI/FS and move towards a final remedy. We assume that some of the improvements and technologies in use at the site will be part of the configuration of alternatives evaluated in the Feasibility Study for the Final Remedy. As such, it is critical to know whether discharges from these technologies will be fully protective of the biota in Leviathan Creek. We note that the interim discharge requirements currently in place should not be assumed to be fully protective. For example, the discharge criteria from the *Leviathan Modification to Removal Action Memorandum* (USEPA, 2008) for aluminum (maximum dissolved: 4,000 µg/L and average dissolved: 2000 µg/L) is much higher than National Toxics Rule criteria for aluminum (Criterion Maximum Concentration, total recoverable: 750 µg/L and Criterion Continuous Concentration, total recoverable: 87 µg/L). In the past, USEPA indicated that it wished to convene a work group to address the issue of appropriate discharge requirements for the Final Remedy. The Service is interested in participating in such a group to ensure protectiveness of the Final Remedy.

If it would be useful, the Service is willing to offer a discussion or presentation, on behalf of the Trustees, covering the NRDA process as the NRDA and clean-up can be conducted most efficiently when closely coordinated with each other. Data collected during the RI can often be used for the NRDA and studies for the NRDA can provide data useful for the RI thereby resulting in cost savings. In addition, the injuries to natural resources caused by continued releases or continued injuries occurring in areas that cannot be cleaned-up result in a larger NRD claim.

Mr. Kevin Mayer

3

If you have questions regarding our comments or the NRDA process at the site please call Janet Whitlock at (916) 414-6599 or John Henderson at (916) 414-6595.

Sincerely,



*tsf*

M. Kathleen Wood  
Assistant Field Supervisor

Attachments

cc:

Chuck McKinley, DOI SOL, Oakland, CA  
Becky Stanton, CDFG, Sacramento, CA  
Lynelle Hartway, Washoe Tribe, Gardnerville, NV  
Ken Maas, USFS, Sparks, NV  
Chein Ping Kao, RWQCB, South Lake Tahoe, CA  
Steven Siegel, NDOW, Reno, NV  
Wendy Johnson, CDFG, Sacramento, CA  
Kirk Minckler, USDA, Golden, CO  
John Krause, BIA, Phoenix, AZ  
Damian Higgins, FWS, Sacramento, CA  
Bob Williams, FWS, Reno, CA

References

Hanson, John. 2007. Results of Fish Surveys in the Leviathan Mine Area In Fall 2006. CDFG

Lehr, Stafford. 2000. Leviathan Mine Natural Resources Damage Assessment, Phase I Fisheries Assessment, CDFG.

U.S. Environmental Protection Agency. 2008. Leviathan Modification to Removal Action Memo <http://yosemite.epa.gov/r9/sfund/r9sfdocw.nsf/ViewByEPAID/cad980673685?OpenDocument#documents>.

**United States Fish and Wildlife (Service) comments on Atlantic Richfield Company's (ARCO) Program Work Plan (PWP) for the Leviathan Mine Remedial Investigation/Feasibility Study (RI/FS), in Alpine County, California, dated July 10, 2009 and addendums dated November 16, 2009**

