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Anthony R. Brown
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April 7, 2017

Lynda Deschambault
Remedial Project Manager, Superfund Division
U.S. Environmental Protection Agency, Region 9
75 Hawthorne Street, 10th Floor (SFD 7-1)
San Francisco, California 94105

Subject: Implementation of 2017 Surface Water Monitoring Program
Leviathan Mine Site
Alpine County, California

Dear Ms. Deschambault:

Atlantic Richfield Company (Atlantic Richfield) requests approval for implementation of a 2017 interim post-Remedial Investigation (RI) surface water monitoring program for the Leviathan Mine Site in Alpine County, California. The surface water monitoring program is being implemented in partial fulfillment of the requirements of Statement of Work attached to the Administrative Order for Remedial Investigation and Feasibility Study, Comprehensive Environmental Response, Compensation, and Liability Act Docket No. 2008-18 issued by the U.S. Environmental Protection Agency (U.S. EPA) on June 23, 2008.

As described in the latest version of the Surface Water Technical Data Summary Report[1] (Surface Water TDSR) submitted on March 14, 2016, Atlantic Richfield believes that surface water data collected through 2016 are adequate for the completion of the RI/FS and related human health and ecological risk assessments. However, additional surface monitoring is proposed for 2017 to continue to provide an ongoing record of general trends in surface water quality under anticipated high-flow conditions while monitoring the effects of treated water discharges during the spring, summer, and fall seasons.

Further details on the background, rationale, and proposed modifications to the 2017 surface water monitoring program are described in this letter.

BACKGROUND

In 2012 and 2013, surface water flow rates were measured manually and surface water samples were collected at approximately 30 locations. Surface water monitoring locations are shown on Figure 1 (attached). Surface water flow rates were measured approximately monthly at on-property locations and surface water samples were collected during four separate events that were scheduled based on capture and treatment of the Channel Underdrain (CUD), Delta Seep (DS), and discharge from the High Density Sludge (HDS) Treatment System and

[1] Atlantic Richfield, 2016. Surface Water Technical Data Summary Report, Leviathan Mine Site, Alpine County, California. Prepared by Amec Foster Wheeler, March 14 (Draft).

Lahontan Regional Water Quality Control Board (LRWQCB). The four events typically occur in approximately April/May, June, August, and October/November.

In 2014 and 2015, Atlantic Richfield requested and the U.S. EPA approved a reduced sampling program during the second and third events because of below normal surface water flow conditions caused by three to four years of drought. Atlantic Richfield implemented the reduced surface water monitoring program in 2014 and 2015 to the extent practicable.

In 2016, after a return to near normal surface water flow conditions, Atlantic Richfield requested and the U.S EPA approved sampling at 30 locations for three events (high-flow conditions in the spring, times when both treatment systems are operating and discharging, and during low flow conditions in the fall). The intent of the sampling was to confirm that higher precipitation years will result in lower metals concentrations in surface water, which was one of the conclusions in the Surface Water TDSR. In addition, Atlantic Richfield collected monthly flow measurements at 26 on-property surface water locations to assist in evaluating surface water flow conditions during a near normal flow year.

RATIONALE FOR PROPOSED MODIFICATIONS TO SURFACE WATER MONITORING PROGRAM

Atlantic Richfield recognizes that the amount of precipitation recorded to date in 2017 indicates that the flows during spring runoff will be above what was measured during the previous years of RI data collection (2012 through 2016). Because the surface water flow conditions are likely to be much higher than average, Atlantic Richfield recommends collecting samples and measuring flow at all 30 locations, as practicable, during the first event.

Other than the opportunity to perform surface water monitoring during the unusually high flows likely to occur during the first event, Atlantic Richfield anticipates that when the 2017 snowpack has melted, the surface water flows in Leviathan, Aspen, and Bryant Creeks will recede to slightly above average or average flows. As explained in the section above, surface water chemistry and flow were monitored at all locations during 2016, which was an average precipitation year. Therefore, the second and third sampling events in 2017 will only need to be performed at limited locations to monitor overall temporal changes in surface water chemistry and mass loading to Leviathan Creek and to confirm that 2017 surface water chemistry is similar to that collected in previous years. Additionally, monthly flow measurements during months when no sampling occurs are not necessary since these data have already been collected during approximately average flows in prior years.

RECOMMENDATIONS

As was completed in 2016 and as recommended in the Surface Water TDSR, Atlantic Richfield recommends that the 2017 monitoring frequency continue to coincide with high-flow conditions in the spring, times when both treatment systems are operating and discharging, and during low flow conditions in the fall, for a total of three events. The first event will consist of sampling and measuring flow at the 24 on-property and 6 off-property locations that have been sampled in

previous years. The second and third events would consist of sample collection and measuring flow at seven locations: SW-01, SW-08, SW-09, SW-10, SW-15, SW-16, and SW-25.

