



APPENDIX A

2011 Monthly Reports

Atlantic Richfield Company

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February 10, 2011

Mr. Gary Riley
US EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105

Mr. Kevin Mayer
US EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105

RE: Leviathan Monthly Report for January 2011

Dear Mr. Riley and Mr. Mayer:

The following text describes activities conducted during the month of January 2011 at the Leviathan Mine Site and activities anticipated to occur during the upcoming month. These activities are organized by work area [Aspen Seep, Channel Underdrain (CUD) and Delta Seep (DS)], and site-wide tasks. This progress report is being submitted in accordance with Paragraph 62 of the Administrative Settlement Agreement and Order on Consent for Removal Action (AOC) (effective January 21, 2009).

ACTIVITIES FOR JANUARY

Aspen Seep

- Operated the Aspen Seep Bioreactor (ASB) in recirculation mode during the month of January. Winter access O&M, influent sampling, and effluent sampling occurred on January 7, 2011. The currently available influent and effluent water quality data for the January 7, 2011 sampling event are presented in Table 1. Recent pH and ORP field data are summarized in Table 2. Influent flow data for the time period of October 1, 2010 through January 9, 2011 was recently received from the USGS and is presented in Table 3. Any new flow data received will be included in subsequent monthly reports.

CUD and DS

- The HDS Treatment Plant and CUD and DS capture equipment remained winterized during the month of January.

Site-wide

- Work continued on updating the Leviathan Mine Project Database with data from monitoring performed by Atlantic Richfield and various agencies.



- On January 18, 2011, a conference call was conducted with EPA to provide a general progress update.
- Continued compiling information for the 2010 Annual Report (due April 10, 2011).
- Continued developing the 2011 Removal Action Work Plan (RAWP) (due March 1, 2011), which will describe activities to be performed by Atlantic Richfield at the Site during 2011.

ACTIVITIES FOR UPCOMING MONTH

Aspen Seep

- Continue operation of the Bioreactor in recirculation mode and conduct winter access monitoring and maintenance as outlined in the 2010 RAWP.
- On February 14, 2011, AMEC Geomatrix will host a webinar with EPA to discuss the 2010 Aspen Seep Bioreactor Treatment System performance.

CUD and DS

- Data from the 2010 HDS Treatment Plant operations will continue to be compiled for inclusion in the 2010 Annual Report.

Site-wide

- Continue to provide project progress updates to EPA via conference call. The next conference call is currently scheduled for February 15, 2011.
- Continue compiling information for the 2010 Annual Report.
- Continue development of the 2011 Removal Action Work Plan.

If you have any questions or comments, please feel free to contact me at (714) 228-6770 or via e-mail at Anthony.Brown@bp.com.

Sincerely,

ORIGINAL SIGNED BY DAVE McCARTHY FOR

Tony Brown
Project Manager

Attachments:

- Table 1 – Aspen Seep Bioreactor Monthly Influent and Effluent Sample Results
- Table 2 – Aspen Seep Bioreactor, Recent pH and ORP Field Measurements
- Table 3 – Aspen Seep Bioreactor, CUD, DS, and HDS Flow Rates

Gary Riley and Kevin Mayer – USEPA Region 9

February 10, 2011

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cc: Chuck Curtis, Lahontan Regional Water Quality Control Board
Ronald Halsey, Atlantic Richfield Company
Nathan Block, Esq., BP America Inc.
Adam Cohen, Esq., Davis Graham & Stubbs LLP
Dave McCarthy, Copper Environmental Consulting
Joe Niland, AMEC-Geomatrix Consultants, Inc.
Sandy Riese, EnSci, Inc.
Randy Miller, Broadbent & Associates, Inc.

TABLE 1
ASPEN SEEP BIOREACTOR - SAMPLE RESULTS
JANUARY 2011 MONTHLY SUMMARY
Draft - Provisional Data

Parameter	Basis	January 7 2011 138ASPINF442 Influent mg/L	January 7 2011 138ASPEFF441 Effluent mg/L	Maximum Discharge Criteria mg/L	Average Discharge Criteria mg/L
pH ¹	Field	2.92	6.15	--	6.0 - 9.0 ²
Al	Dissolved	38	0.070	4	2
As	Dissolved	<0.00090	<0.00090	0.34	0.15
Cd	Dissolved	0.0013	<0.00010	0.009	0.004
Ca	Dissolved	312	283	--	--
Cr	Dissolved	0.0022	<0.00090	0.97	0.31
Cu	Dissolved	0.47	0.0034	0.026	0.016
Hardness	Dissolved	1100	1000	--	--
Fe	Dissolved	125	21.0	2	1
Pb	Dissolved	<0.00020	<0.00020	0.136	0.005
Mg	Dissolved	75	71	--	--
Ni	Dissolved	0.35	0.12	0.84	0.094
Zn	Dissolved	0.47	0.020	0.21	0.21
Se	Total	0.0014 J	0.00059 J	NP	0.005
Acidity	Total	530	<2.0	--	--
Alkalinity (Total)	Total	<2.00	112	--	--
Alkalinity (Bicarbonate)	Total	<2.40	137	--	--
Alkalinity (Carbonate)	Total	<1.20	<1.20	--	--
Alkalinity (Hydroxide)	Total	<0.700	<0.700	--	--
Sulfate	Lab Filtered	1540	1170	--	--
Chloride	Total	3.6	3.8	--	--
TDS	Total	2450	2000	--	--
TSS	Total	40	38	--	--

Notes

1. pH value was collected in field; pH is in standard units.
2. Discharge criteria for average pH based on 24-hour (single day) average discharge.
3. Values in bold are effluent concentrations greater than the maximum or average discharge criteria.

Abbreviations

NP = Not Promulgated

J - Estimated value. Analyte detected at a level less than the Reporting Limit and greater than or equal to the Method Detection Limit.

< - Analyte NOT DETECTED at or above the or method detection limit.

-- - Discharge criteria not established.

TABLE 2
ASPEN SEEP BIOREACTOR - RECENT pH and ORP FIELD MEASUREMENTS
JANUARY 2011 MONTHLY SUMMARY
Draft - Provisional Data

Date	Aspen Influent ¹			Manhole 1 or 2		Manhole 5 or 4		Manhole 6		Manhole 7		Aspen Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	B.R.#1 Influent pH (s.U.)	ORP (mV)	B.R.#1 Eff/B.R.#2 Inf pH (s.U.)	ORP (mV)	NaOH dosing pH (s.U.)	ORP (mV)	B.R. #2 Eff pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
09/21/07	6.0	2.91	428.9	7.34	-268.4	7.13	-280.3	9.56	-285.8	7.13	-265.3	8.42	2.6
09/26/07	6.2	2.89	496.7	7.80	-192.1	7.36	-223.0	9.64	-195.4	7.34	-232.7	8.34	50.3
10/03/07	5.5	2.85	484.1	8.07	-127.7	8.50	-129.6	11.25	-136.5	7.64	-164.0	8.22	-5.2
10/10/07 ²	5.8	2.80	498.0	5.50	55.9	5.64	-70.5	10.00	-190.0	6.20	-171.6	7.78	-268.0
10/18/07 ²	5.9	2.83	482.4	5.00	26.8	5.68	-46.2	11.38	-112.0	6.23	-139.0	8.69	135.0
10/31/07 ²	9.0	2.88	402.7	4.26	319.3	6.85	-156.7	9.80	-170.0	6.95	-212.2	7.66	-94.3
11/08/07	6.0	2.88	418.0	7.55	-128.3	7.01	-116.7	8.23	-133.9	6.86	-125.8	7.51	-50.6
11/13/07	-	2.86	484.5	7.06	-2.3	6.84	-65.3	7.86	-42.6	6.79	-78.1	7.58	4.2
11/27/07	5.5	2.86	479.4	6.99	-38.5	6.97	-205.0	8.46	-183.9	6.91	-156.8	7.25	-1.7
12/12/07	-	3.01	482.2	7.20	-25.3	7.20	-115.2	7.64	-107.7	7.04	-129.7	6.90	-31.9
01/15/08	4.8	2.98	483.3	6.76	5.9	6.73	-85.5	7.89	-94.3	6.67	-137.4	6.71	-33.0
02/07/08 ³	-	-	-	-	-	-	-	-	-	-	-	5.77	20.2
02/12/08	7.0	2.76	487.4	6.67	44.6	-	-	7.39	-45.6	6.42	-88.0	6.70	-15.3
03/18/08	6.0	2.88	375.1	7.85	3.6	-	-	8.80	-189.2	7.23	-211.3	7.05	-95.3
04/10/08	7.5	2.90	397.7	6.74	-80.0	6.70	-163.4	7.50	-142.6	6.57	-165.3	7.39	-24.5
05/15/08	7.3	2.97	442.2	6.24	21.2	6.55	-265.4	6.55	-233.7	5.60	-183.7	7.29	-143.3
05/27/08	7.0	3.00	464.1	7.11	-16.3	6.85	-242.2	6.98	-191.1	6.80	-235.2	7.26	-19.5
06/09/08	7.0	3.10	455.4	7.40	-47.5	7.09	-251.2	7.70	-178.8	6.97	-219.7	7.19	-61.5
06/17/08	7.5	2.91	443.9	7.42	-22.7	6.90	-283.0	7.29	-131.0	6.88	-244.3	7.30	-82.5
07/10/08	7.3	2.98	470.9	7.32	-34.1	6.90	-238.4	7.05	-172.6	6.90	-215.0	7.85	-113.5
07/22/08	7.0	2.99	455.5	6.94	-272.5	6.97	-267.4	7.07	-190.6	7.01	-248.9	7.35	-89.1
08/04/08	6.8	2.89	450.7	7.60	-94.4	6.94	-266.0	6.19	-173.1	7.02	-251.2	-	-
08/05/08	-	3.05	445.3	-	-	-	-	-	-	-	-	7.29	-70.0
08/18/08	7.3	3.93	478.9	7.46	-166.7	7.08	-291.9	7.40	-202.6	7.07	-268.8	7.40	-52.4
08/22/08	-	2.89	473.7	7.97	-212.9	7.08	-301.8	7.74	-224.0	7.03	-275.9	7.67	-27.8
08/25/08	-	2.93	470.5	7.77	-287.7	7.18	-286.1	6.89	-205.6	7.12	-273.8	8.02	-108.4
08/26/08	-	2.91	468.8	7.95	-255.4	7.09	-305.4	7.75	-281.2	7.14	-273.1	7.77	-41.4
09/24/08	-	3.03	423.2	7.18	-107.8	6.99	-255.4	7.11	-205.7	6.89	-245.2	7.70	-87.7
09/30/08	-	3.02	434.3	7.77	-151.9	6.89	-267.5	-	-	6.92	-269.9	8.10	-94.0
10/13/08	5.8	3.34	433.1	7.17	-98.7	6.94	-218.3	6.80	-157.2	7.01	-206.1	8.32	-101.0
10/27/08	5.8	3.21	247.8	7.34	-162.5	6.96	-175.3	7.20	-152.3	6.98	-126.8	7.88	273.7
11/19/08	5.5	2.83	453.7	7.20	-104.5	6.77	-204.7	7.12	-82.2	6.71	-154.7	7.74	-35.1
12/03/08	5.3	3.56	453.0	7.23	-45.0	6.86	-141.3	7.06	-100.1	6.84	-135.6	7.65	-47.5
01/9/09 ⁴	-	3.15	458.3	-	-	-	-	-	-	-	-	6.95	-43.0
01/12/09	5.3	2.94	466.3	6.36	-82.8	6.38	-245.1	-	-	6.82	-259.0	7.11	-74.0
02/19/09 ⁴	5.3	2.78	480.1	6.60	-3.2	6.74	-145.1	7.26	-117.6	6.25	-162.3	6.68	-18.1
03/10/09	5.0	2.88	481.2	-	-	-	-	-	-	-	-	7.36	34.3

TABLE 2
ASPEN SEEP BIOREACTOR - RECENT pH and ORP FIELD MEASUREMENTS
JANUARY 2011 MONTHLY SUMMARY
Draft - Provisional Data

Date	Aspen Influent ¹			Manhole 1 or 2		Manhole 5 or 4		Manhole 6		Manhole 7		Aspen Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	B.R.#1 Influent pH (s.U.)	ORP (mV)	B.R.#1 Eff/B.R.#2 Inf pH (s.U.)	ORP (mV)	NaOH dosing pH (s.U.)	ORP (mV)	B.R. #2 Eff pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
04/13/09	7.0	2.78	532.7	7.45	-9.9	7.04	-185.5	7.50	-65.8	6.98	-175.4	7.77	-32.2
05/06/09	5.5	2.89	444.4	-	-	6.47	-221.3	-	-	6.56	-206.5	7.62	-86.6
06/03/09	6.5	2.91	445.9	6.98	-145.1	6.62	-260.8	7.07	-192.8	6.65	-260.4	7.55	-15.4
06/16/09	6.5	2.98	388.0	7.09	-186.6	6.79	-319.3	7.16	-233.2	6.80	-298.2	7.70	-158.1
07/01/09	6.0	2.95	376.5	7.43	376.5	6.93	-366.2	7.42	-310.8	6.97	-350.5	7.89	-189.6
07/14/09	5.8	2.97	394.4	-	-	6.85	-338.8	-	-	6.98	-331.9	7.90	-146.2
07/29/09	6.0	2.78	404.5	7.24	-175.5	7.39	-427.7	8.10	-260.2	7.29	-403.7	8.05	-135.6
08/05/09	5.5	2.89	433.8	-	-	-	-	8.73	-120.7	-	-	8.17	-146.0
08/19/09	5.1	2.97	425.7	-	-	-	-	8.25	-37.6	-	-	7.54	47.0
09/17/09	5.3	2.38	490.6	7.27	-91.3	6.81	-180.3	7.75	-120.2	6.85	-182.3	6.95	-24.7
09/30/09	5.0	2.96	503.7	8.03	-18.9	8.99	-253.1	7.75	-217.2	7.03	-276.6	7.98	-17.0
10/15/09	5.5	2.93	496.6	6.57	-121.4	7.63	-301.0	8.33	-148.5	7.71	-314.5	7.85	-41.2
10/28/09	4.9	2.96	487.6	8.79	-69.9	7.28	-216.4	9.08	-143.0	7.24	-162.8	7.94	2.8
11/11/09	5.0	2.91	420.8	8.34	-15.3	7.49	-243.7	8.42	-163.9	7.51	-199.3	7.74	60.6
12/17/09 ⁵	5.0	2.90	416.5	4.65	100.2	5.00	15.3	-	-	5.12	-1.8	5.91	-26.4
01/14/10 ⁵	4.8	2.85	417.7	6.96	-89.0	6.82	-186.4	-	-	6.84	-206.1	6.45	-67.4
02/02/10 ⁵	4.7	2.94	484.0	7.58	-46.7	6.85	-129.6	-	-	6.67	-131.1	6.95	-48.1
03/09/10	4.8	2.74	474.7	8.27	-78.3	7.95	-204.2	8.74	-208.9	8.10	-220.8	7.75	-5.9
04/26/10 ⁶	12.0	2.85	479.5	5.14	135.1	5.61	-19.0	5.04	109.2	5.60	-29.6	6.15	35.9
05/17/10	9.7	2.97	436.9	6.26	196.9	7.04	-283.9	7.79	-235.1	7.08	285.4	7.76	-73.8
05/24/10	9.4	3.16	418.0	7.43	-156.1	7.00	-259.9	7.27	-171.4	6.89	-282.6	7.11	-78.6
05/27/10	9.6	3.18	423.1	5.52	-225.1	7.58	-316.7	8.86	-318.2	6.74	-296.8	7.07	-98.7
06/01/10	10.5	3.11	444.0	8.47	-32.2	7.72	-292.6	9.00	-	6.74	-300.9	7.01	-31.5
06/14/10	10.0	2.99	427.7	7.40	-81.7	6.85	-272.5	8.22	-220.2	6.61	-181.6	7.48	-93.7
06/15/10	-	-	-	8.04	-221.6	6.89	-347.7	-	-	6.17	-355.9	-	-
06/16/10	-	2.99	427.7	7.40	-81.7	6.85	-272.6	8.22	-220.2	6.61	-181.6	7.48	-93.7
06/18/10	9.1	-	-	7.72	-211.7	6.79	-335.6	-	-	6.69	-336.7	-	-
06/21/10	9.0	3.21	409.4	7.99	-242.7	6.96	-364.1	7.86	-303.4	6.78	-349.5	7.70	-142.3
06/30/10	10.0	2.59	451.5	8.73	-216.2	8.73	-216.2	-	-	6.78	-337.9	7.96	-164.5
07/01/10	-	2.82	422.4	-	-	-	-	-	-	-	-	7.94	-241.9
07/13/10	10.0	2.62	479.5	7.52	-112.1	6.90	-279.5	8.02	-255.2	6.90	-294.0	7.76	-65.8
07/21/10	10.0	2.93	475.1	7.90	-70.5	7.15	-301.5	7.80	-212.4	7.27	-315.3	8.09	-95.7
07/29/10	10.0	2.90	465.3	7.73	-168.6	7.25	-318.1	7.08	-192.5	7.15	-318.5	7.06	-45.6
08/03/10	9.0	2.94	458.6	7.69	-193.3	7.16	-311.4	7.16	-311.4	7.17	-324.5	7.39	-66.3
08/12/10	9.0	2.85	476.3	7.98	-255.3	7.07	-299.3	7.50	-235.2	7.06	-307.0	7.55	-26.2
08/17/10	9.5	2.64	470.9	8.09	-47.2	7.54	-306.0	8.47	-206.8	7.37	-320.0	7.86	-74.0
08/24/10	9.2	3.04	250.0	7.81	-129.9	7.21	-151.9	7.20	-202.9	7.09	-147.9	7.81	2.9
09/02/10	9.2	2.84	503.9	7.70	-208.4	--	--	8.15	-227.0	7.32	-267.2	7.97	-20.2

TABLE 2
ASPEN SEEP BIOREACTOR - RECENT pH and ORP FIELD MEASUREMENTS
JANUARY 2011 MONTHLY SUMMARY
Draft - Provisional Data

Date	Aspen Influent ¹			Manhole 1 or 2		Manhole 5 or 4		Manhole 6		Manhole 7		Aspen Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	B.R.#1 Influent pH (s.U.)	ORP (mV)	B.R.#1 Eff/B.R.#2 Inf pH (s.U.)	ORP (mV)	NaOH dosing pH (s.U.)	ORP (mV)	B.R. #2 Eff pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
09/16/10	8.0	3.21	455.8	8.40	-219.9	7.29	-209.3	8.66	-197.0	7.32	-279.7	7.76	-76.4
09/22/10 ⁷	8.0	3.06	476.5	8.50	-151.0	7.25	-276.9	8.30	-257.8	7.39	-279.9	7.93	-112.0
09/30/10 ⁷	7.6	3.16	503.3	8.49	-263.9	7.32	-265.4	8.53	-221.9	7.26	-267.8	8.61	94.1
10/06/10 ⁸	9.0	3.28	479.3	7.83	-287.5	7.39	-305.8	8.25	-246.7	7.62	-305.1	8.17	-235.5
10/11/10	8.0	3.20	479.3	7.52	-190.4	7.00	-284.4	8.28	-227.4	7.15	-290.4	7.85	26.4
10/19/10	8.0	2.89	447.3	8.75	-157.3	7.43	-310.4	8.52	-203.0	7.22	-310.6	8.15	130.4
10/28/10	8.0	2.95	579.0	7.23	-282.8	6.98	-368.9	8.50	-384.7	7.12	-402.6	7.73	-30.7
11/02/10	8.0	2.69	366.7	7.89	-285.1	7.14	-385.2	8.46	-307.5	7.00	-385.7	7.62	-31.5
11/15/10	8.5	2.94	361.7	7.79	-273.2	7.08	-381.9	8.04	-269.3	6.89	-384.5	7.64	-2.2
12/07/10 ⁹	8.5	3.01	387.2	6.97	-298.4	6.82	-375.1	-	-	6.57	-353.5	6.41	-112.4
01/07/11 ⁹	8.5	2.92	434.1	6.50	-134.0	5.98	-200.1	-	-	6.08	-216.2	6.15	-4.9
02/01/11 ⁹	8.0	3.07	423.8	6.75	-332.2	6.86	-279.7	-	-	6.59	-297.0	6.62	-9.3

Notes

1. Aspen Seep Influent Flow measurements are field measurements completed with a graduated bucket and stop watch.
2. Bioreactor #1 was flushed on 10/08/07, 10/09/07, and 10/18/07; Bioreactor #1 was bypassed during this flushing period. Low pH readings in Manhole 1 from 10/10/07 through 10/31/07 were caused by drainage into pretreatment pond from failed seal in weir box cap.
3. Measurements are believed to be erroneous due to calibration error. Parameters were re-evaluated on 02/12/08.
4. Low pH measurements due to a power outage and associated chemical pump shutdown.
5. Low pH measurements caused by stripped gears on NaOH pump head that prevented dosing to Manhole 6.
6. Low pH measurements due to increase in system flow rates; chemical dosing rates lagged behind these system flow rate increases and were unable to prevent decrease in system pH.
7. Effluent readings were collected from the centrifuge discharge point on these dates due to sludge dewatering. Water was not being discharged from Pond 4.
8. Effluent readings were collected Pond 4 effluent on this date. Water was not being discharged from Pond 4.
9. Low pH measurements due to power outage and associated chemical pump failure during the inverter failure on November 29, 2010.

Abbreviations

- - not measured, not recorded, or bioreactor operation did not have flow at given location on the specified date.

TABLE 3
ASPEN SEEP BIOREACTOR, CUD, DS and HDS - FLOW RATES^{1,2}
JANUARY 2011 MONTHLY SUMMARY
Draft - Provisional Data

Date	Aspen Seep Flow ³						
	gpm		gpm		gpm		gpm
10/01/10	8.30	11/01/10	8.39	12/01/10	8.66	01/01/11	7.99
10/02/10	8.66	11/02/10	8.48	12/02/10	8.80	01/02/11	7.94
10/03/10	8.89	11/03/10	8.53	12/03/10	8.75	01/03/11	7.94
10/04/10	10.50	11/04/10	8.57	12/04/10	8.53	01/04/11	7.85
10/05/10	12.07	11/05/10	8.57	12/05/10	8.62	01/05/11	7.85
10/06/10	9.02	11/06/10	8.62	12/06/10	8.57	01/06/11	7.85
10/07/10	8.98	11/07/10	9.20	12/07/10	8.21	01/07/11	7.76
10/08/10	8.62	11/08/10	9.02	12/08/10	8.62	01/08/11	7.50
10/09/10	8.57	11/09/10	8.71	12/09/10	9.02	01/09/11	7.41
10/10/10	8.57	11/10/10	8.66	12/10/10	9.47	01/10/11	NA
10/11/10	8.71	11/11/10	8.53	12/11/10	8.62	01/11/11	NA
10/12/10	8.48	11/12/10	8.53	12/12/10	7.99	01/12/11	NA
10/13/10	8.44	11/13/10	8.44	12/13/10	8.08	01/13/11	NA
10/14/10	8.39	11/14/10	8.84	12/14/10	8.80	01/14/11	NA
10/15/10	8.44	11/15/10	8.71	12/15/10	8.35	01/15/11	NA
10/16/10	8.48	11/16/10	8.48	12/16/10	8.03	01/16/11	NA
10/17/10	9.11	11/17/10	8.44	12/17/10	7.99	01/17/11	NA
10/18/10	8.89	11/18/10	8.57	12/18/10	9.43	01/18/11	NA
10/19/10	8.62	11/19/10	8.57	12/19/10	10.46	01/19/11	NA
10/20/10	8.44	11/20/10	8.93	12/20/10	8.89	01/20/11	NA
10/21/10	8.53	11/21/10	8.93	12/21/10	8.66	01/21/11	NA
10/22/10	8.44	11/22/10	8.89	12/22/10	8.44	01/22/11	NA
10/23/10	8.62	11/23/10	9.07	12/23/10	8.12	01/23/11	NA
10/24/10	11.49	11/24/10	8.71	12/24/10	7.99	01/24/11	NA
10/25/10	9.29	11/25/10	8.57	12/25/10	8.17	01/25/11	NA
10/26/10	8.39	11/26/10	8.75	12/26/10	7.94	01/26/11	NA
10/27/10	8.44	11/27/10	8.89	12/27/10	7.85	01/27/11	NA
10/28/10	8.44	11/28/10	8.75	12/28/10	8.12	01/28/11	NA
10/29/10	8.57	11/29/10	8.62	12/29/10	8.26	01/29/11	NA
10/30/10	8.53	11/30/10	8.75	12/30/10	7.99	01/30/11	NA
10/31/10	8.44	--	--	12/31/10	7.90	01/31/11	NA
Average Flow Rate or Total Discharged	8.88	Average Flow Rate or Total Discharged	8.69	Average Flow Rate or Total Discharged	8.49	Average Flow Rate or Total Discharged	7.79

Notes

1. DS capture was shutdown for the season on 11/01/10. DS flow is not recorded by the HDS Treatment Plant after this date.
2. CUD capture was shutdown on 11/01/10, restarted on 11/05/10, and shutdown for the season on 11/9/10. CUD flow is not recorded by the HDS Treatment Plant after this date.
3. Aspen Seep flow data is provided by the USGS.

Abbreviations

CUD - Channel Underdrain
HDS - High Density Sludge
gpm - gallons per minute

DS - Delta Seep
USGS - United States Geological Survey

Atlantic Richfield Company

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March 10, 2011

Mr. Gary Riley
US EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105

Mr. Kevin Mayer
US EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105

RE: Leviathan Monthly Report for February 2011

Dear Mr. Riley and Mr. Mayer:

The following text describes activities conducted during the month of February 2011 at the Leviathan Mine Site and activities anticipated to occur during the upcoming month. These activities are organized by work area [Aspen Seep, Channel Underdrain (CUD) and Delta Seep (DS)], and site-wide tasks. This progress report is being submitted in accordance with Paragraph 62 of the Administrative Settlement Agreement and Order on Consent for Removal Action (AOC) (effective January 21, 2009).

ACTIVITIES FOR FEBRUARY

Aspen Seep

- Operated the Aspen Seep Bioreactor (ASB) in recirculation mode during the month of February. Winter access O&M, influent sampling, and effluent sampling occurred on February 1, 2011. The currently available influent and effluent water quality data for the February 1, 2011 sampling event are presented in Table 1. Recent pH and ORP field data are summarized in Table 2. We have not received any new influent flow rate data from the USGS since January 9, 2011. Any new flow data received will be included in subsequent monthly reports.
- On February 14, 2011, AMEC Geomatrix held a webinar with EPA discussing the 2010 Aspen Seep Bioreactor Treatment System performance. On February 23, 2011, Atlantic Richfield provided a copy of the presentation slides to EPA.

CUD and DS

- The HDS Treatment Plant and CUD and DS capture equipment remained winterized during the month of February.

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Site-wide

- Work continued on updating the Leviathan Mine Project Database with data from monitoring performed by Atlantic Richfield and various agencies.
- On February 14, 2011, EPA provided draft minutes of the Leviathan Technical Advisory Committee meeting held on December 2, 2010 in Carson City, NV.
- On February 22, 2011, Atlantic Richfield submitted the 2011 Hazardous Materials Business Plan (HMBP) to Alpine County.
- On February 22, 2011, a conference call was conducted with EPA to provide a general progress update.
- Continued compiling information for the 2010 Annual Report (due April 10, 2011).
- Continued developing the 2011 Removal Action Work Plan (RAWP), which will describe activities to be performed by Atlantic Richfield at the Site during 2011. On February 23, 2011, Atlantic Richfield requested an extension to the submittal date for the 2011 RAWP. On March 1, 2011, EPA provided approval of the extension request, thus allowing for submittal of the 2011 RAWP on March 10, 2011.
- Also, on January 19, 2011, Atlantic Richfield submitted amended documentation of financial assurance in the amount of \$9 million to Jane Diamond, Superfund Project Manager, EPA Region 9.

ACTIVITIES FOR UPCOMING MONTH

Aspen Seep

- Continue operation of the Bioreactor in recirculation mode and conduct winter access monitoring and maintenance as outlined in the 2010 RAWP.

CUD and DS

- Data from the 2010 HDS Treatment Plant operations will continue to be compiled for inclusion in the 2010 Annual Report.

Site-wide

- Continue to provide project progress updates to EPA via conference call. The next conference call is currently scheduled for March 15, 2011.
- Continue compiling information for the 2010 Annual Report.
- Submit the 2011 Removal Action Work Plan.

Gary Riley and Kevin Mayer – USEPA Region 9

March 10, 2011

Page 3 of 3

If you have any questions or comments, please feel free to contact me at (714) 228-6770 or via e-mail at Anthony.Brown@bp.com.

Sincerely,

ORIGINAL SIGNED BY DAVE McCARTHY FOR

Tony Brown
Project Manager

Attachments:

Table 1 – Aspen Seep Bioreactor Monthly Influent and Effluent Sample Results

Table 2 – Aspen Seep Bioreactor, Recent pH and ORP Field Measurements

Table 3 – Aspen Seep Bioreactor, CUD, DS, and HDS Flow Rates

cc: Chuck Curtis, Lahontan Regional Water Quality Control Board
Ronald Halsey, Atlantic Richfield Company
Nathan Block, Esq., BP America Inc.
Adam Cohen, Esq., Davis Graham & Stubbs LLP
Dave McCarthy, Copper Environmental Consulting
Joe Niland, AMEC-Geomatrix Consultants, Inc.
Sandy Riese, EnSci, Inc.
Randy Miller, Broadbent & Associates, Inc.

TABLE 1
ASPEN SEEP BIOREACTOR - SAMPLE RESULTS
FEBRUARY 2011 MONTHLY SUMMARY
Draft - Provisional Data

Parameter	Basis	February 1 2011	February 1 2011	Maximum Discharge Criteria (mg/L)	Average Discharge Criteria (mg/L)
		139ASPINF444 Influent (mg/L)	139ASPEFF443 Effluent (mg/L)		
pH ¹	Field	3.07	6.62	-	6.0 - 9.0 ²
Aluminum	Dissolved	41	<0.040	4	2
Arsenic	Dissolved	<0.00090	0.00090 J	0.34	0.15
Cadmium	Dissolved	0.0012	<0.00010	0.009	0.004
Calcium	Dissolved	310	280	-	-
Chromium	Dissolved	0.0024	<0.00090	0.97	0.31
Copper	Dissolved	0.48	0.0041	0.026	0.016
Hardness	Dissolved	1100	980	-	-
Iron	Dissolved	130	2.6	2	1
Lead	Dissolved	<0.00020	<0.00020	0.136	0.005
Magnesium	Dissolved	73	68	-	-
Nickel	Dissolved	0.33	0.066	0.84	0.094
Zinc	Dissolved	0.43	0.0069 J	0.21	0.21
Selenium	Total	0.0017 J	0.00079 J	NP	0.005
Acidity	Total	600	<2.0	-	-
Alkalinity (Total)	Total	<2.0	180	-	-
Alkalinity (Bicarbonate)	Total	<2.4	220	-	-
Alkalinity (Carbonate)	Total	<1.2	<1.2	-	-
Alkalinity (Hydroxide)	Total	<0.70	<0.70	-	-
Sulfate	Lab Filtered	1600	1300	-	-
Chloride	Total	4.3	3.8	-	-
Total Dissolved Solids	Total	2400	2200	-	-
Total Suspended Solids	Total	23	4.0 J	-	-

Notes

1. pH value was collected in field; pH is in standard units.
2. Discharge criteria for average pH based on 24-hour (single day) average discharge.
3. Values in bold are effluent concentrations greater than the maximum or average discharge criteria.

Abbreviations

NP - Not Promulgated

J - Estimated value. Analyte detected at a level less than the Reporting Limit and greater than or equal to the Method Detection Limit.

< - Analyte NOT DETECTED at or above the or method detection limit.

-- Discharge criteria not established.

TABLE 2
ASPEN SEEP BIOREACTOR - RECENT pH and ORP FIELD MEASUREMENTS
FEBRUARY 2011 MONTHLY SUMMARY

Draft - Provisional Data

Date	Aspen Influent ¹			Manhole 1 or 2		Manhole 5 or 4		Manhole 6		Manhole 7		Aspen Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	B.R.#1 Influent pH (s.U.)	ORP (mV)	B.R.#1 Eff/B.R.#2 Inf pH (s.U.)	ORP (mV)	NaOH dosing pH (s.U.)	ORP (mV)	B.R. #2 Eff pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
09/21/07	6.0	2.91	428.9	7.34	-268.4	7.13	-280.3	9.56	-285.8	7.13	-265.3	8.42	2.6
09/26/07	6.2	2.89	496.7	7.80	-192.1	7.36	-223.0	9.64	-195.4	7.34	-232.7	8.34	50.3
10/03/07	5.5	2.85	484.1	8.07	-127.7	8.50	-129.6	11.25	-136.5	7.64	-164.0	8.22	-5.2
10/10/07 ²	5.8	2.80	498.0	5.50	55.9	5.64	-70.5	10.00	-190.0	6.20	-171.6	7.78	-268.0
10/18/07 ²	5.9	2.83	482.4	5.00	26.8	5.68	-46.2	11.38	-112.0	6.23	-139.0	8.69	135.0
10/31/07 ²	9.0	2.88	402.7	4.26	319.3	6.85	-156.7	9.80	-170.0	6.95	-212.2	7.66	-94.3
11/08/07	6.0	2.88	418.0	7.55	-128.3	7.01	-116.7	8.23	-133.9	6.86	-125.8	7.51	-50.6
11/13/07	-	2.86	484.5	7.06	-2.3	6.84	-65.3	7.86	-42.6	6.79	-78.1	7.58	4.2
11/27/07	5.5	2.86	479.4	6.99	-38.5	6.97	-205.0	8.46	-183.9	6.91	-156.8	7.25	-1.7
12/12/07	-	3.01	482.2	7.20	-25.3	7.20	-115.2	7.64	-107.7	7.04	-129.7	6.90	-31.9
01/15/08	4.8	2.98	483.3	6.76	5.9	6.73	-85.5	7.89	-94.3	6.67	-137.4	6.71	-33.0
02/07/08 ³	-	-	-	-	-	-	-	-	-	-	-	5.77	20.2
02/12/08	7.0	2.76	487.4	6.67	44.6	-	-	7.39	-45.6	6.42	-88.0	6.70	-15.3
03/18/08	6.0	2.88	375.1	7.85	3.6	-	-	8.80	-189.2	7.23	-211.3	7.05	-95.3
04/10/08	7.5	2.90	397.7	6.74	-80.0	6.70	-163.4	7.50	-142.6	6.57	-165.3	7.39	-24.5
05/15/08	7.3	2.97	442.2	6.24	21.2	6.55	-265.4	6.55	-233.7	5.60	-183.7	7.29	-143.3
05/27/08	7.0	3.00	464.1	7.11	-16.3	6.85	-242.2	6.98	-191.1	6.80	-235.2	7.26	-19.5
06/09/08	7.0	3.10	455.4	7.40	-47.5	7.09	-251.2	7.70	-178.8	6.97	-219.7	7.19	-61.5
06/17/08	7.5	2.91	443.9	7.42	-22.7	6.90	-283.0	7.29	-131.0	6.88	-244.3	7.30	-82.5
07/10/08	7.3	2.98	470.9	7.32	-34.1	6.90	-238.4	7.05	-172.6	6.90	-215.0	7.85	-113.5
07/22/08	7.0	2.99	455.5	6.94	-272.5	6.97	-267.4	7.07	-190.6	7.01	-248.9	7.35	-89.1
08/04/08	6.8	2.89	450.7	7.60	-94.4	6.94	-266.0	6.19	-173.1	7.02	-251.2	-	-
08/05/08	-	3.05	445.3	-	-	-	-	-	-	-	-	7.29	-70.0
08/18/08	7.3	3.93	478.9	7.46	-166.7	7.08	-291.9	7.40	-202.6	7.07	-268.8	7.40	-52.4
08/22/08	-	2.89	473.7	7.97	-212.9	7.08	-301.8	7.74	-224.0	7.03	-275.9	7.67	-27.8
08/25/08	-	2.93	470.5	7.77	-287.7	7.18	-286.1	6.89	-205.6	7.12	-273.8	8.02	-108.4
08/26/08	-	2.91	468.8	7.95	-255.4	7.09	-305.4	7.75	-281.2	7.14	-273.1	7.77	-41.4
09/24/08	-	3.03	423.2	7.18	-107.8	6.99	-255.4	7.11	-205.7	6.89	-245.2	7.70	-87.7
09/30/08	-	3.02	434.3	7.77	-151.9	6.89	-267.5	-	-	6.92	-269.9	8.10	-94.0
10/13/08	5.8	3.34	433.1	7.17	-98.7	6.94	-218.3	6.80	-157.2	7.01	-206.1	8.32	-101.0
10/27/08	5.8	3.21	247.8	7.34	-162.5	6.96	-175.3	7.20	-152.3	6.98	-126.8	7.88	273.7
11/19/08	5.5	2.83	453.7	7.20	-104.5	6.77	-204.7	7.12	-82.2	6.71	-154.7	7.74	-35.1
12/03/08	5.3	3.56	453.0	7.23	-45.0	6.86	-141.3	7.06	-100.1	6.84	-135.6	7.65	-47.5
01/9/09 ⁴	-	3.15	458.3	-	-	-	-	-	-	-	-	6.95	-43.0
01/12/09	5.3	2.94	466.3	6.36	-82.8	6.38	-245.1	-	-	6.82	-259.0	7.11	-74.0
02/19/09 ⁴	5.3	2.78	480.1	6.60	-3.2	6.74	-145.1	7.26	-117.6	6.25	-162.3	6.68	-18.1
03/10/09	5.0	2.88	481.2	-	-	-	-	-	-	-	-	7.36	34.3
04/13/09	7.0	2.78	532.7	7.45	-9.9	7.04	-185.5	7.50	-65.8	6.98	-175.4	7.77	-32.2

TABLE 2
ASPEN SEEP BIOREACTOR - RECENT pH and ORP FIELD MEASUREMENTS
FEBRUARY 2011 MONTHLY SUMMARY

Draft - Provisional Data

Date	Aspen Influent ¹			Manhole 1 or 2		Manhole 5 or 4		Manhole 6		Manhole 7		Aspen Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	B.R.#1 Influent pH (s.U.)	ORP (mV)	B.R.#1 Eff/B.R.#2 Inf pH (s.U.)	ORP (mV)	NaOH dosing pH (s.U.)	ORP (mV)	B.R. #2 Eff pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
05/06/09	5.5	2.89	444.4	-	-	6.47	-221.3	-	-	6.56	-206.5	7.62	-86.6
06/03/09	6.5	2.91	445.9	6.98	-145.1	6.62	-260.8	7.07	-192.8	6.65	-260.4	7.55	-15.4
06/16/09	6.5	2.98	388.0	7.09	-186.6	6.79	-319.3	7.16	-233.2	6.80	-298.2	7.70	-158.1
07/01/09	6.0	2.95	376.5	7.43	376.5	6.93	-366.2	7.42	-310.8	6.97	-350.5	7.89	-189.6
07/14/09	5.8	2.97	394.4	-	-	6.85	-338.8	-	-	6.98	-331.9	7.90	-146.2
07/29/09	6.0	2.78	404.5	7.24	-175.5	7.39	-427.7	8.10	-260.2	7.29	-403.7	8.05	-135.6
08/05/09	5.5	2.89	433.8	-	-	-	-	8.73	-120.7	-	-	8.17	-146.0
08/19/09	5.1	2.97	425.7	-	-	-	-	8.25	-37.6	-	-	7.54	47.0
09/17/09	5.3	2.38	490.6	7.27	-91.3	6.81	-180.3	7.75	-120.2	6.85	-182.3	6.95	-24.7
09/30/09	5.0	2.96	503.7	8.03	-18.9	8.99	-253.1	7.75	-217.2	7.03	-276.6	7.98	-17.0
10/15/09	5.5	2.93	496.6	6.57	-121.4	7.63	-301.0	8.33	-148.5	7.71	-314.5	7.85	-41.2
10/28/09	4.9	2.96	487.6	8.79	-69.9	7.28	-216.4	9.08	-143.0	7.24	-162.8	7.94	2.8
11/11/09	5.0	2.91	420.8	8.34	-15.3	7.49	-243.7	8.42	-163.9	7.51	-199.3	7.74	60.6
12/17/09 ⁵	5.0	2.90	416.5	4.65	100.2	5.00	15.3	-	-	5.12	-1.8	5.91	-26.4
01/14/10 ⁵	4.8	2.85	417.7	6.96	-89.0	6.82	-186.4	-	-	6.84	-206.1	6.45	-67.4
02/02/10 ⁵	4.7	2.94	484.0	7.58	-46.7	6.85	-129.6	-	-	6.67	-131.1	6.95	-48.1
03/09/10	4.8	2.74	474.7	8.27	-78.3	7.95	-204.2	8.74	-208.9	8.10	-220.8	7.75	-5.9
04/26/10 ⁶	12.0	2.85	479.5	5.14	135.1	5.61	-19.0	5.04	109.2	5.60	-29.6	6.15	35.9
05/17/10	9.7	2.97	436.9	6.26	196.9	7.04	-283.9	7.79	-235.1	7.08	285.4	7.76	-73.8
05/24/10	9.4	3.16	418.0	7.43	-156.1	7.00	-259.9	7.27	-171.4	6.89	-282.6	7.11	-78.6
05/27/10	9.6	3.18	423.1	5.52	-225.1	7.58	-316.7	8.86	-318.2	6.74	-296.8	7.07	-98.7
06/01/10	10.5	3.11	444.0	8.47	-32.2	7.72	-292.6	9.00	-	6.74	-300.9	7.01	-31.5
06/14/10	10.0	2.99	427.7	7.40	-81.7	6.85	-272.5	8.22	-220.2	6.61	-181.6	7.48	-93.7
06/15/10	-	-	-	8.04	-221.6	6.89	-347.7	-	-	6.17	-355.9	-	-
06/16/10	-	2.99	427.7	7.40	-81.7	6.85	-272.6	8.22	-220.2	6.61	-181.6	7.48	-93.7
06/18/10	9.1	-	-	7.72	-211.7	6.79	-335.6	-	-	6.69	-336.7	-	-
06/21/10	9.0	3.21	409.4	7.99	-242.7	6.96	-364.1	7.86	-303.4	6.78	-349.5	7.70	-142.3
06/30/10	10.0	2.59	451.5	8.73	-216.2	8.73	-216.2	-	-	6.78	-337.9	7.96	-164.5
07/01/10	-	2.82	422.4	-	-	-	-	-	-	-	-	7.94	-241.9
07/13/10	10.0	2.62	479.5	7.52	-112.1	6.90	-279.5	8.02	-255.2	6.90	-294.0	7.76	-65.8
07/21/10	10.0	2.93	475.1	7.90	-70.5	7.15	-301.5	7.80	-212.4	7.27	-315.3	8.09	-95.7
07/29/10	10.0	2.90	465.3	7.73	-168.6	7.25	-318.1	7.08	-192.5	7.15	-318.5	7.06	-45.6
08/03/10	9.0	2.94	458.6	7.69	-193.3	7.16	-311.4	7.16	-311.4	7.17	-324.5	7.39	-66.3
08/12/10	9.0	2.85	476.3	7.98	-255.3	7.07	-299.3	7.50	-235.2	7.06	-307.0	7.55	-26.2
08/17/10	9.5	2.64	470.9	8.09	-47.2	7.54	-306.0	8.47	-206.8	7.37	-320.0	7.86	-74.0
08/24/10	9.2	3.04	250.0	7.81	-129.9	7.21	-151.9	7.20	-202.9	7.09	-147.9	7.81	2.9
09/02/10	9.2	2.84	503.9	7.70	-208.4	--	--	8.15	-227.0	7.32	-267.2	7.97	-20.2
09/16/10	8.0	3.21	455.8	8.40	-219.9	7.29	-209.3	8.66	-197.0	7.32	-279.7	7.76	-76.4

TABLE 2
ASPEN SEEP BIOREACTOR - RECENT pH and ORP FIELD MEASUREMENTS
FEBRUARY 2011 MONTHLY SUMMARY

Draft - Provisional Data

Date	Aspen Influent ¹			Manhole 1 or 2		Manhole 5 or 4		Manhole 6		Manhole 7		Aspen Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	B.R.#1 Influent pH (s.U.)	ORP (mV)	B.R.#1 Eff/B.R.#2 Inf pH (s.U.)	ORP (mV)	NaOH dosing pH (s.U.)	ORP (mV)	B.R. #2 Eff pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
09/22/10 ⁷	8.0	3.06	476.5	8.50	-151.0	7.25	-276.9	8.30	-257.8	7.39	-279.9	7.93	-112.0
09/30/10 ⁷	7.6	3.16	503.3	8.49	-263.9	7.32	-265.4	8.53	-221.9	7.26	-267.8	8.61	94.1
10/06/10 ⁸	9.0	3.28	479.3	7.83	-287.5	7.39	-305.8	8.25	-246.7	7.62	-305.1	8.17	-235.5
10/11/10	8.0	3.20	479.3	7.52	-190.4	7.00	-284.4	8.28	-227.4	7.15	-290.4	7.85	26.4
10/19/10	8.0	2.89	447.3	8.75	-157.3	7.43	-310.4	8.52	-203.0	7.22	-310.6	8.15	130.4
10/28/10	8.0	2.95	579.0	7.23	-282.8	6.98	-368.9	8.50	-384.7	7.12	-402.6	7.73	-30.7
11/02/10	8.0	2.69	366.7	7.89	-285.1	7.14	-385.2	8.46	-307.5	7.00	-385.7	7.62	-31.5
11/15/10	8.5	2.94	361.7	7.79	-273.2	7.08	-381.9	8.04	-269.3	6.89	-384.5	7.64	-2.2
12/07/10 ⁹	8.5	3.01	387.2	6.97	-298.4	6.82	-375.1	-	-	6.57	-353.5	6.41	-112.4
01/07/11 ⁹	8.5	2.92	434.1	6.50	-134.0	5.98	-200.1	-	-	6.08	-216.2	6.15	-4.9
02/01/11 ⁹	8.0	3.07	423.8	6.75	-332.2	6.86	-279.7	-	-	6.59	-297.0	6.62	-9.3

Notes

1. Aspen Seep Influent Flow measurements are field measurements completed with a graduated bucket and stop watch.
2. Bioreactor #1 was flushed on 10/08/07, 10/09/07, and 10/18/07; Bioreactor #1 was bypassed during this flushing period. Low pH readings in Manhole 1 from 10/10/07 through 10/31/07 were caused by drainage into pretreatment pond from failed seal in weir box cap.
3. Measurements are believed to be erroneous due to calibration error. Parameters were re-evaluated on 02/12/08.
4. Low pH measurements due to a power outage and associated chemical pump shutdown.
5. Low pH measurements caused by stripped gears on NaOH pump head that prevented dosing to Manhole 6.
6. Low pH measurements due to increase in system flow rates; chemical dosing rates lagged behind these system flow rate increases and were unable to prevent decrease in system pH.
7. Effluent readings were collected from the centrifuge discharge point on these dates due to sludge dewatering. Water was not being discharged from Pond 4.
8. Effluent readings were collected Pond 4 effluent on this date. Water was not being discharged from Pond 4.
9. Low pH measurements due to power outage and associated chemical pump failure during the inverter failure on November 29, 2010.

Abbreviations

- - not measured, not recorded, or bioreactor operation did not have flow at given location on the specified date.

Atlantic Richfield Company

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Project Manager, Mining

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April 11, 2011

Mr. Gary Riley
US EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105

Mr. Kevin Mayer
US EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105

RE: Leviathan Monthly Report for March 2011 and Quarterly RI/FS Progress Report

Dear Mr. Riley and Mr. Mayer:

The following text describes activities conducted during the month of March 2011 at the Leviathan Mine Site and activities anticipated to occur during the upcoming month. These activities are organized by work area [Aspen Seep, Channel Underdrain (CUD) and Delta Seep (DS)], and site-wide tasks. This progress report is being submitted in accordance with Paragraph 62 of the Administrative Settlement Agreement and Order on Consent for Removal Action (AOC) (effective January 21, 2009).

Atlantic Richfield is also submitting this letter in satisfaction of the quarterly progress reporting requirement set forth in Paragraph 63 of the Administrative Order for Remedial Investigation and Feasibility Study (U.S. EPA Region IX, CERCLA Docket No. 2008-18, June 23, 2008) (UAO). The quarterly summary of RI/FS activities is provided at the end of this letter.

ACTIVITIES FOR MARCH

Aspen Seep

- Operated the Aspen Seep Bioreactor (ASB) in recirculation mode during the month of March. Winter access O&M, influent sampling, and effluent sampling occurred on March 11, 2011. The currently available influent and effluent water quality data for the March 11, 2011 sampling event are presented in Table 1. Recent pH and ORP field data are summarized in Table 2. We have not received any new influent flow rate data from the USGS since January 31, 2011. Any new flow data received will be included in subsequent monthly reports.

CUD and DS

- The HDS Treatment Plant and CUD and DS capture equipment remained winterized during the month of March.

A BP affiliated company



- On March 23, 2011 Atlantic Richfield submitted a letter to EPA summarizing Atlantic Richfield's plans for access, commissioning, and startup of the HDS Treatment System and requesting authorization to perform water treatment during the 2011 Winter/Spring Portion of the Limited Access Season. On March 30, 2011, EPA provided a letter approving the request for authorization.
- Revisions to the Spill Prevention, Control and Countermeasures Plan for the HDS Treatment System were completed as of March 31, 2011.

Site-wide

- Work continued on updating the Leviathan Mine Project Database with data from monitoring performed by Atlantic Richfield and various agencies.
- On March 15, 2011, a conference call was conducted with EPA to provide a general progress update.
- On March 15, 2011, a meeting was held with EPA and the Lahontan Regional Water Quality Control Board (LRWQCB) to discuss Simultaneous Operation Planning (SIMOPS).
- Continued compiling information for the 2010 Annual Report (due April 10, 2011).
- On March 1, 2011, EPA approved Atlantic Richfield's request for an extension to the submittal date for the 2011 Removal Action Work Plan (RAWP). The 2011 RAWP was submitted to EPA on March 10, 2011. On March 30, 2011, EPA provided approval and direction to implement the 2011 RAWP, subject to EPA's comments.
- On March 31, 2011, the Forest Service granted Atlantic Richfield's request to extend the submittal date for the Annual Road Operating Plan until April 15, 2011.

ACTIVITIES FOR UPCOMING MONTH

Aspen Seep

- Continue operation of the Bioreactor in recirculation mode and conduct winter access monitoring and maintenance as outlined in the 2010 RAWP.