**General Comments**

- 1) Important elements of the RI/FS work presented in the PWP are the bioassessment studies proposed for both on/off-property habitats. In addition to the COPC characterization, water quality and sediment bioassay work elements that are discussed in the plans for the bioassessment investigations, the Service would suggest that a habitat quality assessment element be considered in the bioassessment investigations. Established protocols for rapid bioassessment are in use and one protocol is the *Rapid Bioassessment Protocols For Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish, Second Edition*. EPA 841-B-99-002.
- 2) In addition to the Habitat Related Surface Water Sampling proposed in the bioassessment studies, the Service suggests that the RI/FS should include surface water toxicity bioassays for all on/off-property locations and study areas including reference areas. The toxicity bioassays can help identify water quality issues that might not be apparent through analysis of COPC concentrations. The USEPA standard that might be considered for this type of work is the document titled: *Short-term methods for estimating the chronic toxicity of effluents and receiving water to freshwater organisms, Forth Edition*. EPA-821-R-02-013.
- 3) In some areas the PWP presents very specific information and in other areas the discussion is very general and leaves the reader wondering if the information is a placeholder indicating further evaluation will be done or if it is the endpoint of a formal evaluation.
- 4) The Service reviewed comments on the PWP submitted by the California Regional Water Quality Control Board, Lahontan Region on November 12, 2009 to USEPA and in general supports the Regional Board comments. The Service strongly agrees with Regional Board comments General Comment 5 and Specific Comments 2, 4, 5, 7, 24, 61, 66, 67, 70, 73-81, 92, 93, 96, 100, 101, 103, 104, 106-110, 112 -118, 120, 121, 129, 130, 132, 138, 140, 143, 144-152, 159, 164-169, 173 and 174.
- 5) There are unsupported and inaccurate statements and missing information in the PWP and in the newly proposed FRI Work Plans. In addition, there are inconsistencies between statements in the DQO document and the PWP. Some of these statements are discussed in the Regional Board comments and in the following specific comments by the Service. The Service suggests that a reconciliation of stakeholder comments be made and incorporated into a final PWP document. The Service hopes that the forthcoming FRI work plans/sampling plans for the Leviathan Mine RI/FS will incorporate or at least answer stakeholder comments.

## Specific Comments

### 3.0 Initial Evaluations

#### 6) Section 3.1.1, Previous Investigations, Pg 52 PWP

Attached is a list of investigations conducted for the Natural Resource Damage Assessment. Some of the reports on the attached list were not included on the list of previous investigations starting on Page 52 of the PWP or on Table 3 of the PWP. It is not clear if the investigations were excluded because the authors of the PWP were not aware of the reports or if the reports are not considered useful to the RI/FS process. One report in particular is the, *Phase II Report: The Toxicity and Chemistry of Receiving Streams During Evaporation Pond Overflows at the Leviathan Mine*, dated April, 1999 by Thompson and Welsh (2000).

#### 7) Section 3.3.4, Page 74

The text in this section refers to a list of ARARs but there is not an ARAR list in this section and the text does not indicate the location of the ARAR list in a table or some other location in the PWP or another report. If this list exists, the Service is interested in reviewing it.

#### 8) Section 3.4, Page 75

In the Ecological Risk Conceptual Model (Figure 44), there is only one possible complete exposure pathway listed for groundwater (riparian plants). Exposure to mine affected groundwater could potentially occur outside of the riparian zone and the Service suggests inclusion of a pathway to represent this exposure scenario. Deeply rooted trees that are not located in the riparian zone could be exposed to contaminated groundwater, for example. In addition, burrowing species and soil invertebrates could also be exposed to shallow groundwater.

#### 9) Section 3.4.2, Page 78

At least several times, pH was included in the discussions at the December 1, 2009 TAC meeting as being an indicator of improving water quality or as a standard met by treatment systems. However, the use of pH is not clear from the discussion in this section and it appears that it will not be considered along with the sulfates and sulfuric acid.

The chemicals (total sulfate, ferric sulfate, ferrous sulfate and sulfuric acid) listed under the four bullets at the top of Page 78 should not be excluded from the list of COPCs without a rationale for the exclusion being presented. These chemicals should be evaluated for their potential toxicity to receptors in the study areas and included in the Human and Ecological Risk Assessments. Sulfate, for example, is a known toxicant to aquatic moss as described in the paper by Davies (2008). [Davies, Trevor D. Sulphate toxicity to the aquatic moss, *Fontinalis antipyretica*, *Chemosphere* 66 (2007) 444-451]

The SOW states that additional COCs may be identified during the Remedial Investigation but this statement is not apparent in the PWP. Additional COCs may include chemicals that are utilized in existing or proposed treatment systems and then remain in the treatment system effluent.