Atlantic Richfield recommends discontinuing monthly flow measurements previously performed in months when no surface water sampling was performed. However, flow measurements will continue to be collected at all sampling locations at the time of surface water sampling. In addition, year-round flow measurements will continue to be collected at U.S. Geological Survey (USGS) gages installed at SW-01, SW-05, SW-06, SW-12, SW-15, SW-18, SW-25, SW-27, SW-29, and flow stations installed in the Upper Tributary for the RI (SF-01, SF-02, and SF-03) to assess surface water flow conditions in 2017.

REPORTING

Atlantic Richfield will complete a comprehensive surface water evaluation that incorporates 2012 through 2016 data so that a post RI surface water monitoring program can be developed. This evaluation would include proposed stations to be monitored, constituents to be analyzed, and monitoring frequency. Surface water data collected during the 2014, 2015, and 2016 field seasons will be incorporated into the Surface Water TDSR to be presented as an appendix to the Site Characterization Report planned for submittal by the end of 2017. As described in our March 3, 2017 letter[2] regarding the RI/FS schedule provided as follow up to our January 17, 2017 management meeting, sampling data collected during the 2017 field season will not be incorporated in the Site Characterization Report.

After surface water data collected in 2017 is made available for evaluation, results from this event can be used in conjunction with those collected during 2016 (during near normal flow conditions) to support the evaluation of metals concentrations in surface water during high-flow years. Atlantic Richfield does not anticipate that the 2017 surface water data will be substantially different from the surface water data already collected during the RI/FS surface water monitoring or produce new data that will materially affect the characterization of surface water conditions.

ACCESS AND TIMING CONSIDERATIONS

Surface water flows during the spring are anticipated to be the highest observed since RI surface monitoring has been implemented. As a result, Atlantic Richfield will attempt to collect samples or flow measurements at the identified locations, but certain locations may be inaccessible because of high-flow conditions. If conditions are encountered where a location cannot be safely accessed, the conditions preventing access will be documented.

High precipitation during the 2017 winter months has required the LRWQCB to perform spring treatment of pond water. Treated water discharge from spring treatment may be occurring during or near to the time Atlantic Richfield is planning on conducting the first sampling event. Atlantic Richfield will monitor any ongoing spring treatment activities and consider spring treatment discharges to Leviathan Creek into the timing of surface water sampling. Atlantic

[2] Atlantic Richfield, 2016. Follow Up to January 17, 2017 Management Meeting, Remedial Investigation Feasibility Study (RI/FS) Schedule, Leviathan Mine Site, Alpine County, California. March 3.

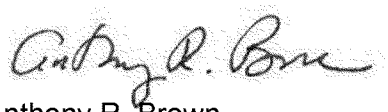
Richfield anticipates approximately 10 to 15 days will be necessary to perform the first sampling event. Depending on when spring treatment ends, there may not be adequate days to collect the surface water samples and flow measurements for the first event during the period between spring treatment and the capture and treatment of the CUD, DS and startup of the HDS Treatment System. In that case, sample collection and flow measurements would occur at all 30 locations while spring treatment discharges are taking place but before the capture and treatment of the CUD, DS and startup of the HDS Treatment System.

CLOSING

Atlantic Richfield respectfully requests approval of the recommended program. Based on current long range forecast, sampling for the first event would begin in approximately May 2017.

If you have any questions or comments, please feel free to contact me at (657) 529-4537 or anthony.brown@bp.com.

Sincerely,



Anthony R. Brown
Project Manager, Mining

Attachment: Table 1 – Summary of Proposed 2017 Surface Water Monitoring
Figure 1 – Surface Water and Source Monitoring Locations

cc: Gary Riley, U.S. Environmental Protection Agency, Region 9 – via electronic copy
John Hillenbrand, U.S. Environmental Protection Agency, Region 9 – via electronic copy
Douglas Carey, Lahontan Regional Water Quality Control Board – via electronic copy
Nathan Block, Esq., BP – via electronic copy
Adam Cohen, Esq., Davis Graham & Stubbs, LLP – via electronic copy
Sandy Riese, EnSci, Inc. – via electronic copy
Marc Lombardi, Amec Foster Wheeler – via electronic copy
Grant Ohland, Ohland HydroGeo, LLC – via electronic copy
Dave McCarthy, Copper Environmental Consulting – via electronic copy
Cory Koger, U.S. Army Corps of Engineers – via electronic copy
Greg Reller, Burleson Consulting – via electronic copy
Michelle Hochrein, Washoe Tribe of California and Nevada – via electronic copy
Fred Kirschner, AESE, Inc. – via electronic copy