CUD and DS

- Data from the 2010 HDS Treatment Plant operations will continue to be compiled for inclusion in the 2010 Annual Report.
- Perform road maintenance and snow removal activities as necessary for the winter/spring portion of the 2011 Limited Access Season.
- Begin site setup activities in the Pond 4 area for the winter/spring portion of the 2011 Limited Access Season operations, weather and safe access conditions permitting.

Site-wide

- Continue to provide project progress updates to EPA via conference call. The next conference call is currently scheduled for April 19, 2011.

- Submit the 2010 Annual Report to EPA.
- Submit the 2011 Annual Road Operating Plan to the Forest Service.

* * * *

Quarterly RI/FS Progress Report

As required by Paragraph 63 of the UAO, the following Quarterly Progress Report for Remedial Investigation and Feasibility Study (RI/FS) activities describes: (a) the actions taken to comply with the UAO during the prior quarter, (b) the work planned for the next quarter, and (c) any problems encountered or anticipated including any actual or anticipated delays in schedules.

Actions Taken to Comply with the UAO

- Atlantic Richfield submitted the Quarterly Progress Report for the third quarter on January 10, 2011.
- Atlantic Richfield submitted the Mapping FRI Report on January 25, 2011.
- Atlantic Richfield conducted a Technical Work Group call to discuss the draft Human Health Risk Assessment Work Plan on January 25, 2011.
- Atlantic Richfield submitted a response to EPA and LRWQCB comments on the On-Property FRI Work Plan on February 15, 2011.
- Atlantic Richfield received Approval with Comments and Direction to Implement the Human Health Risk Assessment Work Plan on March 10, 2011.
- Atlantic Richfield submitted the draft results of the reference FRI study activities on March 10, 2011.
- Atlantic Richfield conducted a meeting with EPA on March 15, 2011 to discuss the results of the initial reference FRI activities and the table of contents for the Reference FRI Work Plan.

Work Planned for the Next Quarter

- Atlantic Richfield plans on submitting draft responses to comments on the Human Health Risk Assessment Report in the second quarter of 2011.
- Atlantic Richfield plans on meeting with EPA to discuss the draft response to comments on the Human Health Risk Assessment in the second quarter of 2011.
- Atlantic Richfield will continue to prepare the Ecological Risk Assessment Work Plan in the second quarter of 2011.
- Atlantic Richfield plans on submitting the Reference FRI Work Plan in the second quarter of 2011.
- Atlantic Richfield plans on implementing the data collection under the On-Property FRI Work Plan in the second quarter of 2011.
- Atlantic Richfield plans on submitting a Quarterly Progress Report for the second quarter of 2011 on April 10, 2011.

* * * *

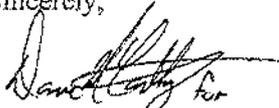
Gary Riley and Kevin Mayer -- USEPA Region 9

April 11, 2011

Page 4 of 4

If you have any questions or comments, please feel free to contact me at (714) 228-6770 or via e-mail at Anthony.Brown@bp.com.

Sincerely,

A handwritten signature in black ink, appearing to read "Tony Brown" with a stylized flourish at the end.

Tony Brown
Project Manager

Attachments:

- Table 1 -- Aspen Seep Bioreactor Monthly Influent and Effluent Sample Results
- Table 2 -- Aspen Seep Bioreactor, Recent pH and ORP Field Measurements

cc: Chuck Curtis, Lahontan Regional Water Quality Control Board
Ronald Halsey, Atlantic Richfield Company
Nathan Block, Esq., BP America Inc.
Adam Cohen, Esq., Davis Graham & Stubbs LLP
Dave McCarthy, Copper Environmental Consulting
Joe Niland, AMEC-Geomatrix Consultants, Inc.
Sandy Riese, EnSci, Inc.
Randy Miller, Broadbent & Associates, Inc.

TABLE 1
ASPEN SEEP BIOREACTOR - SAMPLE RESULTS
MARCH 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Parameter	Basis	March 11 2011 140ASPINF446 ASB Influent (mg/L)	March 11 2011 140ASPEFF445 ASB Effluent (mg/L)	Maximum Discharge Criteria (mg/L)	Average Discharge Criteria (mg/L)
pH ¹	Field	3.05	7.05	-	6.0 - 9.0 ²
Aluminum	Dissolved	42	<0.040	4	2
Arsenic	Dissolved	<0.00090	<0.00090	0.34	0.15
Cadmium	Dissolved	0.0014	<0.00010	0.009	0.004
Calcium	Dissolved	304	256	-	-
Chromium	Dissolved	0.0027	<0.00090	0.97	0.31
Copper	Dissolved	0.64	0.0023	0.026	0.016
Hardness	Dissolved	1100	880	-	-
Iron	Dissolved	112	0.300	2	1
Lead	Dissolved	<0.00020	<0.00020	0.136	0.005
Magnesium	Dissolved	74	59	-	-
Nickel	Dissolved	0.44	0.025	0.84	0.094
Zinc	Dissolved	0.54	<0.0040	0.21	0.21
Selenium	Total	0.0018 J	0.00051 J	NP	0.005
Acidity	Total	660	<2.0	-	-
Alkalinity (Total)	Total	<2.00	185	-	-
Alkalinity (Bicarbonate)	Total	<2.40	226	-	-
Alkalinity (Carbonate)	Total	<1.20	<1.20	-	-
Alkalinity (Hydroxide)	Total	<0.700	<0.700	-	-
Sulfate	Lab Filtered	1640	1160	-	-
Chloride	Total	3.9	2.4	-	-
Total Dissolved Solids	Total	2340	1990	-	-
Total Suspended Solids	Total	38	20	-	-

Notes

1. pH values are field measurements and are reported in standard units.
2. Discharge criteria for average pH based on 24-hour (single day) average discharge.

Abbreviations

< - Analyte not detected at or above the or method detection limit

-- Discharge criteria not established

ASB - Aspen Seep Bioreactor

J - Estimated value - Analyte detected at a level less than the Reporting Limit and greater than or equal to the Method Detection Limit

NP - Not Promulgated

TABLE 2
ASPEN SEEP BIOREACTOR - RECENT pH and ORP FIELD MEASUREMENTS
MARCH 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)			Manhole 7 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)
09/21/07	6.0	2.91	428.9	7.34	-268.4	7.13	-280.3	9.36	-285.8	7.13	-265.3	8.42	2.6	
09/26/07	6.2	2.89	496.7	7.80	-192.1	7.36	-273.0	9.64	-195.4	7.34	-232.7	8.34	50.3	
10/03/07	5.5	2.85	484.1	8.07	-127.7	8.50	-129.6	11.25	-136.5	7.64	-164.0	8.22	-5.2	
10/10/07 ²	5.8	2.80	498.0	5.50	55.9	5.64	-70.5	10.00	-190.0	6.20	-171.6	7.78	-268.0	
10/18/07 ²	5.9	2.83	482.4	5.00	26.8	5.68	-46.2	11.38	-112.0	6.23	-139.0	8.69	135.0	
10/31/07 ²	9.0	2.88	402.7	4.26	319.3	6.85	-156.7	9.80	-179.0	6.95	-212.2	7.66	-94.3	
11/08/07	6.0	2.88	418.0	7.55	-128.3	7.01	-116.7	8.23	-133.9	6.86	-125.8	7.51	-50.6	
11/13/07	-	2.86	484.5	7.06	-2.3	6.84	-65.3	7.86	-42.6	6.79	-78.1	7.58	4.2	
11/27/07	5.5	2.86	479.4	6.99	-38.5	6.97	-205.0	8.46	-183.9	6.91	-156.8	7.25	-1.7	
12/12/07	-	3.01	482.2	7.20	-25.5	7.20	-115.2	7.64	-107.7	7.04	-129.7	6.90	-31.9	
01/15/08	4.8	2.98	483.3	6.76	5.9	6.73	-85.5	7.89	-94.3	6.67	-137.4	6.71	-33.0	
02/07/08 ³	-	-	-	-	-	-	-	-	-	-	-	-	20.2	
02/12/08	7.0	2.76	487.4	6.67	44.6	-	-	7.39	-45.6	6.42	-88.0	6.70	-15.3	
03/18/08	6.0	2.88	375.1	7.85	3.6	-	-	8.80	-189.2	7.23	-211.3	7.05	-95.3	
04/10/08	7.5	2.90	397.7	6.74	-80.0	6.70	-163.4	7.50	-142.6	6.57	-165.3	7.39	-24.5	
05/15/08	7.3	2.97	442.2	6.24	21.2	6.55	-265.4	6.55	-233.7	5.60	-183.7	7.29	-143.5	
05/27/08	7.0	3.00	464.1	7.11	-16.3	6.85	-242.2	6.98	-191.1	6.80	-235.2	7.26	-19.5	
06/09/08	7.0	3.16	455.4	7.40	-47.5	7.09	-251.2	7.70	-178.8	6.97	-219.7	7.19	-61.5	
06/17/08	7.5	2.91	443.9	7.42	-22.7	6.90	-283.0	7.29	-131.0	6.88	-244.3	7.30	-82.5	
07/10/08	7.3	2.98	470.9	7.32	-34.1	6.90	-238.4	7.05	-172.6	6.90	-215.0	7.85	-113.5	
07/22/08	7.0	2.99	455.5	6.94	-272.5	6.97	-267.4	7.07	-190.6	7.01	-248.9	7.35	-89.1	
08/04/08	6.8	2.89	450.7	7.60	-94.4	6.94	-266.0	6.19	-173.1	7.02	-251.2	-	-	
08/05/08	-	3.05	445.3	-	-	-	-	-	-	-	-	-	-70.0	
08/18/08	7.3	3.93	478.9	7.46	-166.7	7.08	-291.9	7.40	-202.6	7.07	-268.8	7.40	-52.4	
08/22/08	-	2.89	473.7	7.97	-212.9	7.08	-301.8	7.74	-224.0	7.03	-275.9	7.67	-27.8	
08/25/08	-	2.93	470.5	7.77	-287.7	7.18	-286.1	6.89	-205.6	7.12	-273.8	8.02	-108.4	
08/26/08	-	2.91	468.8	7.95	-255.4	7.09	-305.4	7.75	-281.2	7.14	-273.1	7.77	-41.4	
09/24/08	-	3.03	423.2	7.18	-197.8	6.99	-255.4	7.11	-203.7	6.89	-245.2	7.70	-87.7	
09/30/08	-	3.02	434.3	7.77	-151.9	6.89	-267.5	-	-	6.92	-269.9	8.10	-94.0	
10/13/08	5.8	3.34	433.1	7.17	-98.7	6.94	-218.5	6.80	-157.2	7.01	-206.1	8.32	-101.0	
10/27/08	5.8	3.21	247.8	7.34	-162.5	6.96	-175.3	7.20	-152.3	6.98	-126.8	7.88	273.7	
11/19/08	5.5	2.83	453.7	7.20	-104.5	6.77	-204.7	7.12	-82.2	6.71	-154.7	7.74	-35.1	
12/03/08	5.3	3.56	453.0	7.23	-45.0	6.86	-141.3	7.06	-100.1	6.84	-135.6	7.65	-47.5	
01/09/09 ⁴	-	3.15	458.3	-	-	-	-	-	-	-	-	-	6.95	
01/12/09	5.3	2.94	466.3	6.36	-82.8	6.38	-245.1	-	-	6.82	-259.0	7.11	-74.0	
02/19/09 ⁴	5.3	2.78	480.1	6.60	-3.2	6.74	-145.1	7.26	-117.6	6.25	-162.3	6.68	-18.1	

TABLE 2
ASPEN SEEP BIOREACTOR - RECENT pH and ORP FIELD MEASUREMENTS
MARCH 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)			Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)			Manhole 6 (NaOH dosing location)			Manhole 7 (Biocell 2 Effluent)			Aspen Seep Bioreactor Effluent		
	Flow (gpm)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	
																		Flow (gpm)
03/10/09	5.0	2.88	481.2	7.45	-9.9	7.04	-185.5	7.50	-65.8	6.98	-175.4	7.36	34.3					
04/13/09	7.0	2.78	532.7	6.47	-	6.47	-221.3	-	-	6.56	-206.5	7.77	-32.2					
05/06/09	5.5	2.89	444.4	6.98	-145.1	6.62	-260.8	7.07	-192.8	6.65	-260.4	7.62	-86.6					
06/03/09	6.5	2.91	445.9	7.09	-186.6	6.79	-319.3	7.16	-233.2	6.80	-298.2	7.55	-15.4					
06/16/09	6.5	2.98	388.0	7.43	376.5	6.93	-366.2	7.42	-310.8	6.97	-350.5	7.70	-158.1					
07/01/09	6.0	2.95	376.5	-	-	6.85	-338.8	-	-	6.98	-331.9	7.89	-189.6					
07/14/09	5.8	2.97	394.4	7.21	-175.5	7.39	-427.7	8.10	-260.2	6.98	-403.7	7.90	-146.2					
07/29/09	6.0	2.78	404.5	-	-	-	-	8.73	-120.7	7.29	-	8.05	-135.6					
08/05/09	5.5	2.89	433.8	-	-	-	-	8.25	-37.6	-	-	8.17	-146.0					
08/19/09	5.1	2.97	425.7	-	-	-	-	8.25	-37.6	-	-	8.17	-146.0					
09/17/09	5.3	2.38	490.6	7.27	-91.3	6.81	-180.3	8.25	-37.6	6.85	-182.3	7.54	47.0					
09/30/09	5.0	2.96	503.7	8.03	-18.9	8.99	-253.1	7.75	-120.2	7.03	-276.6	6.95	-24.7					
10/15/09	5.5	2.93	496.6	6.57	-121.4	7.63	-301.0	7.75	-217.2	7.71	-314.5	7.98	-17.0					
10/28/09	4.9	2.96	487.6	8.79	-69.9	7.28	-216.4	8.33	-148.5	7.71	-314.5	7.85	-41.2					
11/11/09	5.0	2.91	420.8	8.34	-15.3	7.49	-243.7	9.08	-143.0	7.24	-162.8	7.94	2.8					
12/17/09 ⁵	5.0	2.90	416.5	4.65	100.2	5.00	15.3	8.42	-163.9	7.51	-199.3	7.74	60.6					
01/14/10 ⁵	4.8	2.85	417.7	6.96	-89.0	6.82	-186.4	-	-	5.12	-11.8	5.91	-26.4					
02/02/10 ⁵	4.7	2.94	484.0	7.58	-46.7	6.85	-129.6	-	-	6.84	-206.1	6.45	-67.4					
03/09/10	4.8	2.74	474.7	8.27	-78.3	7.95	-204.2	-	-	6.67	-131.1	6.95	-48.1					
04/26/10 ⁶	12.0	2.85	479.5	5.14	135.1	5.61	-19.0	8.74	-208.9	8.10	-220.8	7.75	-5.9					
05/17/10	9.7	2.97	436.9	6.26	196.9	7.04	-283.9	5.04	109.2	5.60	-29.6	6.15	35.9					
05/24/10	9.4	3.16	418.0	7.43	-156.1	7.00	-259.9	7.79	-235.1	7.08	285.4	7.76	-73.8					
05/27/10	9.6	3.18	423.1	5.52	-225.1	7.58	-316.7	7.27	-171.4	6.89	-282.6	7.11	-78.6					
06/01/10	10.5	3.11	444.0	8.47	-32.2	7.72	-292.6	8.86	-318.2	6.74	-296.8	7.07	-98.7					
06/14/10	10.0	2.99	427.7	7.40	-81.7	6.85	-272.5	9.00	-	6.74	-300.9	7.01	-31.5					
06/15/10	-	-	-	8.04	-221.6	6.89	-347.7	8.22	-220.2	6.61	-181.6	7.48	-93.7					
06/16/10	-	2.99	427.7	7.40	-81.7	6.85	-272.6	8.22	-220.2	6.61	-181.6	7.48	-93.7					
06/18/10	9.1	-	-	7.72	-211.7	6.79	-335.6	-	-	6.69	-336.7	-	-					
06/21/10	9.0	3.21	409.4	7.99	-242.7	6.96	-364.1	7.86	-303.4	6.78	-349.5	7.70	-142.3					
06/30/10	10.0	2.59	451.5	8.73	-216.2	8.73	-216.2	-	-	6.78	-337.9	2.96	-164.5					
07/01/10	-	2.82	422.4	-	-	-	-	-	-	6.78	-337.9	2.96	-164.5					
07/13/10	10.0	2.62	479.5	7.52	-112.1	6.90	-279.5	8.02	-255.2	6.90	-294.0	7.76	-65.8					
07/21/10	10.0	2.93	475.1	7.90	-70.5	7.15	-301.5	7.80	-212.4	7.27	-315.3	8.09	-95.7					
07/29/10	10.0	2.90	465.3	7.73	-168.6	7.25	-318.1	7.08	-192.5	7.15	-318.5	7.06	-45.6					
08/03/10	9.0	2.94	488.6	7.69	-193.3	7.16	-311.4	7.16	-311.4	7.17	-324.5	7.39	-66.3					
08/12/10	9.0	2.85	476.3	7.98	-255.3	7.07	-299.3	7.50	-235.2	7.06	-307.0	7.55	-26.2					

TABLE 2
ASPEN SEEP BIOREACTOR - RECENT pH and ORP FIELD MEASUREMENTS
MARCH 2011 MONTHLY SUMMARY

Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
08/17/10	9.5	2.64	470.9	8.09	-47.2	7.54	-306.0	8.47	-206.8	7.37	-320.0	7.86	-74.0
08/24/10	9.2	3.04	250.0	7.81	-129.9	7.21	-151.9	7.20	-202.9	7.09	-147.9	7.81	2.9
09/02/10	9.2	2.84	503.9	7.70	-208.4	--	--	8.15	-227.0	7.32	-267.2	7.97	-20.2
09/16/10	8.0	3.21	455.8	8.40	-219.9	7.29	-209.3	8.66	-197.0	7.32	-279.7	7.76	-76.4
09/22/10 ⁷	8.0	3.06	476.5	8.50	-151.0	7.25	-276.9	8.30	-257.8	7.39	-279.9	7.93	-112.0
09/30/10 ⁷	7.6	3.16	503.3	8.49	-263.9	7.32	-265.4	8.53	-221.9	7.26	-267.8	8.61	94.1
10/06/10 ⁸	9.0	3.28	479.3	7.83	-287.5	7.39	-305.8	8.25	-246.7	7.62	-305.1	8.17	-235.5
10/11/10	8.0	3.20	479.3	7.52	-190.4	7.00	-284.4	8.28	-227.4	7.15	-290.4	7.85	26.4
10/19/10	8.0	2.89	447.3	8.75	-157.3	7.43	-310.4	8.52	-203.0	7.22	-310.6	8.15	130.4
10/28/10	8.0	2.95	579.0	7.23	-282.8	6.98	-368.9	8.50	-384.7	7.12	-402.6	7.73	-30.7
11/02/10	8.0	2.69	366.7	7.89	-285.1	7.14	-385.2	8.46	-307.5	7.00	-385.7	7.62	-31.5
11/15/10	8.5	2.94	361.7	7.79	-273.2	7.08	-381.9	8.04	-269.3	6.89	-384.5	7.64	-2.2
12/07/10 ⁹	8.5	3.01	387.2	6.97	-298.4	6.82	-375.1	-	-	6.57	-353.5	6.41	-112.4
01/07/11 ⁹	8.5	2.92	434.1	6.50	-134.0	5.98	-200.1	-	-	6.08	-216.2	6.15	-4.9
02/01/11 ⁹	8.0	3.07	423.8	6.75	-332.2	6.86	-279.7	-	-	6.59	-297.0	6.62	-9.3
03/11/11	8.5	3.05	384.7	7.66	-239.2	7.11	-344.7	-	-	6.85	-370.1	7.05	-73.4

Notes

- Aspen Seep Bioreactor Influent Flow measurements are field measurements completed with a graduated bucket and stop watch.
- Biocell 1 was flushed on 10/08/07, 10/09/07, and 10/18/07; Biocell 1 was bypassed during this flushing period. Low pH readings in Manhole 1 from 10/10/07 through 10/31/07 were caused by drainage into pretreatment pond from failed seal in weir box cap.
- Measurements are believed to be erroneous due to calibration error. Parameters were re-evaluated on 02/12/08.
- Low pH measurements due to a power outage and associated chemical pump shutdown.
- Low pH measurements caused by stripped gears on NaOH pump head that prevented dosing to Manhole 6.
- Low pH measurements due to increase in system flow rates; chemical dosing rates lagged behind these system flow rate increases and were unable to prevent decrease in system pH.
- Effluent readings were collected from the centrifuge discharge point on these dates due to sludge dewatering. Water was not being discharged from Pond 4.
- Effluent readings were collected Pond 4 effluent on this date. Water was not being discharged from Pond 4.
- Low pH measurements due to power outage and associated chemical pump failure during the inverter failure on November 29, 2010.

Abbreviations

- - not measured, not recorded, or bioreactor operation did not have flow at given location on the specified date.
gpm - gallons per minute ORP - oxidation/reduction potential
mV - millivolts s.U. - standard unit

Atlantic Richfield Company

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May 10, 2011

Mr. Gary Riley
US EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105

Mr. Kevin Mayer
US EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105

RE: Leviathan Monthly Report for April 2011

Dear Mr. Riley and Mr. Mayer:

The following text describes activities conducted during the month of April 2011 at the Leviathan Mine Site and activities anticipated to occur during the upcoming month. These activities are organized by work area [Aspen Seep, Channel Underdrain (CUD) and Delta Seep (DS)], and site-wide tasks. This progress report is being submitted in accordance with Paragraph 62 of the Administrative Settlement Agreement and Order on Consent for Removal Action (AOC) (effective January 21, 2009).

ACTIVITIES FOR APRIL

Aspen Seep

- Operated the Aspen Seep Bioreactor (ASB) in recirculation mode during the month of April. Routine O&M, influent sampling, and effluent sampling occurred on April 26, 2011. The currently available influent and effluent water quality data for the April 26, 2011 sampling event are presented in Table 1. Recent pH and ORP field data are summarized in Table 2. We have not received any new influent flow rate data from the USGS since January 31, 2011. Any new flow data received will be included in subsequent monthly reports.

CUD and DS

- Atlantic Richfield road maintenance and snow removal activities began on April 14, 2011 for the winter/spring portion of the 2011 Limited Access Season.
- Site setup activities were initiated on April 18, 2011 in the Pond 4 area for the winter/spring portion of the 2011 Limited Access Season operations. Site setup activities were periodically delayed in April due to inclement weather. Activities have included the following: de-winterization of the HDS Plant, inspection of CUD and DS conveyance pipelines, servicing of plant motors and gearboxes,

A BP affiliated company



maintenance and startup of site generators, installation of site communications equipment, and delivery of site trailers.

- On April 12, 2011, Atlantic Richfield provided e-mail updates to EPA regarding the Limited Access Season schedule of activities.

Site-wide

- Work continued on updating the Leviathan Mine Project Database with data from monitoring performed by Atlantic Richfield and various agencies.
- On March 31, 2011, the Forest Service granted Atlantic Richfield's request to extend the submittal date for the Annual Road Operating Plan until April 15, 2011. Atlantic Richfield submitted the Annual Road Operating Plan to the Forest Service on April 13, 2011. The Forest Service provided comments on April 18, 2011. Atlantic Richfield provided a response to the Forest Service comments in a letter dated April 29, 2011.
- The 2010 Annual Completion Report was submitted to EPA on April 8, 2011.
- On April 19, 2011, a conference call was conducted with EPA to provide a general progress update.
- On April 21, 2011, Atlantic Richfield submitted updated certificates of insurance to EPA, in accordance with Paragraph 140 of the AOC.
- On April 27, 2011, Atlantic Richfield participated in a conference call with EPA and the Lahontan Regional Water Quality Control Board (LRWQCB) to discuss coordination of response actions.

ACTIVITIES FOR UPCOMING MONTH

Aspen Seep

- Continue operation of the Bioreactor in recirculation mode and conduct routine operation, maintenance, and monitoring as outlined in the 2011 RAWP.

CUD and DS

- Complete site setup activities in the Pond 4 area for the winter/spring portion of the 2011 Limited Access Season operations, weather and safe access conditions permitting.
- Continue with the startup, optimization, operation, and maintenance of the HDS Treatment System.
- Initiate collection and treatment of the CUD and DS.

Site-wide

- Continue to provide project progress updates to EPA via conference call. The next conference call is currently scheduled for May 24, 2011.
- Submit responses to EPA comments provided in the March 30, 2011 letter approving and directing Atlantic Richfield to implement the 2011 RAWP.

Gary Riley and Kevin Mayer – USEPA Region 9

May 10, 2011

Page 3 of 3

- Perform road maintenance as needed on the Leviathan Mine Road, including surface repairs and dust control on the residential section of the Nevada access road near US 395.

If you have any questions or comments, please feel free to contact me at (714) 228-6770 or via e-mail at Anthony.Brown@bp.com.

Sincerely,

SIGNED BY DAVE MCCARTHY for

Tony Brown
Project Manager

Attachments:

Table 1 – Aspen Seep Bioreactor Monthly Influent and Effluent Sample Results

Table 2 – Aspen Seep Bioreactor, Recent pH and ORP Field Measurements

cc: Chuck Curtis, Lahontan Regional Water Quality Control Board
Ronald Halsey, Atlantic Richfield Company
Nathan Block, Esq., BP America Inc.
Adam Cohen, Esq., Davis Graham & Stubbs LLP
Dave McCarthy, Copper Environmental Consulting
Joe Niland, AMEC-Geomatrix Consultants, Inc.
Sandy Riese, EnSci, Inc.
Randy Miller, Broadbent & Associates, Inc.

TABLE 1
ASPEN SEEP BIOREACTOR - SAMPLE RESULTS
APRIL 2011 MONTHLY SUMMARY
Draft - Provisional Data

Parameter	Basis	April 26 2011 141ASPINF449 Influent (mg/L)	April 26 2011 141ASPEFF447 Effluent (mg/L)	Maximum Discharge Criteria (mg/L)	Average Discharge Criteria (mg/L)
pH ¹	Field	2.91	7.22	-	6.0 - 9.0 ²
Aluminum	Dissolved	52	<0.040	4	2
Arsenic	Dissolved	<0.00090	0.00090 J	0.34	0.15
Cadmium	Dissolved	0.002	<0.00010	0.009	0.004
Calcium	Dissolved	366	328	-	-
Chromium	Dissolved	0.0089	<0.00090	0.97	0.31
Copper	Dissolved	1.10	0.0026	0.026	0.016
Hardness	Dissolved	1200	1100	-	-
Iron	Dissolved	121	4.59	2	1
Lead	Dissolved	<0.00020	0.00024 J	0.136	0.005
Magnesium	Dissolved	80	66	-	-
Nickel	Dissolved	0.37	0.079	0.84	0.094
Zinc	Dissolved	0.54	0.013	0.21	0.21
Selenium	Total	0.0055	0.0034	NP	0.005
Acidity	Total	530	<2.0	-	-
Alkalinity (Total)	Total	<2.0	61.0	-	-
Alkalinity (Bicarbonate)	Total	<2.4	74.4	-	-
Alkalinity (Carbonate)	Total	<1.2	<1.2	-	-
Alkalinity (Hydroxide)	Total	<0.70	<0.70	-	-
Sulfate	Lab Filtered	1880	1500	-	-
Chloride	Total	3.5	2.7	-	-
Total Dissolved Solids	Total	2640	2230	-	-
Total Suspended Solids	Total	25	15	-	-

Notes

1. pH value was collected in field; pH is in standard units.
2. Discharge criteria for average pH based on 24-hour (single day) average discharge.
3. Values in bold are effluent concentrations greater than the maximum or average discharge criteria.

Abbreviations

NP - Not Promulgated

J - Estimated value. Analyte detected at a level less than the Reporting Limit and greater than or equal to the Method Detection Limit.

< - Analyte NOT DETECTED at or above the or method detection limit.

-- Discharge criteria not established.

TABLE 2
ASPEN SEEP BIOREACTOR - RECENT pH and ORP FIELD MEASUREMENTS
APRIL 2011 MONTHLY SUMMARY
Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 4 or 5 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
09/21/07	6.0	2.91	428.9	7.34	-268.4	7.13	-280.3	9.56	-285.8	7.13	-265.3	8.42	2.6
09/26/07	6.2	2.89	496.7	7.80	-192.1	7.36	-223.0	9.64	-195.4	7.34	-232.7	8.34	50.3
10/03/07	5.5	2.85	484.1	8.07	-127.7	8.50	-129.6	11.25	-136.5	7.64	-164.0	8.22	-5.2
10/10/07 ²	5.8	2.80	498.0	5.50	55.9	5.64	-70.5	10.00	-190.0	6.20	-171.6	7.78	-268.0
10/18/07 ²	5.9	2.83	482.4	5.00	26.8	5.68	-46.2	11.38	-112.0	6.23	-139.0	8.69	135.0
10/31/07 ²	9.0	2.88	402.7	4.26	319.3	6.85	-156.7	9.80	-170.0	6.95	-212.2	7.66	-94.3
11/08/07	6.0	2.88	418.0	7.55	-128.3	7.01	-116.7	8.23	-133.9	6.86	-125.8	7.51	-50.6
11/13/07	-	2.86	484.5	7.06	-2.3	6.84	-65.3	7.86	-42.6	6.79	-78.1	7.58	4.2
11/27/07	5.5	2.86	479.4	6.99	-38.5	6.97	-205.0	8.46	-183.9	6.91	-156.8	7.25	-1.7
12/12/07	-	3.01	482.2	7.20	-25.3	7.20	-115.2	7.64	-107.7	7.04	-129.7	6.90	-31.9
01/15/08	4.8	2.98	483.3	6.76	5.9	6.73	-85.5	7.89	-94.3	6.67	-137.4	6.71	-33.0
02/07/08 ³	-	-	-	-	-	-	-	-	-	-	-	5.77	20.2
02/12/08	7.0	2.76	487.4	6.67	44.6	-	-	7.39	-45.6	6.42	-88.0	6.70	-15.3
03/18/08	6.0	2.88	375.1	7.85	3.6	-	-	8.80	-189.2	7.23	-211.3	7.05	-95.3
04/10/08	7.5	2.90	397.7	6.74	-80.0	6.70	-163.4	7.50	-142.6	6.57	-165.3	7.39	-24.5
05/15/08	7.3	2.97	442.2	6.24	21.2	6.55	-265.4	6.55	-233.7	5.60	-183.7	7.29	-143.3
05/27/08	7.0	3.00	464.1	7.11	-16.3	6.85	-242.2	6.98	-191.1	6.80	-235.2	7.26	-19.5
06/09/08	7.0	3.10	455.4	7.40	-47.5	7.09	-251.2	7.70	-178.8	6.97	-219.7	7.19	-61.5
06/17/08	7.5	2.91	443.9	7.42	-22.7	6.90	-283.0	7.29	-131.0	6.88	-244.3	7.30	-82.5
07/10/08	7.3	2.98	470.9	7.32	-34.1	6.90	-238.4	7.05	-172.6	6.90	-215.0	7.85	-113.5
07/22/08	7.0	2.99	455.5	6.94	-272.5	6.97	-267.4	7.07	-190.6	7.01	-248.9	7.35	-89.1
08/04/08	6.8	2.89	450.7	7.60	-94.4	6.94	-266.0	6.19	-173.1	7.02	-251.2	-	-
08/05/08	-	3.05	445.3	-	-	-	-	-	-	-	-	7.29	-70.0
08/18/08	7.3	3.93	478.9	7.46	-166.7	7.08	-291.9	7.40	-202.6	7.07	-268.8	7.40	-52.4
08/22/08	-	2.89	473.7	7.97	-212.9	7.08	-301.8	7.74	-224.0	7.03	-275.9	7.67	-27.8
08/25/08	-	2.93	470.5	7.77	-287.7	7.18	-286.1	6.89	-205.6	7.12	-273.8	8.02	-108.4
08/26/08	-	2.91	468.8	7.95	-255.4	7.09	-305.4	7.75	-281.2	7.14	-273.1	7.77	-41.4
09/24/08	-	3.03	423.2	7.18	-107.8	6.99	-255.4	7.11	-205.7	6.89	-245.2	7.70	-87.7
09/30/08	-	3.02	434.3	7.77	-151.9	6.89	-267.5	-	-	6.92	-269.9	8.10	-94.0
10/13/08	5.8	3.34	433.1	7.17	-98.7	6.94	-218.3	6.80	-157.2	7.01	-206.1	8.32	-101.0
10/27/08	5.8	3.21	247.8	7.34	-162.5	6.96	-175.3	7.20	-152.3	6.98	-126.8	7.88	273.7
11/19/08	5.5	2.83	453.7	7.20	-104.5	6.77	-204.7	7.12	-82.2	6.71	-154.7	7.74	-35.1
12/03/08	5.3	3.56	453.0	7.23	-45.0	6.86	-141.3	7.06	-100.1	6.84	-135.6	7.65	-47.5
01/9/09 ⁴	-	3.15	458.3	-	-	-	-	-	-	-	-	6.95	-43.0
01/12/09	5.3	2.94	466.3	6.36	-82.8	6.38	-245.1	-	-	6.82	-259.0	7.11	-74.0
02/19/09 ⁴	5.3	2.78	480.1	6.60	-3.2	6.74	-145.1	7.26	-117.6	6.25	-162.3	6.68	-18.1
03/10/09	5.0	2.88	481.2	-	-	-	-	-	-	-	-	7.36	34.3
04/13/09	7.0	2.78	532.7	7.45	-9.9	7.04	-185.5	7.50	-65.8	6.98	-175.4	7.77	-32.2
05/06/09	5.5	2.89	444.4	-	-	6.47	-221.3	-	-	6.56	-206.5	7.62	-86.6
06/03/09	6.5	2.91	445.9	6.98	-145.1	6.62	-260.8	7.07	-192.8	6.65	-260.4	7.55	-15.4
06/16/09	6.5	2.98	388.0	7.09	-186.6	6.79	-319.3	7.16	-233.2	6.80	-298.2	7.70	-158.1

TABLE 2
ASPEN SEEP BIOREACTOR - RECENT pH and ORP FIELD MEASUREMENTS
APRIL 2011 MONTHLY SUMMARY
Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 4 or 5 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
07/01/09	6.0	2.95	376.5	7.43	376.5	6.93	-366.2	7.42	-310.8	6.97	-350.5	7.89	-189.6
07/14/09	5.8	2.97	394.4	-	-	6.85	-338.8	-	-	6.98	-331.9	7.90	-146.2
07/29/09	6.0	2.78	404.5	7.24	-175.5	7.39	-427.7	8.10	-260.2	7.29	-403.7	8.05	-135.6
08/05/09	5.5	2.89	433.8	-	-	-	-	8.73	-120.7	-	-	8.17	-146.0
08/19/09	5.1	2.97	425.7	-	-	-	-	8.25	-37.6	-	-	7.54	47.0
09/17/09	5.3	2.38	490.6	7.27	-91.3	6.81	-180.3	7.75	-120.2	6.85	-182.3	6.95	-24.7
09/30/09	5.0	2.96	503.7	8.03	-18.9	8.99	-253.1	7.75	-217.2	7.03	-276.6	7.98	-17.0
10/15/09	5.5	2.93	496.6	6.57	-121.4	7.63	-301.0	8.33	-148.5	7.71	-314.5	7.85	-41.2
10/28/09	4.9	2.96	487.6	8.79	-69.9	7.28	-216.4	9.08	-143.0	7.24	-162.8	7.94	2.8
11/11/09	5.0	2.91	420.8	8.34	-15.3	7.49	-243.7	8.42	-163.9	7.51	-199.3	7.74	60.6
12/17/09 ⁵	5.0	2.90	416.5	4.65	100.2	5.00	15.3	-	-	5.12	-1.8	5.91	-26.4
01/14/10 ⁵	4.8	2.85	417.7	6.96	-89.0	6.82	-186.4	-	-	6.84	-206.1	6.45	-67.4
02/02/10 ⁵	4.7	2.94	484.0	7.58	-46.7	6.85	-129.6	-	-	6.67	-131.1	6.95	-48.1
03/09/10	4.8	2.74	474.7	8.27	-78.3	7.95	-204.2	8.74	-208.9	8.10	-220.8	7.75	-5.9
04/26/10 ⁶	12.0	2.85	479.5	5.14	135.1	5.61	-19.0	5.04	109.2	5.60	-29.6	6.15	35.9
05/17/10	9.7	2.97	436.9	6.26	196.9	7.04	-283.9	7.79	-235.1	7.08	285.4	7.76	-73.8
05/24/10	9.4	3.16	418.0	7.43	-156.1	7.00	-259.9	7.27	-171.4	6.89	-282.6	7.11	-78.6
05/27/10	9.6	3.18	423.1	5.52	-225.1	7.58	-316.7	8.86	-318.2	6.74	-296.8	7.07	-98.7
06/01/10	10.5	3.11	444.0	8.47	-32.2	7.72	-292.6	9.00	-	6.74	-300.9	7.01	-31.5
06/14/10	10.0	2.99	427.7	7.40	-81.7	6.85	-272.5	8.22	-220.2	6.61	-181.6	7.48	-93.7
06/15/10	-	-	-	8.04	-221.6	6.89	-347.7	-	-	6.17	-355.9	-	-
06/16/10	-	2.99	427.7	7.40	-81.7	6.85	-272.6	8.22	-220.2	6.61	-181.6	7.48	-93.7
06/18/10	9.1	-	-	7.72	-211.7	6.79	-335.6	-	-	6.69	-336.7	-	-
06/21/10	9.0	3.21	409.4	7.99	-242.7	6.96	-364.1	7.86	-303.4	6.78	-349.5	7.70	-142.3
06/30/10	10.0	2.59	451.5	8.73	-216.2	8.73	-216.2	-	-	6.78	-337.9	7.96	-164.5
07/01/10	-	2.82	422.4	-	-	-	-	-	-	-	-	7.94	-241.9
07/13/10	10.0	2.62	479.5	7.52	-112.1	6.90	-279.5	8.02	-255.2	6.90	-294.0	7.76	-65.8
07/21/10	10.0	2.93	475.1	7.90	-70.5	7.15	-301.5	7.80	-212.4	7.27	-315.3	8.09	-95.7
07/29/10	10.0	2.90	465.3	7.73	-168.6	7.25	-318.1	7.08	-192.5	7.15	-318.5	7.06	-45.6
08/03/10	9.0	2.94	458.6	7.69	-193.3	7.16	-311.4	7.16	-311.4	7.17	-324.5	7.39	-66.3
08/12/10	9.0	2.85	476.3	7.98	-255.3	7.07	-299.3	7.50	-235.2	7.06	-307.0	7.55	-26.2
08/17/10	9.5	2.64	470.9	8.09	-47.2	7.54	-306.0	8.47	-206.8	7.37	-320.0	7.86	-74.0
08/24/10	9.2	3.04	250.0	7.81	-129.9	7.21	-151.9	7.20	-202.9	7.09	-147.9	7.81	2.9
09/02/10	9.2	2.84	503.9	7.70	-208.4	--	--	8.15	-227.0	7.32	-267.2	7.97	-20.2
09/16/10	8.0	3.21	455.8	8.40	-219.9	7.29	-209.3	8.66	-197.0	7.32	-279.7	7.76	-76.4
09/22/10 ⁷	8.0	3.06	476.5	8.50	-151.0	7.25	-276.9	8.30	-257.8	7.39	-279.9	7.93	-112.0
09/30/10 ⁷	7.6	3.16	503.3	8.49	-263.9	7.32	-265.4	8.53	-221.9	7.26	-267.8	8.61	94.1
10/06/10 ⁸	9.0	3.28	479.3	7.83	-287.5	7.39	-305.8	8.25	-246.7	7.62	-305.1	8.17	-235.5
10/11/10	8.0	3.20	479.3	7.52	-190.4	7.00	-284.4	8.28	-227.4	7.15	-290.4	7.85	26.4
10/19/10	8.0	2.89	447.3	8.75	-157.3	7.43	-310.4	8.52	-203.0	7.22	-310.6	8.15	130.4
10/28/10	8.0	2.95	579.0	7.23	-282.8	6.98	-368.9	8.50	-384.7	7.12	-402.6	7.73	-30.7

TABLE 2
ASPEN SEEP BIOREACTOR - RECENT pH and ORP FIELD MEASUREMENTS
APRIL 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 4 or 5 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
11/02/10	8.0	2.69	366.7	7.89	-285.1	7.14	-385.2	8.46	-307.5	7.00	-385.7	7.62	-31.5
11/15/10	8.5	2.94	361.7	7.79	-273.2	7.08	-381.9	8.04	-269.3	6.89	-384.5	7.64	-2.2
12/07/10 ⁹	8.5	3.01	387.2	6.97	-298.4	6.82	-375.1	-	-	6.57	-353.5	6.41	-112.4
01/07/11 ⁹	8.5	2.92	434.1	6.50	-134.0	5.98	-200.1	-	-	6.08	-216.2	6.15	-4.9
02/01/11 ⁹	8.0	3.07	423.8	6.75	-332.2	6.86	-279.7	-	-	6.59	-297.0	6.62	-9.3
03/11/11	8.5	3.05	384.7	7.66	-239.2	7.11	-344.7	-	-	6.85	-370.1	7.05	-73.4
04/19/11 ¹⁰	30	2.61	454.9	-	-	-	--	-	-	-	-	4.72	172.9
04/26/11	29	2.91	362.1	7.45	-199.2	6.58	-346.5	7.42	-232.8	6.41	-369.7	7.22	-144.6

Notes

1. Aspen Seep Bioreactor Influent Flow measurements are field measurements completed with a graduated bucket and stop watch.
2. Biocell 1 was flushed on 10/08/07, 10/09/07, and 10/18/07; Biocell 1 was bypassed during this flushing period. Low pH readings in Manhole 1 from 10/10/07 through 10/31/07 were caused by drainage into pretreatment pond from failed seal in weir box cap.
3. Measurements are believed to be erroneous due to calibration error. Parameters were re-evaluated on 02/12/08.
4. Low pH measurements due to a power outage and associated chemical pump shutdown.
5. Low pH measurements caused by stripped gears on NaOH pump head that prevented dosing to Manhole 6.
6. Low pH measurements due to increase in system flow rates; chemical dosing rates lagged behind these system flow rate increases and were unable to prevent decrease in system pH.
7. Effluent readings were collected from the centrifuge discharge point on these dates due to sludge dewatering. Water was not being discharged from Pond 4.
8. Effluent readings were collected Pond 4 effluent on this date. Water was not being discharged from Pond 4.
9. Low pH measurements due to power outage and associated chemical pump failure during the inverter failure on November 29, 2010.
10. Low pH measurement due to increase in system flow rates.

Abbreviations

- - not measured, not recorded, or bioreactor operation did not have flow at given location on the specified date.
 gpm - gallons per minute ORP - oxidation/reduction potential
 mV - millivolts s.U. - standard unit

Atlantic Richfield Company

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June 10, 2011

Mr. Gary Riley
US EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105

Mr. Kevin Mayer
US EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105

RE: Leviathan Monthly Report for May 2011

Dear Mr. Riley and Mr. Mayer:

The following text describes activities conducted during the month of May 2011 at the Leviathan Mine Site and activities anticipated to occur during the upcoming month. These activities are organized by work area [Aspen Seep, Channel Underdrain (CUD) and Delta Seep (DS)], and site-wide tasks. This progress report is being submitted in accordance with Paragraph 62 of the Administrative Settlement Agreement and Order on Consent for Removal Action (AOC) (effective January 21, 2009).

ACTIVITIES FOR MAY

Aspen Seep

- Operated the Aspen Seep Bioreactor (ASB) in recirculation mode during the month of May. Routine O&M, influent sampling, and effluent sampling occurred on May 11 and 20, 2011. The currently available influent and effluent water quality data for the May 11 and 20, 2011 sampling events are presented in Table 1. Recent pH and ORP field data are summarized in Table 2. Influent flow rate data from the USGS is summarized in Table 3.
- Due to the increased influent flows through the ASB this spring, a much greater than normal volume of sludge has already accumulated in ASB Pond 3. To maintain the health of the ASB, Atlantic Richfield has determined that sludge removal and dewatering will be required in 2011 and plans to initiate setup of the dewatering equipment (holding tanks, mix tanks, centrifuge, and ancillary equipment) and begin dewatering operations in June. In preparation for dewatering activities, sludge in ASB Ponds 3 and 4 was sampled for percent solids. The results of this sampling are presented in Table 4.



CUD and DS

- Site setup activities were completed in May and included the following: cleaning of CUD and DS conveyance pipelines, servicing of plant motors and gearboxes, installation of CUD and DS capture pumps, installation of site communications equipment, delivery and installation of sludge bins, and setup of site sanitation systems. Site setup activities were periodically delayed in May due to inclement weather.
- The process of bringing Pond 4 water into the HDS Treatment Plant and drawing down the Pond 4 water level began on May 4, 2011. The HDS Treatment Plant was started in recycle mode at 80 gpm on May 5, 2011 and began discharging treated water on the same date once discharge criteria were achieved and stable operations were established. Capture of the CUD and DS was initiated on May 13, 2011. The HDS Treatment Plant effluent was sampled for laboratory analytical parameters on May 10 and 17, 2011. The analytical results associated with the May 10 and 17, 2011 sampling events are presented in Table 5. HDS Treatment Plant effluent samples were collected weekly during startup phase monitoring as described in the 2011 RAWP. An HDS influent sample was collected on May 17, 2011 as part of the monthly compliance sampling, and the results are included in Table 5. Flow rates recorded for the CUD, DS, and treated water discharge from the HDS Treatment Plant are included in Table 6. A summary of the HDS Treatment Plant operational data is presented in Table 7.
- On May 6, 2011, Atlantic Richfield provided an e-mail update to EPA regarding the Limited Access Season schedule of activities. On May 16, 2011, Atlantic Richfield provided another e-mail update to EPA and also included a description of two unplanned and temporary automated shutdowns of the HDS Treatment Plant and one short-term, partial interruption in capture of the CUD. Details of these events are provided in the May 16, 2011 email. Equipment-related short-term interruptions also occurred on May 27, 2011 and May 30, 2011.
- On May 31, 2011, the HDS Treatment Plant and associated power systems (including power to the CUD and DS collection pumps) were shut-down for approximately 30 minutes to perform necessary servicing of the electrical equipment.

Site-wide

- Work continued on updating the Leviathan Mine Project Database with data from monitoring performed by Atlantic Richfield and various agencies.
- On May 10, 2011, Atlantic Richfield submitted to the Forest Service a draft Notice of Road Work to be hand delivered to the residents along Leviathan Mine Road near Hwy 395 and a schedule for the road maintenance activities. On May 10, 2011, the USFS approved the draft Notice of Road Work. On May 11, 2011 Atlantic Richfield provided an updated schedule for road maintenance activities to the Forest Service. Atlantic Richfield distributed the Notice of Road Work to residents on May 26, 2011 and provided an update on the status of road work activities to EPA via email on May 27, 2011.
- On May 11, 2011, Atlantic Richfield submitted a letter to EPA presenting responses to comments on the 2011 Removal Action Work Plan received from EPA on March 30, 2011.

ACTIVITIES FOR UPCOMING MONTH

Aspen Seep

- Continue operation of the Aspen Seep Bioreactor in recirculation mode and conduct routine operation, maintenance, and monitoring as outlined in the 2011 RAWP.
- Begin planning, site preparation, and implementation of bioreactor sludge removal and dewatering operations.

CUD and DS

- Continue with the optimization, operation, and maintenance of the HDS Treatment System.
- Submit an amendment to the 2011 RAWP describing plans and schedule for removal of accumulated sludge from Pond 4.

Site-wide

- Continue to provide project progress updates to EPA via conference call. The next conference call is currently scheduled for June 21, 2011.
- Perform road maintenance as needed on the Leviathan Mine Road, including surface repairs and dust control on the residential section of the Nevada access road near US 395.

If you have any questions or comments, please feel free to contact me at (714) 228-6770 or via e-mail at Anthony.Brown@bp.com.

Sincerely,

ORIGINAL SIGNED BY DAVE MCCARTHY FOR

Tony Brown
Project Manager

Attachments:

- Table 1 – Aspen Seep Bioreactor Monthly Influent and Effluent Sample Results
- Table 2 – Aspen Seep Bioreactor, Recent pH and ORP Field Measurements
- Table 3 – Aspen Seep Bioreactor, Flow Rates
- Table 4 – Aspen Seep Bioreactor, Sludge Analytical Results
- Table 5 – HDS Treatment System Influent and Effluent Sample Results
- Table 6 – CUD, DS, and HDS Treatment System Flow Rates
- Table 7 – HDS Treatment System Operational Summary

Gary Riley and Kevin Mayer – USEPA Region 9

June 10, 2011

Page 4 of 4

cc: Chuck Curtis, Lahontan Regional Water Quality Control Board
Ronald Halsey, Atlantic Richfield Company
Nathan Block, Esq., BP America Inc.
Adam Cohen, Esq., Davis Graham & Stubbs LLP
Dave McCarthy, Copper Environmental Consulting
Joe Niland, AMEC-Geomatrix Consultants, Inc.
Sandy Riese, EnSci, Inc.
Randy Miller, Broadbent & Associates, Inc.

TABLE 1
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - SAMPLE RESULTS
JUNE 2011 MONTHLY SUMMARY
Draft - Provisional Data

Parameter	Basis	May 11	May 11	May 20	May 20	Maximum Discharge Criteria (mg/L)	Average Discharge Criteria (mg/L)
		2011 142ASPINF452 ASB Influent (mg/L)	2011 142ASPEFF451 ASB Effluent (mg/L)	2011 143ASPINF454 ASB Influent (mg/L)	2011 143ASPEFF453 ASB Effluent (mg/L)		
pH ¹	Field	2.84	6.99	3.03	7.36	-	6.0 - 9.0 ²
Aluminum	Dissolved	55	<0.040	290	0.043 J	4	2
Arsenic	Dissolved	0.0029	0.0022	<0.00090	<0.00090	0.34	0.15
Cadmium	Dissolved	0.0021	<0.00010	0.0023	<0.00010	0.009	0.004
Calcium	Dissolved	406	396	2110	389	-	-
Chromium	Dissolved	0.0065	<0.00090	0.0072	<0.00090	0.97	0.31
Copper	Dissolved	1.1	0.0035	1.2	0.0022	0.026	0.016
Hardness	Dissolved	1400	1300	7300	1200	-	-
Iron ³	Dissolved	153	3.60	822	0.0890	2	1
Lead	Dissolved	<0.00020	<0.00020	<0.00020	<0.00020	0.136	0.005
Magnesium	Dissolved	93	75	480	65	-	-
Nickel ³	Dissolved	0.47	0.11	0.50	0.059	0.84	0.094
Zinc	Dissolved	0.61	0.011 J	0.50	<0.0040	0.21	0.21
Selenium	Total	0.0050	0.0041	0.0033	0.0033	NP	0.005
Acidity	Total	710	96	610	<2.0	-	-
Alkalinity (Total)	Total	<2.00	104	<2.00	140	-	-
Alkalinity (Bicarbonate)	Total	<2.40	127	<2.40	171	-	-
Alkalinity (Carbonate)	Total	<1.20	<1.20	<1.20	<1.20	-	-
Alkalinity (Hydroxide)	Total	<0.700	<0.700	<0.700	<0.700	-	-
Sulfate	Lab Filtered	949	811	1860	1610	-	-
Chloride	Total	3.7	2.6	4.1	3.8	-	-
Total Dissolved Solids	Total	3120	2630	2830	2680	-	-
Total Suspended Solids	Total	14	13	32	5.0 J	-	-

Notes

1. pH values are field measurements and are reported in standard units.
2. Discharge criteria for average pH based on 24-hour (single day) average discharge.
3. Values in bold are concentrations greater than the maximum or average discharge criteria.