10) Section 3.4.5.2, Page 86

Bullet number 1, last sentence, "Additional data is required to characterize soil COPC concentrations in on-property and surrounding area habitats utilized by ecological receptors." The Data Quality Objectives document and the PWP define the study areas or the on- and off-property areas but here the reader is left wondering why the location of the "...surrounding area habitats..." is not spelled out specifically as this information was presented earlier.

11) Section 3.4

Stressors at the mine site may not be limited to chemical stressors and may include physical and biological stressors as well. (ERA Guidelines, Pg A-4). These stressors should be considered and discussed in the PWP. The physical and biological stressors caused by releases from Leviathan Mine or from the operation of treatment systems could include, for example, the smothering effect of very fine material eroded from the de-vegetated areas; the smothering effect of metal precipitates accumulating on benthic substrates; rapid changes in stream discharge, water levels and certain water quality parameters such as temperature, pH and conductivity; or rapid changes in contaminant concentrations. Stressors could also include changes in habitat quality, such as changes in riparian vegetation, brought about by exposure to COPCs.

## **5.0 RI Approach**

12) Section 5.1.2 Page 97

In the discussion of Task BIO-3 on page 98 the text refers to "anecdotal information" concerning the chemical analysis of fish tissue collected in vicinity of Leviathan Mine by the Service. Two investigations (Thompson and Welsh, 1999 and Higgins, 2006) conducted by the Service included the analysis of fish tissue for at least some of the COPCs (listed in Section 3.4.2 on Page 74) and are included on the list of previous investigations in Section 3.1.1. on Page 52.

13) Section 5.2.4 DSA (Downstream Study Area), Page 118

The geographic coverage of all applicable off-property FRIs should extend as far downstream from Leviathan Mine as necessary to encompass the extent of contamination by mine releases. Based on photos of discolored water flowing from Bryant Creek to the East Fork of the Carson River (EFCR) shown by Regional Board staff at the Leviathan Mine TAC on Dec. 1, 2009, it is evident that material from Leviathan Mine has been transported at least to the EFCR. Page 7 of the SOW discusses the importance of conducting an evaluation of sediments at the Ruhenstroth Dam Site which is approximately 5 miles downstream from the EFCR /Bryant Creek confluence. However, in this section, there is no mention of the EFCR or the Ruhenstroth Dam Site. None of the Maps and Figures included in the PWP indicate that "Lower" Bryant Creek or any part of the EFCR is part of the DSA. The description of the DSA should include all of Bryant Creek and the East Fork of the Carson River at least to the Ruhenstroth Dam. The RI/FS should include a plan to determine if contamination caused by Leviathan Mine releases extends downstream of the Ruhenstroth Dam.

This section, under Task DSA-1, states that based on anecdotal information it is suspected that Leviathan Mine waste rock was used as road bed material. The Service agrees that areas potentially impacted by mine waste from the road bed, such as the areas along side the road, should be considered in RI/FS Task DSA-1.

## 6.0 Risk Assessment Approach

### 14) Section 6.2 Page 124

The second paragraph in this section refers to Figure 46 in defining the ERA study area. Figure 46 shows a circle approximately 2.25 miles in diameter superimposed over the Leviathan Mine area and the figure is titled "Habitat Study Area." This figure implies that only the area within the circle will be part of the ERA. It appears that the extent of geographical coverage of the ERA was defined in an arbitrary manner. The area shown in Figure 46 has no relationship to the area where hazardous substances from Leviathan Mine may have been transported and hence where the exposures will occur. Either the text in this section should be changed to relax the definition of the area where the ERA will be conducted as given in Figure 46 or Figure 46 should be changed to better reflect the extent of contamination and adverse effects from the mine releases supported by the existing information.