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TABLE 1
SUMMARY OF PROPOSED 2017 SURFACE WATER MONITORING
Leviathan Mine Site
Alpine County, California

Parameters			Ferrous Iron[1]	Cr+6[2]		Dissolved Metals[3]	Total Metals[3]	Cations[4]	Hardness	DOC	NH_3 (as N)	Anions[5]	Alkalinity	Acidity	TDS	Flow Rate[6]	QC Samples[7]			Location is sampled during first monitoring event	Location is sampled during second and third monitoring events
Laboratory			NA	TestAmerica		ALS										NA	Same as Primary Sample				
Method			SOP 6.0	EPA 218.6		EPA 200.7/ EPA 200.8/ EPA 245.1	EPA 200.7/ EPA 200.8/ EPA 245.1	EPA 200.7	SM 2340B	SM 5310B	SM 4500 NH3	EPA 300.0/ EPA 365.3	SM 2320B	SM 2310B	SM 2540C	SOP 8.0	Field Blanks	Field Duplicates	MS/MSD or LD[8]		
Containers			1 x 250 mL HDPE	1 X 250 mL HDPE	2 X 250 mL HDPE[2]	1 x 250 mL HDPE	1 x 250 mL HDPE			1x250 mL glass	1 x 500 mL HDPE	1 x 1 L HDPE				NA	Same as Primary Sample		Same as Primary Sample		
Minimum Volume			25 mL	250 mL	250 mL	250 mL	250 mL			125 mL	500 mL	100 mL	300		500 mL	NA					
Field Filtered[9]			Yes	Yes		Yes	No			Yes	No	No				NA					
Preservation[10]			None	None	$(NH_4)_2SO_4$ pH >8	HNO_3 pH<2	HNO_3 pH<2			H_2SO_4 or HCl	H_2SO_4	None				NA					
Maximum Holding Time			ASAP	24 hr	14 d	28 d	28 d			28 d	28 d	2 d	14 d		7 d	NA					
Study Area	**Creek**	**Sampling Locations[11]**																			
Off-Property Locations																					
DSA	Bryant	SW-30 [12]	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X		X	
DSA	Bryant	SW-29 [12]	X	X		X	X	X	X	X	X	X	X	X	X	X				X	
DSA	Bryant	SW-28 [12]	X	X		X	X	X	X	X	X	X	X	X	X	X				X	
DSA	Bryant	SW-27 [12]	X	X		X	X	X	X	X	X	X	X	X	X	X				X	
RSA	Mountaineer	SW-26 [12]	X	X		X	X	X	X	X	X	X	X	X	X	X				X	
DSA	Leviathan	SW-25 [12]	X	X		X	X	X	X	X	X	X	X	X	X	X			X	X	X
On-Property Locations																					
DSA	Leviathan	SW-16 [12]	X	X		X	X	X	X	X	X	X	X	X	X	X	X			X	X
LCSA	Leviathan	SW-15 [12]	X	X		X	X	X	X	X	X	X	X	X	X	X		X		X	X
LCSA	Leviathan	SW-14 [12]	X	X		X	X	X	X	X	X	X	X	X	X	NA[13]				X	
LCSA	Leviathan	SW-13 [12]	X	X		X	X	X	X	X	X	X	X	X	X	NA[13]				X	
LCSA	4L	SW-12 [12]	X	X		X	X	X	X	X	X	X	X	X	X	X				X	
LCSA	Leviathan	SW-11 [12]	X	X		X	X	X	X	X	X	X	X	X	X	X				X	
LCSA	Leviathan	SW-10 [12]	X	X		X	X	X	X	X	X	X	X	X	X	X	X			X	X
LCSA	Leviathan	SW-09 [12]	X	X		X	X	X	X	X	X	X	X	X	X	X			X	X	X
LCSA	Leviathan	SW-08	X	X		X	X	X	X	X	X	X	X	X	X	X		X		X	X
LCSA	Leviathan	SW-07	X	X		X	X	X	X	X	X	X	X	X	X	NA[13]				X	
LCSA	Lower Tributary	SW-06	X	X		X	X	X	X	X	X	X	X	X	X	X				X	
LCSA	Upper Tributary	SW-05	X	X		X	X	X	X	X	X	X	X	X	X	X				X	
LCSA	Upper Tributary	SW-04	X	X		X	X	X	X	X	X	X	X	X	X	X				X	
LCSA	Leviathan	SW-03	X	X		X	X	X	X	X	X	X	X	X	X	X				X	
LCSA	Leviathan	SW-01	X	X		X	X	X	X	X	X	X	X	X	X	X				X	X
ACSA	Aspen	SW-24	X	X		X	X	X	X	X	X	X	X	X	X	X				X	
ACSA	Aspen	SW-23	X	X		X	X	X	X	X	X	X	X	X	X	X				X	
ACSA	NA	SW-17	X	X		X	X	X	X	X	X	X	X	X	X	X				X	
ACSA	Aspen	SW-22	X	X		X	X	X	X	X	X	X	X	X	X	NA[13]				X	
ACSA	NA	SD-22	X	X		X	X	X	X	X	X	X	X	X	X	X				X	
ACSA	NA	SW-19	X	X		X	X	X	X	X	X	X	X	X	X	X				X	
ACSA	Aspen	SW-21	X	X		X	X	X	X	X	X	X	X	X	X	X				X	
ACSA	NA	OUS	X	X		X	X	X	X	X	X	X	X	X	X	X				X	
ACSA	Aspen	SW-18	X	X		X	X	X	X	X	X	X	X	X	X	X				X	
		Total Samples	30														3	3	2	30	7