Abbreviations

< - Analyte not detected at or above the or method detection limit

-- Discharge criteria not established

ASB - Aspen Seep Bioreactor

J - Estimated value. Analyte detected at a level less than the Reporting Limit and greater than or equal to the Method Detection Limit

NP - Not Promulgated

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
JUNE 2011 MONTHLY SUMMARY
Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
09/21/07	6.0	2.91	428.9	7.34	-268.4	7.13	-280.3	9.56	-285.8	7.13	-265.3	8.42	2.6
09/26/07	6.2	2.89	496.7	7.80	-192.1	7.36	-223.0	9.64	-195.4	7.34	-232.7	8.34	50.3
10/03/07	5.5	2.85	484.1	8.07	-127.7	8.50	-129.6	11.25	-136.5	7.64	-164.0	8.22	-5.2
10/10/07 ²	5.8	2.80	498.0	5.50	55.9	5.64	-70.5	10.00	-190.0	6.20	-171.6	7.78	-268.0
10/18/07 ²	5.9	2.83	482.4	5.00	26.8	5.68	-46.2	11.38	-112.0	6.23	-139.0	8.69	135.0
10/31/07 ²	9.0	2.88	402.7	4.26	319.3	6.85	-156.7	9.80	-170.0	6.95	-212.2	7.66	-94.3
11/08/07	6.0	2.88	418.0	7.55	-128.3	7.01	-116.7	8.23	-133.9	6.86	-125.8	7.51	-50.6
11/13/07	-	2.86	484.5	7.06	-2.3	6.84	-65.3	7.86	-42.6	6.79	-78.1	7.58	4.2
11/27/07	5.5	2.86	479.4	6.99	-38.5	6.97	-205.0	8.46	-183.9	6.91	-156.8	7.25	-1.7
12/12/07	-	3.01	482.2	7.20	-25.3	7.20	-115.2	7.64	-107.7	7.04	-129.7	6.90	-31.9
01/15/08	4.8	2.98	483.3	6.76	5.9	6.73	-85.5	7.89	-94.3	6.67	-137.4	6.71	-33.0
02/07/08 ³	-	-	-	-	-	-	-	-	-	-	-	5.77	20.2
02/12/08	7.0	2.76	487.4	6.67	44.6	-	-	7.39	-45.6	6.42	-88.0	6.70	-15.3
03/18/08	6.0	2.88	375.1	7.85	3.6	-	-	8.80	-189.2	7.23	-211.3	7.05	-95.3
04/10/08	7.5	2.90	397.7	6.74	-80.0	6.70	-163.4	7.50	-142.6	6.57	-165.3	7.39	-24.5
05/15/08	7.3	2.97	442.2	6.24	21.2	6.55	-265.4	6.55	-233.7	5.60	-183.7	7.29	-143.3
05/27/08	7.0	3.00	464.1	7.11	-16.3	6.85	-242.2	6.98	-191.1	6.80	-235.2	7.26	-19.5
06/09/08	7.0	3.10	455.4	7.40	-47.5	7.09	-251.2	7.70	-178.8	6.97	-219.7	7.19	-61.5
06/17/08	7.5	2.91	443.9	7.42	-22.7	6.90	-283.0	7.29	-131.0	6.88	-244.3	7.30	-82.5
07/10/08	7.3	2.98	470.9	7.32	-34.1	6.90	-238.4	7.05	-172.6	6.90	-215.0	7.85	-113.5
07/22/08	7.0	2.99	455.5	6.94	-272.5	6.97	-267.4	7.07	-190.6	7.01	-248.9	7.35	-89.1
08/04/08	6.8	2.89	450.7	7.60	-94.4	6.94	-266.0	6.19	-173.1	7.02	-251.2	-	-
08/05/08	-	3.05	445.3	-	-	-	-	-	-	-	-	7.29	-70.0
08/18/08	7.3	3.93	478.9	7.46	-166.7	7.08	-291.9	7.40	-202.6	7.07	-268.8	7.40	-52.4
08/22/08	-	2.89	473.7	7.97	-212.9	7.08	-301.8	7.74	-224.0	7.03	-275.9	7.67	-27.8
08/25/08	-	2.93	470.5	7.77	-287.7	7.18	-286.1	6.89	-205.6	7.12	-273.8	8.02	-108.4
08/26/08	-	2.91	468.8	7.95	-255.4	7.09	-305.4	7.75	-281.2	7.14	-273.1	7.77	-41.4
09/24/08	-	3.03	423.2	7.18	-107.8	6.99	-255.4	7.11	-205.7	6.89	-245.2	7.70	-87.7
09/30/08	-	3.02	434.3	7.77	-151.9	6.89	-267.5	-	-	6.92	-269.9	8.10	-94.0
10/13/08	5.8	3.34	433.1	7.17	-98.7	6.94	-218.3	6.80	-157.2	7.01	-206.1	8.32	-101.0
10/27/08	5.8	3.21	247.8	7.34	-162.5	6.96	-175.3	7.20	-152.3	6.98	-126.8	7.88	273.7
11/19/08	5.5	2.83	453.7	7.20	-104.5	6.77	-204.7	7.12	-82.2	6.71	-154.7	7.74	-35.1

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
JUNE 2011 MONTHLY SUMMARY
Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
12/03/08	5.3	3.56	453.0	7.23	-45.0	6.86	-141.3	7.06	-100.1	6.84	-135.6	7.65	-47.5
01/9/09 ⁴	-	3.15	458.3	-	-	-	-	-	-	-	-	6.95	-43.0
01/12/09	5.3	2.94	466.3	6.36	-82.8	6.38	-245.1	-	-	6.82	-259.0	7.11	-74.0
02/19/09 ⁴	5.3	2.78	480.1	6.60	-3.2	6.74	-145.1	7.26	-117.6	6.25	-162.3	6.68	-18.1
03/10/09	5.0	2.88	481.2	-	-	-	-	-	-	-	-	7.36	34.3
04/13/09	7.0	2.78	532.7	7.45	-9.9	7.04	-185.5	7.50	-65.8	6.98	-175.4	7.77	-32.2
05/06/09	5.5	2.89	444.4	-	-	6.47	-221.3	-	-	6.56	-206.5	7.62	-86.6
06/03/09	6.5	2.91	445.9	6.98	-145.1	6.62	-260.8	7.07	-192.8	6.65	-260.4	7.55	-15.4
06/16/09	6.5	2.98	388.0	7.09	-186.6	6.79	-319.3	7.16	-233.2	6.80	-298.2	7.70	-158.1
07/01/09	6.0	2.95	376.5	7.43	376.5	6.93	-366.2	7.42	-310.8	6.97	-350.5	7.89	-189.6
07/14/09	5.8	2.97	394.4	-	-	6.85	-338.8	-	-	6.98	-331.9	7.90	-146.2
07/29/09	6.0	2.78	404.5	7.24	-175.5	7.39	-427.7	8.10	-260.2	7.29	-403.7	8.05	-135.6
08/05/09	5.5	2.89	433.8	-	-	-	-	8.73	-120.7	-	-	8.17	-146.0
08/19/09	5.1	2.97	425.7	-	-	-	-	8.25	-37.6	-	-	7.54	47.0
09/17/09	5.3	2.38	490.6	7.27	-91.3	6.81	-180.3	7.75	-120.2	6.85	-182.3	6.95	-24.7
09/30/09	5.0	2.96	503.7	8.03	-18.9	8.99	-253.1	7.75	-217.2	7.03	-276.6	7.98	-17.0
10/15/09	5.5	2.93	496.6	6.57	-121.4	7.63	-301.0	8.33	-148.5	7.71	-314.5	7.85	-41.2
10/28/09	4.9	2.96	487.6	8.79	-69.9	7.28	-216.4	9.08	-143.0	7.24	-162.8	7.94	2.8
11/11/09	5.0	2.91	420.8	8.34	-15.3	7.49	-243.7	8.42	-163.9	7.51	-199.3	7.74	60.6
12/17/09 ⁵	5.0	2.90	416.5	4.65	100.2	5.00	15.3	-	-	5.12	-1.8	5.91	-26.4
01/14/10 ⁵	4.8	2.85	417.7	6.96	-89.0	6.82	-186.4	-	-	6.84	-206.1	6.45	-67.4
02/02/10 ⁵	4.7	2.94	484.0	7.58	-46.7	6.85	-129.6	-	-	6.67	-131.1	6.95	-48.1
03/09/10	4.8	2.74	474.7	8.27	-78.3	7.95	-204.2	8.74	-208.9	8.10	-220.8	7.75	-5.9
04/26/10 ⁶	12.0	2.85	479.5	5.14	135.1	5.61	-19.0	5.04	109.2	5.60	-29.6	6.15	35.9
05/17/10	9.7	2.97	436.9	6.26	196.9	7.04	-283.9	7.79	-235.1	7.08	285.4	7.76	-73.8
05/24/10	9.4	3.16	418.0	7.43	-156.1	7.00	-259.9	7.27	-171.4	6.89	-282.6	7.11	-78.6
05/27/10	9.6	3.18	423.1	5.52	-225.1	7.58	-316.7	8.86	-318.2	6.74	-296.8	7.07	-98.7
06/01/10	10.5	3.11	444.0	8.47	-32.2	7.72	-292.6	9.00	-	6.74	-300.9	7.01	-31.5
06/14/10	10.0	2.99	427.7	7.40	-81.7	6.85	-272.5	8.22	-220.2	6.61	-181.6	7.48	-93.7
06/15/10	-	-	-	8.04	-221.6	6.89	-347.7	-	-	6.17	-355.9	-	-
06/16/10	-	2.99	427.7	7.40	-81.7	6.85	-272.6	8.22	-220.2	6.61	-181.6	7.48	-93.7

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
JUNE 2011 MONTHLY SUMMARY

Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
06/18/10	9.1	-	-	7.72	-211.7	6.79	-335.6	-	-	6.69	-336.7	-	-
06/21/10	9.0	3.21	409.4	7.99	-242.7	6.96	-364.1	7.86	-303.4	6.78	-349.5	7.70	-142.3
06/30/10	10.0	2.59	451.5	8.73	-216.2	8.73	-216.2	-	-	6.78	-337.9	7.96	-164.5
07/01/10	-	2.82	422.4	-	-	-	-	-	-	-	-	7.94	-241.9
07/13/10	10.0	2.62	479.5	7.52	-112.1	6.90	-279.5	8.02	-255.2	6.90	-294.0	7.76	-65.8
07/21/10	10.0	2.93	475.1	7.90	-70.5	7.15	-301.5	7.80	-212.4	7.27	-315.3	8.09	-95.7
07/29/10	10.0	2.90	465.3	7.73	-168.6	7.25	-318.1	7.08	-192.5	7.15	-318.5	7.06	-45.6
08/03/10	9.0	2.94	458.6	7.69	-193.3	7.16	-311.4	7.16	-311.4	7.17	-324.5	7.39	-66.3
08/12/10	9.0	2.85	476.3	7.98	-255.3	7.07	-299.3	7.50	-235.2	7.06	-307.0	7.55	-26.2
08/17/10	9.5	2.64	470.9	8.09	-47.2	7.54	-306.0	8.47	-206.8	7.37	-320.0	7.86	-74.0
08/24/10	9.2	3.04	250.0	7.81	-129.9	7.21	-151.9	7.20	-202.9	7.09	-147.9	7.81	2.9
09/02/10	9.2	2.84	503.9	7.70	-208.4	--	--	8.15	-227.0	7.32	-267.2	7.97	-20.2
09/16/10	8.0	3.21	455.8	8.40	-219.9	7.29	-209.3	8.66	-197.0	7.32	-279.7	7.76	-76.4
09/22/10 ⁷	8.0	3.06	476.5	8.50	-151.0	7.25	-276.9	8.30	-257.8	7.39	-279.9	7.93	-112.0
09/30/10 ⁷	7.6	3.16	503.3	8.49	-263.9	7.32	-265.4	8.53	-221.9	7.26	-267.8	8.61	94.1
10/06/10 ⁸	9.0	3.28	479.3	7.83	-287.5	7.39	-305.8	8.25	-246.7	7.62	-305.1	8.17	-235.5
10/11/10	8.0	3.20	479.3	7.52	-190.4	7.00	-284.4	8.28	-227.4	7.15	-290.4	7.85	26.4
10/19/10	8.0	2.89	447.3	8.75	-157.3	7.43	-310.4	8.52	-203.0	7.22	-310.6	8.15	130.4
10/28/10	8.0	2.95	579.0	7.23	-282.8	6.98	-368.9	8.50	-384.7	7.12	-402.6	7.73	-30.7
11/02/10	8.0	2.69	366.7	7.89	-285.1	7.14	-385.2	8.46	-307.5	7.00	-385.7	7.62	-31.5
11/15/10	8.5	2.94	361.7	7.79	-273.2	7.08	-381.9	8.04	-269.3	6.89	-384.5	7.64	-2.2
12/07/10 ⁹	8.5	3.01	387.2	6.97	-298.4	6.82	-375.1	-	-	6.57	-353.5	6.41	-112.4
01/07/11 ⁹	8.5	2.92	434.1	6.50	-134.0	5.98	-200.1	-	-	6.08	-216.2	6.15	-4.9
02/01/11 ⁹	8.0	3.07	423.8	6.75	-332.2	6.86	-279.7	-	-	6.59	-297.0	6.62	-9.3
03/11/11	8.5	3.05	384.7	7.66	-239.2	7.11	-344.7	-	-	6.85	-370.1	7.05	-73.4
04/19/11 ¹⁰	30	2.61	454.9	-	-	-	--	-	-	-	-	4.72	172.9
04/26/11	29	2.91	362.1	7.45	-199.2	6.58	-346.5	7.42	-232.8	6.41	-369.7	7.22	-144.6

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
JUNE 2011 MONTHLY SUMMARY

Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
05/03/11	27	2.90	355.0	7.70	-264.8	6.56	-361.5	7.81	-264.9	6.54	-402.2	7.60	-137.5
05/11/11	24	2.84	344.2	6.81	-198.2	6.31	-229.0	6.99	-200.7	6.23	-204.0	6.99	-139.2
05/20/11	17	3.03	372.4	8.10	-282.2	7.09	-361.8	7.89	-219.6	6.39	-367.9	7.36	-44.1

Notes

1. Aspen Seep Bioreactor Influent Flow measurements are field measurements completed with a graduated bucket and stop watch.
2. Biocell 1 was flushed on 10/08/07, 10/09/07, and 10/18/07; Biocell 1 was bypassed during this flushing period. Low pH readings in Manhole 1 from 10/10/07 through 10/31/07 were caused by drainage into pretreatment pond from failed seal in weir box cap.
3. Measurements are believed to be erroneous due to calibration error. Parameters were re-evaluated on 02/12/08.
4. Low pH measurements due to a power outage and associated chemical pump shutdown.
5. Low pH measurements caused by stripped gears on NaOH pump head that prevented dosing to Manhole 6.
6. Low pH measurements due to increase in system flow rates; chemical dosing rates lagged behind these system flow rate increases and were unable to prevent decrease in system pH.
7. Effluent readings were collected from the centrifuge discharge point on these dates due to sludge dewatering. Water was not being discharged from Pond 4.
8. Effluent readings were collected Pond 4 effluent on this date. Water was not being discharged from Pond 4.
9. Low pH measurements due to power outage and associated chemical pump failure during the inverter failure on November 29, 2010.
10. Low pH measurement due to increase in system flow rates.

Abbreviations

- - not measured, not recorded, or bioreactor operation did not have flow at given location on the specified date.

gpm - gallons per minute

ORP - oxidation/reduction potential

mV - millivolts

s.U. - standard unit

TABLE 3
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - FLOW RATES¹
JUNE 2011 MONTHLY SUMMARY
Draft - Provisional Data

Date	Flow Rate (gpm)								
01/01/11	8.84	02/01/11	7.54	03/01/11	9.96	04/01/11	18.40	05/01/11	24.55
01/02/11	8.80	02/02/11	7.23	03/02/11	11.00	04/02/11	20.02	05/02/11	24.15
01/03/11	8.80	02/03/11	7.09	03/03/11	10.77	04/03/11	19.34	05/03/11	24.28
01/04/11	8.66	02/04/11	7.27	03/04/11	10.82	04/04/11	19.66	05/04/11	23.83
01/05/11	8.66	02/05/11	7.45	03/05/11	11.31	04/05/11	20.38	05/05/11	23.38
01/06/11	8.71	02/06/11	7.67	03/06/11	12.07	04/06/11	19.43	05/06/11	23.20
01/07/11	8.57	02/07/11	7.85	03/07/11	12.48	04/07/11	19.12	05/07/11	23.16
01/08/11	8.30	02/08/11	7.54	03/08/11	13.06	04/08/11	18.76	05/08/11	22.98
01/09/11	8.21	02/09/11	6.96	03/09/11	13.78	04/09/11	18.49	05/09/11	23.11
01/10/11	7.90	02/10/11	6.69	03/10/11	14.81	04/10/11	17.82	05/10/11	21.50
01/11/11	7.72	02/11/11	6.69	03/11/11	14.81	04/11/11	17.86	05/11/11	20.83
01/12/11	7.72	02/12/11	7.00	03/12/11	14.32	04/12/11	18.13	05/12/11	20.33
01/13/11	7.94	02/13/11	7.05	03/13/11	14.27	04/13/11	18.36	05/13/11	20.06
01/14/11	7.81	02/14/11	7.41	03/14/11	15.31	04/14/11	18.63	05/14/11	20.47
01/15/11	7.94	02/15/11	7.32	03/15/11	40.89	04/15/11	19.70	05/15/11	20.92
01/16/11	8.39	02/16/11	7.50	03/16/11	21.54	04/16/11	20.92	05/16/11	20.20
01/17/11	8.26	02/17/11	7.76	03/17/11	15.35	04/17/11	23.43	05/17/11	20.06
01/18/11	7.94	02/18/11	9.96	03/18/11	13.78	04/18/11	25.13	05/18/11	20.56
01/19/11	7.90	02/19/11	10.19	03/19/11	13.11	04/19/11	26.57	05/19/11	19.79
01/20/11	7.59	02/20/11	10.10	03/20/11	13.06	04/20/11	27.96	05/20/11	18.99
01/21/11	7.67	02/21/11	10.05	03/21/11	12.97	04/21/11	46.32	05/21/11	19.39
01/22/11	7.85	02/22/11	10.01	03/22/11	12.70	04/22/11	27.38	05/22/11	18.85
01/23/11	7.72	02/23/11	9.96	03/23/11	12.88	04/23/11	26.53	05/23/11	18.72
01/24/11	7.72	02/24/11	10.01	03/24/11	13.02	04/24/11	26.08	05/24/11	18.54
01/25/11	7.76	02/25/11	10.19	03/25/11	13.20	04/25/11	25.76	05/25/11	19.12
01/26/11	7.67	02/26/11	10.01	03/26/11	13.55	04/26/11	26.08	05/26/11	N/A
01/27/11	7.63	02/27/11	9.96	03/27/11	14.50	04/27/11	25.99	05/27/11	N/A
01/28/11	7.76	02/28/11	9.96	03/28/11	14.72	04/28/11	26.35	05/28/11	N/A
01/29/11	7.85	--	--	03/29/11	15.53	04/29/11	26.12	05/29/11	N/A
01/30/11	7.63	--	--	03/30/11	16.47	04/30/11	25.22	05/30/11	N/A
01/31/11	7.63	--	--	03/31/11	17.15	--	--	05/31/11	N/A
Average	8.05	Average	8.37	Average	14.62	Average	23.00	Average	21.24

Notes

1. Aspen Seep flow data is provided by the USGS.

Abbreviations

gpm - gallons per minute

USGS - United States Geological Survey

TABLE 4
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - SLUDGE
ANALYTICAL RESULTS
JUNE 2011 MONTHLY SUMMARY
Draft - Provisional Data

Date	Sample ID	Sample Location	% Solids (SM2540B)
5/26/11	144OSP3455	Pond 3, Upper Level	1.5
5/26/11	144OSP3456	Pond 3, Mid-Level	2.0
5/26/11	144OSP3457	Pond 3, Lower Level	4.1
5/26/11	144OSP4458	Pond 4, Upper Level	0.30
5/26/11	144OSP4459	Pond 4, Mid-Level	2.7
5/26/11	144OSP4460	Pond 4, Lower Level	3.8

TABLE 5
HIGH DENSITY SLUDGE TREATMENT PLANT - SAMPLE RESULTS
JUNE 2011 MONTHLY SUMMARY
Draft - Provisional Data

Parameter	Basis	May 10 2011 154HDSEFF401 Effluent (mg/L)	May 17 2011 155HDSEFF402 Effluent (mg/L)	May 17 2011 155HDSINF403 Influent (mg/L)	May 17 2011 155CUD404 CUD (mg/L)	May 17 2011 155DS405 DS (mg/L)	Maximum Discharge Criteria (mg/L)	Average Discharge Criteria (mg/L)
pH ¹	Field	8.03	8.46	3.35	3.36	3.18	--	6.0-9.0 ²
Aluminum	Dissolved	0.66	0.76	87	26	32	4	2
Arsenic	Dissolved	<0.00090	<0.00090	0.42	1.4	0.021	0.34	0.15
Cadmium	Dissolved	0.00047 J	<0.00010	0.0092	0.012	0.0040	0.009	0.004
Calcium	Dissolved	275	838	355	69.6	353	--	--
Chromium	Dissolved	<0.00090	<0.00090	0.076	0.14	0.011	0.97	0.31
Copper	Dissolved	0.0056	0.0042	0.19	0.067	0.32	0.026	0.016
Hardness	Dissolved	930	2500	1300	250	1300	--	--
Iron	Dissolved	0.0269 J	0.172 J	400	148	26.0	2.0	1.0
Lead	Dissolved	<0.00020	<0.00020	<0.00040	<0.00040	<0.00020	0.136	0.005
Magnesium	Dissolved	59	88	90	18	97	--	--
Nickel	Dissolved	0.035	0.040	2.1	3.1	0.72	0.84	0.094
Zinc	Dissolved	0.0041 J	<0.0040	0.38	0.35	0.38	0.21	0.21
Selenium ³	Total	0.009 ⁴	0.0057 ⁴	0.0045 ⁴	<0.0050 ⁴	0.0053 ⁴	NP	0.005
Acidity	Total	6.0	6.0	1200	2000	380	--	--
Alkalinity (Total)	Total	15.0	18.0	<2.00	<2.00	<2.00	--	--
Alkalinity (Bicarbonate)	Total	18.3	22.0	<2.40	<2.40	<2.40	--	--
Alkalinity (Carbonate)	Total	<1.20	<1.20	<1.20	<1.20	<1.20	--	--
Alkalinity (Hydroxide)	Total	<0.700	<0.700	<0.700	<0.700	<0.700	--	--
Sulfate	Lab Filtered	1140	2380	2460	3230	1430	--	--
Chloride	Total	1.8	2.7	4.7	4.9	3.6	--	--
Total Dissolved Solids	Total	1280	3500	3790	5230	2240	--	--
Total Suspended Solids	Total	9.0	11	18	14	55	--	--

Notes

1. pH value was collected in field and is the average of 3 grab samples comprising the HDS Effluent sample or one grab sample for the HDS Influent sample. pH is in standard units.
2. Discharge criteria pH based on 24-hour (single day) average discharge.
3. Values in bold are concentrations greater than the maximum or average discharge criteria.
4. The accuracy of the laboratory analytical results for selenium on May 10, 2011 and May 17, 2011 is currently being confirmed through re-analysis by the laboratory.

Abbreviations

< - Analyte not detected at or above the or method detection limit

J - Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL).

NP - Not Promulgated

TABLE 6
CHANNEL UNDERDRAIN, DELTA SEEP, AND HDS TREATMENT PLANT
FLOW RATES
JUNE 2011 MONTHLY SUMMARY
Draft - Provisional Data

Date	Delta Seep Recorded Flow		Channel Underdrain Recorded Flow		Treated Water Discharge from HDS Plant Recorded Flow	
	gpm	Gallons	gpm	Gallons	gpm	Gallons
5/1/2011	0.00	0	0.00	0	0.00	0
5/2/2011	0.00	0	0.00	0	0.00	0
5/3/2011	0.00	0	0.00	0	0.00	0
5/4/2011	0.00	0	0.00	0	0.00	0
5/5/2011	0.00	0	0.00	0	80.00	78,853
5/6/2011	0.00	0	0.00	0	80.00	115,200
5/7/2011	0.00	0	0.00	0	80.00	115,197
5/8/2011	0.00	0	0.00	0	80.00	115,196
5/9/2011	0.00	0	0.00	0	80.00	73,603
5/10/2011	0.00	0	0.00	0	80.00	51,154
5/11/2011	0.00	0	0.00	0	45.00	64,564
5/12/2011	0.00	0	0.00	0	40.00	23,268
5/13/2011	19.00	27,392	33.90	48,855	70.00	10,807
5/14/2011	26.40	38,018	42.44	61,111	65.00	60,839
5/15/2011	26.24	37,782	41.63	59,940	65.00	30,277
5/16/2011	25.55	36,787	42.50	61,200	65.00	74,412
5/17/2011	25.24	36,339	42.50	61,200	70.00	98,722
5/18/2011	24.92	35,889	42.50	61,200	70.00	95,608
5/19/2011	24.16	34,796	42.50	61,200	70.00	100,757
5/20/2011	23.60	33,989	42.60	61,398	70.00	10,759
5/21/2011	23.36	33,633	42.60	61,344	70.00	100,798
5/22/2011	23.07	33,214	42.60	61,344	70.00	100,798
5/23/2011	23.00	33,120	42.60	61,344	70.00	100,747
5/24/2011	22.30	32,112	42.70	61,488	70.00	100,732
5/25/2011	22.30	32,111	42.90	61,776	70.00	100,662
5/26/2011	21.59	31,087	42.90	61,776	70.00	100,725
5/27/2011	21.04	30,297	43.20	62,208	70.00	100,725
5/28/2011	21.53	30,999	43.20	62,208	70.00	100,798
5/29/2011	21.68	31,214	43.30	62,352	70.00	100,798
5/30/2011	20.84	30,012	44.00	63,360	70.00	36,333
5/31/2011	20.71	29,823	44.00	63,359	70.00	84,141
Average Flow Rate or Total Discharged	14.08	628,615	25.95	1,158,663	60.64	2,146,472

Notes:

1. DS, CUD, and Treated Water Discharge from HDS Plant flow rates are calculated from volume measured by flow totalizers.

Abbreviations:

gpm - gallons per minute

TABLE 7
HIGH DENSITY SLUDGE TREATMENT SYSTEM - OPERATIONAL DATA SUMMARY
JUNE 2011 MONTHLY SUMMARY

Draft - Provisional Data

Time Period	Treated Water Discharged (gal)	Lime Consumed (kg)	Diesel Fuel Consumed (gal)	Flocculant Consumed (kg)	Sludge Wasted (gal)	Freshwater Consumed (gal)
May 1 - May 31, 2011	2,146,472	6,633	2,570	59	4,200	4,700

Atlantic Richfield Company

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July 11, 2011

Mr. Gary Riley
US EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105

Mr. Kevin Mayer
US EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105

RE: Leviathan Monthly Report for June 2011 and Quarterly RI/FS Progress Report

Dear Mr. Riley and Mr. Mayer:

The following text describes activities conducted during the month of June 2011 at the Leviathan Mine Site and activities anticipated to occur during the upcoming month. These activities are organized by work area [Aspen Seep, Channel Underdrain (CUD) and Delta Seep (DS)], and site-wide tasks. This progress report is being submitted in accordance with Paragraph 62 of the Administrative Settlement Agreement and Order on Consent for Removal Action (AOC) (effective January 21, 2009).

Atlantic Richfield is also submitting this letter in satisfaction of the quarterly progress reporting requirement set forth in Paragraph 63 of the Administrative Order for Remedial Investigation and Feasibility Study (U.S. EPA Region IX, CERCLA Docket No. 2008-18, June 23, 2008) (UAO). The quarterly summary of RI/FS activities is provided at the end of this letter.

ACTIVITIES FOR JUNE

Aspen Seep

- Operated the Aspen Seep Bioreactor (ASB) in recirculation mode during the month of June. Routine O&M, influent sampling, and effluent sampling occurred on June 1, 2011. The currently available influent and effluent water quality data for the June 1, 2011 sampling event are presented in Table 1. Recent pH and ORP field data are summarized in Table 2. Influent flow rate data from the USGS has not been received since May 30, 2011; any new flow data received will be included in subsequent monthly reports.
- On June 13, 2011 Atlantic Richfield provided email notification to EPA that sludge removal and dewatering activities at the Aspen Seep Bioreactor would be conducted in 2011. Mobilization of sludge removal and dewatering equipment began on June 6, 2011. Approximately 95,000 gallons of sludge were pumped from Pond 3 to Pond 4, and approximately 10,000 gallons of sludge were pumped from the Pre-Treatment Pond to Pond 4 in June to await processing. Approximately 33,000

A BP affiliated company



gallons of sludge were pumped from Pond 4 into storage tanks in preparation for dewatering activities. On June 22, 2011 it was determined that the centrifuge mobilized to the site was not appropriate for dewatering the sludge from the ASB. An appropriate centrifuge was not readily available; therefore, a belt filter press has been mobilized to dewater the ASB sludge this year.

CUD and DS

- Operation of the HDS Treatment Plant and the associated capture of the CUD and DS continued during the month of June. The HDS Treatment Plant effluent was sampled for laboratory analytical parameters on June 2, 2011. The analytical results associated with the May 24 and June 2, 2011 sampling events are presented in Table 3. An HDS influent sample was collected on June 2, 2011 as part of the monthly compliance sampling, and the results are included in Table 3. Table 4 presents analytical results for samples collected of the HDS Treatment System generated solids and Pond 4 solids. Flow rates recorded for the Delta Seep, Channel Underdrain, and treated water discharge from the HDS Treatment Plant are included in Table 5. A summary of the HDS Plant operational data for June 2011 is presented in Table 6.
- On May 31, 2011, the HDS Treatment Plant experienced a short term equipment related interruption to normal operations. The screw conveyor that transfers lime from the Lime Transfer Hopper to the Lime Storage Hopper stopped working. Spare equipment was installed, and the lime system was returned to normal operations on June 1, 2011. Capture of the CUD and DS was unaffected.
- On June 21, 2011, Atlantic Richfield submitted Amendment No.1 to the 2011 RAWP to EPA. This amendment describes Atlantic Richfield's plans for removing, dewatering, and disposing of sludge from Pond 4. EPA approved the amendment in an email dated June 22, 2011. Planning activities and mobilization of equipment began in June.
- On June 22, 2011, a water sample was collected from the overflow pipe conveying water into Pond 4 from the Pond 3 overflow and underdrain system. The sample was submitted for laboratory analysis; analytical results from the collected sample are summarized in Table 7. Flow from this pipe into Pond 4 at the time of sampling was estimated at approximately 1 gpm.
- On June 23, 2011, the HDS Treatment Plant influent pumps were turned off to allow for the implementation of a leak detection survey on the Pond 4 liner as part of ongoing Remedial Investigation activities. A short temporary interruption of treated water discharge to Leviathan Creek was experienced; however, there was no interruption in the collection and conveyance of flows from the CUD or DS.
- On June 27, 2011, Atlantic Richfield submitted to EPA a Waste Material Off-Site Shipment Notification Letter for the HDS Treatment System solids. Approximately 54 cubic yards of HDS Treatment System solids were shipped off site on June 28, 2011.

Site-wide

- Work continued on updating the Leviathan Mine Project Database with data from monitoring performed by Atlantic Richfield and various agencies.
- On May 10, 2011, Atlantic Richfield submitted to the Forest Service a draft Notice of Road Work to be hand delivered to the residents along Leviathan Mine Road near Hwy 395 and a schedule for the road maintenance activities. On May 10, 2011, the USFS approved the draft Notice of Road Work. On May 11, 2011 Atlantic Richfield provided an updated schedule for road maintenance activities to

the Forest Service. Atlantic Richfield distributed the Notice of Road Work to residents on May 26, 2011 and provided an update on the status of road work activities to EPA via email on May 27, 2011. The majority of road maintenance activities described within the Notice of Road Work were completed in June.

- On June 2, 2011, Atlantic Richfield participated in a conference call with EPA and the Lahontan Regional Water Quality Control Board (LRWQCB) to discuss coordination of response actions.
- On June 21, 2011, a conference call was conducted with EPA to provide a general progress update.

ACTIVITIES FOR UPCOMING MONTH

Aspen Seep

- Continue operation of the Aspen Seep Bioreactor in recirculation mode and conduct routine operation, maintenance, and monitoring as outlined in the 2011 RAWP.
- Continue sludge removal and dewatering operations at the Aspen Seep Bioreactor.

CUD and DS

- Continue with the optimization, operation, and maintenance of the HDS Treatment System.
- Continue removal of accumulated sludge from Pond 4 as described in Amendment No. 1 to the 2011 RAWP.

Site-wide

- Continue to provide project progress updates to EPA via conference call. The next conference call is currently scheduled for July 26, 2011.

* * * *

Quarterly RI/FS Progress Report

As required by Paragraph 63 of the UAO, the following Quarterly Progress Report for Remedial Investigation and Feasibility Study (RI/FS) activities describes: (a) the actions taken to comply with the UAO during the prior quarter, (b) the work planned for the next quarter, and (c) any problems encountered or anticipated including any actual or anticipated delays in schedules.

Actions Taken to Comply with the UAO

- Atlantic Richfield submitted the Quarterly Progress Report for the first quarter on April 10, 2011.
- Atlantic Richfield conducted Monthly Progress Conference Calls with EPA April, May and June 2011 where RI/FS updates were provided.
- Atlantic Richfield submitted preliminary responses to EPA comments on the Human Health Risk Assessment Work Plan on April 15, 2011

- Atlantic Richfield had a meeting with EPA to discuss the responses to EPA comments on the Human Health Risk Assessment Work Plan on April 26, 2011.
- Atlantic Richfield submitted final responses to EPA comments on the Human Health Risk Assessment Work Plan on May 19, 2011.
- In response to input received at a March 2011 meeting with EPA, Atlantic Richfield initiated preparation of the draft Reference FRI Work Plan in second quarter 2011.
- Atlantic Richfield continued to prepare the Problem Formulation for the Ecological Risk Assessment and the Ecological Risk Assessment Work Plan in second quarter 2011.
- Atlantic Richfield implemented field investigation activities under the EPA approved On-Property FRI Work Plan in the second quarter of 2011. Atlantic Richfield notifies EPA of planned field investigation activities by providing a “Three-week Look Ahead” of upcoming work, several notifications were provided in the second quarter 2011. This notification also allows EPA to plan its oversight of the On-Property FRI activities. On-Property FRI investigation activities initiated in second quarter included:
 - Mapping of erosional features
 - Mapping of mine features and storm water structures
 - Mapping of geotechnical features
 - Mapping of surface water
 - Mapping of stream sediment on-property
 - Planning for the installation of the on-property meteorological station installation
 - Design and installation of the storm water sample collection stations
 - Evaluation of the existing pond underdrain system
 - Electrical leak detection survey of the on-property ponds
 - Design of pond water loss monitoring systems
 - Geophysical surveys in the LCSA and the ACSA
 - Sample collection from the existing groundwater monitoring wells
 - Planning for installation of new piezometers and groundwater monitoring wells planned in the On-Property FRI Work Plan

Work Planned for the Next Quarter

- Atlantic Richfield plans to submit the draft Ecological Risk Assessment Problem Formulation and an outline for the Ecological Risk Assessment Work Plan in the third quarter of 2011. These submittals will be discussed at a planned meeting with EPA.
- Atlantic Richfield plans to submit the draft Reference FRI Work Plan in the third quarter of 2011.
- Atlantic Richfield plans to continue implementation of field investigation activities under the On-Property FRI Work Plan in the third quarter of 2011.
- Atlantic Richfield plans on submitting a Quarterly Progress Report for the second quarter of 2011 on July 11, 2011.

Gary Riley and Kevin Mayer – USEPA Region 9

July 11, 2011

Page 5 of 5

* * * *

If you have any questions or comments, please feel free to contact me at (714) 228-6770 or via e-mail at Anthony.Brown@bp.com.

Sincerely,

ORIGINAL SIGNED BY DAVE McCARTHY for

Tony Brown
Project Manager

Attachments:

- Table 1 – Aspen Seep Bioreactor Monthly Influent and Effluent Sample Results
- Table 2 – Aspen Seep Bioreactor, Recent pH and ORP Field Measurements
- Table 3 – HDS Treatment System Influent and Effluent Sample Results
- Table 4 – HDS Treatment System, Treatment Generated Solids Sample Results
- Table 5 – CUD, DS, and HDS Treatment System Flow Rates
- Table 6 – HDS Treatment System Operational Summary
- Table 7 – Pond 3-to-Pond 4 Pipe Sample Results

cc: Chuck Curtis, Lahontan Regional Water Quality Control Board
Ronald Halsey, Atlantic Richfield Company
Nathan Block, Esq., BP America Inc.
Adam Cohen, Esq., Davis Graham & Stubbs LLP
Dave McCarthy, Copper Environmental Consulting
Joe Niland, AMEC-Geomatrix Consultants, Inc.
Sandy Riese, EnSci, Inc.
Randy Miller, Broadbent & Associates, Inc.

TABLE 1
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - SAMPLE RESULTS
JUNE 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Parameter	Basis	Units	June 1	June 1	June 1	June 1	June 1	June 1	Maximum Discharge Criteria (mg/L)	Average Discharge Criteria (mg/L)
			2011 145ASPINF465 Influent (mg/L)	2011 145MH2462 Manhole 2 (mg/L)	2011 145MH4463 Manhole 4 (mg/L)	2011 145MH6467 Manhole 6 (mg/L)	2011 145MH7464 Manhole 7 (mg/L)	2011 145ASPEFF461 Effluent (mg/L)		
Selenium	Total	mg/L	0.0026	-	-	-	-	0.0027	NP	0.005
Aluminum	Dissolved	mg/L	55	0.57	0.59	0.71	0.14	0.17	4	2
Arsenic	Dissolved	mg/L	<0.00090	<0.00090	<0.00090	<0.00090	<0.00090	<0.00090	0.34	0.15
Cadmium	Dissolved	mg/L	0.0024	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.009	0.004
Calcium	Dissolved	mg/L	383	356	381	348	345	375	-	-
Chromium	Dissolved	mg/L	0.0062	0.0012 J	0.0020	<0.00090	0.0017 J	<0.00090	0.97	0.31
Copper	Dissolved	mg/L	0.99	0.0032	0.0050	0.0058	0.0021	0.0019 J	0.026	0.016
Hardness	Dissolved	mg/L	1300	1100	1200	1100	1100	1200	-	-
Iron	Dissolved	mg/L	149	0.187	0.868	0.800	0.0881	<0.0150	2	1
Phosphorus	Dissolved	mg/L	<0.040	<0.020	<0.020	<0.020	<0.020	<0.020	-	-
Magnesium	Dissolved	mg/L	92	61	65	56	61	62	-	-
Lead	Dissolved	mg/L	<0.00020	<0.00020	<0.00020	0.00026 J	<0.00020	<0.00020	0.136	0.005
Nickel	Dissolved	mg/L	0.47	0.011	0.021	0.019	0.0077	0.019	0.84	0.094
Zinc	Dissolved	mg/L	0.44	<0.0040	0.0047 J	<0.0040	<0.0040	<0.0040	0.21	0.21
Chloride	Total	mg/L	4.8	-	-	-	-	3.0	-	-
Acidity	Total	mg/L	660	-	-	-	-	<2.0	-	-
Alkalinity (Total)	Total	mg/L	<2.00	168	240	172	324	168	-	-
Alkalinity (Bicarbonate)	Total	mg/L	<2.40	205	293	210	395	205	-	-
Alkalinity (Carbonate)	Total	mg/L	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	-	-
Alkalinity (Hydroxide)	Total	mg/L	<0.700	<0.700	<0.700	<0.700	<0.700	<0.700	-	-
Total Kjeldahl Nitrogen	Total	mg/L	-	-	-	-	-	-	-	-
Total Dissolved Solids	Total	mg/L	2,960	-	-	-	-	2,750	-	-
Total Suspended Solids	Total	mg/L	17	-	-	-	-	6.0 J	-	-
Sulfate	Lab Filtered	mg/L	2,030	1,690	1,570	1,700	1,420	1,700	-	-
Sulfide	Dissolved	mg/L	-	0.050 J	0.82	0.46	4.8	-	-	-
Ammonia-N	Dissolved	mg/L	0.38 J	0.22 J	0.13 J	0.24 J	<0.10	0.16 J	-	-
Ethanol	Total	mg/L	-	-	-	-	-	-	-	-
Dissolved Organic Carbon	Dissolved	mg/L	1.1	410	370	170	380	200	-	-
Nitrate/Nitrite-N	Dissolved	mg/L	<0.18	<0.090	<0.090	<0.090	<0.090	<0.090	-	-
Nitrate-N	Dissolved	mg/L	<0.12	<0.060	<0.060	<0.060	<0.060	<0.060	-	-
Nitrite-N	Dissolved	mg/L	<0.18	<0.090	<0.090	<0.090	<0.090	<0.090	-	-
pH	Field	s.U.	2.92	8.18	7.11	8.14	6.55	7.32	-	6.0 - 9.0 ²
ORP	Field	mV	378.6	-175.7	-360.0	-272.8	-337.9	-50.3	-	-
Temperature	Field	C	11.65	17.97	8.81	9.25	7.71	11.07	-	-
Conductivity	Field	uS/cm	2822	3145	3006	3055	2955	3117	-	-

Abbreviations

-- not measured or not available
 C - Celsius
 mg/L - milligrams per liter

mV - millivolts
 ORP - oxidation/reduction potential
 s.U. - standard unit

uS/cm - microSiemens per centimeter

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
JUNE 2011 MONTHLY SUMMARY
Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
09/21/07	6.0	2.91	428.9	7.34	-268.4	7.13	-280.3	9.56	-285.8	7.13	-265.3	8.42	2.6
09/26/07	6.2	2.89	496.7	7.80	-192.1	7.36	-223.0	9.64	-195.4	7.34	-232.7	8.34	50.3
10/03/07	5.5	2.85	484.1	8.07	-127.7	8.50	-129.6	11.25	-136.5	7.64	-164.0	8.22	-5.2
10/10/07 ²	5.8	2.80	498.0	5.50	55.9	5.64	-70.5	10.00	-190.0	6.20	-171.6	7.78	-268.0
10/18/07 ²	5.9	2.83	482.4	5.00	26.8	5.68	-46.2	11.38	-112.0	6.23	-139.0	8.69	135.0
10/31/07 ²	9.0	2.88	402.7	4.26	319.3	6.85	-156.7	9.80	-170.0	6.95	-212.2	7.66	-94.3
11/08/07	6.0	2.88	418.0	7.55	-128.3	7.01	-116.7	8.23	-133.9	6.86	-125.8	7.51	-50.6
11/13/07	-	2.86	484.5	7.06	-2.3	6.84	-65.3	7.86	-42.6	6.79	-78.1	7.58	4.2
11/27/07	5.5	2.86	479.4	6.99	-38.5	6.97	-205.0	8.46	-183.9	6.91	-156.8	7.25	-1.7
12/12/07	-	3.01	482.2	7.20	-25.3	7.20	-115.2	7.64	-107.7	7.04	-129.7	6.90	-31.9
01/15/08	4.8	2.98	483.3	6.76	5.9	6.73	-85.5	7.89	-94.3	6.67	-137.4	6.71	-33.0
02/07/08 ³	-	-	-	-	-	-	-	-	-	-	-	5.77	20.2
02/12/08	7.0	2.76	487.4	6.67	44.6	-	-	7.39	-45.6	6.42	-88.0	6.70	-15.3
03/18/08	6.0	2.88	375.1	7.85	3.6	-	-	8.80	-189.2	7.23	-211.3	7.05	-95.3
04/10/08	7.5	2.90	397.7	6.74	-80.0	6.70	-163.4	7.50	-142.6	6.57	-165.3	7.39	-24.5
05/15/08	7.3	2.97	442.2	6.24	21.2	6.55	-265.4	6.55	-233.7	5.60	-183.7	7.29	-143.3
05/27/08	7.0	3.00	464.1	7.11	-16.3	6.85	-242.2	6.98	-191.1	6.80	-235.2	7.26	-19.5
06/09/08	7.0	3.10	455.4	7.40	-47.5	7.09	-251.2	7.70	-178.8	6.97	-219.7	7.19	-61.5
06/17/08	7.5	2.91	443.9	7.42	-22.7	6.90	-283.0	7.29	-131.0	6.88	-244.3	7.30	-82.5
07/10/08	7.3	2.98	470.9	7.32	-34.1	6.90	-238.4	7.05	-172.6	6.90	-215.0	7.85	-113.5
07/22/08	7.0	2.99	455.5	6.94	-272.5	6.97	-267.4	7.07	-190.6	7.01	-248.9	7.35	-89.1
08/04/08	6.8	2.89	450.7	7.60	-94.4	6.94	-266.0	6.19	-173.1	7.02	-251.2	-	-
08/05/08	-	3.05	445.3	-	-	-	-	-	-	-	-	7.29	-70.0
08/18/08	7.3	3.93	478.9	7.46	-166.7	7.08	-291.9	7.40	-202.6	7.07	-268.8	7.40	-52.4
08/22/08	-	2.89	473.7	7.97	-212.9	7.08	-301.8	7.74	-224.0	7.03	-275.9	7.67	-27.8
08/25/08	-	2.93	470.5	7.77	-287.7	7.18	-286.1	6.89	-205.6	7.12	-273.8	8.02	-108.4
08/26/08	-	2.91	468.8	7.95	-255.4	7.09	-305.4	7.75	-281.2	7.14	-273.1	7.77	-41.4
09/24/08	-	3.03	423.2	7.18	-107.8	6.99	-255.4	7.11	-205.7	6.89	-245.2	7.70	-87.7
09/30/08	-	3.02	434.3	7.77	-151.9	6.89	-267.5	-	-	6.92	-269.9	8.10	-94.0
10/13/08	5.8	3.34	433.1	7.17	-98.7	6.94	-218.3	6.80	-157.2	7.01	-206.1	8.32	-101.0
10/27/08	5.8	3.21	247.8	7.34	-162.5	6.96	-175.3	7.20	-152.3	6.98	-126.8	7.88	273.7
11/19/08	5.5	2.83	453.7	7.20	-104.5	6.77	-204.7	7.12	-82.2	6.71	-154.7	7.74	-35.1

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
JUNE 2011 MONTHLY SUMMARY

Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
12/03/08	5.3	3.56	453.0	7.23	-45.0	6.86	-141.3	7.06	-100.1	6.84	-135.6	7.65	-47.5
01/9/09 ⁴	-	3.15	458.3	-	-	-	-	-	-	-	-	6.95	-43.0
01/12/09	5.3	2.94	466.3	6.36	-82.8	6.38	-245.1	-	-	6.82	-259.0	7.11	-74.0
02/19/09 ⁴	5.3	2.78	480.1	6.60	-3.2	6.74	-145.1	7.26	-117.6	6.25	-162.3	6.68	-18.1
03/10/09	5.0	2.88	481.2	-	-	-	-	-	-	-	-	7.36	34.3
04/13/09	7.0	2.78	532.7	7.45	-9.9	7.04	-185.5	7.50	-65.8	6.98	-175.4	7.77	-32.2
05/06/09	5.5	2.89	444.4	-	-	6.47	-221.3	-	-	6.56	-206.5	7.62	-86.6
06/03/09	6.5	2.91	445.9	6.98	-145.1	6.62	-260.8	7.07	-192.8	6.65	-260.4	7.55	-15.4
06/16/09	6.5	2.98	388.0	7.09	-186.6	6.79	-319.3	7.16	-233.2	6.80	-298.2	7.70	-158.1
07/01/09	6.0	2.95	376.5	7.43	376.5	6.93	-366.2	7.42	-310.8	6.97	-350.5	7.89	-189.6
07/14/09	5.8	2.97	394.4	-	-	6.85	-338.8	-	-	6.98	-331.9	7.90	-146.2
07/29/09	6.0	2.78	404.5	7.24	-175.5	7.39	-427.7	8.10	-260.2	7.29	-403.7	8.05	-135.6
08/05/09	5.5	2.89	433.8	-	-	-	-	8.73	-120.7	-	-	8.17	-146.0
08/19/09	5.1	2.97	425.7	-	-	-	-	8.25	-37.6	-	-	7.54	47.0
09/17/09	5.3	2.38	490.6	7.27	-91.3	6.81	-180.3	7.75	-120.2	6.85	-182.3	6.95	-24.7
09/30/09	5.0	2.96	503.7	8.03	-18.9	8.99	-253.1	7.75	-217.2	7.03	-276.6	7.98	-17.0
10/15/09	5.5	2.93	496.6	6.57	-121.4	7.63	-301.0	8.33	-148.5	7.71	-314.5	7.85	-41.2
10/28/09	4.9	2.96	487.6	8.79	-69.9	7.28	-216.4	9.08	-143.0	7.24	-162.8	7.94	2.8
11/11/09	5.0	2.91	420.8	8.34	-15.3	7.49	-243.7	8.42	-163.9	7.51	-199.3	7.74	60.6
12/17/09 ⁵	5.0	2.90	416.5	4.65	100.2	5.00	15.3	-	-	5.12	-1.8	5.91	-26.4
01/14/10 ⁵	4.8	2.85	417.7	6.96	-89.0	6.82	-186.4	-	-	6.84	-206.1	6.45	-67.4
02/02/10 ⁵	4.7	2.94	484.0	7.58	-46.7	6.85	-129.6	-	-	6.67	-131.1	6.95	-48.1
03/09/10	4.8	2.74	474.7	8.27	-78.3	7.95	-204.2	8.74	-208.9	8.10	-220.8	7.75	-5.9
04/26/10 ⁶	12.0	2.85	479.5	5.14	135.1	5.61	-19.0	5.04	109.2	5.60	-29.6	6.15	35.9
05/17/10	9.7	2.97	436.9	6.26	196.9	7.04	-283.9	7.79	-235.1	7.08	285.4	7.76	-73.8
05/24/10	9.4	3.16	418.0	7.43	-156.1	7.00	-259.9	7.27	-171.4	6.89	-282.6	7.11	-78.6
05/27/10	9.6	3.18	423.1	5.52	-225.1	7.58	-316.7	8.86	-318.2	6.74	-296.8	7.07	-98.7
06/01/10	10.5	3.11	444.0	8.47	-32.2	7.72	-292.6	9.00	-	6.74	-300.9	7.01	-31.5
06/14/10	10.0	2.99	427.7	7.40	-81.7	6.85	-272.5	8.22	-220.2	6.61	-181.6	7.48	-93.7
06/15/10	-	-	-	8.04	-221.6	6.89	-347.7	-	-	6.17	-355.9	-	-
06/16/10	-	2.99	427.7	7.40	-81.7	6.85	-272.6	8.22	-220.2	6.61	-181.6	7.48	-93.7