### 15) Section 6.2.1.2, Page 125-6: Listing of Assessment Endpoints No. 1 through 7.

The text states, "Assessment endpoints selected for the Leviathan Mine Baseline ERA are presented below." This may be a formal identification of the Assessment Endpoints or perhaps is just a placeholder. It is not clear which is the case. If this is a formal identification of the endpoints then supporting information to support this evaluation should be presented.

## 7.0 Feasibility Study Approach

### 16) Section 7.0, Page 131, 2<sup>nd</sup> paragraph

This paragraph leads the reader to believe that the Responsible Party may be planning winter storage as part of the Final Remedy. The Service is concerned that a remedy which includes winter storage would not be fully protective of downstream resources. The Service expects a full evaluation of all potential alternatives in the final feasibility study. The Service also expects that any early action contemplated as part of the Final Remedy would undergo a full evaluation in a feasibility study, including evaluation against the nine criteria and appropriate public review.

### 17) Section 7.2.1, Page 137

The bold text of the last bulleted item in this section does not include off-property treatment. If USEPA has decided to exclude this option, it should be properly evaluated and documented.

### 18) Section 7.2.2, Page 137

This section lists remedial technologies and process options that will be considered in the FS Report. If off site treatment has not been excluded per the comment above, do the technologies listed here include all that would be required for off-site treatment alternatives?

## Tables, Attachments and Addendums

### 19) Tables 5 and 6, of the SAP, Pages 33 and 34.

The method detection limits may be above the appropriate water quality criteria for many of the analytes. If so, methodologies with lower detection limits must be selected.

20) Table 1, FRI Work Plan Structure

According to Table 1 there are not any bioassessment plans proposed for off-property areas. The reasons for not extending the bioassessments to off-property areas such as the DSA have not been stated. What is the rationale for limiting bioassessment work to the on-property area?

21) Table 41, Review of Existing Data Sources for Inclusion in the Risk Assessment

The title of the table does not state which risk assessment this review applies to. Is it the human health risk assessment or the ecological risk assessment? In any case there does not appear to be any discussion in the text of the PWP or the SAP regarding the selection process and criteria applied to the existing data.

22) Table 48, Animal Species Potentially Present And Their Preferred Habitat

For the fish section of this table please see:

Chapman, G.A., 1999. An Acute TRV for Rainbow Trout and Bull Trout. Report prepared for the Montana Natural Resources Damage Program, Helena, MT, USA. 16 April.

23) Reference FRI Data Quality Objectives (Draft)

In general, this document is lacking in detail and specificity to allow for a meaningful review. The Service requests the opportunity to review and comment on the completed draft of the Reference FRI before data collection based on this FRI commences. Some specific comments are given below.

**Step-7- Optimize the Design for Obtaining Data**

**Sediment**

In this sub-section the use of Multi-incremental sampling (MIS) methodology is proposed and the reader is referred to a "description" but the location of the description is not given. The reader is referred to "Section X.X.X" for a detailed description of the plan. There is not enough information given to review this section.

**Biota**

**Vegetation**

An ecological risk assessment should not necessarily be based only on the abundance of an organism and the likelihood of a receptor consuming that organism. This is not enough information on which to base sampling strategy for an ERA. Please review the document *Ecological Risk Assessment Guidance for Superfund* (USEPA, 1998) and other associated guidance documents which can be found at the following website <http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=12460>

**Fish**

The reader is referred to Section X.X for detailed information on the proposed methodology. Detailed information on methodology is missing and adequate review is not possible.