Note(s)
1. Dissolved ferrous iron will be measured in the field using Hach Colorimeter (or equivalent) in accordance with SOP 6.0.
2. Sample can be preserved with $(NH_4)_2SO_4$ when sample pH $\geq$ 6.
3. -Metals include: aluminum, antimony, arsenic, barium, beryllium, cadmium,-chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, silver, selenium, thallium, vanadium, and zinc.
4. Cations include: calcium, potassium, sodium, and magnesium.
5. Anions include: chloride, sulfate, nitrate, and ortho-phosphate.
6. Flow rate will be measured in the field in accordance with SOP 8.0.
7. The number of QA/QC samples collected are dependent on actual number of primary samples collected and will be adjusted to meet the minimum requirements frequency of 10% for field duplicates, 10% for field blanks, and 5% for MS/MSD or LD.
8. Three times the original sample volume must be provided to the laboratories for MS/MSD or LD and designated on the COC.
9. Filter samples using a 0.45 micron high capacity filter.
10. Samples should be stored at a temperature ranging from 0°C - 6°C.
11. Approximate sampling locations shown on Figure 1.
12. During the first sampling event, the flow and samples must be collected pre-treatment (early spring, prior to capture of CUD and DS). During the third sampling event, the flow and samples must be collected at least one week after treatment ceases (fall, after capture of CUD and DS ceases).
13. Flow not measured at this location because of unsafe conditions, access issues, or because the sampling location is a pond.

Sample ID(s)
SWAMMDDYYXX Use for all samples collected in the ACSA, consecutively, for a given date.
SWDMMDDYYXX Use for all samples collected in the DSA, consecutively, for a given date.
SWLMMDDYYXX Use for all samples collected in the LCSA, consecutively, for a given date.
SWRMMDDYYXX Use for all samples collected in the RSA, consecutively, for a given date.
SWPMMDDYYXX Use for all samples collected in the PSA, consecutively, for a given date.

Sample Matrix
SW Use for all primary and duplicate samples.
W Use for all field blanks.

Abbreviation(s)
°C = degrees Celsius
ACSA = Aspen Creek Study Area
ALS = ALS Environmental, Kelso, WA
ASAP = as soon as possible
$CaCO_3$ = calcium carbonate
Cr+6 = hexavalent chromium
d = days
DOC = dissolved organic carbon
DSA = Downstream Study Area
EPA = Environmental Protection Agency
H_2SO_4 = sulfuric acid
HCl = hydrochloric acid
HDPE = high density polyethylene
HNO_3 = nitric acid
hr = hours
ID = identification
L = liter
LD = laboratory duplicate
LCSA = Leviathan Creek Study Area
mL = milliliter
MS/MSD = matrix spike / matrix spike duplicate
N = nitrogen
NA = not applicable
$(NH_4)_2SO_4$ = ammonium sulfate
NH_3 = ammonia
QC = quality control
RI/FS = remedial investigation / feasibility study
RSA = Reference Study Area
SM = Standard Methods for Water and Wastewater
SOP = standard operating procedure
TDS = total dissolved solids