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
JUNE 2011 MONTHLY SUMMARY

Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
06/18/10	9.1	-	-	7.72	-211.7	6.79	-335.6	-	-	6.69	-336.7	-	-
06/21/10	9.0	3.21	409.4	7.99	-242.7	6.96	-364.1	7.86	-303.4	6.78	-349.5	7.70	-142.3
06/30/10	10.0	2.59	451.5	8.73	-216.2	8.73	-216.2	-	-	6.78	-337.9	7.96	-164.5
07/01/10	-	2.82	422.4	-	-	-	-	-	-	-	-	7.94	-241.9
07/13/10	10.0	2.62	479.5	7.52	-112.1	6.90	-279.5	8.02	-255.2	6.90	-294.0	7.76	-65.8
07/21/10	10.0	2.93	475.1	7.90	-70.5	7.15	-301.5	7.80	-212.4	7.27	-315.3	8.09	-95.7
07/29/10	10.0	2.90	465.3	7.73	-168.6	7.25	-318.1	7.08	-192.5	7.15	-318.5	7.06	-45.6
08/03/10	9.0	2.94	458.6	7.69	-193.3	7.16	-311.4	7.16	-311.4	7.17	-324.5	7.39	-66.3
08/12/10	9.0	2.85	476.3	7.98	-255.3	7.07	-299.3	7.50	-235.2	7.06	-307.0	7.55	-26.2
08/17/10	9.5	2.64	470.9	8.09	-47.2	7.54	-306.0	8.47	-206.8	7.37	-320.0	7.86	-74.0
08/24/10	9.2	3.04	250.0	7.81	-129.9	7.21	-151.9	7.20	-202.9	7.09	-147.9	7.81	2.9
09/02/10	9.2	2.84	503.9	7.70	-208.4	-	-	8.15	-227.0	7.32	-267.2	7.97	-20.2
09/16/10	8.0	3.21	455.8	8.40	-219.9	7.29	-209.3	8.66	-197.0	7.32	-279.7	7.76	-76.4
09/22/10 ⁷	8.0	3.06	476.5	8.50	-151.0	7.25	-276.9	8.30	-257.8	7.39	-279.9	7.93	-112.0
09/30/10 ⁷	7.6	3.16	503.3	8.49	-263.9	7.32	-265.4	8.53	-221.9	7.26	-267.8	8.61	94.1
10/06/10 ⁸	9.0	3.28	479.3	7.83	-287.5	7.39	-305.8	8.25	-246.7	7.62	-305.1	8.17	-235.5
10/11/10	8.0	3.20	479.3	7.52	-190.4	7.00	-284.4	8.28	-227.4	7.15	-290.4	7.85	26.4
10/19/10	8.0	2.89	447.3	8.75	-157.3	7.43	-310.4	8.52	-203.0	7.22	-310.6	8.15	130.4
10/28/10	8.0	2.95	579.0	7.23	-282.8	6.98	-368.9	8.50	-384.7	7.12	-402.6	7.73	-30.7
11/02/10	8.0	2.69	366.7	7.89	-285.1	7.14	-385.2	8.46	-307.5	7.00	-385.7	7.62	-31.5
11/15/10	8.5	2.94	361.7	7.79	-273.2	7.08	-381.9	8.04	-269.3	6.89	-384.5	7.64	-2.2
12/07/10 ⁹	8.5	3.01	387.2	6.97	-298.4	6.82	-375.1	-	-	6.57	-353.5	6.41	-112.4
01/07/11 ⁹	8.5	2.92	434.1	6.50	-134.0	5.98	-200.1	-	-	6.08	-216.2	6.15	-4.9
02/01/11 ⁹	8.0	3.07	423.8	6.75	-332.2	6.86	-279.7	-	-	6.59	-297.0	6.62	-9.3
03/11/11	8.5	3.05	384.7	7.66	-239.2	7.11	-344.7	-	-	6.85	-370.1	7.05	-73.4
4/19/2011 ¹⁰	30	2.61	454.9	-	-	-	--	-	-	-	-	4.72	172.9
04/26/11	29	2.91	362.1	7.45	-199.2	6.58	-346.5	7.42	-232.8	6.41	-369.7	7.22	-144.6

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
JUNE 2011 MONTHLY SUMMARY

Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
05/03/11	27	2.90	355.0	7.70	-264.8	6.56	-361.5	7.81	-264.9	6.54	-402.2	7.60	-137.5
05/11/11	24	2.84	344.2	6.81	-198.2	6.31	-229.0	6.99	-200.7	6.23	-204.0	6.99	-139.2
05/20/11	17	3.03	372.4	8.10	-282.2	7.09	-361.8	7.89	-219.6	6.39	-367.9	7.36	-44.1
06/01/11	18	2.92	378.6	8.18	-175.7	7.11	-360.0	8.14	-272.8	6.55	-337.9	7.32	-50.3
6/15/11 ¹¹	16	3.18	407.7	-	-	-	-	8.60	-231.3	-	-	8.15	-3.9
6/21/11 ¹¹	15	3.09	415.6	-	-	-	-	8.15	-184.2	-	-	-	-
6/28/11 ¹²	15	2.95	204.5	7.66	-503.6	6.94	-581.5	8.44	-458.1	6.93	-581.5	7.52	-85.1

Notes

1. Aspen Seep Bioreactor Influent Flow measurements are field measurements completed with a graduated bucket and stop watch.
2. Biocell 1 was flushed on 10/08/07, 10/09/07, and 10/18/07; Biocell 1 was bypassed during this flushing period. Low pH readings in Manhole 1 from 10/10/07 through 10/31/07 were caused by drainage into pretreatment pond from failed seal in weir box cap.
3. Measurements are believed to be erroneous due to calibration error. Parameters were re-evaluated on 02/12/08.
4. Low pH measurements due to a power outage and associated chemical pump shutdown.
5. Low pH measurements caused by stripped gears on NaOH pump head that prevented dosing to Manhole 6.
6. Low pH measurements due to increase in system flow rates; chemical dosing rates lagged behind these system flow rate increases and were unable to prevent decrease in system pH.
7. Effluent readings were collected from the centrifuge discharge point on these dates due to sludge dewatering. Water was not being discharged from Pond 4.
8. Effluent readings were collected Pond 4 effluent on this date. Water was not being discharged from Pond 4.
9. Low pH measurements due to power outage and associated chemical pump failure during the inverter failure on November 29, 2010.
10. Low pH measurement due to increase in system flow rates.
11. Field measurements at intermediate bioreactor manholes were not collected when recirculation operations were interrupted due to sludge dewatering operations.
12. ORP measurements are inaccurate due to probe calibration issues.

Abbreviations

- - not recorded, not recorded, or bioreactor operation did not have flow at given location on the specified date.

gpm - gallons per minute

ORP - oxidation/reduction potential

mV - millivolts

s.U. - standard unit

TABLE 3
HIGH DENSITY SLUDGE TREATMENT PLANT - SAMPLE RESULTS
JUNE 2011 MONTHLY SUMMARY
Draft - Provisional Data

Parameter	Basis	May 24	June 2	June 2	June 2	June 2	Maximum Discharge Criteria	Average Discharge Criteria
		2011 156HDSEFF406 Effluent (mg/L)	2011 158HDSEFF411 Effluent (mg/L)	2011 158HDSINF416 Influent (mg/L)	2011 158DS414 DS (mg/L)	2011 158CUD415 CUD (mg/L)		
pH ¹	Field	8.51	8.32	3.16	3.38	3.22	-	6.0-9.0 ²
Aluminum	Dissolved	0.81	0.50	79	24	93	4	2
Arsenic	Dissolved	<0.00090	0.0010	0.52	0.025	1.5	0.34	0.15
Cadmium	Dissolved	<0.00010	<0.00010	0.0057	0.0035	0.0062	0.009	0.004
Calcium	Dissolved	898	812	337	314	302	-	-
Chromium	Dissolved	<0.00090	<0.00090	0.054	0.0071	0.082	0.97	0.31
Copper	Dissolved	0.0040	0.0016 J	0.13	0.23	0.053	0.026	0.016
Hardness	Dissolved	2600	2400	1200	1100	1100	-	-
Iron	Dissolved	0.142 J	0.103	386	19.5	567	2.0	1.0
Lead	Dissolved	<0.00020	<0.00020	<0.00040	<0.00020	<0.0010	0.136	0.005
Magnesium	Dissolved	92	97	89	88	78	-	-
Nickel	Dissolved	0.037	0.078	2.0	0.58	2.8	0.84	0.094
Zinc	Dissolved	<0.0040	<0.0040	0.50	0.34	0.61	0.21	0.21
Selenium	Total	0.0036	0.0019 J	0.0026 J	0.0034	<0.0025	NP	0.005
Acidity	Total	2.0	<2.0	1200	210	1500	-	-
Alkalinity (Total)	Total	16.0	21.0	<2.00	<2.00	<2.00	-	-
Alkalinity (Bicarbonate)	Total	19.5	25.6	<2.40	<2.40	<2.40	-	-
Alkalinity (Carbonate)	Total	<1.20	<1.20	<1.20	<1.20	<1.20	-	-
Alkalinity (Hydroxide)	Total	<0.700	<0.700	<0.700	<0.700	<0.700	-	-
Sulfate	Lab Filtered	2460	2320	2390	684	2820	-	-
Chloride	Total	2.3	2.4	6.9	2.8	6.0	-	-
Total Dissolved Solids	Total	3700	3530	3750	2120	4480	-	-
Total Suspended Solids	Total	6.0 J	13	52	53	44	-	-

Notes

1. pH value was collected in field and is the average of 3 grab samples comprising the HDS Effluent sample or one grab sample for the HDS Influent sample. pH is reported in standard units.
2. Discharge criteria pH based on 24-hour (single day) average discharge.
3. Values in bold are concentrations greater than the maximum or average discharge criteria.

Abbreviations

< - Analyte not detected at or above the or method detection limit

J - Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL).

NP - Not Promulgated

-- not measured or not available

TABLE 4
HIGH DENSITY SLUDGE TREATMENT PLANT AND POND 4 - TREATMENT GENERATED SOLIDS SAMPLE RESULTS
JUNE 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Date	Sample ID	Analysis	Parameter (mg/L, except mg/kg for Total Metals)																				pH (standard units)	Soil Measure (% by weight)
			Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc			
05/27/11	157POND4SLG-1 407	Total Metals	4,100	<4.4	250	25	<1.0	<1.0	7.9	30	21	99,000	<2.5	0.67	<1.0	68	<5.0	<4.0	<4.0	25	31	6.8	76	
		STLC DI-WET	<0.040	<0.00030	0.0016	0.21	0.00010 J	0.00054 J	<0.00090	0.061	0.0013 J	<0.015	<0.00020	<0.00010	0.00076 J	0.27	0.0013 J	<0.00010	0.013	0.0015	0.012 J			
		SPLP	0.41 J	<0.070	<0.070	<0.060	<0.010	<0.020	<0.020	0.071 J	<0.030	<0.15	<0.040	<0.0010	<0.020	0.29	<0.080	<0.060	<0.070	<0.030	<0.060			
		TCLP	<0.40	<0.070	<0.070	<0.060	<0.010	<0.020	<0.020	<0.020	<0.030	<0.15	<0.040	<0.0010	<0.020	0.17 J	0.12	<0.060	<0.070	<0.030	0.072 J			
		STLC	200	<0.14	0.64	0.20	<0.018	<0.040	0.083 J	3.8	0.28	740	<0.080	<0.0010	<0.040	8.6	0.75	<0.12	<0.14	0.082 J	0.72			
05/27/11	157POND4SLG-2 408	Total Metals	4,000	<4.4	310	33	<0.99	<0.99	8.5	24	19	97,000	<2.5	0.73	<0.99	53	<5.0	<4.0	<4.0	31	27	4.1	70	
		STLC DI-WET	<0.040	<0.00030	0.0015	0.031	<0.00010	0.0011	<0.00090	0.11	0.0014 J	0.038 J	0.00033 J	<0.00010	<0.00020	0.30	0.0012 J	<0.00010	0.016	0.0014	0.023			
		SPLP	0.85 J	0.094 J	<0.070	<0.060	<0.010	<0.020	0.021 J	0.19 J	<0.030	<0.15	<0.040	<0.0010	<0.020	0.37	<0.080	<0.060	<0.070	<0.030	0.11 J			
		TCLP	<0.40	<0.070	<0.070	<0.060	<0.010	<0.020	<0.020	0.049 J	<0.030	0.23 J	<0.040	<0.0010	<0.020	0.14 J	<0.080	<0.060	<0.070	<0.030	0.60			
		STLC	53	<0.14	0.65	<0.12	<0.018	<0.040	0.23	0.39	0.17 J	2,000	<0.080	0.0013 J	<0.040	0.98	<0.16	<0.12	<0.14	0.53	0.29 J			
05/27/11	157POND4SLG-3 409	Total Metals	18,000	<1.8	160	240	0.81	0.63	31	64	93	42,000	14	5.4	<0.40	150	13	<1.6	5.6	38	60	7.6	51	
		STLC DI-WET	<0.040	<0.00030	<0.00090	0.013	<0.00010	<0.00010	<0.00090	0.00050 J	0.0013 J	<0.015	<0.00020	<0.00010	<0.00020	0.0045	0.0013 J	<0.00010	0.0053	0.0013	0.014 J			
		SPLP	0.46 J	<0.070	<0.070	<0.060	<0.010	<0.020	<0.020	<0.020	<0.030	<0.15	<0.040	<0.0010	<0.020	<0.020	<0.080	<0.060	<0.070	<0.030	<0.060			
		TCLP	<0.40	<0.070	<0.070	0.13 J	<0.010	<0.020	<0.020	<0.020	<0.030	<0.15	<0.040	<0.0010	<0.020	0.054 J	0.22	<0.060	<0.070	<0.030	0.063 J			
		STLC	420	<0.14	0.76	1.1	0.064 J	<0.040	0.56	5.5	5.2	850	<0.080	0.0016 J	<0.040	8.3	0.38	<0.12	0.19 J	0.094 J	3.1			
05/27/11	157POND4SLG-4 410	Total Metals	20,000	<4.4	98	9.3	3.2	1.3 J	9.3	300	59	87,000	<2.5	0.23	<0.99	650	<5.0	<4.0	<4.0	6.8	180	7.8	69	
		STLC DI-WET	0.050	<0.00030	<0.00090	0.0057	<0.00010	<0.00010	<0.00090	0.020	0.00096 J	<0.015	<0.00020	<0.00010	<0.00020	0.029	<0.00050	<0.00010	0.016	0.0014	<0.0040			
		SPLP	0.46 J	<0.070	<0.070	<0.060	<0.010	<0.020	<0.020	<0.020	<0.030	<0.15	<0.040	<0.0010	<0.020	0.036 J	<0.080	<0.060	<0.070	<0.030	<0.060			
		TCLP	<0.40	<0.070	<0.070	<0.060	<0.010	<0.020	<0.020	1.1	<0.030	<0.15	<0.040	<0.0010	<0.020	2.8	0.20	<0.060	0.16	<0.030	0.11 J			
		STLC	820	<0.14	0.40	0.15 J	0.18	<0.040	0.50	16	3.5	2,800	<0.080	<0.0010	<0.040	33	<0.16	<0.12	0.42	<0.060	5.4			
06/02/11	159HSDSLUDGE 417	Total Metals	30,000	<4.4	180	7.1	3.6	<1.0	28	270	110	120,000	<2.5	0.26	<1.0	660	7.4 J	<4.0	20 J	29	170	8.5	54	
		STLC DI-WET	0.80	<0.00030	<0.00090	0.0041	<0.00010	0.00014 J	<0.00090	0.0016	0.0029	0.020 J	<0.00020	<0.00010	0.00069 J	0.0038	0.0010 J	<0.00010	0.042	<0.00080	0.020			
		SPLP	5.8	<0.070	<0.070	<0.060	<0.010	<0.020	<0.020	<0.020	<0.030	<0.15	<0.040	<0.0010	<0.020	<0.020	<0.080	<0.060	<0.070	<0.030	<0.060			
		TCLP	0.97 J	<0.070	<0.070	<0.060	<0.010	<0.020	0.028 J	<0.020	0.067 J	<0.15	<0.040	<0.0010	0.024 J	0.037 J	0.11	<0.060	0.073 J	<0.030	<0.060			
		STLC	930	<0.14	0.39	<0.12	0.053 J	0.050 J	0.30	8.6	2.1	860	<0.080	0.012	<0.040	18	0.24	<0.12	<0.14	<0.060	0.92			
TTLC Regulatory Limits for Total Metals (mg/kg)			NA	500	500	10,000	75	100	500 ^a	8,000	2,500	NA	1,000	20	3,500	2,000	100	500	700	2,400	5,000	Corrosivity criteria for pH = ≤ 2.0 or ≥ 12.5 ^c	-	
STLC Regulatory Limits (mg/L)			NA	15	5.0	100	0.75	1.0	5 (560) ^b	80	25	NA	5.0	0.2	350	20	1.0	5.0	7.0	24	250			
TCLP Regulatory Limits (mg/L)			NA	NA	5.0	100	NA	1.0	5.0	NA	NA	NA	5.0	0.2	NA	NA	1.0	5.0	NA	NA	NA			

Notes

^a Concentration limit for total chromium and/or chromium (III) is 2,500 mg/L and limit for chromium (VI) is 500 mg/L.

^b The federal hazardous waste level for soluble chromium is 5mg/L. California has a Waste Extraction Test (DI-WET) soluble level for chromium (III) (560 mg/L) and chromium (VI) (5 mg/L). To use the 560 mg/L regulatory threshold, it must be demonstrated first that the waste is not a Resource Conservation Recovery Act (RCRA) waste.

^c Title 22 California Code of Regulations, Section 66261.24 (a)(2): Samples were tested for waste extraction test, solubility, and total concentrations. If the results of the STLC or TTLC equal or exceed their respective regulatory thresholds, the waste is a hazardous waste.

Abbreviations

"<" - Constituent not detected at or above the reporting limit or the method detection limit
 J - The associated value is an estimated quantity
 mg/L - milligrams per liter

mg/kg - milligrams per kilograms
 NA - Not applicable
 SPLP - Synthetic precipitation leaching procedure
 STLC - Soluble threshold limit concentration
 TCLP - Toxicity Characteristic Leaching Procedure
 TTLC - California Total Threshold Limit Concentration; based on wet weight concentration

TABLE 5
CHANNEL UNDERDRAIN, DELTA SEEP, AND HDS TREATMENT PLANT - FLOW
RATES
JUNE 2011 MONTHLY SUMMARY
Draft - Provisional Data

Date	Delta Seep Recorded Flow ¹		Channel Underdrain Recorded Flow ¹		Treated Water Discharged from the HDS Treatment Plant Recorded Flow ^{1,2}	
	(gpm)	(gallons)	(gpm)	(gallons)	(gpm)	(gallons)
6/1/2011	20.35	29,303	44.40	63,936	70.00	100,799
6/2/2011	20.20	29,088	44.30	63,792	70.00	93,640
6/3/2011	19.65	28,296	44.28	63,766	70.00	100,767
6/4/2011	19.62	28,251	44.33	63,840	70.00	100,800
6/5/2011	19.96	28,745	44.36	63,879	70.00	100,798
6/6/2011	23.07	33,221	44.42	63,969	70.00	100,730
6/7/2011	20.77	29,914	44.48	64,050	70.00	100,713
6/8/2011	19.92	28,681	44.55	64,155	70.00	100,766
6/9/2011	19.32	27,824	44.68	64,342	70.00	100,745
6/10/2011	19.05	27,434	44.86	64,599	70.00	100,789
6/11/2011	18.89	27,204	44.90	64,661	70.00	100,797
6/12/2011	18.57	26,744	44.94	64,713	70.00	100,798
6/13/2011	18.27	26,313	44.94	64,720	70.00	100,758
6/14/2011	17.99	25,907	44.90	64,658	70.00	91,732
6/15/2011	17.92	25,802	44.99	64,780	60.00	86,316
6/16/2011	17.95	25,852	45.03	64,838	60.00	86,279
6/17/2011	17.75	25,562	45.04	64,857	60.00	86,332
6/18/2011	17.57	25,299	45.07	64,901	60.00	86,398
6/19/2011	17.54	25,256	45.10	64,948	60.00	86,398
6/20/2011	17.31	24,924	45.11	64,963	60.00	86,330
6/21/2011	17.14	24,679	45.11	64,954	70.00	91,848
6/22/2011	17.01	24,500	45.08	64,920	70.00	100,729
6/23/2011	16.90	24,338	45.12	64,974	75.00	66,800
6/24/2011	16.79	24,184	45.17	65,048	75.00	107,937
6/25/2011	16.68	24,019	45.21	65,108	75.00	107,996
6/26/2011	16.55	23,834	45.26	65,172	75.00	107,999
6/27/2011	16.48	23,727	45.32	65,254	75.00	107,974
6/28/2011	16.58	23,868	45.41	65,391	75.00	107,856
6/29/2011	17.31	24,930	45.48	65,485	75.00	108,000
6/30/2011	16.36	23,554	45.49	65,505	62.00	99,164
Average Flow Rate or Total Discharged	18.32	791,253	44.91	1,940,178	68.90	2,918,988

Notes:

1. DS, CUD, and Treated Water Discharge from the HDS Treatment Plant flow rates are calculated from flow totalizer values.
2. The operational flow rate is reported. Water discharge does not always occur 24 hours per day.

Abbreviations:

gpm - gallons per minute HDS - High Density Sludge

TABLE 6
HIGH DENSITY SLUDGE TREATMENT SYSTEM - OPERATIONAL DATA SUMMARY
JUNE 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Reporting Period	Treated Water Discharged (gallons)	Lime Consumed (kilograms)	Diesel Fuel Consumed (gallons)	Flocculant Consumed (kilograms)	Sludge Wasted (gallons)	Freshwater Consumed (gallons)
May 1 - May 31, 2011	2,146,472	6,633	2,570	59	4,200	4,700
June 1 - June 30, 2011	2,918,988	9,873	2,291	63	11,000	6,200

TABLE 7
LEVIATHAN MINE SITE - POND 3 OVERFLOW to POND 4 SAMPLE RESULTS
JUNE 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Parameter	Basis	June 22	Maximum	Average
		2011	Discharge	Discharge
		160POND3OVERFLOW418	Criteria	Criteria
		Pond 3 Overflow	(mg/L)	(mg/L)
		(mg/L)		
pH ¹	Field	2.5	-	6.0-9.0 ²
Aluminum	Dissolved	63	4	2
Arsenic	Dissolved	0.0039	0.34	0.15
Cadmium	Dissolved	0.0061	0.009	0.004
Calcium	Dissolved	442	-	-
Chromium	Dissolved	0.036	0.97	0.31
Copper	Dissolved	0.76	0.026	0.016
Hardness	Dissolved	1700	-	-
Iron	Dissolved	18.9	2.0	1.0
Lead	Dissolved	<0.00020	0.136	0.005
Magnesium	Dissolved	150	-	-
Nickel	Dissolved	0.84	0.84	0.094
Zinc	Dissolved	0.53	0.21	0.21
Selenium	Total	0.050	NP	0.005
Acidity	Total	550	-	-
Alkalinity (Total)	Total	<2.00	-	-
Alkalinity (Bicarbonate)	Total	<2.40	-	-
Alkalinity (Carbonate)	Total	<1.20	-	-
Alkalinity (Hydroxide)	Total	<0.700	-	-
Sulfate	Lab Filtered	2240	-	-
Chloride	Total	5.4	-	-
Total Dissolved Solids	Total	3460	-	-
Total Suspended Solids	Total	11	-	-

Notes

1. pH value was collected in field. pH is reported in standard units.
2. Discharge criteria pH based on 24-hour (single day) average discharge.
3. Values in bold are concentrations greater than the maximum or average discharge criteria.

Abbreviations

- < - Analyte not detected at or above the or method detection limit
 J - Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the
 NP - Not Promulgated
 - - not measured or not available

Atlantic Richfield Company

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August 10, 2011

Mr. Gary Riley
US EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105

Mr. Kevin Mayer
US EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105

RE: Leviathan Monthly Report for July 2011

Dear Mr. Riley and Mr. Mayer:

The following text describes activities conducted during the month of July 2011 at the Leviathan Mine Site and activities anticipated to occur during the upcoming month. These activities are organized by work area [Aspen Seep, Channel Underdrain (CUD) and Delta Seep (DS)], and site-wide tasks. This progress report is being submitted in accordance with Paragraph 62 of the Administrative Settlement Agreement and Order on Consent for Removal Action (AOC) (effective January 21, 2009).

ACTIVITIES FOR JULY

Aspen Seep

- Operated the Aspen Seep Bioreactor (ASB) in recirculation mode during the month of July. Routine O&M, influent sampling, and effluent sampling occurred on July 13, 2011. The currently available influent and effluent water quality data for the June 28 and July 13, 2011 sampling events are presented in Table 1. Table 1 also presents the laboratory analytical results of filtrate samples collected from the filtrate of the sludge dewatering operations. Recent pH and ORP field data are summarized in Table 2. Influent flow rate data from the USGS is presented in Table 3.
- On July 14, 2011, samples of sediment were collected from the Infiltration/Overflow Pond area of the ASB. The laboratory results from the samples are presented in Table 4. In accordance with the 2011 Removal Action Work Plan (RAWP), this data will be used to evaluate management of the Aspen Seep Bioreactor Infiltration/Overflow pond.
- Sludge dewatering activities continued during the month. The belt filter press was mobilized to the site on July 7, 2011. Approximately 64,484 gallons of sludge have been dewatered with the belt filter press and approximately 56 cubic yards of sludge cake have been produced through the end of July.



On July 19, 2011, sludge waste characterization samples were collected from the dewatered sludge. The laboratory results from the samples are presented in Table 5.

CUD and DS

- Operation of the HDS Treatment Plant and the associated capture of the CUD and DS continued during the month of July. Samples of the HDS Treatment Plant influent and effluent were collected for laboratory analysis on July 6, 2011. The analytical results associated with the July 6, 2011 sampling event are presented in Table 6. Table 7 presents analytical results for a sample of the Pond 4 solids collected on July 28, 2011. Flow rates recorded for the Delta Seep, Channel Underdrain, and treated water discharge from the HDS Treatment Plant are included in Table 8. A summary of the HDS Plant operational data for July 2011 is presented in Table 9.
- On July 11 and 21, 2011, Atlantic Richfield submitted to EPA Waste Material Off-Site Shipment Notification Letters for HDS Treatment System solids. Approximately 36 and 30 cubic yards of HDS Treatment System solids were shipped off site on July 15 and 22, 2011, respectively.
- On July 13, 2011, Atlantic Richfield submitted to EPA Revision No. 1 to Amendment No.1 to the 2011 RAWP. This revision describes Atlantic Richfield's plan for bypassing Pond 4 during the Pond 4 sludge removal and dewatering operations. Mobilization of dredging, flocculant addition, and filter bin dewatering equipment was completed in July. EPA approved Revision No. 1 to Amendment No. 1 to the 2011 RAWP on July 14, 2011. Operations were initiated on July 15, 2011 and continued for the duration of the month.
- On July 25, 2011, Atlantic Richfield submitted to EPA a Waste Material Off-Site Shipment Notification Letter for the dredged solids from Pond 4. This letter provided notification to the EPA that Atlantic Richfield expects to ship approximately 12 partially filled bins (approximately 180 cubic yards) of Waste Material each week while dredging operations are occurring. Approximately 120 cubic yards of dredged solids from Pond 4 were shipped off site in July, 2011.
- On July 30, 2011, the HDS Treatment Plant automatically shut down and entered Standby Mode due to a high level alarm in the Sludge Bin Sump which was caused by an extreme rain event. A short temporary interruption of treated water discharge to Leviathan Creek was experienced; however, there was no interruption in the collection and conveyance of flows from the CUD or DS. Following this event, the plant control system was programmed to allow the plant to continue normal operation during such an event.

Site-wide

- Work continued on updating the Leviathan Mine Project Database with data from monitoring performed by Atlantic Richfield and various agencies.
- On July 19, 2011, in accordance with Section V.I.3 of the Forest Service Leviathan Mine Road Use Permit, Atlantic Richfield submitted to the Forest Service an updated Certificate of Insurance verifying automobile insurance coverage through July 1, 2012.
- On July 25, 2011, in accordance with the requirements in ¶ 140 of the AOC, Atlantic Richfield provided an updated certificate of insurance for Atlantic Richfield's contractor, AMEC Geomatrix, Inc., verifying coverage through May 1, 2012.
- On July 26, 2011, a conference call was conducted with EPA to provide a general progress update.

ACTIVITIES FOR UPCOMING MONTH

Aspen Seep

- Continue operation of the Aspen Seep Bioreactor in recirculation mode and conduct routine operation, maintenance, and monitoring as outlined in the 2011 RAWP.
- Continue sludge removal and dewatering operations at the Aspen Seep Bioreactor.

CUD and DS

- Continue with the optimization, operation, and maintenance of the HDS Treatment System.
- Continue removal of accumulated sludge from Pond 4 as described in Amendment No. 1 (including Revision No. 1) to the 2011 RAWP.

Site-wide

- Continue to provide project progress updates to EPA via conference call. The next conference call is currently scheduled for August 16, 2011.

If you have any questions or comments, please feel free to contact me at (714) 228-6770 or via e-mail at Anthony.Brown@bp.com.

Sincerely,

ORIGINAL SIGNED BY DAVE McCARTHY FOR

Tony Brown
Project Manager

Attachments:

- Table 1 – Aspen Seep Bioreactor Monthly Influent and Effluent Sample Results
- Table 2 – Aspen Seep Bioreactor, Recent pH and ORP Field Measurements
- Table 3 – Aspen Seep Bioreactor, USGS Flow Data
- Table 4 – Aspen Seep Bioreactor, Infiltration/Overflow Pond Sediment Sample Results
- Table 5 – Aspen Seep Bioreactor, Sludge Sample Results
- Table 6 – HDS Treatment System Influent and Effluent Sample Results
- Table 7 – Pond 4 Solids Sample Results
- Table 8 – CUD, DS, and HDS Treatment System Flow Rates
- Table 9 – HDS Treatment System Operational Data Summary

Gary Riley and Kevin Mayer – USEPA Region 9

August 10, 2011

Page 4 of 4

cc: Chuck Curtis, Lahontan Regional Water Quality Control Board
Ronald Halsey, Atlantic Richfield Company
Nathan Block, Esq., BP America Inc.
Adam Cohen, Esq., Davis Graham & Stubbs LLP
Dave McCarthy, Copper Environmental Consulting
Marc Lombardi, AMEC-Geomatrix Consultants, Inc.
Sandy Riese, EnSci, Inc.
Randy Miller, Broadbent & Associates, Inc.

TABLE 1
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - SAMPLE RESULTS
JULY 2011 MONTHLY SUMMARY
Draft - Provisional Data

Parameter	Basis	Units	June 28 2011 146ASPEFF469 Effluent (mg/L)	June 28 2011 146ASPINF470 Influent (mg/L)	July 13 2011 147ASPEFF471 Effluent (mg/L)	July 13 2011 147ASPEFF473 Effluent (FM) (mg/L)	July 13 2011 147ASPINF472 Influent (mg/L)	July 13 2011 147SD14479 Seep SD-14 ¹ (mg/L)	July 14 2011 148ASPEFF474 Sludge Filtrate ² (mg/L)	July 19 2011 150ASPEFF477 Sludge Filtrate (mg/L)	Maximum Discharge Criteria (mg/L)	Average Discharge Criteria (mg/L)
pH	Field	s.u.	7.52	2.95	7.84	--	2.88	--	--	--	--	--
Selenium	Total	mg/L	0.0028	0.0032	0.0012 J	0.0012 J	0.0029 J	0.0023 J	0.0021	0.0016 J	NP	0.005
Aluminum	Dissolved	mg/L	0.082	49	0.10	0.18	50	0.31	0.11	0.093	4	2
Aluminum	Total	mg/L	--	--	--	--	--	--	0.54	--	--	--
Arsenic	Dissolved	mg/L	<0.00090	0.0027	<0.00090	<0.00090	0.0018	0.0024	<0.00090	<0.00090	0.34	0.15
Arsenic	Total	mg/L	--	--	--	--	--	--	<0.00090	--	--	--
Cadmium	Dissolved	mg/L	<0.00010	0.0023	<0.00010	<0.00010	0.0026	0.00018 J	<0.00010	<0.00010	0.009	0.004
Cadmium	Total	mg/L	--	--	--	--	--	--	<0.00010	--	--	--
Calcium	Dissolved	mg/L	401	387	348	358	348	242	370	306	--	--
Calcium	Total	mg/L	--	--	--	--	--	--	380	--	--	--
Chromium	Dissolved	mg/L	<0.00090	0.0054	<0.00090	<0.00090	0.0045	<0.00090	<0.00090	<0.00090	0.97	0.31
Chromium	Total	mg/L	--	--	--	--	--	--	<0.00090	--	--	--
Copper	Dissolved	mg/L	<0.00050	1.1	0.0017 J	0.0013 J	1.2	0.0036	0.0012 J	0.0019 J	0.026	0.016
Copper	Total	mg/L	--	--	--	--	--	--	0.0079	--	--	--
Hardness	Dissolved	mg/L	1,600	1,300	1,200	1,200	1,200	840	1,400	1,200	--	--
Iron	Dissolved	mg/L	0.0258 J	162	0.0232 J	<0.0150	135	78.1	0.0383 J	0.0913	2	1
Iron	Total	mg/L	--	--	--	--	--	--	2.07	--	--	--
Magnesium	Dissolved	mg/L	150	89	71	70	84	57	110	110	--	--
Magnesium	Total	mg/L	--	--	--	--	--	--	110	--	--	--
Lead	Dissolved	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.136	0.005
Lead	Total	mg/L	--	--	--	--	--	--	<0.00020	--	--	--
Nickel	Dissolved	mg/L	0.0029	0.51	0.0027	0.0023	0.52	0.052	0.014	0.017	0.84	0.094
Nickel	Total	mg/L	--	--	--	--	--	--	0.015	--	--	--
Zinc	Dissolved	mg/L	0.021	0.67	0.0058 J	<0.0040	0.73	0.019 J	<0.0040	0.0097 J	0.21	0.21
Zinc	Total	mg/L	--	--	--	--	--	--	0.011 J	--	--	--
Chloride	Total	mg/L	5.3	5.5	6.2	4.4	3.9	4.3	28	32	--	--
Acidity	Total	mg/L	<2.0	640	<2.0	<2.0	700	120	<2.0	<2.0	--	--
Alkalinity (Total)	Total	mg/L	324	<2.00	240	244	<2.00	<2.00	228	252	--	--
Alkalinity (Bicarbonate)	Total	mg/L	395	<2.40	293	298	<2.40	<2.4	278	307	--	--
Alkalinity (Carbonate)	Total	mg/L	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	--	--
Alkalinity (Hydroxide)	Total	mg/L	<0.700	<0.700	<0.700	<0.700	<0.700	<0.700	<0.700	<0.700	--	--
Sulfate	Total	mg/L	2,430	1,860	1,580	1,600	1,950	1,560	1,700	1,740	--	--
Total Dissolved Solids	Total	mg/L	3,290	2,920	2,950	2,860	3,000	2,320	2,930	1,880	--	--
Total Suspended Solids	Total	mg/L	2.0 J	19	10	8.0 J	25	230	13	7.0 J	--	--

Notes

- Seep SD-14 was observed on June 14, 2011 and has flowed intermittently since that time. When flowing, SD-14 emerges from the ground upgradient of the ASB aeration channel and continues flowing into the infiltration/overflow pond. SD-14 was sampled on July 13, 2011 to assess impact to ASB effluent water quality.
- Analysis for total metals was inadvertently requested.

Abbreviations

-- not measured or not available
C - Celsius

mg/L - milligrams per liter
mV - millivolts

ORP - oxidation/reduction potential
s.U. - standard unit

uS/cm - microSiemens per centimeter

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
JULY 2011 MONTHLY SUMMARY
Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
09/21/07	6.0	2.91	428.9	7.34	-268.4	7.13	-280.3	9.56	-285.8	7.13	-265.3	8.42	2.6
09/26/07	6.2	2.89	496.7	7.80	-192.1	7.36	-223.0	9.64	-195.4	7.34	-232.7	8.34	50.3
10/03/07	5.5	2.85	484.1	8.07	-127.7	8.50	-129.6	11.25	-136.5	7.64	-164.0	8.22	-5.2
10/10/07 ²	5.8	2.80	498.0	5.50	55.9	5.64	-70.5	10.00	-190.0	6.20	-171.6	7.78	-268.0
10/18/07 ²	5.9	2.83	482.4	5.00	26.8	5.68	-46.2	11.38	-112.0	6.23	-139.0	8.69	135.0
10/31/07 ²	9.0	2.88	402.7	4.26	319.3	6.85	-156.7	9.80	-170.0	6.95	-212.2	7.66	-94.3
11/08/07	6.0	2.88	418.0	7.55	-128.3	7.01	-116.7	8.23	-133.9	6.86	-125.8	7.51	-50.6
11/13/07	-	2.86	484.5	7.06	-2.3	6.84	-65.3	7.86	-42.6	6.79	-78.1	7.58	4.2
11/27/07	5.5	2.86	479.4	6.99	-38.5	6.97	-205.0	8.46	-183.9	6.91	-156.8	7.25	-1.7
12/12/07	-	3.01	482.2	7.20	-25.3	7.20	-115.2	7.64	-107.7	7.04	-129.7	6.90	-31.9
01/15/08	4.8	2.98	483.3	6.76	5.9	6.73	-85.5	7.89	-94.3	6.67	-137.4	6.71	-33.0
02/07/08 ³	-	-	-	-	-	-	-	-	-	-	-	5.77	20.2
02/12/08	7.0	2.76	487.4	6.67	44.6	-	-	7.39	-45.6	6.42	-88.0	6.70	-15.3
03/18/08	6.0	2.88	375.1	7.85	3.6	-	-	8.80	-189.2	7.23	-211.3	7.05	-95.3
04/10/08	7.5	2.90	397.7	6.74	-80.0	6.70	-163.4	7.50	-142.6	6.57	-165.3	7.39	-24.5
05/15/08	7.3	2.97	442.2	6.24	21.2	6.55	-265.4	6.55	-233.7	5.60	-183.7	7.29	-143.3
05/27/08	7.0	3.00	464.1	7.11	-16.3	6.85	-242.2	6.98	-191.1	6.80	-235.2	7.26	-19.5
06/09/08	7.0	3.10	455.4	7.40	-47.5	7.09	-251.2	7.70	-178.8	6.97	-219.7	7.19	-61.5
06/17/08	7.5	2.91	443.9	7.42	-22.7	6.90	-283.0	7.29	-131.0	6.88	-244.3	7.30	-82.5
07/10/08	7.3	2.98	470.9	7.32	-34.1	6.90	-238.4	7.05	-172.6	6.90	-215.0	7.85	-113.5
07/22/08	7.0	2.99	455.5	6.94	-272.5	6.97	-267.4	7.07	-190.6	7.01	-248.9	7.35	-89.1
08/04/08	6.8	2.89	450.7	7.60	-94.4	6.94	-266.0	6.19	-173.1	7.02	-251.2	-	-
08/05/08	-	3.05	445.3	-	-	-	-	-	-	-	-	7.29	-70.0
08/18/08	7.3	3.93	478.9	7.46	-166.7	7.08	-291.9	7.40	-202.6	7.07	-268.8	7.40	-52.4
08/22/08	-	2.89	473.7	7.97	-212.9	7.08	-301.8	7.74	-224.0	7.03	-275.9	7.67	-27.8
08/25/08	-	2.93	470.5	7.77	-287.7	7.18	-286.1	6.89	-205.6	7.12	-273.8	8.02	-108.4
08/26/08	-	2.91	468.8	7.95	-255.4	7.09	-305.4	7.75	-281.2	7.14	-273.1	7.77	-41.4
09/24/08	-	3.03	423.2	7.18	-107.8	6.99	-255.4	7.11	-205.7	6.89	-245.2	7.70	-87.7

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
JULY 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
09/30/08	-	3.02	434.3	7.77	-151.9	6.89	-267.5	-	-	6.92	-269.9	8.10	-94.0
10/13/08	5.8	3.34	433.1	7.17	-98.7	6.94	-218.3	6.80	-157.2	7.01	-206.1	8.32	-101.0
10/27/08	5.8	3.21	247.8	7.34	-162.5	6.96	-175.3	7.20	-152.3	6.98	-126.8	7.88	273.7
11/19/08	5.5	2.83	453.7	7.20	-104.5	6.77	-204.7	7.12	-82.2	6.71	-154.7	7.74	-35.1
12/03/08	5.3	3.56	453.0	7.23	-45.0	6.86	-141.3	7.06	-100.1	6.84	-135.6	7.65	-47.5
01/9/09 ⁴	-	3.15	458.3	-	-	-	-	-	-	-	-	6.95	-43.0
01/12/09	5.3	2.94	466.3	6.36	-82.8	6.38	-245.1	-	-	6.82	-259.0	7.11	-74.0
02/19/09 ⁴	5.3	2.78	480.1	6.60	-3.2	6.74	-145.1	7.26	-117.6	6.25	-162.3	6.68	-18.1
03/10/09	5.0	2.88	481.2	-	-	-	-	-	-	-	-	7.36	34.3
04/13/09	7.0	2.78	532.7	7.45	-9.9	7.04	-185.5	7.50	-65.8	6.98	-175.4	7.77	-32.2
05/06/09	5.5	2.89	444.4	-	-	6.47	-221.3	-	-	6.56	-206.5	7.62	-86.6
06/03/09	6.5	2.91	445.9	6.98	-145.1	6.62	-260.8	7.07	-192.8	6.65	-260.4	7.55	-15.4
06/16/09	6.5	2.98	388.0	7.09	-186.6	6.79	-319.3	7.16	-233.2	6.80	-298.2	7.70	-158.1
07/01/09	6.0	2.95	376.5	7.43	376.5	6.93	-366.2	7.42	-310.8	6.97	-350.5	7.89	-189.6
07/14/09	5.8	2.97	394.4	-	-	6.85	-338.8	-	-	6.98	-331.9	7.90	-146.2
07/29/09	6.0	2.78	404.5	7.24	-175.5	7.39	-427.7	8.10	-260.2	7.29	-403.7	8.05	-135.6
08/05/09	5.5	2.89	433.8	-	-	-	-	8.73	-120.7	-	-	8.17	-146.0
08/19/09	5.1	2.97	425.7	-	-	-	-	8.25	-37.6	-	-	7.54	47.0
09/17/09	5.3	2.38	490.6	7.27	-91.3	6.81	-180.3	7.75	-120.2	6.85	-182.3	6.95	-24.7
09/30/09	5.0	2.96	503.7	8.03	-18.9	8.99	-253.1	7.75	-217.2	7.03	-276.6	7.98	-17.0
10/15/09	5.5	2.93	496.6	6.57	-121.4	7.63	-301.0	8.33	-148.5	7.71	-314.5	7.85	-41.2
10/28/09	4.9	2.96	487.6	8.79	-69.9	7.28	-216.4	9.08	-143.0	7.24	-162.8	7.94	2.8
11/11/09	5.0	2.91	420.8	8.34	-15.3	7.49	-243.7	8.42	-163.9	7.51	-199.3	7.74	60.6
12/17/09 ⁵	5.0	2.90	416.5	4.65	100.2	5.00	15.3	-	-	5.12	-1.8	5.91	-26.4
01/14/10 ⁵	4.8	2.85	417.7	6.96	-89.0	6.82	-186.4	-	-	6.84	-206.1	6.45	-67.4
02/02/10 ⁵	4.7	2.94	484.0	7.58	-46.7	6.85	-129.6	-	-	6.67	-131.1	6.95	-48.1
03/09/10	4.8	2.74	474.7	8.27	-78.3	7.95	-204.2	8.74	-208.9	8.10	-220.8	7.75	-5.9

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
JULY 2011 MONTHLY SUMMARY
Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
04/26/10 ⁶	12.0	2.85	479.5	5.14	135.1	5.61	-19.0	5.04	109.2	5.60	-29.6	6.15	35.9
05/17/10	9.7	2.97	436.9	6.26	196.9	7.04	-283.9	7.79	-235.1	7.08	285.4	7.76	-73.8
05/24/10	9.4	3.16	418.0	7.43	-156.1	7.00	-259.9	7.27	-171.4	6.89	-282.6	7.11	-78.6
05/27/10	9.6	3.18	423.1	5.52	-225.1	7.58	-316.7	8.86	-318.2	6.74	-296.8	7.07	-98.7
06/01/10	10.5	3.11	444.0	8.47	-32.2	7.72	-292.6	9.00	-	6.74	-300.9	7.01	-31.5
06/14/10	10.0	2.99	427.7	7.40	-81.7	6.85	-272.5	8.22	-220.2	6.61	-181.6	7.48	-93.7
06/15/10	-	-	-	8.04	-221.6	6.89	-347.7	-	-	6.17	-355.9	-	-
06/16/10	-	2.99	427.7	7.40	-81.7	6.85	-272.6	8.22	-220.2	6.61	-181.6	7.48	-93.7
06/18/10	9.1	-	-	7.72	-211.7	6.79	-335.6	-	-	6.69	-336.7	-	-
06/21/10	9.0	3.21	409.4	7.99	-242.7	6.96	-364.1	7.86	-303.4	6.78	-349.5	7.70	-142.3
06/30/10	10.0	2.59	451.5	8.73	-216.2	8.73	-216.2	-	-	6.78	-337.9	7.96	-164.5
07/01/10	-	2.82	422.4	-	-	-	-	-	-	-	-	7.94	-241.9
07/13/10	10.0	2.62	479.5	7.52	-112.1	6.90	-279.5	8.02	-255.2	6.90	-294.0	7.76	-65.8
07/21/10	10.0	2.93	475.1	7.90	-70.5	7.15	-301.5	7.80	-212.4	7.27	-315.3	8.09	-95.7
07/29/10	10.0	2.90	465.3	7.73	-168.6	7.25	-318.1	7.08	-192.5	7.15	-318.5	7.06	-45.6
08/03/10	9.0	2.94	458.6	7.69	-193.3	7.16	-311.4	7.16	-311.4	7.17	-324.5	7.39	-66.3
08/12/10	9.0	2.85	476.3	7.98	-255.3	7.07	-299.3	7.50	-235.2	7.06	-307.0	7.55	-26.2
08/17/10	9.5	2.64	470.9	8.09	-47.2	7.54	-306.0	8.47	-206.8	7.37	-320.0	7.86	-74.0
08/24/10	9.2	3.04	250.0	7.81	-129.9	7.21	-151.9	7.20	-202.9	7.09	-147.9	7.81	2.9
09/02/10	9.2	2.84	503.9	7.70	-208.4	-	-	8.15	-227.0	7.32	-267.2	7.97	-20.2
09/16/10	8.0	3.21	455.8	8.40	-219.9	7.29	-209.3	8.66	-197.0	7.32	-279.7	7.76	-76.4
09/22/10 ⁷	8.0	3.06	476.5	8.50	-151.0	7.25	-276.9	8.30	-257.8	7.39	-279.9	7.93	-112.0
09/30/10 ⁷	7.6	3.16	503.3	8.49	-263.9	7.32	-265.4	8.53	-221.9	7.26	-267.8	8.61	94.1
10/06/10 ⁸	9.0	3.28	479.3	7.83	-287.5	7.39	-305.8	8.25	-246.7	7.62	-305.1	8.17	-235.5
10/11/10	8.0	3.20	479.3	7.52	-190.4	7.00	-284.4	8.28	-227.4	7.15	-290.4	7.85	26.4
10/19/10	8.0	2.89	447.3	8.75	-157.3	7.43	-310.4	8.52	-203.0	7.22	-310.6	8.15	130.4
10/28/10	8.0	2.95	579.0	7.23	-282.8	6.98	-368.9	8.50	-384.7	7.12	-402.6	7.73	-30.7
11/02/10	8.0	2.69	366.7	7.89	-285.1	7.14	-385.2	8.46	-307.5	7.00	-385.7	7.62	-31.5

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
JULY 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
11/15/10	8.5	2.94	361.7	7.79	-273.2	7.08	-381.9	8.04	-269.3	6.89	-384.5	7.64	-2.2
12/07/10 ⁹	8.5	3.01	387.2	6.97	-298.4	6.82	-375.1	-	-	6.57	-353.5	6.41	-112.4
01/07/11 ⁹	8.5	2.92	434.1	6.50	-134.0	5.98	-200.1	-	-	6.08	-216.2	6.15	-4.9
02/01/11 ⁹	8.0	3.07	423.8	6.75	-332.2	6.86	-279.7	-	-	6.59	-297.0	6.62	-9.3
03/11/11	8.5	3.05	384.7	7.66	-239.2	7.11	-344.7	-	-	6.85	-370.1	7.05	-73.4
4/19/2011 ¹⁰	30	2.61	454.9	-	-	-	--	-	-	-	-	4.72	172.9
04/26/11	29	2.91	362.1	7.45	-199.2	6.58	-346.5	7.42	-232.8	6.41	-369.7	7.22	-144.6
05/03/11	27	2.90	355.0	7.70	-264.8	6.56	-361.5	7.81	-264.9	6.54	-402.2	7.60	-137.5
05/11/11	24	2.84	344.2	6.81	-198.2	6.31	-229.0	6.99	-200.7	6.23	-204.0	6.99	-139.2
05/20/11	17	3.03	372.4	8.10	-282.2	7.09	-361.8	7.89	-219.6	6.39	-367.9	7.36	-44.1
06/01/11	18	2.92	378.6	8.18	-175.7	7.11	-360.0	8.14	-272.8	6.55	-337.9	7.32	-50.3
6/15/11 ¹¹	16	3.18	407.7	-	-	-	-	8.60	-231.3	-	-	8.15	-3.9
6/21/11 ¹¹	15	3.09	415.6	-	-	-	-	8.15	-184.2	-	-	-	-
6/28/11 ¹²	15	2.95	204.5	7.66	-503.6	6.94	-581.5	8.44	-458.1	6.93	-581.5	7.52	-85.1
07/06/11	14	2.95	237.1	8.37	-50.3	6.98	-525.6	8.10	-382.9	6.75	-550.2	7.81	-249.1
07/13/11	14	2.88	352.2	8.46	-312.3	6.83	-412.1	5.43	-48.5	6.67	-420.1	7.84	-37.4
07/19/11	13	3.11	304.3	7.27	-462.3	6.93	-434.0	8.40	-407.5	6.85	-436.0	8.0	-86.6
07/28/11	-	2.98	320.8	8.32	-294.3	7.10	-393.6	8.55	-165.4	6.99	-376.0	7.90	-70.4

Notes

1. Aspen Seep Bioreactor Influent Flow measurements are field measurements completed with a graduated bucket and stop watch.
2. Biocell 1 was flushed on 10/08/07, 10/09/07, and 10/18/07; Biocell 1 was bypassed during this flushing period. Low pH readings in Manhole 1 from 10/10/07 through 10/31/07 were caused by drainage into pretreatment pond from failed seal in weir box cap.
3. Measurements are believed to be erroneous due to calibration error. Parameters were re-evaluated on 02/12/08.
4. Low pH measurements due to a power outage and associated chemical pump shutdown.
5. Low pH measurements caused by stripped gears on NaOH pump head that prevented dosing to Manhole 6.