## Leviathan Mine Reports Prepared for the Trustees

TITLE	DATE	AUTHOR	STUDY
<b>FISH</b>			
Phase I Data Report: Concentrations of Metals and Trace Elements in Aquatic Insects and Fish	Dec, 1999	USFWS (Thompson & Welsh)	Fish and macroinvertebrate tissue analysis
Phase I: Leviathan Mine NRDA Fisheries Assessment	Oct, 2000	CDFG (Lehr)	Fish survey
Preliminary Assessment of Fish Community Dynamics and Trace-Element Exposures to Aquatic Invertebrates and Salmonids, Lower Bryant Creek and East Fork Carson River, Douglas County, Nevada, 2001 (Draft)	Aug, 2006	USFWS (Higgins)	Fish survey; fish and macroinvertebrate tissue analysis
Results of Fish Surveys in Leviathan Mine Area In Fall 2006	May, 2007	CDFG (Hanson)	Fish survey
<b>MACROINVERTEBRATES</b>			
Aquatic invertebrate bioassessment monitoring of Acid Mine Drainage impacts in the Leviathan Creek Watershed	Aug, 1995	Sierra Nevada Aquatic Research Lab (Herbst)	Macroinvertebrate survey
Aquatic invertebrate bioassessment monitoring of Acid Mine Drainage impacts in the Leviathan Creek Watershed	June, 1997	Sierra Nevada Aquatic Research Lab (Herbst)	Macroinvertebrate survey
Bioassessment monitoring of Acid Mine Drainage impacts in streams of the Leviathan Mine watershed for Spring and Fall 1999	Aug, 2000	Sierra Nevada Aquatic Research Lab (Herbst)	Macroinvertebrate survey
Bioassessment monitoring of Acid Mine Drainage impacts in streams of the Leviathan Mine watershed for Spring and Fall 2000	Jan, 2002	Sierra Nevada Aquatic Research Lab (Herbst)	Macroinvertebrate survey
Bioassessment monitoring of Acid Mine Drainage impacts in streams of the Leviathan Mine watershed: An Update for 2001 and 2002 Surveys	Jan, 2004	Sierra Nevada Aquatic Research Lab (Herbst)	Macroinvertebrate survey
Bioassessment monitoring of Acid Mine Drainage impacts in streams of the Leviathan Mine watershed: An Update for 2003 Surveys	Oct, 2004	Sierra Nevada Aquatic Research Lab (Herbst)	Macroinvertebrate survey
<b>WATER QUALITY</b>			
Water and Sediment Toxicity Testing and Benthic Community Data: September 1998 Assessment	Dec, 1999	ENSR	Water, sediment, macroinvertebrate tissue analysis; bioassays
Phase II Report: The Toxicity and Chemistry of Receiving Streams During Evaporation Pond Overflows at the Leviathan Mine in April, 1999	Jan, 2000	USFWS (Thompson & Welsh)	Water analysis; bioassays
Data on stream-water and bed-sediment quality in the vicinity of Leviathan Mine,	2000	USGS (Thomas & Lico)	Water and sediment analysis

Alpine County, Ca and Douglas County, NV, September 1998			
Influence of natural sources on mercury in water, sediment and aquatic biota in seven tributary streams of the North Fork of the Upper Carson River, California	2002	Fischer & Gustin	Water, sediment, macroinvertebrate tissue analysis
Water Quality Study Report for the Natural Resource Damage Assessment of Surface Water Below the Leviathan Mine, Alpine County, CA and Douglas County, NV	Mar, 2006	USFWS (Markin & Yee)	Water quality monitoring, water analysis
Toxicity and Chemistry of Leviathan Creek and Bryant Creek in February 2001.	forthcoming	USFWS	Water analysis, bioassays
<b>RIPARIAN VEGETATION</b>			
Leviathan Mine Floodplain Soil and Riparian Vegetation Study	July, 2004	David Evans & JBR	Soil and plant tissue analysis; riparian cover survey
Leviathan Mine Plant Study: Trace Metals and Mercury Results	May, 2006	Frontier Geosciences	Plant tissue analysis
Leviathan Creek Riparian Scorecard Monitoring Report	forthcoming	USFS (Bergstrom & Howell)	Riparian cover survey
Historical Riparian Vegetation Analysis via Remote Sensing and Aerial Photography	forthcoming	Ocean Imaging	Riparian cover survey