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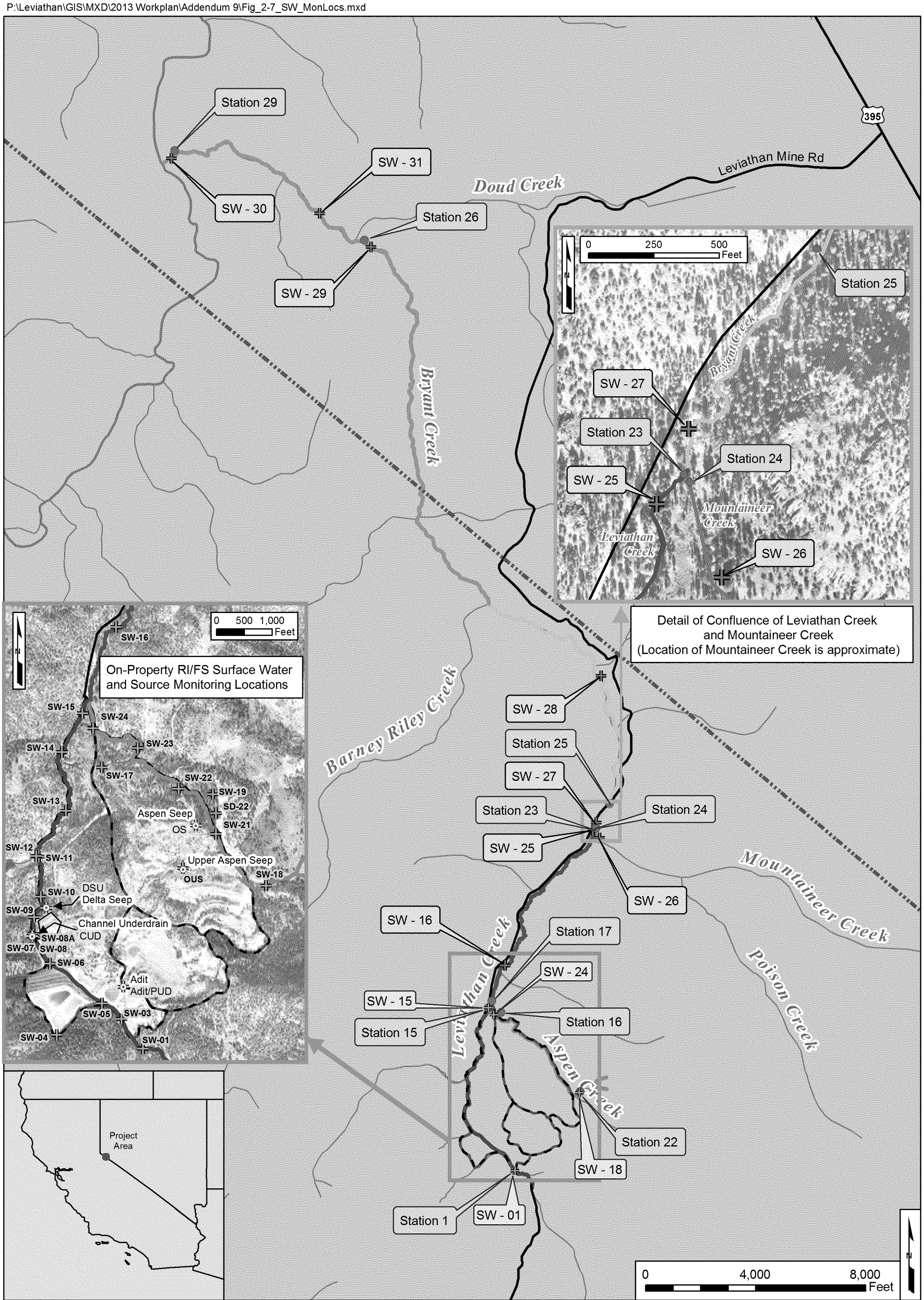

Explanation:

Monitoring Locations
- Historic Surface Water
- On-Property Surface Water
- DSA Surface Water
- On-Property Source Water
- Discharge Points

- Reach #1
- Reach #2
- Reach #3
- On-Property Leviathan Creek
- On-Property Aspen Creek
- On-Property Study Areas
- State Line

Notes: 1. National Hydrography Dataset Flowlines are stream thalweg delineations provided by the USGS, but are not necessarily accurate on a localized scale. Updates to the stream thalwegs have been made where differences were noted based on field observations.
2. Background aerial photograph dated October 22, 2009.
3. All locations and boundaries are approximate.
4. SW-05, SW-06, SW-12 are located on tributaries that flow into Leviathan Creek.

SURFACE WATER AND SOURCE MONITORING LOCATIONS
Leviathan Mine Site
Alpine County, California

amec foster wheeler

Date: 03/21/2016
By: DMC

Project No. 0013091

Figure 1