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
JULY 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)

6. Low pH measurements due to increase in system flow rates; chemical dosing rates lagged behind these system flow rate increases and were unable to prevent decrease in system pH.
7. Effluent readings were collected from the centrifuge discharge point on these dates due to sludge dewatering. Water was not being discharged from Pond 4.
8. Effluent readings were collected Pond 4 effluent on this date. Water was not being discharged from Pond 4.
9. Low pH measurements due to power outage and associated chemical pump failure during the inverter failure on November 29, 2010.
10. Low pH measurement due to increase in system flow rates.
11. Field measurements at intermediate bioreactor manholes were not collected when recirculation operations were interrupted due to sludge dewatering operations.
12. ORP measurements are inaccurate due to probe calibration issues.

Abbreviations

- - not measured, not recorded, or bioreactor operation did not have flow at given location on the specified date.
 gpm - gallons per minute ORP - oxidation/reduction potential
 mV - millivolts s.U. - standard unit

TABLE 3
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - FLOW RATE¹
JULY 2011 MONTHLY SUMMARY
Draft - Provisional Data

Date	Flow Rate (gpm)	Date	Flow Rate (gpm)	Date	Flow Rate (gpm)
05/01/11	24.55	06/01/11	18.63	07/01/11	16.25
05/02/11	24.15	06/02/11	18.18	07/02/11	16.07
05/03/11	24.28	06/03/11	18.09	07/03/11	15.93
05/04/11	23.83	06/04/11	18.85	07/04/11	15.93
05/05/11	23.38	06/05/11	18.58	07/05/11	16.07
05/06/11	23.20	06/06/11	18.22	07/06/11	N/A
05/07/11	23.16	06/07/11	17.95	07/07/11	N/A
05/08/11	22.98	06/08/11	17.55	07/08/11	N/A
05/09/11	23.11	06/09/11	17.19	07/09/11	N/A
05/10/11	21.50	06/10/11	17.10	07/10/11	N/A
05/11/11	20.83	06/11/11	17.19	07/11/11	N/A
05/12/11	20.33	06/12/11	17.06	07/12/11	N/A
05/13/11	20.06	06/13/11	17.01	07/13/11	N/A
05/14/11	20.47	06/14/11	16.83	07/14/11	N/A
05/15/11	20.92	06/15/11	16.83	07/15/11	N/A
05/16/11	20.20	06/16/11	17.06	07/16/11	N/A
05/17/11	20.06	06/17/11	16.92	07/17/11	N/A
05/18/11	20.56	06/18/11	16.97	07/18/11	N/A
05/19/11	19.79	06/19/11	17.06	07/19/11	N/A
05/20/11	18.99	06/20/11	16.79	07/20/11	N/A
05/21/11	19.39	06/21/11	16.65	07/21/11	N/A
05/22/11	18.85	06/22/11	16.61	07/22/11	N/A
05/23/11	18.72	06/23/11	16.61	07/23/11	N/A
05/24/11	18.54	06/24/11	16.61	07/24/11	N/A
05/25/11	19.12	06/25/11	16.61	07/25/11	N/A
05/26/11	18.49	06/26/11	16.56	07/26/11	N/A
05/27/11	18.58	06/27/11	16.52	07/27/11	N/A
05/28/11	19.08	06/28/11	16.88	07/28/11	N/A
05/29/11	19.48	06/29/11	18.49	07/29/11	N/A
05/30/11	18.27	06/30/11	16.38	07/30/11	N/A
05/31/11	18.22	--	--	07/31/11	N/A
Average	20.74	Average	17.27	Average	16.05

Notes

1. Aspen Seep flow data is provided by the USGS.

Abbreviations

gpm - gallons per minute

USGS - United States Geological Survey

TABLE 4
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - INFILTRATION/OVERFLOW POND SEDIMENT SAMPLE RESULTS
JULY 2011 MONTHLY SUMMARY

Draft - Provisional Data

Parameter	July 14 2011 149IOPEFF476 Infiltration/Overflow Pond Sediment					July 14 2011 149IOPINF475 Infiltration/Overflow Pond Sediment					TTLC Regulatory Limits for Total Metals (mg/kg)	STLC Regulatory Limits (mg/L)	TCLP Regulatory Limits (mg/L)
	DI-WET (mg/L)	SPLP (mg/L)	STLC (mg/L)	TCLP (mg/L)	Total (mg/kg, unless noted)	DI-WET (mg/L)	SPLP (mg/L)	STLC (mg/L)	TCLP (mg/L)	Total (mg/kg, unless noted)			
	Aluminum	1.8	4.4	95	1.3	6100	0.053	<0.4	450	3.1			
Antimony	0.0056	<0.07	<0.14	<0.07	<1.8	0.00084J	<0.07	<0.14	<0.07	<1.8	500	15	NA
Arsenic	0.29	<0.07	<0.13	0.15J	81	0.0059	<0.07	<0.13	<0.07	31	500	5.0	5.0
Barium	0.1	0.1J	15	1.1	320	0.082	<0.06	4.4	0.43	110	10,000	100	100
Beryllium	<0.0001	<0.01	<0.018	<0.01	0.46J	<0.0001	<0.01	0.11	<0.01	1.3	75	0.75	NA
Cadmium	<0.0001	<0.02	<0.04	<0.02	<0.4	<0.0001	<0.02	<0.04	<0.02	0.69J	100	1.0	1.0
Chromium	0.00099J	<0.02	1.1	0.024J	22	<0.0009	<0.02	0.4	<0.02	9.2	500 ^a	5 (560) ^b	5.0
Cobalt	0.0013	<0.02	0.15J	0.027J	12	0.00058J	<0.02	<0.04	<0.02	98	8,000	80	NA
Copper	0.0033	<0.03	<0.06	<0.03	50	<0.0005	<0.03	<0.06	<0.03	120	2,500	25	NA
Iron	1.5	2.7	1200	220	28,000	<0.015	<0.15	960	270	30,000	NA	NA	NA
Lead	0.0017	<0.04	<0.08	<0.04	25	<0.0002	<0.04	<0.08	<0.04	8.2	1,000	5.0	5.0
Mercury	0.00016J	<0.001	<0.001	<0.001	2.8	<0.0001	<0.001	<0.001	<0.001	1.3	20	0.2	0.2
Molybdenum	0.032	<0.02	<0.04	<0.02	<0.4	0.0024	<0.02	<0.04	<0.02	<0.4	3,500	350	NA
Nickel	0.0082	<0.02	0.74	<0.02	20	0.0032	<0.02	1.7	<0.02	150	2,000	20	NA
Selenium	0.00071J	<0.08	<0.16	0.11	5.2	<0.0005	0.18	<0.16	<0.08	4.1	100	1.0	1.0
Silver	<0.0001	<0.06	<0.12	<0.06	<1.6	0.00022J	<0.06	<0.12	<0.06	<1.6	500	5.0	5.0
Thallium	0.00034J	<0.07	<0.14	<0.07	5.4J	<0.0002	<0.07	<0.14	<0.07	4.2J	700	7.0	NA
Vanadium	0.015	<0.03	2.9	<0.03	41	<0.0008	<0.03	1	<0.03	17	2,400	24	NA
Zinc	<0.004	<0.06	0.19J	0.6	33	<0.004	<0.06	<0.12	0.06J	180	5,000	250	NA
pH (s.u.)	-	-	-	-	8.7	-	-	-	-	8.3	Corrosivity criteria for pH = ≤ 2.0 or ≥ 12.5 ^c		
Acid Generation Potential Sulfide Acid Leach (tons/1,000 tons)	-	-	-	-	21	-	-	-	-	38	-	-	-
Acid Generation Potential Total Sulfur (tons/1,000 tons)	-	-	-	-	88	-	-	-	-	260	-	-	-
Neutralization Potential (tons/1,000 tons)	-	-	-	-	18	-	-	-	-	56	-	-	-
pH - Saturated Paste (s.u.)	-	-	-	-	7.36	-	-	-	-	7.33	-	-	-
Sulfur Residual - LECO Furnace (%)	-	-	-	-	1.3	-	-	-	-	2.4	-	-	-
Sulfur Sulfate - LECO Furnace (%)	-	-	-	-	0.83	-	-	-	-	4.6	-	-	-
Sulfur Sulfide - LECO Furnace (%)	-	-	-	-	0.66	-	-	-	-	1.2	-	-	-
Sulfur, Total - LECO Furnace (%)	-	-	-	-	2.8	-	-	-	-	8.2	-	-	-
Total Organic Carbon	-	-	-	-	7,800	-	-	-	-	7,600	-	-	-
Percent Moisture (%)	-	-	-	-	38	-	-	-	-	60	-	-	-
Percent Solids (%)	-	-	-	-	62	-	-	-	-	40	-	-	-

Notes

^a Concentration limit for total chromium and/or chromium (III) is 2,500 mg/L and limit for chromium (VI) is 500 mg/L.

^b The federal hazardous waste level for soluble chromium is 5mg/L. California has a Waste Extraction Test (DI-WET) soluble level for chromium (III) (560 mg/L) and chromium (VI) (5 mg/L). To use the 560 mg/L regulatory threshold, it must be demonstrated first that the waste is not a Resource Conservation Recovery Act (RCRA) waste.

^c Title 22 California Code of Regulations, Section 66261.24 (a)(2): Samples were tested for waste extraction test, solubility, and total concentrations. If the results of the STLC or TTLC equal or exceed their respective regulatory thresholds, the waste is a hazardous waste.

Abbreviations

"<" - Constituent not detected at or above the reporting limit or the method detection limit listed

J - The associated value is an estimated quantity

mg/L - milligrams per liter

mg/kg - milligrams per kilograms

NA - Not applicable

SPLP - Synthetic precipitation leaching procedure

TTLC - California Total Threshold Limit Concentration; based on wet weight concentration

STLC - Soluble threshold limit concentration

TCLP - Toxicity Characteristic Leaching Procedure

TABLE 5
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - SLUDGE SAMPLE RESULTS
JULY 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Parameter	July 19 2011 151ASPSLG478 Sludge Waste Characterization					July 19 2011 151ASPSLG478 A Sludge Waste Characterization	July 19 2011 151ASPSLG478 B Sludge Waste Characterization	July 19 2011 151ASPSLG478 C Sludge Waste Characterization	TTLC Regulatory Limits for Total Metals (mg/kg)	STLC Regulatory Limits (mg/L)	TCLP Regulatory Limits (mg/L)
	DI-WET (mg/L)	SPLP (mg/L)	STLC (mg/L)	TCLP (mg/L)	Total (mg/kg, unless noted)						
Aluminum	0.10	<0.40	1200	0.66 J	12000	-	-	-	NA	NA	NA
Antimony	<0.00030	<0.070	<0.14	<0.070	<1.7	-	-	-	500	15	NA
Arsenic	<0.00090	<0.070	<0.13	<0.070	2.0 J	-	-	2.0	500	5.0	5.0
Barium	0.012	<0.060	0.47	0.15 J	9.1	-	-	-	10,000	100	100
Beryllium	<0.00010	<0.010	0.21	<0.010	2.7	-	-	-	75	0.75	NA
Cadmium	<0.00010	<0.020	<0.040	<0.020	0.71 J	-	-	-	100	1.0	1.0
Chromium	<0.00090	<0.020	0.11	<0.020	1.4 J	-	-	-	500 ^a	5 (560) ^b	5.0
Cobalt	0.00029 J	<0.020	1.2	0.27	63	-	-	-	8,000	80	NA
Copper	0.0025	<0.030	<0.060	<0.030	290	-	-	-	2,500	25	NA
Iron	0.24	<0.15	1,900	420	30,000	-	-	-	NA	NA	NA
Lead	<0.00020	<0.040	<0.080	<0.040	1.1 J	-	-	-	1,000	5.0	5.0
Mercury	<0.00010	<0.0010	<0.0010	<0.0010	<0.012	-	-	-	20	0.2	0.2
Molybdenum	0.0024	<0.020	<0.040	<0.020	<0.39	-	-	-	3,500	350	NA
Nickel	0.0012 J	<0.020	3.1	0.91	95	-	-	-	2,000	20	NA
Selenium	<0.00050	<0.080	<0.16	<0.080	<2.0	-	-	-	100	1.0	1.0
Silver	0.00040 J	<0.060	<0.12	<0.060	<1.6	-	-	-	500	5.0	5.0
Thallium	<0.00020	<0.070	<0.14	<0.070	<1.6	-	-	-	700	7.0	NA
Vanadium	<0.00080	<0.030	<0.060	<0.030	<0.59	-	-	-	2,400	24	NA
Zinc	<0.0040	<0.060	4.3	0.35 J	180	-	-	-	5,000	250	NA
pH (s.u.)	-	-	-	-	7.9	-	-	-	Corrosivity criteria for pH = ≤ 2.0 or ≥ 12.5 ^c		
Percent Moisture (%)	-	-	-	-	-	83	81	84	-	-	-
Percent Solids (%)	-	-	-	-	-	14	19	16	-	-	-

Notes

^a Concentration limit for total chromium and/or chromium (III) is 2,500 mg/L and limit for chromium (VI) is 500 mg/L.

^b The federal hazardous waste level for soluble chromium is 5mg/L. California has a Waste Extraction Test (DI-WET) soluble level for chromium (III) (560 mg/L) and chromium (VI) (5 mg/L). To use the 560 mg/L regulatory threshold, it must be demonstrated first that the waste is not a Resource Conservation Recovery Act (RCRA) waste.

^c Title 22 California Code of Regulations, Section 66261.24 (a)(2): Samples were tested for waste extraction test, solubility, and total concentrations. If the results of the STLC or TTLC equal or exceed their respective regulatory thresholds, the waste is a hazardous waste.

Abbreviations

"<" - Constituent not detected at

J - The associated value is an estimated quantity

mg/L - milligrams per liter

TTLC – California Total Threshold Limit Concentration; based on wet weight concentration

TCLP - Toxicity Characteristic Leaching Procedure

SPLP - Synthetic precipitation leaching procedure

TABLE 6
HIGH DENSITY SLUDGE TREATMENT PLANT - SAMPLE RESULTS
JULY 2011 MONTHLY SUMMARY

Draft - Provisional Data

Chemical	Basis	July 6 2011 161CUD422 CUD (mg/L)	July 6 2011 161DS421 DS (mg/L)	July 6 2011 161HDSEFF419 Effluent (mg/L)	July 6 2011 161HDSINF420 Influent (mg/L)	Maximum Discharge (mg/L)	Average Discharge (mg/L)
pH	Field	3.58	4.01	8.55	2.99	--	--
Aluminum	Dissolved	71	19	0.74	59	4	2
Arsenic	Dissolved	0.74	0.019	<0.00090	0.23	0.34	0.15
Calcium	Dissolved	314	317	776	318	--	--
Cadmium	Dissolved	0.0018 J	0.0022	<0.00010	0.0014	0.009	0.004
Chloride	Total	6.5	3.7	2.9	5.8	--	--
Chromium	Dissolved	0.026	0.0022	<0.00090	0.019	0.97	0.31
Copper	Dissolved	0.022	0.15	0.010	0.034	0.026	0.016
Iron	Dissolved	559	16.2	0.329 J	329	2	1
Hardness	Dissolved	1,100	1,200	2,300	1,200	--	--
Magnesium	Dissolved	85	93	83	89	--	--
Nickel	Dissolved	2.0	0.47	0.025	1.1	0.84	0.094
Lead	Dissolved	<0.0010	<0.00020	<0.00020	<0.00020	0.136	0.005
Selenium	Total	0.0039 J	0.0030	0.0018 J	0.0031	NP	0.005
Acidity	Total	1300	230	<2.0	1000	--	--
Alkalinity (Bicarbonate)	Total	<2.40	<2.40	26.8	<2.40	--	--
Alkalinity (Carbonate)	Total	<1.20	<1.20	<1.20	<1.20	--	--
Alkalinity (Hydroxide)	Total	<0.700	<0.700	<0.700	<0.700	--	--
Alkalinity (Total)	Total	<2.00	<2.00	22.0	<2.00	--	--
Sulfate	Total	2,350	1,290	2,150	2,160	--	--
Total Dissolved Solids	Total	3,950	2,110	3,350	3,470	--	--
Total Suspended Solids	Total	64	29	16	130	--	--
Zinc	Dissolved	0.42	0.25	0.013 J	0.25	0.21	0.21

Notes

1. pH value was collected in field and is the average of 3 grab samples comprising the HDS Effluent sample or one grab sample for the HDS Influent sample. pH is reported in standard units.
2. Discharge criteria pH based on 24-hour (single day) average discharge.
3. Values in bold are concentrations greater than the maximum or average discharge criteria.

Abbreviations

- < - Analyte not detected at or above the or method detection limit
 -- not measured or not available

TABLE 7
POND 4 SOLIDS SAMPLE RESULTS
JULY MONTHLY SUMMARY REPORT
 Draft - Provisional Data

Parameter	July 28 2011 162PND4SLUDGE423 Pond 4 Sludge					TTLC Regulatory Limits for Total Metals (mg/kg)	STLC Regulatory Limits (mg/L)	TCLP Regulatory Limits (mg/L)
	DI-WET (mg/L)	SPLP (mg/L)	STLC (mg/L)	TCLP (mg/L)	Total (mg/kg)			
Aluminum	0.15	0.44 J	240	<0.40	2800	NA	NA	NA
Antimony	0.00031 J	<0.070	<0.14	<0.070	<1.7	500	15	NA
Arsenic	<0.00090	<0.070	1.2	<0.070	64	500	5.0	5.0
Barium	0.0014	<0.060	0.15 J	<0.060	3.5	10,000	100	100
Beryllium	<0.00010	<0.010	0.041 J	<0.010	0.45 J	75	0.75	NA
Cadmium	<0.00010	<0.020	<0.040	<0.020	<0.39	100	1.0	1.0
Chromium	<0.00090	<0.020	0.18	<0.020	2.5	500 ^a	5 (560) ^b	5.0
Cobalt	0.00058 J	<0.020	4.4	0.11 J	42	8,000	80	NA
Copper	0.0013 J	<0.030	0.56	<0.030	9.9	2,500	25	NA
Iron	0.10	<0.15	1600	<0.15	28000	NA	NA	NA
Lead	<0.00020	<0.040	<0.080	<0.040	<0.99	1,000	5.0	5.0
Mercury	<0.00010	<0.0010	<0.0010	<0.0010	0.019 J	20	0.2	0.2
Molybdenum	0.0016 J	0.021 J	<0.040	<0.020	<0.39	3,500	350	NA
Nickel	0.0025	<0.020	9.5	0.89	90	2,000	20	NA
Selenium	<0.00050	<0.080	<0.16	<0.080	<2.0	100	1.0	1.0
Silver	<0.00010	<0.060	<0.12	<0.060	<1.6	500	5.0	5.0
Thallium	0.0073	<0.070	<0.14	<0.070	<1.6	700	7.0	NA
Vanadium	<0.00080	<0.030	0.31	<0.030	7.2	2,400	24	NA
Zinc	<0.0040	<0.060	2.6	0.082 J	29	5,000	250	NA
pH	--	--	--	--	6.3	Corrosivity criteria for pH = ≤ 2.0 or ≥ 12.5 ^c		
% Moisture	--	--	--	--	86	-	-	-
% Solids	--	--	--	--	14	-	-	-

Notes

^a Concentration limit for total chromium and/or chromium (III) is 2,500 mg/L and limit for chromium (VI) is 500 mg/L.

^b The federal hazardous waste level for soluble chromium is 5mg/L. California has a Waste Extraction Test (DI-WET) soluble level for chromium (III) (560 mg/L) and chromium (VI) (5 mg/L). To use the 560 mg/L regulatory threshold, it must be demonstrated first that the waste is not a Resource Conservation Recovery Act (RCRA) waste.

^c Title 22 California Code of Regulations, Section 66261.24 (a)(2): Samples were tested for waste extraction test, solubility, and total concentrations. If the results of the STLC or TTLC equal or exceed their respective regulatory thresholds, the waste is a hazardous waste.

Abbreviations

"<" - Constituent not detected at or above the reporting limit or the method detection limit listed

J - The associated value is an estimated quantity

mg/L - milligrams per liter

mg/kg - milligrams per kilograms

NA - Not applicable

SPLP - Synthetic precipitation leaching procedure

STLC - Soluble threshold limit concentration

TCLP - Toxicity Characteristic Leaching Procedure

TTLC - California Total Threshold Limit Concentration; based on wet weight concentration

TABLE 8
CHANNEL UNDERDRAIN, DELTA SEEP, AND HDS TREATMENT PLANT - FLOW
RATES
JULY 2011 MONTHLY SUMMARY
Draft - Provisional Data

Date	Delta Seep Recorded Flow ¹		Channel Underdrain Recorded Flow ¹		Treated Water Discharged from the HDS Treatment Plant Recorded Flow ^{1,2}	
	(gpm)	(gallons)	(gpm)	(gallons)	(gpm)	(gallons)
7/1/2011	16.17	23,279	45.54	65,578	62.00	89,280
7/2/2011	15.99	23,021	45.61	65,674	62.00	89,279
7/3/2011	15.83	22,790	45.67	65,760	62.00	89,280
7/4/2011	15.68	22,584	45.69	65,801	62.00	89,283
7/5/2011	15.62	22,487	45.78	65,923	62.00	89,156
7/6/2011	15.68	22,575	45.62	65,688	58.00	86,727
7/7/2011	15.56	22,407	45.14	64,996	58.00	83,474
7/8/2011	15.48	22,289	45.15	65,021	58.00	83,520
7/9/2011	15.44	22,227	45.29	65,223	58.00	83,518
7/10/2011	15.33	22,074	45.34	65,296	58.00	83,517
7/11/2011	15.19	21,876	45.46	65,457	58.00	83,390
7/12/2011	15.16	21,835	45.40	65,373	56.00	81,689
7/13/2011	15.16	21,824	45.42	65,406	56.00	80,641
7/14/2011	15.13	21,784	45.44	65,436	58.00	88,204
7/15/2011	15.14	21,805	45.52	65,545	75.00	62,942
7/16/2011	14.89	21,448	45.43	65,424	0.00	0 ³
7/17/2011	14.74	21,227	45.43	65,420	0.00	0 ³
7/18/2011	14.60	21,021	45.44	65,427	0.00	0 ³
7/19/2011	14.50	20,881	45.42	65,405	59.00	31,913
7/20/2011	14.46	20,816	45.41	65,397	57.00	31,497
7/21/2011	14.43	20,781	45.44	65,434	59.00	55,465
7/22/2011	14.42	20,761	45.45	65,441	57.00	82,811
7/23/2011	14.29	20,574	45.42	65,403	60.00	84,418
7/24/2011	14.13	20,340	45.39	65,357	57.00	83,382
7/25/2011	14.09	20,286	45.41	65,395	57.00	81,542
7/26/2011	14.15	20,383	45.41	65,386	56.00	80,609
7/27/2011	14.09	20,285	45.37	65,336	58.00	82,407
7/28/2011	13.97	20,111	45.33	65,281	58.00	82,478
7/29/2011	15.08	21,709	45.32	65,266	56.00	80,637
7/30/2011	15.66	22,552	45.35	65,303	58.00	61,039
7/31/2011	14.44	20,800	45.28	65,202	85.00	63,773
Average Flow Rate or Total Discharged	14.98	668,831	45.43	2,028,055	54.19	2,165,870

Notes:

1. Channel Underdrain, Delta Seep, and Treated Water Discharge from the HDS Treatment Plant flow rates are calculated from flow totalizer volume measurements.
2. The operational flow rate is reported. Water discharge does not always occur 24 hours per day.
3. Water from the HDS Treatment Plant was discharged to Pond 4 during this time to accomplish pH adjustment of Pond 4 prior to dredging of solids from the pond.

Abbreviations:

gpm - gallons per minute HDS - High Density Sludge

TABLE 9
HIGH DENSITY SLUDGE TREATMENT SYSTEM - OPERATIONAL DATA SUMMARY
JULY 2011 MONTHLY SUMMARY

Draft - Provisional Data

Reporting Period	Treated Water Discharged (gallons)	Lime Consumed (kilograms)	Diesel Fuel Consumed (gallons)	Flocculant Consumed (kilograms)	Sludge Wasted (gallons)	Freshwater Consumed (gallons)
May 1 - May 31, 2011	2,146,472	6,633	2,570	59	4,200	4,700
June 1 - June 30, 2011	2,918,988	9,873	2,291	63	11,000	6,200
July 1 - July 31, 2011	2,165,870	7,455	2,129	55	15,800	9,100 ¹

Notes

Atlantic Richfield Company

Anthony R. Brown
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September 12, 2011

Mr. Gary Riley
US EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105

Mr. Kevin Mayer
US EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105

RE: Leviathan Monthly Report for August 2011

Dear Mr. Riley and Mr. Mayer:

The following text describes activities conducted during the month of August 2011 at the Leviathan Mine Site and activities anticipated to occur during the upcoming month. These activities are organized by work area [Aspen Seep, Channel Underdrain (CUD) and Delta Seep (DS)], and site-wide tasks. This progress report is being submitted in accordance with Paragraph 62 of the Administrative Settlement Agreement and Order on Consent for Removal Action (AOC) (effective January 21, 2009).

ACTIVITIES FOR AUGUST

Aspen Seep

- Operated the Aspen Seep Bioreactor (ASB) in recirculation mode during the month of August. Routine O&M, influent sampling, and effluent sampling occurred on July 28, August 11, and August 31, 2011. The currently available influent and effluent water quality data for the July 28 and August 11, 2011 sampling events are presented in Table 1. Table 1 also presents the laboratory analytical results of recent filtrate samples collected from the filtrate of the sludge dewatering operations. Recent pH and ORP field data are summarized in Table 2. Influent flow rate data from the USGS is presented in Table 3. Results from the enhanced sampling event performed on August 11, 2011 are included in Table 4.
- Sludge dewatering activities continued during the month. The belt filter press was used to dewater a total of approximately 185,000 gallons of sludge. Approximately 180 cubic yards of sludge cake were produced. Demobilization of the sludge dewatering equipment began in late August.
- On August 26, 2011, Atlantic Richfield submitted to EPA a Waste Material Off-Site Shipment Notification Letter for Aspen Seep Bioreactor treatment system generated solids. Approximately 180 cubic yards of solids are scheduled to be shipped from the site during September 2011.

A BP affiliated company



- Sediment samples were collected from the infiltration/overflow pond area adjacent to Aspen Creek for chemical analysis.

CUD and DS

- Operation of the HDS Treatment Plant and the associated capture of the CUD and DS continued during the month of August. Samples of the HDS Treatment Plant influent and effluent were collected for laboratory analysis on August 3, 2011. The analytical results associated with the August 3, 2011 sampling event are presented in Table 5. Table 6 presents analytical results for a sample of the Pond 4 solids collected on August 11, 2011. Flow rates recorded for the Delta Seep, Channel Underdrain, and treated water discharge from the HDS Treatment Plant are included in Table 7. A summary of the HDS Plant operational data for August 2011 is presented in Table 8.
- On August 3, 2011, the HDS Treatment Plant automatically shut down and entered Standby Mode due to a Reactor Tank low pH alarm which was caused by lime bridging above the lime feeder hopper. The bridging was caused by a fail-to-start fault in the lime storage hopper bin activator. The plant control system programming was modified subsequent to this event to minimize the potential for reoccurrence. A short temporary interruption of treated water discharge to Leviathan Creek was experienced; however, there was no interruption in the collection and conveyance of flows from the CUD or DS.
- On August 26, 2011, Atlantic Richfield submitted to EPA a Waste Material Off-Site Shipment Notification Letter for HDS Treatment System solids. Approximately 18 cubic yards of HDS Treatment System solids were shipped off site on September 1, 2011.
- Pond 4 sludge removal and dewatering operations continued during the month of August as specified within Amendment No.1 (including Revision No.1) to the 2011 RAWP. Approximately 770 cubic yards of dewatered sludge were shipped from the site through the end of August.

Site-wide

- Work continued on updating the Leviathan Mine Project Database with data from monitoring performed by Atlantic Richfield and various agencies.
- On August 5, 2011, Atlantic Richfield notified EPA via email of a safety-related stand-down, during which Atlantic Richfield contractors would not be working at the site while State of California contractors implemented access road improvements and maintenance. The stand-down occurred August 8 to 10, 2011, during which Atlantic Richfield personnel and contractors did not access the site. The HDS Treatment Plant and Aspen Seep Bioreactor continued to operate normally during this period.
- Atlantic Richfield performed maintenance on the Nevada access road, including placement of approximately 300 tons of baserock to the road surface, grading, and compaction.
- On August 16, 2011, a conference call was conducted with EPA to provide a general progress update.

ACTIVITIES FOR UPCOMING MONTH

Aspen Seep

- Continue operation of the Aspen Seep Bioreactor in recirculation mode and conduct routine operation, maintenance, and monitoring as outlined in the 2011 RAWP.

- Complete demobilization of the sludge removal and dewatering operations at the Aspen Seep Bioreactor.
- Complete battery replacement and construction of a separate battery room in the Electrical Conex at the Aspen Seep Bioreactor.

CUD and DS

- Continue with the optimization, operation, and maintenance of the HDS Treatment System.
- Continue removal of accumulated sludge from Pond 4 as described in Amendment No. 1 (including Revision No. 1) to the 2011 RAWP.
- Notify EPA of Atlantic Richfield's plans for continuing operation of the HDS Treatment System during the fall/winter portion of the Limited Access Season. Atlantic Richfield will provide this notice no later than September 26, 2011, as required under Paragraph 50.g of the AOC.

Site-wide

- Continue to provide project progress updates to EPA via conference call. The next conference call is currently scheduled for September 20, 2011.

If you have any questions or comments, please feel free to contact me at (714) 228-6770 or via e-mail at Anthony.Brown@bp.com.

Sincerely,

ORIGINAL SIGNED BY DAVE McCARTHY FOR

Tony Brown
Project Manager

Attachments:

- Table 1 – Aspen Seep Bioreactor Monthly Influent and Effluent Sample Results
- Table 2 – Aspen Seep Bioreactor, Recent pH and ORP Field Measurements
- Table 3 – Aspen Seep Bioreactor, USGS Flow Data
- Table 4 – Aspen Seep Bioreactor, Enhanced Sampling Results
- Table 5 – HDS Treatment System, Influent and Effluent Sample Results
- Table 6 – Pond 4, Solids Sample Results
- Table 7 – CUD, DS, and HDS Treatment System Flow Rates
- Table 8 – HDS Treatment System Operational Data Summary

Gary Riley and Kevin Mayer – USEPA Region 9

September 12, 2011

Page 4 of 4

cc: Chuck Curtis, Lahontan Regional Water Quality Control Board
Ronald Halsey, Atlantic Richfield Company
Nathan Block, Esq., BP America Inc.
Adam Cohen, Esq., Davis Graham & Stubbs LLP
Dave McCarthy, Copper Environmental Consulting
Marc Lombardi, AMEC-Geomatrix Consultants, Inc.
Sandy Riese, EnSci, Inc.

TABLE 1
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - SAMPLE RESULTS
AUGUST 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Parameter	Basis	Units	July 28	July 28	July 28	August 4	August 11	August 11	August 11	August 16	August 24	Maximum Discharge Criteria (mg/L)	Average Discharge Criteria (mg/L)
			2011	2011	2011	2011	2011	2011	2011	2011	2011		
			152ASPEFF480 Sludge Filtrate (mg/L)	152ASPEFF481 Effluent (mg/L)	152ASPINF482 Influent (mg/L)	153ASPEFF485 Sludge Filtrate (mg/L)	155ASPEFF487 Effluent (mg/L)	155ASPINF492 Influent (mg/L)	154ASPEFF486 Sludge Filtrate (mg/L)	156ASPEFF493 Sludge Filtrate (mg/L)	157ASPEFF494 Sludge Filtrate (mg/L)		
pH	Field	s.u.	--	7.90	2.98	--	8.04	2.85	--	--	--	-	-
Selenium	Total	mg/L	0.00074 J	0.00053 J	0.0017 J	0.00057 J	0.00092 J	0.0021	0.00089 J	0.0013 J	0.0016 J	NP	0.005
Aluminum	Dissolved	mg/L	0.14	0.13	52	0.15	1.4	43	0.41	0.11	0.079	4	2
Arsenic	Dissolved	mg/L	<0.0009	<0.0009	0.0016	<0.0009	0.0022	0.0019	<0.00090	0.0011	<0.0018	0.34	0.15
Cadmium	Dissolved	mg/L	<0.0001	<0.0001	0.0024	<0.0001	<0.00010	0.0023	<0.00010	<0.00010	<0.00020	0.009	0.004
Calcium	Dissolved	mg/L	308	349	406	303	310	338	282	233	196	-	-
Chromium	Dissolved	mg/L	<0.0009	<0.0009	0.0048	<0.0009	<0.00090	0.0042	<0.00090	<0.00090	<0.0018	0.97	0.31
Copper	Dissolved	mg/L	0.0014 J	0.00086 J	1.1	0.0027	0.0028	1.0	0.0057	0.0031	0.0068	0.026	0.016
Hardness	Dissolved	mg/L	1400	1200	1400	1400	1000	1200	1300	1200	1000	-	-
Iron	Dissolved	mg/L	0.0266 J	0.0402	168	0.269	1.88	127	1.71	0.0526	0.0232 J	2	1
Magnesium	Dissolved	mg/L	150	76	96	150	62	80	140	160	130	-	-
Lead	Dissolved	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	0.00039 J	<0.00020	<0.00020	<0.00020	0.00042 J	0.136	0.005
Nickel	Dissolved	mg/L	0.017	0.0023	0.48	0.015	0.0074	0.47	0.014	0.014	0.019	0.84	0.094
Zinc	Dissolved	mg/L	<0.004	<0.004	0.67	0.0091 J	0.0088 J	0.69	0.033	0.0055 J	0.013 J	0.21	0.21
Chloride	Total	mg/L	46	<1.5	2.0 J	47	4.2	3.7	46	77	69	-	-
Acidity	Total	mg/L	<2	<2	620	<2	<2	640	<2	<2	<2	-	-
Alkalinity (Total)	Total	mg/L	240	292	<2	256	284	<2	292	320	352	-	-
Alkalinity (Bicarbonate)	Total	mg/L	293	356	<2.4	312	346	<2.4	356	390	429	-	-
Alkalinity (Carbonate)	Total	mg/L	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.20	<1.2	-	-
Alkalinity (Hydroxide)	Total	mg/L	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.700	<0.7	-	-
Sulfate	Total	mg/L	1970	1590	2090	1760	1430	1790	1610	1570	1390	-	-
Total Dissolved Solids	Total	mg/L	2880	2820	2950	2760	2870	3010	2860	2670	2540	-	-
Total Suspended Solids	Total	mg/L	4.0 J	5.0 J	35	20	11	28	22	15	63	-	-

Abbreviations

< - Analyte not detected at or above the or method detection limit

- - Discharge criteria not established

J - Estimated value. Analyte detected at a level less than the Reporting Limit and greater than or equal to the Method Detection Limit

mg/L - milligrams per liter

NP - Not Promulgated

s.U. - standard unit

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
AUGUST 2011 MONTHLY SUMMARY
Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2)		Manhole 6 (NaOH dosing location)		Manhole 7 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
09/21/07	6.0	2.91	428.9	7.34	-268.4	7.13	-280.3	9.56	-285.8	7.13	-265.3	8.42	2.6
09/26/07	6.2	2.89	496.7	7.80	-192.1	7.36	-223.0	9.64	-195.4	7.34	-232.7	8.34	50.3
10/03/07	5.5	2.85	484.1	8.07	-127.7	8.50	-129.6	11.25	-136.5	7.64	-164.0	8.22	-5.2
10/10/07 ²	5.8	2.80	498.0	5.50	55.9	5.64	-70.5	10.00	-190.0	6.20	-171.6	7.78	-268.0
10/18/07 ²	5.9	2.83	482.4	5.00	26.8	5.68	-46.2	11.38	-112.0	6.23	-139.0	8.69	135.0
10/31/07 ²	9.0	2.88	402.7	4.26	319.3	6.85	-156.7	9.80	-170.0	6.95	-212.2	7.66	-94.3
11/08/07	6.0	2.88	418.0	7.55	-128.3	7.01	-116.7	8.23	-133.9	6.86	-125.8	7.51	-50.6
11/13/07	-	2.86	484.5	7.06	-2.3	6.84	-65.3	7.86	-42.6	6.79	-78.1	7.58	4.2
11/27/07	5.5	2.86	479.4	6.99	-38.5	6.97	-205.0	8.46	-183.9	6.91	-156.8	7.25	-1.7
12/12/07	-	3.01	482.2	7.20	-25.3	7.20	-115.2	7.64	-107.7	7.04	-129.7	6.90	-31.9
01/15/08	4.8	2.98	483.3	6.76	5.9	6.73	-85.5	7.89	-94.3	6.67	-137.4	6.71	-33.0
02/07/08 ³	-	-	-	-	-	-	-	-	-	-	-	5.77	20.2
02/12/08	7.0	2.76	487.4	6.67	44.6	-	-	7.39	-45.6	6.42	-88.0	6.70	-15.3
03/18/08	6.0	2.88	375.1	7.85	3.6	-	-	8.80	-189.2	7.23	-211.3	7.05	-95.3
04/10/08	7.5	2.90	397.7	6.74	-80.0	6.70	-163.4	7.50	-142.6	6.57	-165.3	7.39	-24.5
05/15/08	7.3	2.97	442.2	6.24	21.2	6.55	-265.4	6.55	-233.7	5.60	-183.7	7.29	-143.3
05/27/08	7.0	3.00	464.1	7.11	-16.3	6.85	-242.2	6.98	-191.1	6.80	-235.2	7.26	-19.5
06/09/08	7.0	3.10	455.4	7.40	-47.5	7.09	-251.2	7.70	-178.8	6.97	-219.7	7.19	-61.5
06/17/08	7.5	2.91	443.9	7.42	-22.7	6.90	-283.0	7.29	-131.0	6.88	-244.3	7.30	-82.5
07/10/08	7.3	2.98	470.9	7.32	-34.1	6.90	-238.4	7.05	-172.6	6.90	-215.0	7.85	-113.5
07/22/08	7.0	2.99	455.5	6.94	-272.5	6.97	-267.4	7.07	-190.6	7.01	-248.9	7.35	-89.1
08/04/08	6.8	2.89	450.7	7.60	-94.4	6.94	-266.0	6.19	-173.1	7.02	-251.2	-	-
08/05/08	-	3.05	445.3	-	-	-	-	-	-	-	-	7.29	-70.0
08/18/08	7.3	3.93	478.9	7.46	-166.7	7.08	-291.9	7.40	-202.6	7.07	-268.8	7.40	-52.4
08/22/08	-	2.89	473.7	7.97	-212.9	7.08	-301.8	7.74	-224.0	7.03	-275.9	7.67	-27.8
08/25/08	-	2.93	470.5	7.77	-287.7	7.18	-286.1	6.89	-205.6	7.12	-273.8	8.02	-108.4
08/26/08	-	2.91	468.8	7.95	-255.4	7.09	-305.4	7.75	-281.2	7.14	-273.1	7.77	-41.4
09/24/08	-	3.03	423.2	7.18	-107.8	6.99	-255.4	7.11	-205.7	6.89	-245.2	7.70	-87.7
09/30/08	-	3.02	434.3	7.77	-151.9	6.89	-267.5	-	-	6.92	-269.9	8.10	-94.0
10/13/08	5.8	3.34	433.1	7.17	-98.7	6.94	-218.3	6.80	-157.2	7.01	-206.1	8.32	-101.0
10/27/08	5.8	3.21	247.8	7.34	-162.5	6.96	-175.3	7.20	-152.3	6.98	-126.8	7.88	273.7
11/19/08	5.5	2.83	453.7	7.20	-104.5	6.77	-204.7	7.12	-82.2	6.71	-154.7	7.74	-35.1
12/03/08	5.3	3.56	453.0	7.23	-45.0	6.86	-141.3	7.06	-100.1	6.84	-135.6	7.65	-47.5
01/9/09 ⁴	-	3.15	458.3	-	-	-	-	-	-	-	-	6.95	-43.0

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
AUGUST 2011 MONTHLY SUMMARY
Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2)		Manhole 6 (NaOH dosing location)		Manhole 7 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
01/12/09	5.3	2.94	466.3	6.36	-82.8	6.38	-245.1	-	-	6.82	-259.0	7.11	-74.0
02/19/09 ⁴	5.3	2.78	480.1	6.60	-3.2	6.74	-145.1	7.26	-117.6	6.25	-162.3	6.68	-18.1
03/10/09	5.0	2.88	481.2	-	-	-	-	-	-	-	-	7.36	34.3
04/13/09	7.0	2.78	532.7	7.45	-9.9	7.04	-185.5	7.50	-65.8	6.98	-175.4	7.77	-32.2
05/06/09	5.5	2.89	444.4	-	-	6.47	-221.3	-	-	6.56	-206.5	7.62	-86.6
06/03/09	6.5	2.91	445.9	6.98	-145.1	6.62	-260.8	7.07	-192.8	6.65	-260.4	7.55	-15.4
06/16/09	6.5	2.98	388.0	7.09	-186.6	6.79	-319.3	7.16	-233.2	6.80	-298.2	7.70	-158.1
07/01/09	6.0	2.95	376.5	7.43	376.5	6.93	-366.2	7.42	-310.8	6.97	-350.5	7.89	-189.6
07/14/09	5.8	2.97	394.4	-	-	6.85	-338.8	-	-	6.98	-331.9	7.90	-146.2
07/29/09	6.0	2.78	404.5	7.24	-175.5	7.39	-427.7	8.10	-260.2	7.29	-403.7	8.05	-135.6
08/05/09	5.5	2.89	433.8	-	-	-	-	8.73	-120.7	-	-	8.17	-146.0
08/19/09	5.1	2.97	425.7	-	-	-	-	8.25	-37.6	-	-	7.54	47.0
09/17/09	5.3	2.38	490.6	7.27	-91.3	6.81	-180.3	7.75	-120.2	6.85	-182.3	6.95	-24.7
09/30/09	5.0	2.96	503.7	8.03	-18.9	8.99	-253.1	7.75	-217.2	7.03	-276.6	7.98	-17.0
10/15/09	5.5	2.93	496.6	6.57	-121.4	7.63	-301.0	8.33	-148.5	7.71	-314.5	7.85	-41.2
10/28/09	4.9	2.96	487.6	8.79	-69.9	7.28	-216.4	9.08	-143.0	7.24	-162.8	7.94	2.8
11/11/09	5.0	2.91	420.8	8.34	-15.3	7.49	-243.7	8.42	-163.9	7.51	-199.3	7.74	60.6
12/17/09 ⁵	5.0	2.90	416.5	4.65	100.2	5.00	15.3	-	-	5.12	-1.8	5.91	-26.4
01/14/10 ⁵	4.8	2.85	417.7	6.96	-89.0	6.82	-186.4	-	-	6.84	-206.1	6.45	-67.4
02/02/10 ⁵	4.7	2.94	484.0	7.58	-46.7	6.85	-129.6	-	-	6.67	-131.1	6.95	-48.1
03/09/10	4.8	2.74	474.7	8.27	-78.3	7.95	-204.2	8.74	-208.9	8.10	-220.8	7.75	-5.9
04/26/10 ⁶	12.0	2.85	479.5	5.14	135.1	5.61	-19.0	5.04	109.2	5.60	-29.6	6.15	35.9
05/17/10	9.7	2.97	436.9	6.26	196.9	7.04	-283.9	7.79	-235.1	7.08	285.4	7.76	-73.8
05/24/10	9.4	3.16	418.0	7.43	-156.1	7.00	-259.9	7.27	-171.4	6.89	-282.6	7.11	-78.6
05/27/10	9.6	3.18	423.1	5.52	-225.1	7.58	-316.7	8.86	-318.2	6.74	-296.8	7.07	-98.7
06/01/10	10.5	3.11	444.0	8.47	-32.2	7.72	-292.6	9.00	-	6.74	-300.9	7.01	-31.5
06/14/10	10.0	2.99	427.7	7.40	-81.7	6.85	-272.5	8.22	-220.2	6.61	-181.6	7.48	-93.7
06/15/10	-	-	-	8.04	-221.6	6.89	-347.7	-	-	6.17	-355.9	-	-
06/16/10	-	2.99	427.7	7.40	-81.7	6.85	-272.6	8.22	-220.2	6.61	-181.6	7.48	-93.7
06/18/10	9.1	-	-	7.72	-211.7	6.79	-335.6	-	-	6.69	-336.7	-	-
06/21/10	9.0	3.21	409.4	7.99	-242.7	6.96	-364.1	7.86	-303.4	6.78	-349.5	7.70	-142.3
06/30/10	10.0	2.59	451.5	8.73	-216.2	8.73	-216.2	-	-	6.78	-337.9	7.96	-164.5
07/01/10	-	2.82	422.4	-	-	-	-	-	-	-	-	7.94	-241.9
07/13/10	10.0	2.62	479.5	7.52	-112.1	6.90	-279.5	8.02	-255.2	6.90	-294.0	7.76	-65.8

TABLE 2
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Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2)		Manhole 6 (NaOH dosing location)		Manhole 7 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
07/21/10	10.0	2.93	475.1	7.90	-70.5	7.15	-301.5	7.80	-212.4	7.27	-315.3	8.09	-95.7
07/29/10	10.0	2.90	465.3	7.73	-168.6	7.25	-318.1	7.08	-192.5	7.15	-318.5	7.06	-45.6
08/03/10	9.0	2.94	458.6	7.69	-193.3	7.16	-311.4	7.16	-311.4	7.17	-324.5	7.39	-66.3
08/12/10	9.0	2.85	476.3	7.98	-255.3	7.07	-299.3	7.50	-235.2	7.06	-307.0	7.55	-26.2
08/17/10	9.5	2.64	470.9	8.09	-47.2	7.54	-306.0	8.47	-206.8	7.37	-320.0	7.86	-74.0
08/24/10	9.2	3.04	250.0	7.81	-129.9	7.21	-151.9	7.20	-202.9	7.09	-147.9	7.81	2.9
09/02/10	9.2	2.84	503.9	7.70	-208.4	-	-	8.15	-227.0	7.32	-267.2	7.97	-20.2
09/16/10	8.0	3.21	455.8	8.40	-219.9	7.29	-209.3	8.66	-197.0	7.32	-279.7	7.76	-76.4
09/22/10 ⁷	8.0	3.06	476.5	8.50	-151.0	7.25	-276.9	8.30	-257.8	7.39	-279.9	7.93	-112.0
09/30/10 ⁷	7.6	3.16	503.3	8.49	-263.9	7.32	-265.4	8.53	-221.9	7.26	-267.8	8.61	94.1
10/06/10 ⁸	9.0	3.28	479.3	7.83	-287.5	7.39	-305.8	8.25	-246.7	7.62	-305.1	8.17	-235.5
10/11/10	8.0	3.20	479.3	7.52	-190.4	7.00	-284.4	8.28	-227.4	7.15	-290.4	7.85	26.4
10/19/10	8.0	2.89	447.3	8.75	-157.3	7.43	-310.4	8.52	-203.0	7.22	-310.6	8.15	130.4
10/28/10	8.0	2.95	579.0	7.23	-282.8	6.98	-368.9	8.50	-384.7	7.12	-402.6	7.73	-30.7
11/02/10	8.0	2.69	366.7	7.89	-285.1	7.14	-385.2	8.46	-307.5	7.00	-385.7	7.62	-31.5
11/15/10	8.5	2.94	361.7	7.79	-273.2	7.08	-381.9	8.04	-269.3	6.89	-384.5	7.64	-2.2
12/07/10 ⁹	8.5	3.01	387.2	6.97	-298.4	6.82	-375.1	-	-	6.57	-353.5	6.41	-112.4
01/07/11 ⁹	8.5	2.92	434.1	6.50	-134.0	5.98	-200.1	-	-	6.08	-216.2	6.15	-4.9
02/01/11 ⁹	8.0	3.07	423.8	6.75	-332.2	6.86	-279.7	-	-	6.59	-297.0	6.62	-9.3
03/11/11	8.5	3.05	384.7	7.66	-239.2	7.11	-344.7	-	-	6.85	-370.1	7.05	-73.4
4/19/2011 ¹⁰	30	2.61	454.9	-	-	-	--	-	-	-	-	4.72	172.9
04/26/11	29	2.91	362.1	7.45	-199.2	6.58	-346.5	7.42	-232.8	6.41	-369.7	7.22	-144.6
05/03/11	27	2.90	355.0	7.70	-264.8	6.56	-361.5	7.81	-264.9	6.54	-402.2	7.60	-137.5
05/11/11	24	2.84	344.2	6.81	-198.2	6.31	-229.0	6.99	-200.7	6.23	-204.0	6.99	-139.2
05/20/11	17	3.03	372.4	8.10	-282.2	7.09	-361.8	7.89	-219.6	6.39	-367.9	7.36	-44.1
06/01/11	18	2.92	378.6	8.18	-175.7	7.11	-360.0	8.14	-272.8	6.55	-337.9	7.32	-50.3
6/15/11 ¹¹	16	3.18	407.7	-	-	-	-	8.60	-231.3	-	-	8.15	-3.9
6/21/11 ¹¹	15	3.09	415.6	-	-	-	-	8.15	-184.2	-	-	-	-
6/28/11 ¹²	15	2.95	204.5	7.66	-503.6	6.94	-581.5	8.44	-458.1	6.93	-581.5	7.52	-85.1
07/06/11	14	2.95	237.1	8.37	-50.3	6.98	-525.6	8.10	-382.9	6.75	-550.2	7.81	-249.1
07/13/11	14	2.88	352.2	8.46	-312.3	6.83	-412.1	5.43	-48.5	6.67	-420.1	7.84	-37.4
07/19/11	13	3.11	304.3	7.27	-462.3	6.93	-434.0	8.40	-407.5	6.85	-436.0	8.0	-86.6
07/28/11	-	2.98	320.8	8.32	-294.3	7.10	-393.6	8.55	-165.4	6.99	-376.0	7.90	-70.4

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
AUGUST 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2)		Manhole 6 (NaOH dosing location)		Manhole 7 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
08/04/11	12	3.12	337.7	7.88	-416.0	7.20	-437.3	8.73	-437.5	7.11	-431.8	8.14	-155.7
08/11/11	12	2.85	360.2	7.72	-456.0	7.27	-421.6	8.95	-421.9	6.87	-443.0	8.04	-162.8
08/17/11	12	3.00	362.5	6.93	-291.8	6.84	-415.5	8.60	-338.3	6.92	-437.7	7.97	-187.8
08/24/11	12	3.01	362.8	6.42	-257.0	7.08	-405.5	8.30	-277.9	6.84	-402.2	7.85	-164.4

Notes

1. Aspen Seep Bioreactor Influent Flow measurements are field measurements completed with a graduated bucket and stop watch.
2. Biocell 1 was flushed on 10/08/07, 10/09/07, and 10/18/07; Biocell 1 was bypassed during this flushing period. Low pH readings in Manhole 1 from 10/10/07 through 10/31/07 were caused by drainage into pretreatment pond from failed seal in weir box cap.
3. Measurements are believed to be erroneous due to calibration error. Parameters were re-evaluated on 02/12/08.
4. Low pH measurements due to a power outage and associated chemical pump shutdown.
5. Low pH measurements caused by stripped gears on NaOH pump head that prevented dosing to Manhole 6.
6. Low pH measurements due to increase in system flow rates; chemical dosing rates lagged behind these system flow rate increases and were unable to prevent
7. Effluent readings were collected from the centrifuge discharge point on these dates due to sludge dewatering. Water was not being discharged from Pond 4.
8. Effluent readings were collected Pond 4 effluent on this date. Water was not being discharged from Pond 4.
9. Low pH measurements due to power outage and associated chemical pump failure during the inverter failure on November 29, 2010.
10. Low pH measurement due to increase in system flow rates.
11. Field measurements at intermediate bioreactor manholes were not collected when recirculation operations were interrupted due to sludge dewatering operations.
12. ORP measurements may be inaccurate due to probe calibration issues.

Abbreviations

- - not measured, not recorded, or bioreactor operation did not have flow at given location on the specified date.
 gpm - gallons per minute ORP - oxidation/reduction potential
 mV - millivolts s.U. - standard unit

TABLE 3
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - FLOW RATE¹
AUGUST 2011 MONTHLY SUMMARY
Draft - Provisional Data

Date	Flow Rate (gpm)	Date	Flow Rate (gpm)
07/01/11	16.25	08/01/11	14.41
07/02/11	16.07	08/02/11	14.23
07/03/11	15.93	08/03/11	14.27
07/04/11	15.93	08/04/11	14.18
07/05/11	16.07	08/05/11	14.27
07/06/11	16.11	08/06/11	14.18
07/07/11	14.90	08/07/11	14.18
07/08/11	14.81	08/08/11	14.18
07/09/11	14.81	08/09/11	14.18
07/10/11	14.77	08/10/11	N/A
07/11/11	14.72	08/11/11	N/A
07/12/11	14.68	08/12/11	N/A
07/13/11	14.77	08/13/11	N/A
07/14/11	14.72	08/14/11	N/A
07/15/11	14.86	08/15/11	N/A
07/16/11	14.68	08/16/11	N/A
07/17/11	14.45	08/17/11	N/A
07/18/11	14.27	08/18/11	N/A
07/19/11	14.27	08/19/11	N/A
07/20/11	14.36	08/20/11	N/A
07/21/11	14.41	08/21/11	N/A
07/22/11	14.36	08/22/11	N/A
07/23/11	14.18	08/23/11	N/A
07/24/11	13.96	08/24/11	N/A
07/25/11	13.96	08/25/11	N/A
07/26/11	14.05	08/26/11	N/A
07/27/11	13.96	08/27/11	N/A
07/28/11	13.82	08/28/11	N/A
07/29/11	61.00	08/29/11	N/A
07/30/11	50.58	08/30/11	N/A
07/31/11	14.95	08/31/11	N/A
Average	17.44	Average	14.23

Notes

1. Aspen Seep flow data is provided by the USGS.

Abbreviations

gpm - gallons per minute

USGS - United States Geological Survey

TABLE 4
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - ENHANCED SAMPLING RESULTS
AUGUST 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Parameter	Basis	Units	August 11 2011 155ASPEFF487 Effluent (mg/L)	August 11 2011 155MH2488 MH2 (mg/L)	August 11 2011 155MH4489 MH4 (mg/L)	August 11 2011 155MH7490 MH7 (mg/L)	August 11 2011 155MH6491 MH6 (mg/L)	August 11 2011 155ASPINF492 Influent (mg/L)	August 11 2011 154ASPEFF486 Sludge Filtrate (mg/L)	Maximum Discharge Criteria (mg/L)	Average Discharge Criteria (mg/L)
pH	Field	s.u.	8.04	7.72	7.27	6.87	8.95	2.85	--	-	-
Selenium	Total	mg/L	0.0092 J	--	--	--	--	0.0021	0.0089 J	NP	0.005
Aluminum	Dissolved	mg/L	1.4	1.9	0.18	0.11	2.2	43	0.41	4	2
Arsenic	Dissolved	mg/L	0.0022	<0.00090	<0.00090	<0.00090	<0.00090	0.0019	<0.00090	0.34	0.15
Cadmium	Dissolved	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0023	<0.00010	0.009	0.004
Calcium	Dissolved	mg/L	310	311	312	310	272	338	282	-	-
Chromium	Dissolved	mg/L	<0.00090	<0.00090	<0.00090	<0.00090	<0.00090	0.0042	<0.00090	0.97	0.31
Copper	Dissolved	mg/L	0.0028	0.00058 J	<0.00050	<0.00050	0.00056 J	1.0	0.0057	0.026	0.016
Hardness	Dissolved	mg/L	1000	1000	1000	1000	890	1200	1300	-	-
Iron	Dissolved	mg/L	1.88	0.0212 J	0.0314 J	0.0230 J	0.0203 J	127	1.71	2	1
Magnesium	Dissolved	mg/L	62	60	62	59	50	80	140	-	-
Lead	Dissolved	mg/L	0.00039 J	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.136	0.005
Nickel	Dissolved	mg/L	0.0074	0.0055	0.0022	0.0019 J	0.0090	0.47	0.014	0.84	0.094
Phosphorus	Dissolved	mg/L	0.029 J	<0.020	<0.020	<0.020	<0.020	<0.10	--	-	-
Zinc	Dissolved	mg/L	0.0088 J	<0.0040	<0.0040	<0.0040	<0.0040	0.69	0.033	0.21	0.21
Chloride	Total	mg/L	4.2	--	--	--	--	3.7	46	-	-
Acidity	Total	mg/L	<2	--	--	--	--	640	<2	-	-
Alkalinity (Total)	Total	mg/L	284	304	436	552	292	<2	292	-	-
Alkalinity (Bicarbonate)	Total	mg/L	346	356	502	673	356	<2.4	356	-	-
Alkalinity (Carbonate)	Total	mg/L	<1.2	7.19	14.4	<1.2	<1.2	<1.2	<1.2	-	-
Alkalinity (Hydroxide)	Total	mg/L	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	-	-
Nitrate/Nitrite-N	Total	mg/L	<0.45	<0.45	0.53	0.51	0.51	<0.45	--	-	-
Total Kjeldahl Nitrogen	Total	mg/L	<0.15	40	0.20 J	<0.15	0.18 J	0.31 J	--	-	-
Ammonia-N	Total	mg/L	<0.10	59	<0.10	<0.10	<0.10	0.21 J	--	-	-
Dissolved Organic Carbon	Dissolved	mg/L	130	270	240	230	130	2.3	--	-	-
Nitrate-N	Total	mg/L	<0.30	<0.30	0.53 J	0.51 J	0.51 J	<0.30	--	-	-
Nitrite-N	Total	mg/L	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	--	-	-
Sulfate	Total	mg/L	1430	1350	1180	1050	1360	1790	1610	-	-
Sulfide	Total	mg/L	--	2.2	46	110	2.4	--	--	-	-
Total Dissolved Solids	Total	mg/L	2870	--	--	--	--	3010	2860	-	-
Total Suspended Solids	Total	mg/L	11	--	--	--	--	28	22	-	-

Abbreviations

< - Analyte not detected at or above the or method detection limit

-- Discharge criteria not established

J - Estimated value. Analyte detected at a level less than the Reporting Limit and greater than or equal to the Method Detection Limit

mg/L - milligrams per liter

NP - Not Promulgated

s.U. - standard unit

TABLE 5
HIGH DENSITY SLUDGE TREATMENT PLANT - SAMPLE RESULTS
AUGUST 2011 MONTHLY SUMMARY
Draft - Provisional Data

Parameter	Basis	Units	August 3 2011 163HDSINF424 Influent (mg/L)	August 3 2011 163HDSEFF425 Effluent (mg/L)	August 3 2011 163DS426 DS (mg/L)	August 3 2011 163CUD427 CUD (mg/L)	Maximum Discharge (mg/L)	Average Discharge (mg/L)
pH	Field	s.u.	3.20	8.34	4.60	3.67	--	--
Selenium	Total	mg/L	<0.0025	0.00086 J	0.0021	<0.0025	NP	0.005
Aluminum	Dissolved	mg/L	50	0.57	14	63	4	2
Arsenic	Dissolved	mg/L	0.45	0.0015	0.030	0.77	0.34	0.15
Cadmium	Dissolved	mg/L	0.0019 J	<0.00010	0.0021	0.0014 J	0.009	0.004
Calcium	Dissolved	mg/L	314	735	332	313	--	--
Chromium	Dissolved	mg/L	0.021	<0.00090	0.0016 J	0.030	0.97	0.31
Copper	Dissolved	mg/L	0.048	0.0035	0.12	0.016	0.026	0.016
Hardness	Dissolved	mg/L	1100	2200	1200	1100	--	--
Iron	Dissolved	mg/L	349	0.537	16.8	473	2	1
Magnesium	Dissolved	mg/L	79	83	90	76	--	--
Lead	Dissolved	mg/L	<0.0010	<0.00020	<0.00020	<0.0010	0.136	0.005
Nickel	Dissolved	mg/L	1.9	0.044	0.52	2.3	0.84	0.094
Zinc	Dissolved	mg/L	0.41	<0.0040	0.23	0.47	0.21	0.21
Chloride	Total	mg/L	4.1	3.0	3.2	4.2	--	--
Acidity	Total	mg/L	890	<2.0	140	1100	--	--
Alkalinity (Total)	Total	mg/L	<2.00	29	<2.00	<2.00	--	--
Alkalinity (Bicarbonate)	Total	mg/L	<2.40	35.4	<2.40	<2.40	--	--
Alkalinity (Carbonate)	Total	mg/L	<1.20	<1.20	<1.20	<1.20	--	--
Alkalinity (Hydroxide)	Total	mg/L	<0.700	<0.700	<0.700	<0.700	--	--
Sulfate	Total	mg/L	2,060	1,980	1,250	2,290	--	--
Total Dissolved Solids	Total	mg/L	3,230	3,020	2,010	3,760	--	--
Total Suspended Solids	Total	mg/L	53	22	21	44	--	--

Notes

1. pH value was collected in field and is the average of 3 grab samples comprising the HDS Effluent sample or one grab sample for the HDS
2. Discharge criteria pH based on 24-hour (single day) average discharge.
3. Values in bold are concentrations greater than the maximum or average discharge criteria.

Abbreviations

< - Analyte not detected at or above the or method detection limit

-- not measured or not available

J - Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL).

NP - Not Promulgated

CUD - Channel Underdrain

DS - Delta Seep

TABLE 6
POND 4 - SOLIDS SAMPLE RESULTS
AUGUST 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Parameter	August 11 2011 164PND4SLUDGE430 Pond 4 Sludge					TTLC Regulatory Limits for Total Metals (mg/kg)	STLC Regulatory Limits (mg/L)	TCLP Regulatory Limits (mg/L)
	DI-WET (mg/l)	SPLP (mg/l)	STLC (mg/l)	TCLP (mg/l)	Total (mg/kg)			
Aluminum	0.13	3.8	270	56	3200	NA	NA	NA
Antimony	<0.0003	<0.07	<0.14	<0.07	<1.7	500	15	NA
Arsenic	0.0013	<0.07	0.82	<0.07	48	500	5	5
Barium	0.0024	<0.06	0.16 J	0.11 J	5.5	10,000	100	100
Beryllium	<0.0001	<0.01	0.043 J	<0.01	0.44 J	75	0.75	NA
Cadmium	<0.0001	<0.02	<0.04	<0.02	<0.39	100	1	1
Chromium	<0.0009	<0.02	0.2	0.02 J	3.3	500 ^a	5 (560) ^b	5
Cobalt	0.00041 J	<0.02	4.9	2.3	49	8,000	80	NA
Copper	0.0043	<0.03	0.66	0.039 J	11	2,500	25	NA
Iron	<0.015	<0.15	1400	79	25000	NA	NA	NA
Lead	<0.0002	<0.04	<0.08	0.066 J	<0.99	1,000	5	5
Mercury	<0.0001	<0.001	<0.001	<0.001	0.030	20	0.2	0.2
Molybdenum	0.018	<0.02	<0.04	<0.02	<0.39	3,500	350	NA
Nickel	0.0073	<0.02	11	4.8	110	2,000	20	NA
Selenium	0.0014 J	<0.08	<0.16	0.11	4.7	100	1	1
Silver	0.00094 J	<0.06	<0.12	<0.06	<1.6	500	5	5
Thallium	0.0046	<0.07	<0.14	<0.07	<1.6	700	7	NA
Vanadium	0.0042	<0.03	0.12 J	<0.03	6.4	2,400	24	NA
Zinc	<0.004	<0.06	2.5	0.75	32	5,000	250	NA
pH	--	--	--	--	7.6	Corrosivity criteria for pH = ≤ 2.0 or ≥ 12.5 ^c		
Percent Moisture	--	--	--	--	86	-	-	-
Percent Solids	--	--	--	--	14	-	-	-

Notes

^a Concentration limit for total chromium and/or chromium (III) is 2,500 mg/L and limit for chromium (VI) is 500 mg/L.

^b The federal hazardous waste level for soluble chromium is 5mg/L. California has a Waste Extraction Test (DI-WET) soluble level

^c Title 22 California Code of Regulations, Section 66261.24 (a)(2): Samples were tested for waste extraction test, solubility, and total concentrations. If the results of the STLC or TTLC equal or exceed their respective regulatory thresholds, the waste is a hazardous waste.

Abbreviations

"<" - Constituent not detected at or above the reporting limit or the method detection limit listed

J - The associated value is an estimated quantity

mg/L - milligrams per liter

mg/kg - milligrams per kilograms

NA - Not applicable

SPLP - Synthetic precipitation leaching procedure

STLC - Soluble threshold limit concentration

TCLP - Toxicity Characteristic Leaching Procedure

TTLC - California Total Threshold Limit Concentration; based on wet

TABLE 7
CHANNEL UNDERDRAIN, DELTA SEEP, AND HDS TREATMENT PLANT - FLOW RATES
AUGUST 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Date	Delta Seep Recorded Flow ¹		Channel Underdrain Recorded Flow ¹		Treated Water Discharged from the HDS Treatment Plant Recorded Flow ^{1,2}	
	(gpm)	(gallons)	(gpm)	(gallons)	(gpm)	(gallons)
8/1/2011	14.01	20,170	45.20	65,094	57.70	83,094
8/2/2011	13.89	20,006	45.06	64,894	56.40	81,217
8/3/2011	13.95	20,087	44.94	64,715	51.91	74,754
8/4/2011	13.81	19,890	44.92	64,685	55.12	79,377
8/5/2011	13.71	19,749	44.80	64,510	54.00	77,758
8/6/2011	13.62	19,615	44.70	64,372	54.00	77,759
8/7/2011	13.51	19,453	44.61	64,241	57.33	82,556
8/8/2011	13.45	19,367	44.51	64,096	55.34	79,693
8/9/2011	13.45	19,364	44.42	63,968	54.96	79,138
8/10/2011	13.40	19,291	44.32	63,820	54.50	78,479
8/11/2011	13.56	19,521	44.19	63,636	54.44	78,388
8/12/2011	14.16	20,385	44.05	63,428	55.19	79,467
8/13/2011	13.31	19,167	43.92	63,245	55.50	79,919
8/14/2011	13.19	18,999	43.80	63,077	54.61	78,635
8/15/2011	13.14	18,917	43.71	62,947	52.00	32,183 ³
8/16/2011	13.19	18,999	43.51	62,662	0.00	0 ³
8/17/2011	13.28	19,121	43.36	62,435	55.00	28,764 ³
8/18/2011	13.16	18,953	43.25	62,273	55.00	57,221 ³
8/19/2011	13.15	18,932	43.15	62,134	53.82	77,504
8/20/2011	13.09	18,856	43.01	61,928	53.50	77,040
8/21/2011	12.95	18,652	42.83	61,681	52.86	76,115
8/22/2011	12.84	18,487	42.66	61,434	52.00	49,563 ³
8/23/2011	12.81	18,444	42.55	61,266	52.00	46,280 ³
8/24/2011	12.77	18,382	42.33	60,953	51.95	74,809
8/25/2011	12.71	18,305	42.17	60,723	51.83	74,641
8/26/2011	12.57	18,100	41.98	60,452	51.46	74,102
8/27/2011	12.59	18,126	41.79	60,178	51.50	74,159
8/28/2011	12.49	17,982	41.63	59,954	51.50	74,159
8/29/2011	12.46	17,948	41.50	59,759	50.50	27,882 ³
8/30/2011	12.48	17,971	41.35	59,538	50.50	46,005 ³
8/31/2011	12.50	17,994	41.26	59,420	50.50	72,720
Average Flow Rate or Total Discharged	13.20	589,234	43.40	1,937,519	51.84	2,073,380

Notes:

1. Channel Underdrain, Delta Seep, and Treated Water Discharge from the HDS Treatment Plant flow rates are calculated from flow totalizer volume measurements.
2. The operational flow rate is reported. Water discharge does not always occur 24 hours per day.
3. Water from the HDS Treatment Plant was discharged to Pond 4 during this time to raise the Pond 4 water level to support Pond 4 sludge removal activities.

Abbreviations:

gpm - gallons per minute HDS - High Density Sludge

TABLE 8
HIGH DENSITY SLUDGE TREATMENT SYSTEM - OPERATIONAL DATA SUMMARY
AUGUST 2011 MONTHLY SUMMARY

Draft - Provisional Data

Reporting Period	Treated Water Discharged (gallons)	Lime Consumed (kilograms)	Diesel Fuel Consumed (gallons)	Flocculant Consumed (kilograms)	Sludge Wasted (gallons)	Freshwater Consumed (gallons)
May 1 - May 31, 2011	2,146,472	6,633	2,570	59	4,200	4,700
June 1 - June 30, 2011	2,918,988	9,873	2,291	63	11,000	6,200
July 1 - July 31, 2011	2,165,870	7,455	2,129	55	15,800	9,100 ¹
August 1 - August 31, 2011	2,073,380	6,284	2,142	54	6,300	6,200

Notes

1. Includes water taken from the High Density Sludge Treatment System Fresh Water Tank and used for Remedial Investigation and Feasibility Study drilling activities.

Atlantic Richfield Company

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October 10, 2011

Mr. Gary Riley
US EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105

Mr. Kevin Mayer
US EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105

RE: Leviathan Monthly Report for September 2011 and Quarterly RI/FS Progress Report

Dear Mr. Riley and Mr. Mayer:

The following text describes activities conducted during the month of September 2011 at the Leviathan Mine Site and activities anticipated to occur during the upcoming month. These activities are organized by work area [Aspen Seep, Channel Underdrain (CUD) and Delta Seep (DS)], and site-wide tasks. This progress report is being submitted in accordance with Paragraph 62 of the Administrative Settlement Agreement and Order on Consent for Removal Action (AOC) (effective January 21, 2009).

Atlantic Richfield is also submitting this letter in satisfaction of the quarterly progress reporting requirement set forth in Paragraph 63 of the Administrative Order for Remedial Investigation and Feasibility Study (U.S. EPA Region IX, CERCLA Docket No. 2008-18, June 23, 2008) (UAO). The quarterly summary of RI/FS activities is provided at the end of this letter.

ACTIVITIES FOR SEPTEMBER

Aspen Seep

- Operated the Aspen Seep Bioreactor (ASB) in recirculation mode during the month of September. Routine O&M was performed weekly. Influent and effluent sampling occurred on September 15 and 28, 2011. The currently available influent and effluent water quality data for the August 30 and September 15, 2011 sampling events are presented in Table 1. Recent pH and ORP field data are summarized in Table 2. Influent flow rate data from the USGS is presented in Table 3. Results from the enhanced sampling event performed on September 15, 2011 are included in Table 4.
- Inaccurate metals analytical results were reported by Test America Laboratory, Inc. (TA) for three samples collected from the ASB on August 11, 2011. Due to results which were higher than normal and inconsistent with field total dissolved iron results, data was flagged as prospectively inaccurate



during AMEC's internal data review. TA has confirmed the error and issued revised results, which are shown in Table 5. The Leviathan Mine database has been updated to reflect the revised data.

- Demobilization of the sludge dewatering equipment was completed. Approximately 180 cubic yards of dewatered sludge was shipped from the site in September.
- Installation of replacement batteries and construction of a separate battery room in the Electrical Conex was initiated.
- Biocell maintenance was conducted, including the reversal of flow through both biocells and flushing of Biocell 2.

CUD and DS

- Operation of the HDS Treatment Plant and the associated capture of the CUD and DS continued during the month of September. Samples of the HDS Treatment Plant influent and effluent were collected for laboratory analysis on September 1, 2011. The analytical results associated with the September 1, 2011 sampling event are presented in Table 6. Table 6 also presents analytical results for a composite sample of the Pond 4 water collected on September 29, 2011 prior to discharge. Flow rates recorded for the Delta Seep, Channel Underdrain, and treated water discharge from the HDS Treatment Plant are included in Table 7. A summary of the HDS Plant operational data for September 2011 is presented in Table 8.
- On September 15, 2011, Atlantic Richfield submitted to EPA a Waste Material Off-Site Shipment Notification Letter for HDS Treatment System solids. Approximately 18 cubic yards of HDS Treatment System solids were shipped off site on September 22, 2011.
- Pond 4 sludge removal and dewatering operations continued during the month of September as specified within Amendment No.1 (including Revision No.1) to the 2011 RAWP. Approximately 1,200 cubic yards of dewatered sludge were shipped from the site through the end of September. Dredging operations were completed and demobilization activities began on September 29, 2011. On September 26, 2011, Atlantic Richfield provided EPA with an e-mail update of Pond 4 sludge removal and dewatering activities and notification of an associated planned increase in discharge to Leviathan Creek. The analytical results for a composite sample of the Pond 4 water collected on September 29, 2011 prior to discharge are presented in Table 6. The results of this pre-discharge sampling confirmed that the water in Pond 4 satisfied the AOC discharge criteria.
- On September 26, 2011, Atlantic Richfield submitted a letter to EPA requesting approval of Fall 2011 Limited Access Season (LAS) Operations and the 2011 Year-End Decommissioning and Winterization Plan. EPA provided written approval of the Fall 2011 LAS Operations on September 30, 2011.

Site-wide

- Work continued on updating the Leviathan Mine Project Database with data from monitoring performed by Atlantic Richfield and various agencies.
- On September 10, 2011, Atlantic Richfield placed approximately 200 tons of certified weed free base rock material on the road surface near the California access gate and the approach to Pond 4 from the Nevada access gate to cover the 3-inch angular rock placed at these locations as part of the Lahontan Regional Water Quality Control Board's recent on-site paving work.

- From September 12 through September 14, 2011, Atlantic Richfield re-graded the California and Nevada Access roads to remove rocks that had fallen onto the road surface and to improve the rough road surface.
- On September 20, 2011, a conference call was conducted with EPA to provide a general progress update.

ACTIVITIES FOR UPCOMING MONTH

Aspen Seep

- Continue operation of the Aspen Seep Bioreactor in recirculation mode and conduct routine operation, maintenance, and monitoring as outlined in the 2011 RAWP.
- Complete battery replacement and construction of a separate battery room in the Electrical Conex at the Aspen Seep Bioreactor.

CUD and DS

- Continue with the optimization, operation, and maintenance of the HDS Treatment System.
- Complete dewatering and disposal of accumulated sludge from Pond 4 as described in Amendment No. 1 (including Revision No. 1) to the 2011 RAWP. Complete demobilization of Pond 4 sludge removal and dewatering equipment and perform Pond 4 liner repairs.
- Transition to LAS Operations (as defined in the AOC) in accordance with the 2011 Removal Action Work Plan and as stated in Atlantic Richfield's September 26, 2011 letter to EPA. Seasonal decommissioning and winterization of the HDS Treatment System and CUD and DS collection and conveyance equipment will likely commence near the end of October or in early November, depending on the severity of weather conditions.

Site-wide

- A Technical Advisory Committee meeting is scheduled for October 26, 2011 in Carson City, Nevada. Atlantic Richfield will provide a summary of 2011 response actions at the meeting. The next EPA progress update conference call is scheduled for November 15, 2011.

* * * *

Quarterly RI/FS Progress Report

As required by Paragraph 63 of the UAO, the following Quarterly Progress Report for Remedial Investigation and Feasibility Study (RI/FS) activities describes: (a) the actions taken to comply with the UAO during the prior quarter, (b) the work planned for the next quarter, and (c) any problems encountered or anticipated including any actual or anticipated delays in schedules.

Actions Taken to Comply with the UAO

- Atlantic Richfield submitted the Quarterly Progress Report for the second quarter on July 11, 2011.
- Atlantic Richfield conducted Monthly Progress Conference Calls with EPA in July, August, and September 2011, during which RI/FS updates were provided.

- Atlantic Richfield conducted teleconferences with EPA and their technical consultant on August 3 and September 13, 2011, to review the results of the geophysical survey and the well and piezometer locations in the Leviathan Creek Study Area.
- Atlantic Richfield submitted the Ecological Risk Assessment Problem Formulation to EPA on September 20, 2011.
- Atlantic Richfield submitted the Reference FRI Work Plan to EPA on September 21, 2011.
- Atlantic Richfield continued implementation of field investigation activities under the EPA approved On-Property FRI Work Plan in the third quarter of 2011. Atlantic Richfield notifies EPA of planned field investigation activities by providing a “Three-week Look Ahead” of upcoming work; several notifications were provided in the third quarter 2011. This notification also allows EPA to plan its oversight of the On-Property FRI activities. On-Property FRI investigation activities conducted in third quarter are as follows:
 - Initiated drilling and installation of groundwater monitoring wells and piezometers. Associated work completed consisted of:
 - drilling, lithologic logging, monitoring water levels, and collecting grab groundwater samples from 15 soil borings;
 - back grouting one boring not completed as a well or piezometer;
 - completing 11 borings as monitoring wells;
 - completing 3 borings as piezometers; and
 - submitting select grab groundwater samples for laboratory analysis.
 - Initiated the storm water monitoring program and performed twice weekly O&M of storm water sample collection stations.
 - Completed on-property habitat verification.
 - Mapped in-stream sediment (depositional vs non-depositional) in the on-property portions of Leviathan and Aspen creeks.
 - Measured groundwater levels in existing wells in July, August, and September. The September event included new wells/piezometers completed to date.
 - Conducted surveying activities to prepare 1-foot contour topography for certain portions of the site, to locate the underground portion of Leviathan Channel, and to locate former piezometer PZ-17a.
 - Conducted geophysical surveys to locate the Channel Underdrain and the underground portion of the Leviathan Channel.
 - Completed geophysical surveys in the Aspen Creek Study Area.
 - Installed, began collecting data from, and performed O&M activities for three meteorological stations.
 - Installed, began collecting data from, and performed O&M activities for three evaporation pans.
 - Installed a pond water level sensor in Pond 2S.

Work Planned for the Next Quarter

- Atlantic Richfield plans to initiate preparation of the Off-Property FRI Work Plan.
- Atlantic Richfield plans to discuss the Ecological Risk Assessment Work Plan with EPA during a conference call tentatively planned for October 17, 2011. A second conference call, to include EPA and selected project stakeholders, is tentatively planned for October 24, 2011. Thereafter, Atlantic Richfield plans to prepare and submit the Ecological Risk Assessment Work Plan to EPA.
- Atlantic Richfield plans discuss the Reference Area FRI Work Plan with EPA during a conference call tentatively planned for October 31 or November 1, 2011
- Atlantic Richfield plans to attend and make a presentation on RI/FS activities completed in 2011 at the TAC meeting on October 26, 2011.
- Atlantic Richfield plans to continue implementation of field investigation activities under the On-Property FRI Work Plan in the fourth quarter of 2011 until approximately mid-November 2011 depending on the weather and access conditions.
- Atlantic Richfield plans on submitting a Quarterly Progress Report for the fourth quarter of 2011 on January 10, 2012.

* * * *

If you have any questions or comments, please feel free to contact me at (714) 228-6770 or via e-mail at Anthony.Brown@bp.com.

Sincerely,

ORIGINAL SIGNED BY DAVE McCARTHY for

Tony Brown
Project Manager

Attachments:

- Table 1 – Aspen Seep Bioreactor Monthly Influent and Effluent Sample Results
- Table 2 – Aspen Seep Bioreactor, Recent pH and ORP Field Measurements
- Table 3 – Aspen Seep Bioreactor, USGS Flow Data
- Table 4 – Aspen Seep Bioreactor, Enhanced Sampling Results
- Table 5 – Aspen Seep Bioreactor, Enhanced Sampling Results (Revised August 11, 2011 Data)
- Table 6 – HDS Treatment System, Influent and Effluent Sample Results
- Table 7 – CUD, DS, and HDS Treatment System Flow Rates
- Table 8 – HDS Treatment System Operational Data Summary

Gary Riley and Kevin Mayer – USEPA Region 9

October 10, 2011

Page 6 of 6

cc: Chuck Curtis, Lahontan Regional Water Quality Control Board
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Dave McCarthy, Copper Environmental Consulting
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Grant Ohland, AMEC-Geomatrix Consultants, Inc.
Sandy Riese, EnSci, Inc.

TABLE 1
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - SAMPLE RESULTS
SEPTEMBER 2011 MONTHLY SUMMARY

Draft - Provisional Data

Parameter	Basis	August 30 2011 158ASPINF496 Influent (mg/L)	August 30 2011 158ASPEFF495 Effluent (mg/L)	September 15 2011 159ASPINF504 Influent (mg/L)	September 15 2011 159ASPEFF499 Effluent (mg/L)	Maximum Discharge Criteria (mg/L)	Average Discharge Criteria (mg/L)
pH (standard units)	Field	2.90	7.63	3.01	8.07	-	6.0 - 9.0
Selenium	Total	0.0026	0.0013 J	0.0018 J	0.0010 J	NP	0.005
Aluminum	Dissolved	48	<0.040	47	0.25	4	2
Arsenic	Dissolved	<0.00090	0.0012	<0.00090	0.0021	0.34	0.15
Cadmium	Dissolved	0.0022	<0.00010	0.0019	<0.00010	0.009	0.004
Calcium	Dissolved	380	330	380	351	-	-
Chromium	Dissolved	0.0039	<0.00090	0.0026	<0.00090	0.97	0.31
Copper	Dissolved	1.1	0.0036	0.94	0.0046	0.026	0.016
Hardness	Dissolved	1300	1200	1300	1200	-	-
Iron	Dissolved	140	0.069	145	0.148	2	1
Magnesium	Dissolved	93	91	92	78	-	-
Lead	Dissolved	<0.00020	<0.00020	<0.00020	<0.00020	0.136	0.005
Nickel	Dissolved	0.51	0.029	0.45	0.025	0.84	0.094
Zinc	Dissolved	0.57	<0.0040	0.53	<0.0040	0.21	0.21
Chloride	Total	2.2 J	19	2.2 J	3.5	-	-
Acidity	Total	610	<2.0	600	<2.0	-	-
Alkalinity (Total)	Total	<2.0	160	<2.00	344	-	-
Alkalinity (Bicarbonate)	Total	<2.4	200	<2.40	419	-	-
Alkalinity (Carbonate)	Total	<1.2	<1.2	<1.2	<1.2	-	-
Alkalinity (Hydroxide)	Total	<0.70	<0.70	<0.700	<0.700	-	-
Sulfate	Total	2200	2100	2070	1440	-	-
Total Dissolved Solids	Total	2900	2800	2950	2770	-	-
Total Suspended Solids	Total	28	5.0 J	17	10	-	-

Abbreviations

< - Analyte not detected at or above the or method detection limit

- - Discharge criteria not established

J - Estimated value. Analyte detected at a level less than the Reporting Limit and greater than or equal to the Method Detection Limit

mg/L - milligrams per liter

NP - Not Promulgated

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
SEPTEMBER 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 or 9 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
09/21/07	6.0	2.91	428.9	7.34	-268.4	7.13	-280.3	9.56	-285.8	7.13	-265.3	8.42	2.6
09/26/07	6.2	2.89	496.7	7.80	-192.1	7.36	-223.0	9.64	-195.4	7.34	-232.7	8.34	50.3
10/03/07	5.5	2.85	484.1	8.07	-127.7	8.50	-129.6	11.25	-136.5	7.64	-164.0	8.22	-5.2
10/10/07 ²	5.8	2.80	498.0	5.50	55.9	5.64	-70.5	10.00	-190.0	6.20	-171.6	7.78	-268.0
10/18/07 ²	5.9	2.83	482.4	5.00	26.8	5.68	-46.2	11.38	-112.0	6.23	-139.0	8.69	135.0
10/31/07 ²	9.0	2.88	402.7	4.26	319.3	6.85	-156.7	9.80	-170.0	6.95	-212.2	7.66	-94.3
11/08/07	6.0	2.88	418.0	7.55	-128.3	7.01	-116.7	8.23	-133.9	6.86	-125.8	7.51	-50.6
11/13/07	-	2.86	484.5	7.06	-2.3	6.84	-65.3	7.86	-42.6	6.79	-78.1	7.58	4.2
11/27/07	5.5	2.86	479.4	6.99	-38.5	6.97	-205.0	8.46	-183.9	6.91	-156.8	7.25	-1.7
12/12/07	-	3.01	482.2	7.20	-25.3	7.20	-115.2	7.64	-107.7	7.04	-129.7	6.90	-31.9
01/15/08	4.8	2.98	483.3	6.76	5.9	6.73	-85.5	7.89	-94.3	6.67	-137.4	6.71	-33.0
02/07/08 ³	-	-	-	-	-	-	-	-	-	-	-	5.77	20.2
02/12/08	7.0	2.76	487.4	6.67	44.6	-	-	7.39	-45.6	6.42	-88.0	6.70	-15.3
03/18/08	6.0	2.88	375.1	7.85	3.6	-	-	8.80	-189.2	7.23	-211.3	7.05	-95.3
04/10/08	7.5	2.90	397.7	6.74	-80.0	6.70	-163.4	7.50	-142.6	6.57	-165.3	7.39	-24.5
05/15/08	7.3	2.97	442.2	6.24	21.2	6.55	-265.4	6.55	-233.7	5.60	-183.7	7.29	-143.3
05/27/08	7.0	3.00	464.1	7.11	-16.3	6.85	-242.2	6.98	-191.1	6.80	-235.2	7.26	-19.5
06/09/08	7.0	3.10	455.4	7.40	-47.5	7.09	-251.2	7.70	-178.8	6.97	-219.7	7.19	-61.5
06/17/08	7.5	2.91	443.9	7.42	-22.7	6.90	-283.0	7.29	-131.0	6.88	-244.3	7.30	-82.5
07/10/08	7.3	2.98	470.9	7.32	-34.1	6.90	-238.4	7.05	-172.6	6.90	-215.0	7.85	-113.5
07/22/08	7.0	2.99	455.5	6.94	-272.5	6.97	-267.4	7.07	-190.6	7.01	-248.9	7.35	-89.1
08/04/08	6.8	2.89	450.7	7.60	-94.4	6.94	-266.0	6.19	-173.1	7.02	-251.2	-	-
08/05/08	-	3.05	445.3	-	-	-	-	-	-	-	-	7.29	-70.0
08/18/08	7.3	3.93	478.9	7.46	-166.7	7.08	-291.9	7.40	-202.6	7.07	-268.8	7.40	-52.4
08/22/08	-	2.89	473.7	7.97	-212.9	7.08	-301.8	7.74	-224.0	7.03	-275.9	7.67	-27.8
08/25/08	-	2.93	470.5	7.77	-287.7	7.18	-286.1	6.89	-205.6	7.12	-273.8	8.02	-108.4
08/26/08	-	2.91	468.8	7.95	-255.4	7.09	-305.4	7.75	-281.2	7.14	-273.1	7.77	-41.4
09/24/08	-	3.03	423.2	7.18	-107.8	6.99	-255.4	7.11	-205.7	6.89	-245.2	7.70	-87.7
09/30/08	-	3.02	434.3	7.77	-151.9	6.89	-267.5	-	-	6.92	-269.9	8.10	-94.0
10/13/08	5.8	3.34	433.1	7.17	-98.7	6.94	-218.3	6.80	-157.2	7.01	-206.1	8.32	-101.0
10/27/08	5.8	3.21	247.8	7.34	-162.5	6.96	-175.3	7.20	-152.3	6.98	-126.8	7.88	273.7
11/19/08	5.5	2.83	453.7	7.20	-104.5	6.77	-204.7	7.12	-82.2	6.71	-154.7	7.74	-35.1
12/03/08	5.3	3.56	453.0	7.23	-45.0	6.86	-141.3	7.06	-100.1	6.84	-135.6	7.65	-47.5
01/9/09 ⁴	-	3.15	458.3	-	-	-	-	-	-	-	-	6.95	-43.0
01/12/09	5.3	2.94	466.3	6.36	-82.8	6.38	-245.1	-	-	6.82	-259.0	7.11	-74.0

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
SEPTEMBER 2011 MONTHLY SUMMARY
Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 or 9 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
02/19/09 ⁴	5.3	2.78	480.1	6.60	-3.2	6.74	-145.1	7.26	-117.6	6.25	-162.3	6.68	-18.1
03/10/09	5.0	2.88	481.2	-	-	-	-	-	-	-	-	7.36	34.3
04/13/09	7.0	2.78	532.7	7.45	-9.9	7.04	-185.5	7.50	-65.8	6.98	-175.4	7.77	-32.2
05/06/09	5.5	2.89	444.4	-	-	6.47	-221.3	-	-	6.56	-206.5	7.62	-86.6
06/03/09	6.5	2.91	445.9	6.98	-145.1	6.62	-260.8	7.07	-192.8	6.65	-260.4	7.55	-15.4
06/16/09	6.5	2.98	388.0	7.09	-186.6	6.79	-319.3	7.16	-233.2	6.80	-298.2	7.70	-158.1
07/01/09	6.0	2.95	376.5	7.43	376.5	6.93	-366.2	7.42	-310.8	6.97	-350.5	7.89	-189.6
07/14/09	5.8	2.97	394.4	-	-	6.85	-338.8	-	-	6.98	-331.9	7.90	-146.2
07/29/09	6.0	2.78	404.5	7.24	-175.5	7.39	-427.7	8.10	-260.2	7.29	-403.7	8.05	-135.6
08/05/09	5.5	2.89	433.8	-	-	-	-	8.73	-120.7	-	-	8.17	-146.0
08/19/09	5.1	2.97	425.7	-	-	-	-	8.25	-37.6	-	-	7.54	47.0
09/17/09	5.3	2.38	490.6	7.27	-91.3	6.81	-180.3	7.75	-120.2	6.85	-182.3	6.95	-24.7
09/30/09	5.0	2.96	503.7	8.03	-18.9	8.99	-253.1	7.75	-217.2	7.03	-276.6	7.98	-17.0
10/15/09	5.5	2.93	496.6	6.57	-121.4	7.63	-301.0	8.33	-148.5	7.71	-314.5	7.85	-41.2
10/28/09	4.9	2.96	487.6	8.79	-69.9	7.28	-216.4	9.08	-143.0	7.24	-162.8	7.94	2.8
11/11/09	5.0	2.91	420.8	8.34	-15.3	7.49	-243.7	8.42	-163.9	7.51	-199.3	7.74	60.6
12/17/09 ⁵	5.0	2.90	416.5	4.65	100.2	5.00	15.3	-	-	5.12	-1.8	5.91	-26.4
01/14/10 ⁵	4.8	2.85	417.7	6.96	-89.0	6.82	-186.4	-	-	6.84	-206.1	6.45	-67.4
02/02/10 ⁵	4.7	2.94	484.0	7.58	-46.7	6.85	-129.6	-	-	6.67	-131.1	6.95	-48.1
03/09/10	4.8	2.74	474.7	8.27	-78.3	7.95	-204.2	8.74	-208.9	8.10	-220.8	7.75	-5.9
04/26/10 ⁶	12.0	2.85	479.5	5.14	135.1	5.61	-19.0	5.04	109.2	5.60	-29.6	6.15	35.9
05/17/10	9.7	2.97	436.9	6.26	196.9	7.04	-283.9	7.79	-235.1	7.08	285.4	7.76	-73.8
05/24/10	9.4	3.16	418.0	7.43	-156.1	7.00	-259.9	7.27	-171.4	6.89	-282.6	7.11	-78.6
05/27/10	9.6	3.18	423.1	5.52	-225.1	7.58	-316.7	8.86	-318.2	6.74	-296.8	7.07	-98.7
06/01/10	10.5	3.11	444.0	8.47	-32.2	7.72	-292.6	9.00	-	6.74	-300.9	7.01	-31.5
06/14/10	10.0	2.99	427.7	7.40	-81.7	6.85	-272.5	8.22	-220.2	6.61	-181.6	7.48	-93.7
06/15/10	-	-	-	8.04	-221.6	6.89	-347.7	-	-	6.17	-355.9	-	-
06/16/10	-	2.99	427.7	7.40	-81.7	6.85	-272.6	8.22	-220.2	6.61	-181.6	7.48	-93.7
06/18/10	9.1	-	-	7.72	-211.7	6.79	-335.6	-	-	6.69	-336.7	-	-
06/21/10	9.0	3.21	409.4	7.99	-242.7	6.96	-364.1	7.86	-303.4	6.78	-349.5	7.70	-142.3
06/30/10	10.0	2.59	451.5	8.73	-216.2	8.73	-216.2	-	-	6.78	-337.9	7.96	-164.5
07/01/10	-	2.82	422.4	-	-	-	-	-	-	-	-	7.94	-241.9
07/13/10	10.0	2.62	479.5	7.52	-112.1	6.90	-279.5	8.02	-255.2	6.90	-294.0	7.76	-65.8
07/21/10	10.0	2.93	475.1	7.90	-70.5	7.15	-301.5	7.80	-212.4	7.27	-315.3	8.09	-95.7
07/29/10	10.0	2.90	465.3	7.73	-168.6	7.25	-318.1	7.08	-192.5	7.15	-318.5	7.06	-45.6
08/03/10	9.0	2.94	458.6	7.69	-193.3	7.16	-311.4	7.16	-311.4	7.17	-324.5	7.39	-66.3

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
SEPTEMBER 2011 MONTHLY SUMMARY
Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 or 9 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
08/12/10	9.0	2.85	476.3	7.98	-255.3	7.07	-299.3	7.50	-235.2	7.06	-307.0	7.55	-26.2
08/17/10	9.5	2.64	470.9	8.09	-47.2	7.54	-306.0	8.47	-206.8	7.37	-320.0	7.86	-74.0
08/24/10	9.2	3.04	250.0	7.81	-129.9	7.21	-151.9	7.20	-202.9	7.09	-147.9	7.81	2.9
09/02/10	9.2	2.84	503.9	7.70	-208.4	-	-	8.15	-227.0	7.32	-267.2	7.97	-20.2
09/16/10	8.0	3.21	455.8	8.40	-219.9	7.29	-209.3	8.66	-197.0	7.32	-279.7	7.76	-76.4
09/22/10 ⁷	8.0	3.06	476.5	8.50	-151.0	7.25	-276.9	8.30	-257.8	7.39	-279.9	7.93	-112.0
09/30/10 ⁷	7.6	3.16	503.3	8.49	-263.9	7.32	-265.4	8.53	-221.9	7.26	-267.8	8.61	94.1
10/06/10 ⁸	9.0	3.28	479.3	7.83	-287.5	7.39	-305.8	8.25	-246.7	7.62	-305.1	8.17	-235.5
10/11/10	8.0	3.20	479.3	7.52	-190.4	7.00	-284.4	8.28	-227.4	7.15	-290.4	7.85	26.4
10/19/10	8.0	2.89	447.3	8.75	-157.3	7.43	-310.4	8.52	-203.0	7.22	-310.6	8.15	130.4
10/28/10	8.0	2.95	579.0	7.23	-282.8	6.98	-368.9	8.50	-384.7	7.12	-402.6	7.73	-30.7
11/02/10	8.0	2.69	366.7	7.89	-285.1	7.14	-385.2	8.46	-307.5	7.00	-385.7	7.62	-31.5
11/15/10	8.5	2.94	361.7	7.79	-273.2	7.08	-381.9	8.04	-269.3	6.89	-384.5	7.64	-2.2
12/07/10 ⁹	8.5	3.01	387.2	6.97	-298.4	6.82	-375.1	-	-	6.57	-353.5	6.41	-112.4
01/07/11 ⁹	8.5	2.92	434.1	6.50	-134.0	5.98	-200.1	-	-	6.08	-216.2	6.15	-4.9
02/01/11 ⁹	8.0	3.07	423.8	6.75	-332.2	6.86	-279.7	-	-	6.59	-297.0	6.62	-9.3
03/11/11	8.5	3.05	384.7	7.66	-239.2	7.11	-344.7	-	-	6.85	-370.1	7.05	-73.4
4/19/2011 ¹⁰	30	2.61	454.9	-	-	-	--	-	-	-	-	4.72	172.9
04/26/11	29	2.91	362.1	7.45	-199.2	6.58	-346.5	7.42	-232.8	6.41	-369.7	7.22	-144.6
05/03/11	27	2.90	355.0	7.70	-264.8	6.56	-361.5	7.81	-264.9	6.54	-402.2	7.60	-137.5
05/11/11	24	2.84	344.2	6.81	-198.2	6.31	-229.0	6.99	-200.7	6.23	-204.0	6.99	-139.2
05/20/11	17	3.03	372.4	8.10	-282.2	7.09	-361.8	7.89	-219.6	6.39	-367.9	7.36	-44.1
06/01/11	18	2.92	378.6	8.18	-175.7	7.11	-360.0	8.14	-272.8	6.55	-337.9	7.32	-50.3
6/15/11 ¹¹	16	3.18	407.7	-	-	-	-	8.60	-231.3	-	-	8.15	-3.9
6/21/11 ¹¹	15	3.09	415.6	-	-	-	-	8.15	-184.2	-	-	-	-
6/28/11 ¹²	15	2.95	204.5	7.66	-503.6	6.94	-581.5	8.44	-458.1	6.93	-581.5	7.52	-85.1
07/06/11	14	2.95	237.1	8.37	-50.3	6.98	-525.6	8.10	-382.9	6.75	-550.2	7.81	-249.1
07/13/11	14	2.88	352.2	8.46	-312.3	6.83	-412.1	5.43	-48.5	6.67	-420.1	7.84	-37.4
07/19/11	13	3.11	304.3	7.27	-462.3	6.93	-434.0	8.40	-407.5	6.85	-436.0	8.0	-86.6
07/28/11	-	2.98	320.8	8.32	-294.3	7.10	-393.6	8.55	-165.4	6.99	-376.0	7.90	-70.4
08/04/11	12	3.12	337.7	7.88	-416.0	7.20	-437.3	8.73	-437.5	7.11	-431.8	8.14	-155.7
08/11/11	12	2.85	360.2	7.72	-456.0	7.27	-421.6	8.95	-421.9	6.87	-443.0	8.04	-162.8
08/17/11	12	3.00	362.5	6.93	-291.8	6.84	-415.5	8.60	-338.3	6.92	-437.7	7.97	-187.8
08/24/11	12	3.01	362.8	6.42	-257.0	7.08	-405.5	8.30	-277.9	6.84	-402.2	7.85	-164.4

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
SEPTEMBER 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 or 9 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
08/30/11	12	2.90	350.9	8.23	-321.5	7.27	-433.4	7.49	-366.0	7.05	-428.0	7.63	-63.5
09/08/11	12	2.98	362.2	7.66	-387.0	6.98	-405.5	7.55	-375.2	6.80	-402.3	7.91	-183.6
09/15/11	12	3.01	385.0	8.16	-194.0	6.97	-372.7	8.38	-359.1	6.90	-342.6	8.07	-146.1
09/23/11 ¹¹	12	2.99	400.1	-	-	-	-	6.81	-142.1	-	-	8.30	-295.9

Notes

1. Aspen Seep Bioreactor Influent Flow measurements are field measurements completed with a graduated bucket and stop watch.
2. Biocell 1 was flushed on 10/08/07, 10/09/07, and 10/18/07; Biocell 1 was bypassed during this flushing period. Low pH readings in Manhole 1 from 10/10/07 through 10/31/07 were caused by drainage into pretreatment pond from failed seal in weir box cap.
3. Measurements are believed to be erroneous due to calibration error. Parameters were re-evaluated on 02/12/08.
4. Low pH measurements due to a power outage and associated chemical pump shutdown.
5. Low pH measurements caused by stripped gears on NaOH pump head that prevented dosing to Manhole 6.
6. Low pH measurements due to increase in system flow rates; chemical dosing rates lagged behind these system flow rate increases and were unable to prevent
7. Effluent readings were collected from the centrifuge discharge point on these dates due to sludge dewatering. Water was not being discharged from Pond 4.
8. Effluent readings were collected Pond 4 effluent on this date. Water was not being discharged from Pond 4.
9. Low pH measurements due to power outage and associated chemical pump failure during the inverter failure on November 29, 2010.
10. Low pH measurement due to increase in system flow rates.
11. Field measurements at intermediate bioreactor manholes were not collected when recirculation operations were interrupted due to sludge dewatering operations or biocell flushing.
12. ORP measurements may be inaccurate due to probe calibration issues.

Abbreviations

- - not measured, not recorded, or bioreactor operation did not have flow at given location on the specified date.
 gpm - gallons per minute ORP - oxidation/reduction potential
 mV - millivolts s.U. - standard unit

TABLE 3
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - FLOW RATES¹
SEPTEMBER 2011 MONTHLY SUMMARY
Draft - Provisional Data

Date	Flow Rate (gpm)	Date	Flow Rate (gpm)
08/01/11	14.41	09/01/11	14.14
08/02/11	14.23	09/02/11	14.14
08/03/11	14.27	09/03/11	14.14
08/04/11	14.18	09/04/11	14.09
08/05/11	14.27	09/05/11	14.41
08/06/11	14.18	09/06/11	14.32
08/07/11	14.18	09/07/11	14.27
08/08/11	14.18	09/08/11	N/A
08/09/11	14.18	09/09/11	N/A
08/10/11	14.14	09/10/11	N/A
08/11/11	14.05	09/11/11	N/A
08/12/11	14.00	09/12/11	N/A
08/13/11	14.00	09/13/11	N/A
08/14/11	14.05	09/14/11	N/A
08/15/11	14.09	09/15/11	N/A
08/16/11	14.00	09/16/11	N/A
08/17/11	14.05	09/17/11	N/A
08/18/11	14.05	09/18/11	N/A
08/19/11	14.14	09/19/11	N/A
08/20/11	14.14	09/20/11	N/A
08/21/11	14.05	09/21/11	N/A
08/22/11	14.00	09/22/11	N/A
08/23/11	14.00	09/23/11	N/A
08/24/11	14.05	09/24/11	N/A
08/25/11	14.14	09/25/11	N/A
08/26/11	14.05	09/26/11	N/A
08/27/11	14.09	09/27/11	N/A
08/28/11	14.05	09/28/11	N/A
08/29/11	14.09	09/29/11	N/A
08/30/11	14.09	09/30/11	N/A
08/31/11	14.09	-	-
Average	14.11	Average	14.22

Notes

1. Aspen Seep flow data is provided by the USGS.

Abbreviations

gpm - gallons per minute

USGS - United States Geological Survey

TABLE 4
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - ENHANCED SAMPLING RESULTS
SEPTEMBER 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Parameter	Basis	September 15 2011 159ASPINF504 Influent (mg/L)	September 15 2011 159ASPMH2500 MH2 (mg/L)	September 15 2011 159ASPMH5501 MH5 (mg/L)	September 15 2011 159ASPMH7502 MH7 (mg/L)	September 15 2011 159ASPMH6503 MH6 (mg/L)	September 15 2011 159ASPEFF499 Effluent (mg/L)	Maximum Discharge Criteria (mg/L)	Average Discharge Criteria (mg/L)
pH (standard units)	Field	3.01	8.16	-	6.9	8.38	8.07	-	6.0 - 9.0
Selenium	Total	0.0018 J	-	-	-	-	0.0010 J	NP	0.005
Aluminum	Dissolved	47	0.30	0.13	0.041 J	0.85	0.25	4	2
Arsenic	Dissolved	<0.00090	0.0022	0.0018	0.0016	0.0018	0.0021	0.34	0.15
Cadmium	Dissolved	0.0019	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.009	0.004
Calcium	Dissolved	380	351	345	357	357	351	-	-
Chromium	Dissolved	0.0026	<0.00090	<0.00090	0.00092 J	<0.00090	<0.00090	0.97	0.31
Copper	Dissolved	0.94	0.0041	0.0043	0.0035	0.0042	0.0046	0.026	0.016
Hardness	Dissolved	1300	1200	1200	1200	1200	1200	-	-
Iron	Dissolved	145	0.0711	0.257	0.0243 J	0.449	0.148	2	1
Magnesium	Dissolved	92	77	78	79	71	78	-	-
Lead	Dissolved	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.136	0.005
Nickel	Dissolved	0.45	0.017	0.0025	0.00073 J	0.012	0.025	0.84	0.094
Phosphorus	Dissolved	<0.040	0.15	<0.020	<0.020	<0.020	<0.020		
Zinc	Dissolved	0.53	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	0.21	0.21
Chloride	Total	2.2 J	-	-	-	-	3.5	-	-
Acidity	Total	600	-	-	-	-	<2.0	-	-
Alkalinity (Total)	Total	<2.00	336	432	488	300	344	-	-
Alkalinity (Bicarbonate)	Total	<2.40	410	517	595	361	419	-	-
Alkalinity (Carbonate)	Total	<1.20	<1.20	4.80	<1.20	2.40	<1.20	-	-
Alkalinity (Hydroxide)	Total	<0.700	<0.700	<0.700	<0.700	<0.700	<0.700	-	-
Nitrate/Nitrite-N	Total	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	-	-
Ammonia-N	Total	0.44 J	0.41 J	<0.10	<0.10	0.19 J	0.20 J	-	-
Dissolved Organic Carbon	Dissolved	1.8	350	330	310	190	180	-	-
Nitrate-N	Total	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	-	-
Nitrite-N	Total	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	-	-
Sulfate	Total	2070	1560	1350	1280	1590	1440	-	-
Sulfide	Total	--	<0.020	38	88	0.021 J	-	-	-
Total Dissolved Solids	Total	2950	-	-	-	-	2770	-	-
Total Suspended Solids	Total	17	-	-	-	-	10	-	-

Abbreviations

< - Analyte not detected at or above the or method detection limit
 -- Discharge criteria not established or analysis was not requested
 J - Estimated value. Analyte detected at
 mg/L - milligrams per liter
 NP - Not Promulgated

TABLE 5
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - AUGUST 11, 2011 REVISED ANALYTICAL RESULTS¹
SEPTEMBER 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Parameter	Basis	August 11 2011 154ASPEFF486 Filtrate (mg/L)	August 11 2011 155ASPEFF487 Effluent (mg/L)	August 11 2011 155MH2488 MH2 (mg/L)	August 11 2011 155MH4489 MH4 (mg/L)	August 11 2011 155MH7490 MH7 (mg/L)	August 11 2011 155MH6491 MH6 (mg/L)	August 11 2011 155ASPINF492 Influent (mg/L)	Maximum Discharge Criteria (mg/L)	Average Discharge Criteria (mg/L)
pH (standard units)	Field	--	8.04	7.72	7.27	6.87	8.95	2.85	-	6.0 - 9.0
Selenium	Total	0.0015 J	0.0012 J	--	--	--	--	0.0014 J	NP	0.005
Aluminum	Dissolved	<0.040	0.47	1.9	0.18	0.11	2.2	51	4	2
Arsenic	Dissolved	<0.00090	0.0016	<0.00090	<0.00090	<0.00090	<0.00090	0.0017	0.34	0.15
Cadmium	Dissolved	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0028	0.009	0.004
Calcium	Dissolved	300	327	311	312	310	272	382	-	-
Chromium	Dissolved	<0.00090	0.0011 J	<0.00090	<0.00090	<0.00090	<0.00090	0.0048	0.97	0.31
Copper	Dissolved	0.0040	0.0030	0.00058 J	<0.00050	<0.00050	0.00056 J	1.1	0.026	0.016
Hardness	Dissolved	1400	1100	1000	1000	1000	890	1300	-	-
Iron	Dissolved	0.173	0.0383 J	0.0212 J	0.0314 J	0.0230 J	0.0203 J	144	2	1
Magnesium	Dissolved	150	62	60	62	59	50	93	-	-
Lead	Dissolved	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.136	0.005
Nickel	Dissolved	0.012	0.0045	0.0055	0.0022	0.0019 J	0.0090	0.60	0.84	0.094
Phosphorus	Dissolved	--	<0.020	<0.020	<0.020	<0.020	<0.020	<0.040		
Zinc	Dissolved	0.011 J	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	0.76	0.21	0.21
Chloride	Total	46	4.2	--	--	--	--	3.7	-	-
Acidity	Total	<2.0	<2.0	--	--	--	--	640	-	-
Alkalinity (Total)	Total	292	284	304	436	552	292	<2.00	-	-
Alkalinity (Bicarbonate)	Total	356	346	356	502	673	356	<2.40	-	-
Alkalinity (Carbonate)	Total	<1.20	<1.20	7.19	14.4	<1.20	<1.20	<1.20	-	-
Alkalinity (Hydroxide)	Total	<0.700	<0.700	<0.700	<0.700	<0.700	<0.700	<0.700	-	-
Nitrate/Nitrite-N	Total	--	<0.45	<0.45	0.53	0.51	0.51	<0.45	-	-
Total Kjeldahl Nitrogen	Total	--	<0.15	40	0.20 J	<0.15	0.18 J	0.31 J	-	-
Ammonia-N	Total	--	<0.10	59	<0.10	<0.10	<0.10	0.21 J	-	-
Dissolved Organic Carbon	Dissolved	--	130	270	240	230	130	2.3	-	-
Nitrate-N	Total	--	<0.30	<0.30	0.53 J	0.51 J	0.51 J	<0.30	-	-
Nitrite-N	Total	--	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	-	-
Sulfate	Total	1610	1430	1350	1180	1050	1360	1790	-	-
Sulfide	Total	--	--	2.2	46	110	2.4	--	-	-
Total Dissolved Solids	Total	2860	2870	--	--	--	--	3010	-	-
Total Suspended Solids	Total	22	11	--	--	--	--	28	-	-

Notes

1. Original sample results were reported in the August Monthly Report Summary Tables. The final revised lab report was issued on October 5, 2011 upon identification and correction of a laboratory error.

Abbreviations

< - Analyte not detected at or above the or method detection limit

-- Discharge criteria not established

J - Estimated value. Analyte detected at a level less than the Reporting Limit and greater than or equal to the Method Detection

mg/L - milligrams per liter

NP - Not Promulgated

TABLE 6
HIGH DENSITY SLUDGE TREATMENT PLANT - SAMPLE RESULTS
SEPTEMBER 2011 MONTHLY SUMMARY

Draft - Provisional Data

Parameter	Basis	September 1 2011 165HDSSEFF431 Effluent (mg/L)	September 1 2011 165HDSINF432 Influent (mg/L)	September 1 2011 165DS433 DS (mg/L)	September 1 2011 165CUD434 CUD (mg/L)	September 29 2011 166POND4COMP435 Pond 4 Pre-Discharge (mg/L)	Maximum Discharge (mg/L)	Average Discharge (mg/L)
pH ¹ (standard units)	Field	8.39	3.69	4.54	3.52	-	-	6.0 - 9.0
Selenium	Total	0.0015 J	0.0028 J	0.0021	0.0029 J	0.0023	NP	0.005
Aluminum	Dissolved	0.30	35	9.5	52	0.16	4	2
Arsenic	Dissolved	<0.00090	0.36	0.032	0.50	0.0012	0.34	0.15
Cadmium	Dissolved	<0.00010	0.00093 J	0.0015	0.00068 J	<0.00010	0.009	0.004
Calcium	Dissolved	699	306	298	300	914	-	-
Chromium	Dissolved	<0.00090	0.011	<0.00090	0.019	<0.00090	0.97	0.31
Copper	Dissolved	0.0049	0.041	0.091	0.015	0.012	0.026	0.016
Hardness	Dissolved	2100	1100	1100	1100	2500	-	-
Iron	Dissolved	0.494	321	15.4	426	0.200	2	1
Magnesium	Dissolved	85	78	84	73	58	-	-
Lead	Dissolved	<0.00020	<0.0010	<0.00020	<0.0010	<0.00020	0.136	0.005
Nickel	Dissolved	0.051	1.8	0.47	2.2	0.013	0.84	0.094
Zinc	Dissolved	<0.0040	0.35	0.18	0.36	0.010 J	0.21	0.21
Chloride	Total	3.2	4.7	3.5	7.1	5.2	-	-
Acidity	Total	<2.0	880	10	1100	<2.0	-	-
Alkalinity (Total)	Total	40.0	<2.00	<2.00	<2.00	24.0	-	-
Alkalinity (Bicarbonate)	Total	48.8	<2.40	<2.40	<2.40	29.3	-	-
Alkalinity (Carbonate)	Total	<1.20	<1.20	<1.20	<1.20	<1.20	-	-
Alkalinity (Hydroxide)	Total	<0.700	<0.700	<0.700	<0.700	<0.700	-	-
Sulfate	Total	1,930	1,960	1,200	2,240	2,230	-	-
Total Dissolved Solids	Total	2,920	3,040	1,900	3,430	3,480	-	-
Total Suspended Solids	Total	20	67	31	84	24	-	-

Notes

1. pH value was collected in field and is the average of 3 grab samples comprising the HDS Effluent sample and one grab sample for the HDS Influent, DS, and CUD samples.

Abbreviations

< - Analyte not detected at or above the or method detection limit

CUD - Channel Underdrain

-- not measured or not available

DS - Delta Seep

J - Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL).

NP - Not Promulgated

TABLE 7
CHANNEL UNDERDRAIN, DELTA SEEP, AND HDS TREATMENT PLANT - FLOW RATES
SEPTEMBER 2011 MONTHLY SUMMARY
Draft - Provisional Data

Date	Delta Seep Recorded Flow ¹		Channel Underdrain Recorded Flow ¹		Treated Water Discharged from the HDS Treatment Plant Recorded Flow ^{1,2}	
	(gpm)	(gallons)	(gpm)	(gallons)	(gpm)	(gallons)
9/1/2011	12.41	17,865	41.03	59,088	50.50	72,720
9/2/2011	12.30	17,717	40.86	58,836	50.12	72,172
9/3/2011	12.27	17,669	40.72	58,640	50.00	72,001
9/4/2011	12.21	17,579	40.59	58,443	50.00	71,998
9/5/2011	12.15	17,500	40.45	58,242	49.86	71,793
9/6/2011	12.07	17,380	40.29	58,022	49.50	29,551 ³
9/7/2011	11.99	17,261	40.16	57,826	49.00	41,741 ³
9/8/2011	12.02	17,302	40.05	57,666	49.00	70,556
9/9/2011	12.00	17,281	39.96	57,545	48.67	70,081
9/10/2011	11.99	17,264	39.88	57,428	48.50	69,840
9/11/2011	11.99	17,265	39.78	57,282	48.50	69,840
9/12/2011	12.00	17,283	39.66	57,112	48.47	69,791
9/13/2011	12.01	17,299	39.56	56,962	48.41	69,713
9/14/2011	12.03	17,320	39.49	56,859	48.44	69,751
9/15/2011	11.94	17,196	39.43	56,782	47.66	68,634
9/16/2011	11.72	16,883	39.32	56,627	46.91	67,558
9/17/2011	11.53	16,601	39.20	56,452	47.00	67,678
9/18/2011	11.38	16,380	39.09	56,288	47.00	67,677
9/19/2011	11.57	16,666	39.01	56,175	46.59	67,090
9/20/2011	11.25	16,203	38.94	56,072	45.84	66,005
9/21/2011	11.07	15,943	38.87	55,978	45.50	32,396 ³
9/22/2011	10.97	15,798	38.78	55,850	50.00	40,626 ³
9/23/2011	10.79	15,532	38.67	55,680	47.00	67,679
9/24/2011	10.94	15,758	38.66	55,676	46.53	67,002
9/25/2011	10.72	15,440	38.61	55,600	45.28	65,209
9/26/2011	10.52	15,150	38.51	55,454	44.47	64,038
9/27/2011	10.34	14,887	38.45	55,369	44.34	63,849
9/28/2011	10.56	15,205	38.37	55,253	43.94	63,279
9/29/2011	10.48	15,097	38.34	55,210	44.32	63,824
9/30/2011	10.56	15,211	38.31	55,166	44.59	64,216
Average Flow Rate or Total Discharged	11.53	497,935	39.43	1,703,584	47.53	1,918,306

Notes:

1. Channel Underdrain, Delta Seep, and Treated Water Discharge from the HDS Treatment Plant flow rates are calculated from flow totalizer volume measurements.
2. The operational flow rate is reported. Water discharge does not always occur 24 hours per day.
3. Water from the HDS Treatment Plant was discharged to Pond 4 during this time to raise the Pond 4 water level to support Pond 4 sludge removal activities.

Abbreviations:

gpm - gallons per minute HDS - High Density Sludge

TABLE 8
HIGH DENSITY SLUDGE TREATMENT SYSTEM - OPERATIONAL DATA SUMMARY
SEPTEMBER 2011 MONTHLY SUMMARY

Draft - Provisional Data

Reporting Period	Treated Water Discharged (gallons)	Lime Consumed (kilograms)	Diesel Fuel Consumed (gallons)	Flocculant Consumed (kilograms)	Sludge Wasted (gallons)	Freshwater Consumed (gallons)
May 1 - May 31, 2011	2,146,472	6,633	2,570	59	4,200	4,700
June 1 - June 30, 2011	2,918,988	9,873	2,291	63	11,000	6,200
July 1 - July 31, 2011	2,165,870	7,455	2,129	55	15,800	9,100 ¹
August 1 - August 31, 2011	2,073,380	6,284	2,142	54	6,300	6,200 ¹
September 1 - September 30, 2011	1,918,306	4,466	2,284	46	6,250	9,900 ¹

Notes

1. Includes water taken from the High Density Sludge Treatment System Fresh Water Tank and used for Remedial Investigation and Feasibility Study drilling activities.

Atlantic Richfield Company

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November 10, 2011

Mr. Gary Riley
US EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105

Mr. Kevin Mayer
US EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105

RE: Leviathan Monthly Report for October 2011

Dear Mr. Riley and Mr. Mayer:

The following text describes activities conducted during the month of October 2011 at the Leviathan Mine Site and activities anticipated to occur during the upcoming month. These activities are organized by work area [Aspen Seep, Channel Underdrain (CUD) and Delta Seep (DS)], and site-wide tasks. This progress report is being submitted in accordance with Paragraph 62 of the Administrative Settlement Agreement and Order on Consent for Removal Action (AOC) (effective January 21, 2009).

ACTIVITIES FOR OCTOBER

Aspen Seep

- Operated the Aspen Seep Bioreactor (ASB) in recirculation mode during the month of October. Routine O&M was performed weekly. Influent and effluent sampling occurred on October 28, 2011. The currently available influent and effluent water quality data for the September 28, 2011 sampling event is presented in Table 1. Recent pH and ORP field data are summarized in Table 2. No new influent flow rate data have been received from the USGS since the Monthly Report for September 2011. Any new flow data received will be included in subsequent monthly reports.
- Completed installation of replacement batteries and construction of a separate battery room in the Electrical Conex.
- Initiated winterization activities, including receipt of deliveries of sodium hydroxide, ethanol, and propane.
- On October 7, 2011, elevated concentrations of hydrogen sulfide gas (H₂S) triggered an alarm condition resulting in the evacuation of personnel from the ASB treatment system. The measured H₂S concentrations causing the alarm were significantly higher than historic site H₂S measurements and were approximately 2.5 times the Immediately Dangerous to Life and Health (IDLH)

A BP affiliated company



concentration for H₂S (100 parts per million [ppm]). Consequently, a Stop Work was issued until further protective and investigative actions were implemented. Additional H₂S monitoring equipment was installed, and additional measurements of air quality were conducted in October. Monitoring and testing are ongoing in an attempt to understand the conditions that led to the elevated H₂S concentrations. Following implementation of additional safety procedures, normal operation and maintenance activities resumed on October 19, 2011. As part of the monitoring and testing, ASB manholes MH-6, MH-7 and MH-9, were sampled for sulfate, sulfide and dissolved metals on October 20 and 21, 2011. The results of this sampling have not yet been received from the analytical laboratory and will be provided in next month's report.

CUD and DS

- Limited Access Season (LAS) operation of the HDS Treatment Plant and the associated capture of the CUD and DS continued during the month of October. Samples of the HDS Treatment Plant influent and effluent were collected for laboratory analysis on October 4, 2011. The analytical results associated with the October 4, 2011 sampling event are presented in Table 3. Flow rates recorded for the DS, CUD, and treated water discharge from the HDS Treatment Plant are included in Table 4. A summary of the HDS Plant operational data for October 2011 is presented in Table 5.
- On October 10, 2011, Atlantic Richfield submitted to EPA a Waste Material Off-Site Shipment Notification Letter for HDS Treatment System solids. Approximately 20 cubic yards of HDS Treatment System solids were shipped off site on October 13, 2011.
- Pond 4 sludge removal and dewatering operations were completed in October as specified within Amendment No.1 (including Revision No.1) to the 2011 RAWP. In total, approximately 1,280 cubic yards of dewatered sludge were shipped from the site. Dredging operations were completed and demobilization activities began on September 29, 2011. Demobilization activities were completed on October 4, 2011. Following lowering of the Pond 4 water level, previously identified leaks in the Pond 4 liner were repaired. Flows from the CUD and DS were redirected from the temporary influent storage tanks back to Pond 4, and the HDS Plant was placed into standby mode on October 20, 2011 while Pond 4 refilled. On October 24, 2011, the HDS Plant resumed normal operations with discharge to Leviathan Creek.

Site-wide

- Work continued on updating the Leviathan Mine Project Database with data from monitoring performed by Atlantic Richfield and various agencies.
- On October 12, 2011, Atlantic Richfield submitted to EPA a Waste Material Off-Site Shipment Notification Letter for miscellaneous waste materials resulting from various site operations and maintenance activities. Approximately 3.7 cubic yards of waste material were shipped off site on October 13, 2011.
- On October 14, 2011, personnel from Eastern Alpine Fire were provided a tour of the site.
- A Technical Advisory Committee (TAC) meeting was held on October 26, 2011 in Carson City, Nevada. Atlantic Richfield provided a summary of 2011 response actions at the meeting.
- On October 29, 2011, Atlantic Richfield, EPA, and Lahontan Regional Water Quality Control Board (LRWQCB) personnel met at the site to discuss implementation of certain temporary stormwater management improvements along the main site access road between Pond 3 and Pond 4, and along the crusher roadway which leads north from Pond 3.

ACTIVITIES FOR UPCOMING MONTH

Aspen Seep

- Continue operation of the ASB in recirculation mode and conduct routine operation, maintenance, and monitoring as outlined in the 2011 RAWP.
- Complete winter preparation activities, including receipt of deliveries of sodium hydroxide, ethanol, and propane.
- Continue monitoring and testing related to the elevated H₂S concentrations measured in early October.

CUD and DS

- Implement temporary stormwater controls along the main site access road between Pond 3 and Pond 4 to better manage stormwater flows into the Pond 4 area.
- Seasonal decommissioning and winterization of the HDS Treatment System and CUD and DS collection and conveyance equipment, including lowering of Pond 4 water levels and replenishing consumable supplies, will be completed in November, and Atlantic Richfield will demobilize from the site. Atlantic Richfield and EPA personnel discussed the timing and process for shutting down the CUD and DS capture and conveyance equipment and the winterization of the HDS Treatment System during an EPA site visit on October 27, 2011. All LAS site activities for the HDS Treatment System are expected to be completed by November 18, 2011, subject to weather conditions.

Site-wide

- Due to the Leviathan TAC meeting on October 26, 2011, the regularly scheduled EPA progress update conference call for October was cancelled. The next update is anticipated to be provided to EPA via conference call on November 15, 2011.

If you have any questions or comments, please feel free to contact me at (714) 228-6770 or via e-mail at Anthony.Brown@bp.com.

Sincerely,

Signed by Dave McCarthy

Tony Brown
Project Manager

Gary Riley and Kevin Mayer – USEPA Region 9

November 10, 2011

Page 4 of 4

Attachments:

Table 1 – Aspen Seep Bioreactor, Monthly Influent and Effluent Sample Results

Table 2 – Aspen Seep Bioreactor, Recent pH and ORP Field Measurements

Table 3 – HDS Treatment System, Influent and Effluent Sample Results

Table 4 – CUD, DS, and HDS Treatment System Flow Rates

Table 5 – HDS Treatment System, Operational Data Summary

cc: Chuck Curtis, Lahontan Regional Water Quality Control Board
Ronald Halsey, Atlantic Richfield Company
Nathan Block, Esq., BP America Inc.
Adam Cohen, Esq., Davis Graham & Stubbs LLP
Dave McCarthy, Copper Environmental Consulting
Marc Lombardi, AMEC-Geomatrix Consultants, Inc.
Grant Ohland, AMEC-Geomatrix Consultants, Inc.
Sandy Riese, EnSci, Inc.

TABLE 1
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - SAMPLE RESULTS
OCTOBER 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Parameter	Basis	September 28 2011 160ASPINF506 Influent (mg/L)	September 28 2011 160ASPEFF505 Effluent (mg/L)	Maximum Discharge Criteria (mg/L)	Average Discharge Criteria (mg/L)
pH (Standard Units)	Field	2.86	7.54	-	6.0 - 9.0
Selenium	Total	0.0037	0.00094 J	NP	0.005
Aluminum	Dissolved	51	<0.040	4	2
Arsenic	Dissolved	<0.00090	<0.00090	0.34	0.15
Calcium	Dissolved	365	336	-	-
Cadmium	Dissolved	0.0022	<0.00010	0.009	0.004
Chromium	Dissolved	0.0043	<0.00090	0.97	0.31
Copper	Dissolved	1.1	0.0055	0.026	0.016
Hardness	Dissolved	1300	1200	-	-
Iron	Dissolved	146	0.0317 J	2	1
Magnesium	Dissolved	92	79	-	-
Lead	Dissolved	0.00026 J	<0.00020	0.136	0.005
Nickel	Dissolved	0.53	0.023	0.84	0.094
Zinc	Dissolved	0.67	0.0044 J	0.21	0.21
Chloride	Total	3.7	3.9	-	-
Acidity	Total	650	<2.0	-	-
Alkalinity (Total)	Total	<2.00	272	-	-
Alkalinity (Bicarbonate)	Total	<2.40	332	-	-
Alkalinity (Carbonate)	Total	<1.20	<1.20	-	-
Alkalinity (Hydroxide)	Total	<0.700	<0.700	-	-
Sulfate	Total	2050	1610	-	-
Total Dissolved Solids	Total	2910	2630	-	-
Total Suspended Solids	Total	33	1.0 J	-	-

Abbreviations

< - Analyte not detected at or above the or method detection limit

-- Discharge criteria not established

J - Estimated value; analyte detected at a level less than the Reporting Limit and greater than or equal to the Method Detection Limit

mg/L - milligrams per liter

NP - Not Promulgated

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
OCTOBER 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2)		Manhole 6 (NaOH dosing location)		Manhole 7 or 9 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
09/21/07	6.0	2.91	428.9	7.34	-268.4	7.13	-280.3	9.56	-285.8	7.13	-265.3	8.42	2.6
09/26/07	6.2	2.89	496.7	7.80	-192.1	7.36	-223.0	9.64	-195.4	7.34	-232.7	8.34	50.3
10/03/07	5.5	2.85	484.1	8.07	-127.7	8.50	-129.6	11.25	-136.5	7.64	-164.0	8.22	-5.2
10/10/07 ²	5.8	2.80	498.0	5.50	55.9	5.64	-70.5	10.00	-190.0	6.20	-171.6	7.78	-268.0
10/18/07 ²	5.9	2.83	482.4	5.00	26.8	5.68	-46.2	11.38	-112.0	6.23	-139.0	8.69	135.0
10/31/07 ²	9.0	2.88	402.7	4.26	319.3	6.85	-156.7	9.80	-170.0	6.95	-212.2	7.66	-94.3
11/08/07	6.0	2.88	418.0	7.55	-128.3	7.01	-116.7	8.23	-133.9	6.86	-125.8	7.51	-50.6
11/13/07	-	2.86	484.5	7.06	-2.3	6.84	-65.3	7.86	-42.6	6.79	-78.1	7.58	4.2
11/27/07	5.5	2.86	479.4	6.99	-38.5	6.97	-205.0	8.46	-183.9	6.91	-156.8	7.25	-1.7
12/12/07	-	3.01	482.2	7.20	-25.3	7.20	-115.2	7.64	-107.7	7.04	-129.7	6.90	-31.9
01/15/08	4.8	2.98	483.3	6.76	5.9	6.73	-85.5	7.89	-94.3	6.67	-137.4	6.71	-33.0
02/07/08 ³	-	-	-	-	-	-	-	-	-	-	-	5.77	20.2
02/12/08	7.0	2.76	487.4	6.67	44.6	-	-	7.39	-45.6	6.42	-88.0	6.70	-15.3
03/18/08	6.0	2.88	375.1	7.85	3.6	-	-	8.80	-189.2	7.23	-211.3	7.05	-95.3
04/10/08	7.5	2.90	397.7	6.74	-80.0	6.70	-163.4	7.50	-142.6	6.57	-165.3	7.39	-24.5
05/15/08	7.3	2.97	442.2	6.24	21.2	6.55	-265.4	6.55	-233.7	5.60	-183.7	7.29	-143.3
05/27/08	7.0	3.00	464.1	7.11	-16.3	6.85	-242.2	6.98	-191.1	6.80	-235.2	7.26	-19.5
06/09/08	7.0	3.10	455.4	7.40	-47.5	7.09	-251.2	7.70	-178.8	6.97	-219.7	7.19	-61.5
06/17/08	7.5	2.91	443.9	7.42	-22.7	6.90	-283.0	7.29	-131.0	6.88	-244.3	7.30	-82.5
07/10/08	7.3	2.98	470.9	7.32	-34.1	6.90	-238.4	7.05	-172.6	6.90	-215.0	7.85	-113.5
07/22/08	7.0	2.99	455.5	6.94	-272.5	6.97	-267.4	7.07	-190.6	7.01	-248.9	7.35	-89.1
08/04/08	6.8	2.89	450.7	7.60	-94.4	6.94	-266.0	6.19	-173.1	7.02	-251.2	-	-
08/05/08	-	3.05	445.3	-	-	-	-	-	-	-	-	7.29	-70.0
08/18/08	7.3	3.93	478.9	7.46	-166.7	7.08	-291.9	7.40	-202.6	7.07	-268.8	7.40	-52.4
08/22/08	-	2.89	473.7	7.97	-212.9	7.08	-301.8	7.74	-224.0	7.03	-275.9	7.67	-27.8
08/25/08	-	2.93	470.5	7.77	-287.7	7.18	-286.1	6.89	-205.6	7.12	-273.8	8.02	-108.4
08/26/08	-	2.91	468.8	7.95	-255.4	7.09	-305.4	7.75	-281.2	7.14	-273.1	7.77	-41.4
09/24/08	-	3.03	423.2	7.18	-107.8	6.99	-255.4	7.11	-205.7	6.89	-245.2	7.70	-87.7
09/30/08	-	3.02	434.3	7.77	-151.9	6.89	-267.5	-	-	6.92	-269.9	8.10	-94.0
10/13/08	5.8	3.34	433.1	7.17	-98.7	6.94	-218.3	6.80	-157.2	7.01	-206.1	8.32	-101.0
10/27/08	5.8	3.21	247.8	7.34	-162.5	6.96	-175.3	7.20	-152.3	6.98	-126.8	7.88	273.7
11/19/08	5.5	2.83	453.7	7.20	-104.5	6.77	-204.7	7.12	-82.2	6.71	-154.7	7.74	-35.1
12/03/08	5.3	3.56	453.0	7.23	-45.0	6.86	-141.3	7.06	-100.1	6.84	-135.6	7.65	-47.5
01/9/09 ⁴	-	3.15	458.3	-	-	-	-	-	-	-	-	6.95	-43.0

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
OCTOBER 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2)		Manhole 6 (NaOH dosing location)		Manhole 7 or 9 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
01/12/09	5.3	2.94	466.3	6.36	-82.8	6.38	-245.1	-	-	6.82	-259.0	7.11	-74.0
02/19/09 ⁴	5.3	2.78	480.1	6.60	-3.2	6.74	-145.1	7.26	-117.6	6.25	-162.3	6.68	-18.1
03/10/09	5.0	2.88	481.2	-	-	-	-	-	-	-	-	7.36	34.3
04/13/09	7.0	2.78	532.7	7.45	-9.9	7.04	-185.5	7.50	-65.8	6.98	-175.4	7.77	-32.2
05/06/09	5.5	2.89	444.4	-	-	6.47	-221.3	-	-	6.56	-206.5	7.62	-86.6
06/03/09	6.5	2.91	445.9	6.98	-145.1	6.62	-260.8	7.07	-192.8	6.65	-260.4	7.55	-15.4
06/16/09	6.5	2.98	388.0	7.09	-186.6	6.79	-319.3	7.16	-233.2	6.80	-298.2	7.70	-158.1
07/01/09	6.0	2.95	376.5	7.43	376.5	6.93	-366.2	7.42	-310.8	6.97	-350.5	7.89	-189.6
07/14/09	5.8	2.97	394.4	-	-	6.85	-338.8	-	-	6.98	-331.9	7.90	-146.2
07/29/09	6.0	2.78	404.5	7.24	-175.5	7.39	-427.7	8.10	-260.2	7.29	-403.7	8.05	-135.6
08/05/09	5.5	2.89	433.8	-	-	-	-	8.73	-120.7	-	-	8.17	-146.0
08/19/09	5.1	2.97	425.7	-	-	-	-	8.25	-37.6	-	-	7.54	47.0
09/17/09	5.3	2.38	490.6	7.27	-91.3	6.81	-180.3	7.75	-120.2	6.85	-182.3	6.95	-24.7
09/30/09	5.0	2.96	503.7	8.03	-18.9	8.99	-253.1	7.75	-217.2	7.03	-276.6	7.98	-17.0
10/15/09	5.5	2.93	496.6	6.57	-121.4	7.63	-301.0	8.33	-148.5	7.71	-314.5	7.85	-41.2
10/28/09	4.9	2.96	487.6	8.79	-69.9	7.28	-216.4	9.08	-143.0	7.24	-162.8	7.94	2.8
11/11/09	5.0	2.91	420.8	8.34	-15.3	7.49	-243.7	8.42	-163.9	7.51	-199.3	7.74	60.6
12/17/09 ⁵	5.0	2.90	416.5	4.65	100.2	5.00	15.3	-	-	5.12	-1.8	5.91	-26.4
01/14/10 ⁵	4.8	2.85	417.7	6.96	-89.0	6.82	-186.4	-	-	6.84	-206.1	6.45	-67.4
02/02/10 ⁵	4.7	2.94	484.0	7.58	-46.7	6.85	-129.6	-	-	6.67	-131.1	6.95	-48.1
03/09/10	4.8	2.74	474.7	8.27	-78.3	7.95	-204.2	8.74	-208.9	8.10	-220.8	7.75	-5.9
04/26/10 ⁶	12.0	2.85	479.5	5.14	135.1	5.61	-19.0	5.04	109.2	5.60	-29.6	6.15	35.9
05/17/10	9.7	2.97	436.9	6.26	196.9	7.04	-283.9	7.79	-235.1	7.08	285.4	7.76	-73.8
05/24/10	9.4	3.16	418.0	7.43	-156.1	7.00	-259.9	7.27	-171.4	6.89	-282.6	7.11	-78.6
05/27/10	9.6	3.18	423.1	5.52	-225.1	7.58	-316.7	8.86	-318.2	6.74	-296.8	7.07	-98.7
06/01/10	10.5	3.11	444.0	8.47	-32.2	7.72	-292.6	9.00	-	6.74	-300.9	7.01	-31.5
06/14/10	10.0	2.99	427.7	7.40	-81.7	6.85	-272.5	8.22	-220.2	6.61	-181.6	7.48	-93.7
06/15/10	-	-	-	8.04	-221.6	6.89	-347.7	-	-	6.17	-355.9	-	-
06/16/10	-	2.99	427.7	7.40	-81.7	6.85	-272.6	8.22	-220.2	6.61	-181.6	7.48	-93.7
06/18/10	9.1	-	-	7.72	-211.7	6.79	-335.6	-	-	6.69	-336.7	-	-
06/21/10	9.0	3.21	409.4	7.99	-242.7	6.96	-364.1	7.86	-303.4	6.78	-349.5	7.70	-142.3
06/30/10	10.0	2.59	451.5	8.73	-216.2	8.73	-216.2	-	-	6.78	-337.9	7.96	-164.5
07/01/10	-	2.82	422.4	-	-	-	-	-	-	-	-	7.94	-241.9
07/13/10	10.0	2.62	479.5	7.52	-112.1	6.90	-279.5	8.02	-255.2	6.90	-294.0	7.76	-65.8

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
OCTOBER 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2)		Manhole 6 (NaOH dosing location)		Manhole 7 or 9 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
07/21/10	10.0	2.93	475.1	7.90	-70.5	7.15	-301.5	7.80	-212.4	7.27	-315.3	8.09	-95.7
07/29/10	10.0	2.90	465.3	7.73	-168.6	7.25	-318.1	7.08	-192.5	7.15	-318.5	7.06	-45.6
08/03/10	9.0	2.94	458.6	7.69	-193.3	7.16	-311.4	7.16	-311.4	7.17	-324.5	7.39	-66.3
08/12/10	9.0	2.85	476.3	7.98	-255.3	7.07	-299.3	7.50	-235.2	7.06	-307.0	7.55	-26.2
08/17/10	9.5	2.64	470.9	8.09	-47.2	7.54	-306.0	8.47	-206.8	7.37	-320.0	7.86	-74.0
08/24/10	9.2	3.04	250.0	7.81	-129.9	7.21	-151.9	7.20	-202.9	7.09	-147.9	7.81	2.9
09/02/10	9.2	2.84	503.9	7.70	-208.4	-	-	8.15	-227.0	7.32	-267.2	7.97	-20.2
09/16/10	8.0	3.21	455.8	8.40	-219.9	7.29	-209.3	8.66	-197.0	7.32	-279.7	7.76	-76.4
09/22/10 ⁷	8.0	3.06	476.5	8.50	-151.0	7.25	-276.9	8.30	-257.8	7.39	-279.9	7.93	-112.0
09/30/10 ⁷	7.6	3.16	503.3	8.49	-263.9	7.32	-265.4	8.53	-221.9	7.26	-267.8	8.61	94.1
10/06/10 ⁸	9.0	3.28	479.3	7.83	-287.5	7.39	-305.8	8.25	-246.7	7.62	-305.1	8.17	-235.5
10/11/10	8.0	3.20	479.3	7.52	-190.4	7.00	-284.4	8.28	-227.4	7.15	-290.4	7.85	26.4
10/19/10	8.0	2.89	447.3	8.75	-157.3	7.43	-310.4	8.52	-203.0	7.22	-310.6	8.15	130.4
10/28/10	8.0	2.95	579.0	7.23	-282.8	6.98	-368.9	8.50	-384.7	7.12	-402.6	7.73	-30.7
11/02/10	8.0	2.69	366.7	7.89	-285.1	7.14	-385.2	8.46	-307.5	7.00	-385.7	7.62	-31.5
11/15/10	8.5	2.94	361.7	7.79	-273.2	7.08	-381.9	8.04	-269.3	6.89	-384.5	7.64	-2.2
12/07/10 ⁹	8.5	3.01	387.2	6.97	-298.4	6.82	-375.1	-	-	6.57	-353.5	6.41	-112.4
01/07/11 ⁹	8.5	2.92	434.1	6.50	-134.0	5.98	-200.1	-	-	6.08	-216.2	6.15	-4.9
02/01/11 ⁹	8.0	3.07	423.8	6.75	-332.2	6.86	-279.7	-	-	6.59	-297.0	6.62	-9.3
03/11/11	8.5	3.05	384.7	7.66	-239.2	7.11	-344.7	-	-	6.85	-370.1	7.05	-73.4
4/19/2011 ¹⁰	30	2.61	454.9	-	-	-	-	-	-	-	-	4.72	172.9
04/26/11	29	2.91	362.1	7.45	-199.2	6.58	-346.5	7.42	-232.8	6.41	-369.7	7.22	-144.6
05/03/11	27	2.90	355.0	7.70	-264.8	6.56	-361.5	7.81	-264.9	6.54	-402.2	7.60	-137.5
05/11/11	24	2.84	344.2	6.81	-198.2	6.31	-229.0	6.99	-200.7	6.23	-204.0	6.99	-139.2
05/20/11	17	3.03	372.4	8.10	-282.2	7.09	-361.8	7.89	-219.6	6.39	-367.9	7.36	-44.1
06/01/11	18	2.92	378.6	8.18	-175.7	7.11	-360.0	8.14	-272.8	6.55	-337.9	7.32	-50.3
6/15/11 ¹¹	16	3.18	407.7	-	-	-	-	8.60	-231.3	-	-	8.15	-3.9
6/21/11 ¹¹	15	3.09	415.6	-	-	-	-	8.15	-184.2	-	-	-	-
6/28/11 ¹²	15	2.95	204.5	7.66	-503.6	6.94	-581.5	8.44	-458.1	6.93	-581.5	7.52	-85.1
07/06/11	14	2.95	237.1	8.37	-50.3	6.98	-525.6	8.10	-382.9	6.75	-550.2	7.81	-249.1
07/13/11	14	2.88	352.2	8.46	-312.3	6.83	-412.1	5.43	-48.5	6.67	-420.1	7.84	-37.4
07/19/11	13	3.11	304.3	7.27	-462.3	6.93	-434.0	8.40	-407.5	6.85	-436.0	8.0	-86.6

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
OCTOBER 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2)		Manhole 6 (NaOH dosing location)		Manhole 7 or 9 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
07/28/11	-	2.98	320.8	8.32	-294.3	7.10	-393.6	8.55	-165.4	6.99	-376.0	7.90	-70.4
08/04/11	12	3.12	337.7	7.88	-416.0	7.20	-437.3	8.73	-437.5	7.11	-431.8	8.14	-155.7
08/11/11	12	2.85	360.2	7.72	-456.0	7.27	-421.6	8.95	-421.9	6.87	-443.0	8.04	-162.8
08/17/11	12	3.00	362.5	6.93	-291.8	6.84	-415.5	8.60	-338.3	6.92	-437.7	7.97	-187.8
08/24/11	12	3.01	362.8	6.42	-257.0	7.08	-405.5	8.30	-277.9	6.84	-402.2	7.85	-164.4
08/30/11	12	2.90	350.9	8.23	-321.5	7.27	-433.4	7.49	-366.0	7.05	-428.0	7.63	-63.5
09/08/11	12	2.98	362.2	7.66	-387.0	6.98	-405.5	7.55	-375.2	6.80	-402.3	7.91	-183.6
09/15/11	12	3.01	385.0	8.16	-194.0	6.97	-372.7	8.38	-359.1	6.90	-342.6	8.07	-146.1
09/23/11 ¹¹	12	2.99	400.1	-	-	-	-	6.81	-142.1	-	-	8.30	-295.9
09/28/11	12	2.86	429.9	7.29	-312.1	6.76	-232.9	7.11	-108.4	6.71	-224.1	7.54	-131.1
10/06/11	12	2.96	389.0	6.73	-220.1	6.48	-281.5	6.55	-250.8	6.80	-331.8	7.01	-159.3
10/28/11	11.5	2.91	375.7	7.26	-186.5	6.68	-246.5	7.41	-215.3	6.84	-265.3	7.10	-159.0

Notes

1. Aspen Seep Bioreactor Influent Flow measurements are field measurements completed with a graduated bucket and stop watch.
2. Biocell 1 was flushed on 10/08/07, 10/09/07, and 10/18/07; Biocell 1 was bypassed during this flushing period. Low pH readings in Manhole 1 from 10/10/07 through 10/31/07 were caused by drainage into pretreatment pond from failed seal in weir box cap.
3. Measurements are believed to be erroneous due to calibration error. Parameters were re-evaluated on 02/12/08.
4. Low pH measurements due to a power outage and associated chemical pump shutdown.
5. Low pH measurements caused by stripped gears on NaOH pump head that prevented dosing to Manhole 6.
6. Low pH measurements due to increase in system flow rates; chemical dosing rates lagged behind these system flow rate increases and were unable to prevent decrease in system pH.
7. Effluent readings were collected from the centrifuge discharge point on these dates due to sludge dewatering. Water was not being discharged from Pond 4.
8. Effluent readings were collected Pond 4 effluent on this date. Water was not being discharged from Pond 4.
9. Low pH measurements due to power outage and associated chemical pump failure during the inverter failure on November 29, 2010.
10. Low pH measurement due to increase in system flow rates.
11. Field measurements at intermediate bioreactor manholes were not collected when recirculation operations were interrupted due to sludge dewatering operations or biocell flushing.
12. ORP measurements may be inaccurate due to probe calibration issues.

Abbreviations

- - not measured, not recorded, or bioreactor operation did not have flow at given location on the specified date.
- gpm - gallons per minute
- ORP - oxidation/reduction potential
- mV - millivolts
- s.U. - standard unit

TABLE 3
HIGH DENSITY SLUDGE TREATMENT SYSTEM - SAMPLE RESULTS
OCTOBER 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Parameter	Basis	October 4 2011 167HDSINF437 Influent (mg/L)	October 4 2011 167HDSEFF436 Effluent (mg/L)	October 4 2011 167CUD439 CUD (mg/L)	October 4 2011 167DS438 DS (mg/L)	Maximum Discharge (mg/L)	Average Discharge (mg/L)
pH ¹ (Standard Units)	Field	3.91	8.45	4.68	3.96	-	6.0 - 9.0
Selenium	Total	0.0014 J	<0.0010	0.0017 J	0.0013 J	NP	0.005
Aluminum	Dissolved	39	0.35	49	6.0	4	2
Arsenic	Dissolved	0.27	0.0012	0.51	0.036	0.34	0.15
Cadmium	Dissolved	0.00030 J	<0.00010	<0.00050	0.0014	0.009	0.004
Calcium	Dissolved	292	621	294	274	-	-
Chromium	Dissolved	0.0062	<0.00090	0.0070 J	<0.00090	0.97	0.31
Copper	Dissolved	0.017	0.0089	0.0073 J	0.052	0.026	0.016
Hardness	Dissolved	1100	1900	1100	1000	-	-
Iron	Dissolved	312	0.316	412	16.4	2	1
Magnesium	Dissolved	86	74	82	78	-	-
Lead	Dissolved	<0.00020	<0.00020	<0.0010	<0.00020	0.136	0.005
Nickel	Dissolved	0.95	0.038	1.5	0.41	0.84	0.094
Zinc	Dissolved	0.19	0.0063 J	0.32	0.15	0.21	0.21
Chloride	Total	2.1 J	2.0 J	2.1 J	2.2 J	-	-
Acidity	Total	800	<2.0	920	150	-	-
Alkalinity (Total)	Total	<2.00	31.0	<2.00	<2.00	-	-
Alkalinity (Bicarbonate)	Total	<2.40	37.8	<2.40	<2.40	-	-
Alkalinity (Carbonate)	Total	<1.20	<1.20	<1.20	<1.20	-	-
Alkalinity (Hydroxide)	Total	<0.700	<0.700	<0.700	<0.700	-	-
Sulfate	Total	2010	1880	2380	1270	-	-
Total Dissolved Solids	Total	2840	2810	3240	1800	-	-
Total Suspended Solids	Total	62	<1.0	29	79	-	-

Notes

1. pH value was collected in field and is the average of 3 grab samples comprising the HDS Effluent sample and one grab sample for the HDS Influent, DS, and CUD samples.

Abbreviations

< - Analyte not detected at or above the or method detection limit

CUD - Channel Underdrain

-- not measured or not available

DS - Delta Seep

J - Estimated value; analyte detected at a level less than the Reporting Limit and greater than or equal to the Method Detection Limit

NP - Not Promulgated

TABLE 4
CHANNEL UNDERDRAIN, DELTA SEEP, AND HDS TREATMENT SYSTEM - FLOW RATES
OCTOBER 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Date	Delta Seep Recorded Flow ¹		Channel Underdrain Recorded Flow ¹		Treated Water Discharged from the HDS Treatment Plant Recorded Flow ^{1,2}	
	(gpm)	(gallons)	(gpm)	(gallons)	(gpm)	(gallons)
10/1/2011	10.64	15,327	38.20	55,008	44.70	64,365
10/2/2011	10.88	15,669	38.14	54,922	44.70	64,365
10/3/2011	10.67	15,365	38.04	54,778	44.54	64,140
10/4/2011	10.67	15,362	35.07 ⁴	50,501 ⁴	44.31	63,801
10/5/2011	11.40	16,418	34.92	50,281	44.30	63,795
10/6/2011	10.58	15,236	31.50 ⁴	45,360 ⁴	44.33	63,839
10/7/2011	10.44	15,027	31.40	45,213	44.40	63,935
10/8/2011	10.37	14,931	31.27	45,034	44.40	63,938
10/9/2011	10.31	14,842	31.20	44,922	44.27	63,754
10/10/2011	10.29	14,822	31.12	44,811	43.92	63,245
10/11/2011	10.38	14,948	31.02	44,663	42.78	61,604
10/12/2011	10.60	15,259	30.98	44,605	42.79	61,611
10/13/2011	10.56	15,205	30.92	44,528	42.71	61,501
10/14/2011	10.44	15,040	30.88	44,464	42.55	61,279
10/15/2011	10.46	15,068	30.84	44,407	42.49	61,184
10/16/2011	10.38	14,943	30.76	44,288	42.60	61,343
10/17/2011	10.70	15,409	30.67	44,166	42.46	61,136
10/18/2011	10.48	15,094	30.65	44,132	42.20	60,767
10/19/2011	10.49	15,100	30.63	44,109	42.18	60,745
10/20/2011	10.12	14,576	30.58	44,029	18.91	27,237 ³
10/21/2011	9.59	13,808	30.52	43,955	0.00	0,000 ³
10/22/2011	9.70	13,962	30.46	43,868	0.00	0,000 ³
10/23/2011	9.49	13,666	30.45	43,851	0.00	0,000 ³
10/24/2011	9.55	13,749	30.43	43,825	0.00	0,000 ³
10/25/2011	9.46	13,619	30.39	43,762	0.00	0,000 ³
10/26/2011	9.44	13,600	30.35	43,702	12.94	18,638 ³
10/27/2011	9.40	13,533	30.33	43,672	45.21	65,099
10/28/2011	9.39	13,523	30.28	43,604	56.80	81,791
10/29/2011	9.44	13,598	30.23	43,532	56.35	81,146
10/30/2011	9.43	13,573	30.18	43,465	60.00	86,401
10/31/2011	9.50	13,676	30.16	43,433	59.95	86,329
Average Flow Rate or Total Discharged	10.17	453,948	31.70	1,413,088	36.67	1,636,989

Notes:

1. Channel Underdrain, Delta Seep, and Treated Water Discharge from the HDS Treatment Plant flow rates are calculated from flow totalizer volume measurements.
2. The operational flow rate is reported. Water discharge does not always occur 24 hours per day.
3. Pond 4 was returned to normal operations (acid drainage holding pond) on 10/20/11. The HDS Treatment Plant was shutdown to allow Pond 4 to fill to a sufficient level prior to resuming normal HDS Treatment Plant operations following sludge dredging activities.
4. Channel Underdrain Flow Totalizer A was cleaned on 10/4/11 and Flow Totalizer B was cleaned on 10/6/11.

Abbreviations:

gpm - gallons per minute HDS - High Density Sludge

TABLE 5
HIGH DENSITY SLUDGE TREATMENT SYSTEM - OPERATIONAL DATA SUMMARY
OCTOBER 2011 MONTHLY SUMMARY

Draft - Provisional Data

Reporting Period	Treated Water Discharged (gallons)	Lime Consumed (kilograms)	Diesel Fuel Consumed (gallons)	Flocculant Consumed (kilograms)	Sludge Wasted (gallons)	Freshwater Consumed (gallons)
May 1 - May 31, 2011	2,146,472	6,633	2,570	59	4,200	4,700
June 1 - June 30, 2011	2,918,988	9,873	2,291	63	11,000	6,200
July 1 - July 31, 2011	2,165,870	7,455	2,129	55	15,800	9,100 ¹
August 1 - August 31, 2011	2,073,380	6,284	2,142	54	6,300	6,200 ¹
September 1 - September 30, 2011	1,918,306	4,466	2,284	46	6,250	9,900 ¹
October 1 - October 31, 2011	1,636,989	3,322	2,473	36	4,740	6,900 ¹

Notes

1. Includes water taken from the High Density Sludge Treatment System Fresh Water Tank and used for Remedial Investigation and Feasibility Study drilling activities.

Atlantic Richfield Company

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Project Manager, Mining

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December 12, 2011

Mr. Gary Riley
US EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105

Mr. Kevin Mayer
US EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105

RE: Leviathan Monthly Report for November 2011

Dear Mr. Riley and Mr. Mayer:

The following text describes activities conducted during the month of November 2011 at the Leviathan Mine Site and activities anticipated to occur during the upcoming month. These activities are organized by work area [Aspen Seep, Channel Underdrain (CUD) and Delta Seep (DS)], and site-wide tasks. This progress report is being submitted in accordance with Paragraph 62 of the Administrative Settlement Agreement and Order on Consent for Removal Action (AOC) (effective January 21, 2009).

ACTIVITIES FOR NOVEMBER

Aspen Seep

- Operated the Aspen Seep Bioreactor (ASB) in recirculation mode during the month of November. Routine O&M, influent sampling, and effluent sampling occurred on November 15, 2011. The currently available influent and effluent water quality data for the October 28 and November 15, 2011 sampling events are presented in Table 1. Recent pH and ORP field data are summarized in Table 2. No new influent flow rate data have been received from the USGS since the Monthly Report for September 2011. Any new flow data received will be included in subsequent monthly reports.
- A modified enhanced sampling event was completed on November 15, 2011. Results are presented in Table 3.
- Completed installation of an uninterruptible power supply (UPS) to improve power quality to the ASB Treatment System control panel on November 17, 2011.
- Monitoring and testing related to the elevated hydrogen sulfide (H₂S) concentrations measured on October 7, 2011 was completed in November. The supplemental H₂S monitoring equipment was

A BP affiliated company



demobilized on November 16, 2011. The results from the manhole water sampling conducted on October 20 and 21, and November 2 and 15, 2011 are summarized in Table 4.

- Preparation of the site for winter operations was completed in November.

CUD and DS

- Capture of the CUD and DS continued until November 2, 2011, at which time winterization of the capture and conveyance equipment commenced. The final day of HDS Treatment Plant operation was November 4, 2011, at which time plant winterization activities commenced. As of November 4, 2011, Pond 4 had been pumped down to the lowest feasible depth to provide for maximum storage capacity during the winter/spring seasons.
- Samples of the HDS Treatment Plant influent and effluent were collected for laboratory analysis on November 1, 2011. The analytical results associated with the November 1, 2011 sampling event are presented in Table 5. Flow rates recorded for the DS, CUD, and treated water discharge from the HDS Treatment Plant are included in Table 6. A summary of the HDS Plant operational data for November 2011 is presented in Table 7.
- A sample of the water discharging from the Pond 3 Overflow pipe into Pond 4 was collected for laboratory analysis on November 8, 2011. Results from the November 8, 2011 sampling event are presented in Table 8.
- A composite sample of the residual sludge in Pond 4 was collected for laboratory analysis on October 17, 2011. Results from the October 17, 2011 sampling event are presented in Table 9.
- Completed installation of a new metal roll-up door on the HDS Generator Enclosure to improve Health, Safety, Security, and Environment conditions.
- On November 4, 2011, Atlantic Richfield provided EPA with an email update regarding the Limited Access Season (LAS) operating and winterization schedule.
- On November 14, 2011, Atlantic Richfield submitted to EPA a Waste Material Off-Site Shipment Notification Letter for HDS Treatment System solids. Approximately 24 cubic yards of HDS Treatment System solids were shipped off site on November 15, 2011.
- Winterization of all components of the HDS Treatment Plant was completed on November 17, 2011.

Site-wide

- Work continued on updating the Leviathan Mine Project Database with data from monitoring performed by Atlantic Richfield and various agencies.
- On November 1, 2011, temporary stormwater controls along the main site access road between Pond 3 and Pond 4 were implemented to better manage stormwater flows into the Pond 4 area. This work was completed consistent with the October 27, 2011 meeting between Atlantic Richfield, EPA, and Lahontan Regional Water Quality Control Board (LRWQCB) personnel.
- On November 9, 2011, the Nevada Access Route and the Aspen Seep access road were bladed to remove sections of accumulated snow and ice to improve road conditions.
- On November 11, 2011 three office trailers were removed from the Pond 4 area. Site winterization was completed on November 17, 2011.

- On November 14, 2011, Atlantic Richfield submitted to EPA a Waste Material Off-Site Shipment Notification Letter for miscellaneous waste materials resulting from various site operations and maintenance activities. Approximately 2.7 cubic yards of waste material were shipped off site on November 15, 2011.
- On November 15, 2011, a conference call was conducted with EPA to provide a general progress update.

ACTIVITIES FOR UPCOMING MONTH

Aspen Seep

- Continue operation of the Bioreactor in recirculation mode and conduct winter access monitoring and maintenance as outlined in the 2011 RAWP.

CUD and DS

- Data from the 2011 HDS Treatment Plant operations will be compiled for inclusion in the 2011 Annual Report.

Site-wide

- Continue to provide project progress updates to EPA via conference call. The next conference call is currently scheduled for December 20, 2011.
- Begin compiling information for the 2011 Annual Report (due April 10, 2012).
- Begin work on the 2012 Removal Action Work Plan (due March 1, 2012), which will describe activities to be performed at the Site during 2012.

If you have any questions or comments, please feel free to contact me at (714) 228-6770 or via e-mail at Anthony.Brown@bp.com.

Sincerely,

ORIGINAL SIGNED BY DAVE MCCARTHY for

Tony Brown
Project Manager

Gary Riley and Kevin Mayer – USEPA Region 9

December 12, 2011

Page 4 of 4

Attachments:

- Table 1 – Aspen Seep Bioreactor, Influent and Effluent Sample Results
- Table 2 – Aspen Seep Bioreactor, Recent pH and ORP Field Measurements
- Table 3 – Aspen Seep Bioreactor, Enhanced Sample Results
- Table 4 – Aspen Seep Bioreactor, Hydrogen Sulfide Evaluation Sampling Results
- Table 5 – HDS Treatment System, Influent and Effluent Sample Results
- Table 6 – CUD, DS, and HDS Treatment System Flow Rates
- Table 7 – HDS Treatment System, Operational Data Summary
- Table 8 – Pond 3 Overflow Sample Results
- Table 9 – Pond 4 Sludge Sample Results

cc: Chuck Curtis, Lahontan Regional Water Quality Control Board
Ronald Halsey, Atlantic Richfield Company
Nathan Block, Esq., BP America Inc.
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TABLE 1
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - SAMPLE RESULTS
NOVEMBER 2011 MONTHLY SUMMARY
Draft - Provisional Data

Parameter	Basis	October 28 2011 163ASPINF517 Influent (mg/L)	October 28 2011 163ASPEFF516 Effluent (mg/L)	November 15 2011 165ASPINF586 Influent (mg/L)	November 15 2011 165ASPEFF581 Effluent (mg/L)	Maximum Discharge (mg/L)	Average Discharge (mg/L)
pH	Field	2.91	7.10	3.08	7.14	-	6.0 - 9.0
Selenium	Total	0.0035 J	0.0012 J	0.00083 J	0.0011 J	NP	0.005
Aluminum	Dissolved	48	0.047 J	46	<0.040	4	2
Arsenic	Dissolved	<0.00090	<0.00090	<0.00090	0.0013	0.34	0.15
Calcium	Dissolved	353	351	338	356	-	-
Cadmium	Dissolved	0.0017	<0.00010	0.0020	0.00016 J	0.009	0.004
Chromium	Dissolved	0.0030	<0.00090	0.0032	<0.00090	0.97	0.31
Copper	Dissolved	0.73	0.0047	1.1	0.0035	0.026	0.016
Hardness	Dissolved	1,300	1,200	1,200	1,200	-	-
Iron	Dissolved	141	0.747	137	0.479	2	1
Magnesium	Dissolved	95	81	84	71	-	-
Lead	Dissolved	<0.00020	<0.00020	<0.00020	0.00030 J	0.136	0.005
Nickel	Dissolved	0.40	0.073	0.50	0.042	0.84	0.094
Zinc	Dissolved	0.46	<0.0040	0.58	0.0045 J	0.21	0.21
Chloride	Total	2.1 J	3.5	3.9	3.6	-	-
Acidity	Total	650	<2.0	710	<2.0	-	-
Alkalinity (Total)	Total	<2.00	232	<2.00	192	-	-
Alkalinity (Bicarbonate)	Total	<2.40	283	<2.40	234	-	-
Alkalinity (Carbonate)	Total	<1.20	<1.20	<1.20	<1.20	-	-
Alkalinity (Hydroxide)	Total	<0.700	<0.700	<0.700	<0.700	-	-
Sulfate	Total	2,140	1,560	1,780	1,450	-	-
Total Dissolved Solids	Total	2,710	2,610	2,850	2,680	-	-
Total Suspended Solids	Total	36	6.0 J	6.0 J	3.0 J	-	-

Abbreviations

< - Analyte not detected at or above the or method detection limit

-- Discharge criteria not established

J - Estimated value; analyte detected at a level less than the Reporting Limit and greater than or equal to the Method Detection

mg/L - milligrams per liter

NP - Not Promulgated

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
NOVEMBER 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 or 9 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
09/21/07	6.0	2.91	428.9	7.34	-268.4	7.13	-280.3	9.56	-285.8	7.13	-265.3	8.42	2.6
09/26/07	6.2	2.89	496.7	7.80	-192.1	7.36	-223.0	9.64	-195.4	7.34	-232.7	8.34	50.3
10/03/07	5.5	2.85	484.1	8.07	-127.7	8.50	-129.6	11.25	-136.5	7.64	-164.0	8.22	-5.2
10/10/07 ²	5.8	2.80	498.0	5.50	55.9	5.64	-70.5	10.00	-190.0	6.20	-171.6	7.78	-268.0
10/18/07 ²	5.9	2.83	482.4	5.00	26.8	5.68	-46.2	11.38	-112.0	6.23	-139.0	8.69	135.0
10/31/07 ²	9.0	2.88	402.7	4.26	319.3	6.85	-156.7	9.80	-170.0	6.95	-212.2	7.66	-94.3
11/08/07	6.0	2.88	418.0	7.55	-128.3	7.01	-116.7	8.23	-133.9	6.86	-125.8	7.51	-50.6
11/13/07	-	2.86	484.5	7.06	-2.3	6.84	-65.3	7.86	-42.6	6.79	-78.1	7.58	4.2
11/27/07	5.5	2.86	479.4	6.99	-38.5	6.97	-205.0	8.46	-183.9	6.91	-156.8	7.25	-1.7
12/12/07	-	3.01	482.2	7.20	-25.3	7.20	-115.2	7.64	-107.7	7.04	-129.7	6.90	-31.9
01/15/08	4.8	2.98	483.3	6.76	5.9	6.73	-85.5	7.89	-94.3	6.67	-137.4	6.71	-33.0
02/07/08 ³	-	-	-	-	-	-	-	-	-	-	-	5.77	20.2
02/12/08	7.0	2.76	487.4	6.67	44.6	-	-	7.39	-45.6	6.42	-88.0	6.70	-15.3
03/18/08	6.0	2.88	375.1	7.85	3.6	-	-	8.80	-189.2	7.23	-211.3	7.05	-95.3
04/10/08	7.5	2.90	397.7	6.74	-80.0	6.70	-163.4	7.50	-142.6	6.57	-165.3	7.39	-24.5
05/15/08	7.3	2.97	442.2	6.24	21.2	6.55	-265.4	6.55	-233.7	5.60	-183.7	7.29	-143.3
05/27/08	7.0	3.00	464.1	7.11	-16.3	6.85	-242.2	6.98	-191.1	6.80	-235.2	7.26	-19.5
06/09/08	7.0	3.10	455.4	7.40	-47.5	7.09	-251.2	7.70	-178.8	6.97	-219.7	7.19	-61.5
06/17/08	7.5	2.91	443.9	7.42	-22.7	6.90	-283.0	7.29	-131.0	6.88	-244.3	7.30	-82.5
07/10/08	7.3	2.98	470.9	7.32	-34.1	6.90	-238.4	7.05	-172.6	6.90	-215.0	7.85	-113.5
07/22/08	7.0	2.99	455.5	6.94	-272.5	6.97	-267.4	7.07	-190.6	7.01	-248.9	7.35	-89.1
08/04/08	6.8	2.89	450.7	7.60	-94.4	6.94	-266.0	6.19	-173.1	7.02	-251.2	-	-
08/05/08	-	3.05	445.3	-	-	-	-	-	-	-	-	7.29	-70.0
08/18/08	7.3	3.93	478.9	7.46	-166.7	7.08	-291.9	7.40	-202.6	7.07	-268.8	7.40	-52.4
08/22/08	-	2.89	473.7	7.97	-212.9	7.08	-301.8	7.74	-224.0	7.03	-275.9	7.67	-27.8
08/25/08	-	2.93	470.5	7.77	-287.7	7.18	-286.1	6.89	-205.6	7.12	-273.8	8.02	-108.4
08/26/08	-	2.91	468.8	7.95	-255.4	7.09	-305.4	7.75	-281.2	7.14	-273.1	7.77	-41.4
09/24/08	-	3.03	423.2	7.18	-107.8	6.99	-255.4	7.11	-205.7	6.89	-245.2	7.70	-87.7
09/30/08	-	3.02	434.3	7.77	-151.9	6.89	-267.5	-	-	6.92	-269.9	8.10	-94.0
10/13/08	5.8	3.34	433.1	7.17	-98.7	6.94	-218.3	6.80	-157.2	7.01	-206.1	8.32	-101.0
10/27/08	5.8	3.21	247.8	7.34	-162.5	6.96	-175.3	7.20	-152.3	6.98	-126.8	7.88	273.7
11/19/08	5.5	2.83	453.7	7.20	-104.5	6.77	-204.7	7.12	-82.2	6.71	-154.7	7.74	-35.1
12/03/08	5.3	3.56	453.0	7.23	-45.0	6.86	-141.3	7.06	-100.1	6.84	-135.6	7.65	-47.5
01/9/09 ⁴	-	3.15	458.3	-	-	-	-	-	-	-	-	6.95	-43.0
01/12/09	5.3	2.94	466.3	6.36	-82.8	6.38	-245.1	-	-	6.82	-259.0	7.11	-74.0

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
NOVEMBER 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 or 9 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
02/19/09 ⁴	5.3	2.78	480.1	6.60	-3.2	6.74	-145.1	7.26	-117.6	6.25	-162.3	6.68	-18.1
03/10/09	5.0	2.88	481.2	-	-	-	-	-	-	-	-	7.36	34.3
04/13/09	7.0	2.78	532.7	7.45	-9.9	7.04	-185.5	7.50	-65.8	6.98	-175.4	7.77	-32.2
05/06/09	5.5	2.89	444.4	-	-	6.47	-221.3	-	-	6.56	-206.5	7.62	-86.6
06/03/09	6.5	2.91	445.9	6.98	-145.1	6.62	-260.8	7.07	-192.8	6.65	-260.4	7.55	-15.4
06/16/09	6.5	2.98	388.0	7.09	-186.6	6.79	-319.3	7.16	-233.2	6.80	-298.2	7.70	-158.1
07/01/09	6.0	2.95	376.5	7.43	376.5	6.93	-366.2	7.42	-310.8	6.97	-350.5	7.89	-189.6
07/14/09	5.8	2.97	394.4	-	-	6.85	-338.8	-	-	6.98	-331.9	7.90	-146.2
07/29/09	6.0	2.78	404.5	7.24	-175.5	7.39	-427.7	8.10	-260.2	7.29	-403.7	8.05	-135.6
08/05/09	5.5	2.89	433.8	-	-	-	-	8.73	-120.7	-	-	8.17	-146.0
08/19/09	5.1	2.97	425.7	-	-	-	-	8.25	-37.6	-	-	7.54	47.0
09/17/09	5.3	2.38	490.6	7.27	-91.3	6.81	-180.3	7.75	-120.2	6.85	-182.3	6.95	-24.7
09/30/09	5.0	2.96	503.7	8.03	-18.9	8.99	-253.1	7.75	-217.2	7.03	-276.6	7.98	-17.0
10/15/09	5.5	2.93	496.6	6.57	-121.4	7.63	-301.0	8.33	-148.5	7.71	-314.5	7.85	-41.2
10/28/09	4.9	2.96	487.6	8.79	-69.9	7.28	-216.4	9.08	-143.0	7.24	-162.8	7.94	2.8
11/11/09	5.0	2.91	420.8	8.34	-15.3	7.49	-243.7	8.42	-163.9	7.51	-199.3	7.74	60.6
12/17/09 ⁵	5.0	2.90	416.5	4.65	100.2	5.00	15.3	-	-	5.12	-1.8	5.91	-26.4
01/14/10 ⁵	4.8	2.85	417.7	6.96	-89.0	6.82	-186.4	-	-	6.84	-206.1	6.45	-67.4
02/02/10 ⁵	4.7	2.94	484.0	7.58	-46.7	6.85	-129.6	-	-	6.67	-131.1	6.95	-48.1
03/09/10	4.8	2.74	474.7	8.27	-78.3	7.95	-204.2	8.74	-208.9	8.10	-220.8	7.75	-5.9
04/26/10 ⁶	12.0	2.85	479.5	5.14	135.1	5.61	-19.0	5.04	109.2	5.60	-29.6	6.15	35.9
05/17/10	9.7	2.97	436.9	6.26	196.9	7.04	-283.9	7.79	-235.1	7.08	285.4	7.76	-73.8
05/24/10	9.4	3.16	418.0	7.43	-156.1	7.00	-259.9	7.27	-171.4	6.89	-282.6	7.11	-78.6
05/27/10	9.6	3.18	423.1	5.52	-225.1	7.58	-316.7	8.86	-318.2	6.74	-296.8	7.07	-98.7
06/01/10	10.5	3.11	444.0	8.47	-32.2	7.72	-292.6	9.00	-	6.74	-300.9	7.01	-31.5
06/14/10	10.0	2.99	427.7	7.40	-81.7	6.85	-272.5	8.22	-220.2	6.61	-181.6	7.48	-93.7
06/15/10	-	-	-	8.04	-221.6	6.89	-347.7	-	-	6.17	-355.9	-	-
06/16/10	-	2.99	427.7	7.40	-81.7	6.85	-272.6	8.22	-220.2	6.61	-181.6	7.48	-93.7
06/18/10	9.1	-	-	7.72	-211.7	6.79	-335.6	-	-	6.69	-336.7	-	-
06/21/10	9.0	3.21	409.4	7.99	-242.7	6.96	-364.1	7.86	-303.4	6.78	-349.5	7.70	-142.3
06/30/10	10.0	2.59	451.5	8.73	-216.2	8.73	-216.2	-	-	6.78	-337.9	7.96	-164.5
07/01/10	-	2.82	422.4	-	-	-	-	-	-	-	-	7.94	-241.9
07/13/10	10.0	2.62	479.5	7.52	-112.1	6.90	-279.5	8.02	-255.2	6.90	-294.0	7.76	-65.8
07/21/10	10.0	2.93	475.1	7.90	-70.5	7.15	-301.5	7.80	-212.4	7.27	-315.3	8.09	-95.7
07/29/10	10.0	2.90	465.3	7.73	-168.6	7.25	-318.1	7.08	-192.5	7.15	-318.5	7.06	-45.6

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
NOVEMBER 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 or 9 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
08/03/10	9.0	2.94	458.6	7.69	-193.3	7.16	-311.4	7.16	-311.4	7.17	-324.5	7.39	-66.3
08/12/10	9.0	2.85	476.3	7.98	-255.3	7.07	-299.3	7.50	-235.2	7.06	-307.0	7.55	-26.2
08/17/10	9.5	2.64	470.9	8.09	-47.2	7.54	-306.0	8.47	-206.8	7.37	-320.0	7.86	-74.0
08/24/10	9.2	3.04	250.0	7.81	-129.9	7.21	-151.9	7.20	-202.9	7.09	-147.9	7.81	2.9
09/02/10	9.2	2.84	503.9	7.70	-208.4	-	-	8.15	-227.0	7.32	-267.2	7.97	-20.2
09/16/10	8.0	3.21	455.8	8.40	-219.9	7.29	-209.3	8.66	-197.0	7.32	-279.7	7.76	-76.4
09/22/10 ⁷	8.0	3.06	476.5	8.50	-151.0	7.25	-276.9	8.30	-257.8	7.39	-279.9	7.93	-112.0
09/30/10 ⁷	7.6	3.16	503.3	8.49	-263.9	7.32	-265.4	8.53	-221.9	7.26	-267.8	8.61	94.1
10/06/10 ⁸	9.0	3.28	479.3	7.83	-287.5	7.39	-305.8	8.25	-246.7	7.62	-305.1	8.17	-235.5
10/11/10	8.0	3.20	479.3	7.52	-190.4	7.00	-284.4	8.28	-227.4	7.15	-290.4	7.85	26.4
10/19/10	8.0	2.89	447.3	8.75	-157.3	7.43	-310.4	8.52	-203.0	7.22	-310.6	8.15	130.4
10/28/10	8.0	2.95	579.0	7.23	-282.8	6.98	-368.9	8.50	-384.7	7.12	-402.6	7.73	-30.7
11/02/10	8.0	2.69	366.7	7.89	-285.1	7.14	-385.2	8.46	-307.5	7.00	-385.7	7.62	-31.5
11/15/10	8.5	2.94	361.7	7.79	-273.2	7.08	-381.9	8.04	-269.3	6.89	-384.5	7.64	-2.2
12/07/10 ⁹	8.5	3.01	387.2	6.97	-298.4	6.82	-375.1	-	-	6.57	-353.5	6.41	-112.4
01/07/11 ⁹	8.5	2.92	434.1	6.50	-134.0	5.98	-200.1	-	-	6.08	-216.2	6.15	-4.9
02/01/11 ⁹	8.0	3.07	423.8	6.75	-332.2	6.86	-279.7	-	-	6.59	-297.0	6.62	-9.3
03/11/11	8.5	3.05	384.7	7.66	-239.2	7.11	-344.7	-	-	6.85	-370.1	7.05	-73.4
4/19/2011 ¹⁰	30.0	2.61	454.9	-	-	-	--	-	-	-	-	4.72	172.9
04/26/11	29.0	2.91	362.1	7.45	-199.2	6.58	-346.5	7.42	-232.8	6.41	-369.7	7.22	-144.6
05/03/11	27.0	2.90	355.0	7.70	-264.8	6.56	-361.5	7.81	-264.9	6.54	-402.2	7.60	-137.5
05/11/11	24.0	2.84	344.2	6.81	-198.2	6.31	-229.0	6.99	-200.7	6.23	-204.0	6.99	-139.2
05/20/11	17.0	3.03	372.4	8.10	-282.2	7.09	-361.8	7.89	-219.6	6.39	-367.9	7.36	-44.1
06/01/11	17.5	2.92	378.6	8.18	-175.7	7.11	-360.0	8.14	-272.8	6.55	-337.9	7.32	-50.3
6/15/11 ¹¹	15.6	3.18	407.7	-	-	-	-	8.60	-231.3	-	-	8.15	-3.9
6/21/11 ¹¹	14.7	3.09	415.6	-	-	-	-	8.15	-184.2	-	-	-	-
6/28/11 ¹²	15.0	2.95	204.5	7.66	-503.6	6.94	-581.5	8.44	-458.1	6.93	-581.5	7.52	-85.1
07/06/11	14.0	2.95	237.1	8.37	-50.3	6.98	-525.6	8.10	-382.9	6.75	-550.2	7.81	-249.1
07/13/11	13.8	2.88	352.2	8.46	-312.3	6.83	-412.1	5.43	-48.5	6.67	-420.1	7.84	-37.4
07/19/11	13.0	3.11	304.3	7.27	-462.3	6.93	-434.0	8.40	-407.5	6.85	-436.0	8.0	-86.6
07/28/11	-	2.98	320.8	8.32	-294.3	7.10	-393.6	8.55	-165.4	6.99	-376.0	7.90	-70.4
08/04/11	12.0	3.12	337.7	7.88	-416.0	7.20	-437.3	8.73	-437.5	7.11	-431.8	8.14	-155.7
08/11/11	12.0	2.85	360.2	7.72	-456.0	7.27	-421.6	8.95	-421.9	6.87	-443.0	8.04	-162.8
08/17/11	12.0	3.00	362.5	6.93	-291.8	6.84	-415.5	8.60	-338.3	6.92	-437.7	7.97	-187.8

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
NOVEMBER 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 or 9 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
08/24/11	12.0	3.01	362.8	6.42	-257.0	7.08	-405.5	8.30	-277.9	6.84	-402.2	7.85	-164.4
08/30/11	12.0	2.90	350.9	8.23	-321.5	7.27	-433.4	7.49	-366.0	7.05	-428.0	7.63	-63.5
09/08/11	12.0	2.98	362.2	7.66	-387.0	6.98	-405.5	7.55	-375.2	6.80	-402.3	7.91	-183.6
09/15/11	12.0	3.01	385.0	8.16	-194.0	6.97	-372.7	8.38	-359.1	6.90	-342.6	8.07	-146.1
09/23/11 ¹¹	12.0	2.99	400.1	-	-	-	-	6.81	-142.1	-	-	8.30	-295.9
09/28/11	12.0	2.86	429.9	7.29	-312.1	6.76	-232.9	7.11	-108.4	6.71	-224.1	7.54	-131.1
10/06/11	12.0	2.96	389.0	6.73	-220.1	6.48	-281.5	6.55	-250.8	6.80	-331.8	7.01	-159.3
10/20/11	-	-	-	-	-	-	-	7.50	-375.9	6.93	-365.1	-	-
10/21/11	-	-	-	-	-	-	-	3.14	416.8	6.86	-365.1	-	-
10/27/11	-	3.13	424.5	-	-	-	-	6.91	-189.7	-	-	-	-
10/28/11	11.5	2.91	375.7	7.26	-186.5	6.68	-246.5	7.41	-215.3	6.84	-265.3	7.10	-159.0
11/08/11	-	3.12	368.8	-	-	-	-	-	-	-	-	-	-
11/10/11	11.8	3.08	369.9	-	-	-	-	7.13	-213.9	-	-	-	-
11/15/11	11.5	3.08	371.9	7.89	-335.8	7.21	-223.6	7.54	-252.3	6.68	-348.3	7.14	-109.9

Notes

1. Aspen Seep Bioreactor Influent Flow measurements are field measurements completed with a graduated bucket and stop watch.
2. Biocell 1 was flushed on 10/08/07, 10/09/07, and 10/18/07; Biocell 1 was bypassed during this flushing period. Low pH readings in Manhole 1 from 10/10/07 through 10/31/07 were caused by drainage into pretreatment pond from failed seal in weir box cap.
3. Measurements are believed to be erroneous due to calibration error. Parameters were re-evaluated on 02/12/08.
4. Low pH measurements due to a power outage and associated chemical pump shutdown.
5. Low pH measurements caused by stripped gears on NaOH pump head that interrupted dosing to Manhole 6 between 11/11/09 and 12/17/09 site visits.
6. Low pH measurements due to increase in system flow rates; chemical dosing rates lagged behind these system flow rate increases and were unable to prevent decrease in system pH.
7. Effluent readings were collected from the centrifuge discharge point on these dates due to sludge dewatering. Water was not being discharged from Pond 4.
8. Effluent readings were collected from the Pond 4 sample location on this date. Water was not being discharged from Pond 4.
9. Low pH measurements due to power outage and associated chemical pump failure during the inverter failure on November 29, 2010.
10. Low pH measurement due to increase in system flow rates.
11. Field measurements at intermediate bioreactor manholes were not collected when recirculation operations were interrupted due to sludge dewatering operations or biocell flushing.
12. ORP measurements may be inaccurate due to probe calibration issues.

Abbreviations

- - not measured, not recorded, or bioreactor operation did not have flow at given location on the specified date.
 gpm - gallons per minute ORP - oxidation/reduction potential
 mV - millivolts s.U. - standard unit

TABLE 3
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - ENHANCED SAMPLE RESULTS
NOVEMBER 2011 MONTHLY SUMMARY
Draft - Provisional Data

Parameter	Basis	November 15 2011 165ASPINF586 Influent (mg/L)	November 15 2011 165MH2582 MH-2 (mg/L)	November 15 2011 165MH4583 MH-4 (mg/L)	November 15 2011 165MH7584 MH-7 (mg/L)	November 15 2011 165MH6585 MH-6 (mg/L)	November 15 2011 165MH9587 MH-9 (mg/L)	November 15 2011 165ASPEFF581 Effluent (mg/L)	Maximum Discharge (mg/L)	Average Discharge (mg/L)
pH (Standard Units)	Field	3.08	7.89	7.21	6.68	7.54	-	7.14	-	6.0 - 9.0
Selenium	Total	0.00083 J	-	-	-	-	-	0.0011 J	NP	0.005
Aluminum	Dissolved	46	0.60	<0.040	0.11	1.8	0.075	<0.040	4	2
Arsenic	Dissolved	<0.00090	0.0051	0.0013	0.00092 J	<0.00090	<0.00090	0.0013	0.34	0.15
Cadmium	Dissolved	0.0020	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00016 J	0.009	0.004
Calcium	Dissolved	338	274	345	363	331	341	356	-	-
Chromium	Dissolved	0.0032	<0.00090	<0.00090	<0.00090	<0.00090	<0.00090	<0.00090	0.97	0.31
Copper	Dissolved	1.1	0.0091	0.0033	0.0035	0.0056	0.0030	0.0035	0.026	0.016
Hardness	Dissolved	1,200	940	1,100	1,200	1,100	1,100	1,200	--	--
Iron	Dissolved	137	1.67	0.0481	0.239	0.443	0.123	0.479	2	1
Magnesium	Dissolved	84	62	68	70	60	68	71	--	--
Lead	Dissolved	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00030 J	0.136	0.005
Nickel	Dissolved	0.50	0.018	0.0087	0.0053	0.0038	0.0043	0.042	0.84	0.094
Phosphorus	Dissolved	<0.040	1.8	<0.020	<0.020	<0.020	-	<0.020	-	-
Zinc	Dissolved	0.58	0.023	0.0041 J	<0.0040	0.011 J	<0.0040	0.0045 J	0.21	0.21
Chloride	Total	3.9	-	-	-	-	-	3.6	-	-
Acidity	Total	710	-	-	-	-	-	<2.0	-	-
Alkalinity (Total)	Total	<2.00	-	-	-	-	-	192	-	-
Alkalinity (Bicarbonate)	Total	<2.40	-	-	-	-	-	234	-	-
Alkalinity (Carbonate)	Total	<1.20	-	-	-	-	-	<1.20	-	-
Alkalinity (Hydroxide)	Total	<0.700	-	-	-	-	-	<0.700	-	-
Nitrate/Nitrite-N	Total	<0.45	<0.45	<0.45	<0.45	<0.45	-	<0.18	-	-
Ammonia-N	Total	0.34 J	76	0.50	0.16 J	0.18 J	-	0.18 J	-	-
Nitrate	Total	<0.30	<0.30	<0.30	<0.30	<0.30	-	<0.12	-	-
Nitrite	Total	<0.45	<0.45	<0.45	<0.45	<0.45	-	<0.18	-	-
Sulfate	Total	1,780	-	-	1,450	1,540	1,400	1,450	-	-
Sulfide	Total	-	1.1	8.2	31	0.098 J	36	-	-	-
Total Dissolved Solids	Total	2,850	-	-	-	-	-	2,680	-	-
Total Suspended Solids	Total	6.0 J	-	-	-	-	-	3.0 J	-	-

Abbreviations

- < - Analyte not detected at or above the or method detection limit
- - Discharge criteria not established or analysis was not requested
- J - Estimated value; analyte detected at a level less than the Reporting Limit and greater than or equal to the Method Detection Limit
- mg/L - milligrams per liter
- NP - Not Promulgated

TABLE 4
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - HYDROGEN SULFIDE EVALUATION SAMPLE RESULTS
NOVEMBER 2011 MONTHLY SUMMARY
Draft - Provisional Data

Parameter	Basis	October 20	October 20	October 20	October 21	October 21	October 21	November 2	November 2	November 2	November 15	November 15	November 15
		2011 161ASPMH6509 MH-6 (mg/L)	2011 161ASPMH7510 MH-7 (mg/L)	2011 161ASPMH9511 MH-9 (mg/L)	2011 162ASPMH6512 MH-6 (mg/L)	2011 162ASPMH7513 MH-7 (mg/L)	2011 162ASPMH9514 MH-9 (mg/L)	2011 164ASPMH6578 MH-6 (mg/L)	2011 164ASPMH7579 MH-7 (mg/L)	2011 164ASPMH9580 MH-9 (mg/L)	2011 165MH6585 MH-6 (mg/L)	2011 165MH7584 MH-7 (mg/L)	2011 165MH9587 MH-9 (mg/L)
pH (Standard Units)	Field	7.5	6.98	6.93	3.14	6.65	6.86	-	-	-	7.54	6.68	-
Selenium	Total	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum	Dissolved	0.59	0.10	0.074	46	0.12	0.10	-	-	-	1.8	0.11	0.075
Arsenic	Dissolved	0.00092 J	<0.00090	<0.00090	<0.00090	0.0016	0.0012	-	-	-	<0.00090	0.00092 J	<0.00090
Cadmium	Dissolved	<0.00010	<0.00010	<0.00010	0.0013	<0.00010	<0.00010	-	-	-	<0.00010	<0.00010	<0.00010
Calcium	Dissolved	330	330	340	351	326	327	-	-	-	331	363	341
Chromium	Dissolved	<0.00090	0.0012 J	0.0011 J	0.0027	0.0016 J	0.0014 J	-	-	-	<0.00090	<0.00090	<0.00090
Copper	Dissolved	0.0069	0.0050	0.0049	0.69	0.0064	0.0051	-	-	-	0.0056	0.0035	0.0030
Hardness	Dissolved	1,100	1,100	1,100	1,200	1,100	1,100	-	-	-	1,100	1,200	1,100
Iron	Dissolved	0.40	<0.015	0.030 J	137	0.146	0.0361 J	-	-	-	0.443	0.239	0.123
Magnesium	Dissolved	69	70	65	87	64	63	-	-	-	60	70	68
Lead	Dissolved	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	-	-	-	<0.00020	<0.00020	<0.00020
Nickel	Dissolved	0.011	0.0037	0.0012 J	0.36	0.0010 J	0.00079 J	-	-	-	0.0038	0.0053	0.0043
Zinc	Dissolved	0.023	0.0083 J	0.0088 J	0.34	0.0083 J	0.0062 J	-	-	-	0.011 J	<0.0040	<0.0040
Sulfate	Total	1,400	1,300	1,300	1,780	1,250	1,190	1,500	1,300	1,300	1,540	1,450	1,400
Sulfide	Total	17	17	46	79	64	0.52	0.069 J	53	84	0.098 J	31	36

Abbreviations

- < - Analyte not detected at or above the or method detection limit
- - Discharge criteria not established or analysis was not requested
- J - Estimated value.
- mg/L - milligrams per liter
- NP - Not Promulgated

TABLE 5
HIGH DENSITY SLUDGE TREATMENT PLANT - SAMPLE RESULTS
NOVEMBER 2011 MONTHLY SUMMARY

Draft - Provisional Data

Parameter	Basis	November 1 2011 169HDSINF447 Influent (mg/L)	November 1 2011 169HDSEFF446 Effluent (mg/L)	November 1 2011 169CUD449 CUD (mg/L)	November 1 2011 169DS448 DS (mg/L)	Maximum Discharge (mg/L)	Average Discharge (mg/L)
pH ¹ (Standard Units)	Field	4.53	8.26	4.55	5.37	-	6.0 - 9.0
Selenium	Total	0.0024 J	0.0017 J	0.0031 J	0.0017 J	NP	0.005
Aluminum	Dissolved	28	0.12	43	4.2	4	2
Arsenic	Dissolved	0.15	<0.00090	0.43	0.037	0.34	0.15
Calcium	Dissolved	363	728	330	284	-	-
Cadmium	Dissolved	0.00025 J	<0.00010	<0.00050	0.0010	0.009	0.004
Chromium	Dissolved	0.0031	<0.00090	0.011	<0.00090	0.97	0.31
Copper	Dissolved	0.011	0.0061	0.0050 J	0.045	0.026	0.016
Hardness	Dissolved	1,300	2,200	1,200	1,100	-	-
Iron	Dissolved	259	0.0592 J	401	15.7	2	1
Magnesium	Dissolved	94	100	86	94	-	-
Lead	Dissolved	<0.00020	<0.00020	<0.0010	<0.00020	0.136	0.005
Nickel	Dissolved	0.88	0.060	1.4	0.40	0.84	0.094
Zinc	Dissolved	0.15	<0.0040	0.29	0.12	0.21	0.21
Chloride	Total	4.3	2.9	5.6	3.2	-	-
Acidity	Total	670	<2.0	930	52	-	-
Alkalinity (Total)	Total	<2.00	20.0	<2.00	8.00	-	-
Alkalinity (Bicarbonate)	Total	<2.40	24.4	<2.40	9.75	-	-
Alkalinity (Carbonate)	Total	<1.20	<1.20	<1.20	<1.20	-	-
Alkalinity (Hydroxide)	Total	<0.700	<0.700	<0.700	<0.700	-	-
Sulfate	Total	1,790	1,880	1,960	1,080	-	-
Total Dissolved Solids	Total	2,970	2,810	3,260	1,750	-	-
Total Suspended Solids	Total	16	13	29	29	-	-

Notes

1. pH value was collected in field and is the average of 3 grab samples comprising the HDS Effluent sample and one grab sample for the HDS Influent, DS, and CUD samples.

Abbreviations

< - Analyte not detected at or above the or method detection limit

- - not measured or not available

J - Estimated value; analyte detected at a level less than the Reporting Limit and greater than or equal to the Method Detection Limit

NP - Not Promulgated

CUD - Channel Underdrain

DS - Delta Seep

TABLE 6
CHANNEL UNDERDRAIN, DELTA SEEP, AND HDS TREATMENT PLANT - FLOW RATES
NOVEMBER 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Date	Delta Seep Recorded Flow ^{1,2}		Channel Underdrain Recorded Flow ^{1,2}		Treated Water Discharged from the HDS Treatment Plant Recorded Flow ^{1,3,4}	
	(gpm)	(gallons)	(gpm)	(gallons)	(gpm)	(gallons)
11/1/2011	9.26	13,336	30.10	43,346	59.97	86,359
11/2/2011	9.07	6,258	30.05	18,628	56.65	81,569
11/3/2011	NA	NA	NA	NA	40.00	54,540
11/4/2011	NA	NA	NA	NA	40.00	18,504
11/5/2011	NA	NA	NA	NA	NA	NA
11/6/2011	NA	NA	NA	NA	NA	NA
11/7/2011	NA	NA	NA	NA	NA	NA
11/8/2011	NA	NA	NA	NA	NA	NA
11/9/2011	NA	NA	NA	NA	NA	NA
11/10/2011	NA	NA	NA	NA	NA	NA
11/11/2011	NA	NA	NA	NA	NA	NA
11/12/2011	NA	NA	NA	NA	NA	NA
11/13/2011	NA	NA	NA	NA	NA	NA
11/14/2011	NA	NA	NA	NA	NA	NA
11/15/2011	NA	NA	NA	NA	NA	NA
11/16/2011	NA	NA	NA	NA	NA	NA
11/17/2011	NA	NA	NA	NA	NA	NA
11/18/2011	NA	NA	NA	NA	NA	NA
11/19/2011	NA	NA	NA	NA	NA	NA
11/20/2011	NA	NA	NA	NA	NA	NA
11/21/2011	NA	NA	NA	NA	NA	NA
11/22/2011	NA	NA	NA	NA	NA	NA
11/23/2011	NA	NA	NA	NA	NA	NA
11/24/2011	NA	NA	NA	NA	NA	NA
11/25/2011	NA	NA	NA	NA	NA	NA
11/26/2011	NA	NA	NA	NA	NA	NA
11/27/2011	NA	NA	NA	NA	NA	NA
11/28/2011	NA	NA	NA	NA	NA	NA
11/29/2011	NA	NA	NA	NA	NA	NA
11/30/2011	NA	NA	NA	NA	NA	NA
Average Flow Rate or Total Discharged	9.17	19,594	31.68	61,973	49.15	240,972

Notes

1. Channel Underdrain, Delta Seep, and Treated Water Discharge from the HDS Treatment Plant flow rates are calculated from flow totalizer volume measurements.
2. Channel Underdrain and Delta Seep Collection were shutdown for the season on November 2, 2011.
3. The operational flow rate is reported. Water discharge does not always occur 24 hours per day.
4. HDS Treatment Plant was shutdown for the season on November 4, 2011.

Abbreviations

gpm - gallons per minute HDS - High Density Sludge NA - not applicable

TABLE 7
HIGH DENSITY SLUDGE TREATMENT SYSTEM - OPERATIONAL DATA SUMMARY
NOVEMBER 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Reporting Period	Treated Water Discharged (gallons)	Lime Consumed (kilograms)	Diesel Fuel Consumed (gallons)	Flocculant Consumed (kilograms)	Sludge Wasted (gallons)	Freshwater Consumed (gallons)
May 1 - May 31, 2011	2,146,472	6,633	2,570	59	4,200	4,700
June 1 - June 30, 2011	2,918,988	9,873	2,291	63	11,000	6,200
July 1 - July 31, 2011	2,165,870	7,455	2,129	55	15,800	9,100 ¹
August 1 - August 31, 2011	2,073,380	6,284	2,142	54	6,300	6,200 ¹
September 1 - September 30, 2011	1,918,306	4,466	2,284	46	6,250	9,900 ¹
October 1 - October 31, 2011	1,636,989	3,322	2,473	36	4,740	6,900 ¹
November 1 - November 30, 2011 ²	240,972	536	1,457	6	10,000 ³	11,440 ³

Notes

1. Includes water taken from the High Density Sludge Treatment System Fresh Water Tank and used for Remedial Investigation and Feasibility Study drilling activities.
2. The HDS Treatment Plant was shutdown for the season on November 4, 2011, and winterization was completed on November 17, 2011.
3. Additional freshwater was used and additional sludge was wasted during HDS Treatment Plant winterization.

TABLE 8
POND 3 OVERFLOW SAMPLE RESULTS
NOVEMBER 2011 MONTHLY SUMMARY

Draft - Provisional Data

Parameter	Basis	Analysis Method	November 8 2011 170Pond3Overflow450 Pond 3 Overflow Pipe into Pond 4 (mg/L ¹)
Temperature (°C)	Field	-	8.54
pH (s.u.)	Field	-	2.46
ORP (mV)	Field	-	507.6
Dissolved Oxygen	Field	-	6.84
Conductivity (uS/cm)	Field	-	5002
Aluminum	Dissolved	EPA 6010B	160
Arsenic	Dissolved	EPA 6020	0.002
Calcium	Dissolved	EPA 6010B	508
Cadmium	Dissolved	EPA 6020	0.0081
Chromium	Dissolved	EPA 6020	0.14
Copper	Dissolved	EPA 6020	0.99
Iron	Dissolved	EPA 6010B	99.6
Magnesium	Dissolved	EPA 6010B	350
Nickel	Dissolved	EPA 6020	2.2
Lead	Dissolved	EPA 6020	<0.0002
Zinc	Dissolved	EPA 6020	1.1
Alkalinity (Bicarbonate)	Total	SM2320B	<2.4
Alkalinity (Carbonate)	Total	SM2320B	<1.2
Alkalinity (Hydroxide)	Total	SM2320B	<0.7
Alkalinity (Total)	Total	SM2320B	<2
Bromide	Total	EPA 300.0	<3.5
Calcium	Total	EPA 6010B	563
Chloride	Total	EPA 300.0	13
Fluoride	Total	EPA 300.0	17
Potassium	Total	EPA 6010B	9.9
Magnesium	Total	EPA 6010B	400
Sodium	Total	EPA 6010B	37
Nitrite	Total	EPA 300.0	<3
Nitrate	Total	EPA 300.0	<2.5
Orthophosphate	Total	EPA 300.0	<4
Selenium	Total	EPA 6020	0.031
Sulfate	Total	EPA 300.0	3840

Notes

1. Field parameters have units displayed when different from mg/L

Abbreviations

- < - Analyte not detected at or above the or method detection limit
- °C - degrees Celsius
- gpm - gallons per minute
- J - Estimated value; analyte detected at a level less than the Reporting Limit and greater than or equal to the Method Detection Limit
- uS/cm - micro-Siemens per centimeter
- mg/L - milligrams per liter
- mV - millivolts
- ORP - oxidation/reduction potential

TABLE 9
POND 4 SLUDGE SAMPLE RESULTS
NOVEMBER 2011 MONTHLY SUMMARY
Draft - Provisional Data

Parameter	Description	Analysis Method	October 17 2011 168P4SLUDGE445 Composite sample of Pond 4 sludge from 4 locations (mg/kg) ¹	
Temperature (°C)	Field	-	14.46 ²	14.18 ²
pH (s.u.)	Field	-	8.79 ²	8.75 ²
ORP (mV)	Field	-	-1.0 ²	-2.1 ²
Conductivity (uS/cm)	Field	-	2,448 ²	2,432 ²
Aluminum	Total	EPA 6010B	8,000	
Alkalinity (Bicarbonate)	Total	SM2320B	58,500	
Alkalinity (Carbonate)	Total	SM2320B	959	
Alkalinity (Hydroxide)	Total	SM2320B	<0.7	
Alkalinity (Total)	Total	SM2320B	49,600	
Arsenic	Total	EPA 6020	530	
Calcium	Total	EPA 6010B	29,000	
Cadmium	Total	EPA 6020	1.6 J	
Chloride	Total	EPA 300.0	8.7	
Chromium	Total	EPA 6020	30	
Copper	Total	EPA 6020	85	
Fluoride	Total	EPA 300.0	31	
Iron	Total	EPA 6010B	66,000	
Potassium	Total	EPA 6010B	<94	
Magnesium	Total	EPA 6010B	9,400	
Sodium	Total	EPA 6010B	<120	
Nickel	Total	EPA 6020	1,200	
Nitrate	Total	EPA 300.0	2.9 J	
Orthophosphate	Total	EPA 300.0	<4	
Lead	Total	EPA 6020	5.8	
Sulfate	Total	EPA 300.0	12,000	
Zinc	Total	EPA 6020	380	

Notes

1. Field parameters have units displayed when different from mg/kg
2. 100 grams of sludge from each of four sample locations was mixed together with 400 grams of distilled water. The mixture was allowed to settle for 30 minutes, then parameters of the supernatant were measured. This test was performed twice to confirm results.

Abbreviations

- < - Analyte not detected at or above the or method detection limit
°C - degrees Celsius

Atlantic Richfield Company

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January 10, 2012

Mr. Gary Riley
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75 Hawthorne Street
San Francisco, CA 94105

Mr. Kevin Mayer
US EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105

RE: Leviathan Monthly Report for December 2011 and Quarterly RI/FS Progress Report

Dear Mr. Riley and Mr. Mayer:

The following text describes activities conducted during the month of December 2011 at the Leviathan Mine Site and activities anticipated to occur during the upcoming month. These activities are organized by work area [Aspen Seep, Channel Underdrain (CUD) and Delta Seep (DS)], and site-wide tasks. This progress report is being submitted in accordance with Paragraph 62 of the Administrative Settlement Agreement and Order on Consent for Removal Action (AOC) (effective January 21, 2009).

Atlantic Richfield is also submitting this letter in satisfaction of the quarterly progress reporting requirement set forth in Paragraph 63 of the Administrative Order for Remedial Investigation and Feasibility Study (U.S. EPA Region IX, CERCLA Docket No. 2008-18, June 23, 2008) (UAO). The quarterly summary of RI/FS activities is provided at the end of this letter.

ACTIVITIES FOR DECEMBER

Aspen Seep

- Operated the Aspen Seep Bioreactor (ASB) in recirculation mode during the month of December. Routine O&M, influent sampling, and effluent sampling occurred on December 7, 2011. The currently available influent and effluent water quality data for the December 7, 2011 sampling event are presented in Table 1. Recent pH and ORP field data are summarized in Table 2. No new influent flow rate data have been received from the USGS since the Monthly Report for September 2011. Any new flow data received will be included in subsequent monthly reports.
- On December 31, 2011, an effluent low flow alarm was received from the ASB. Though all chemical and recycle pumps appeared to be working properly when observed using the internet camera, a lower than normal water level was observed within Pond 3, and a higher than normal water level was



observed in Biocell 1. Based upon these limited observations and to protect the recycle pumps from running dry, operators remotely shutdown the recycle and ethanol pumps at approximately 10:50 AM, December 31, 2011. The ethanol pumps were shutdown because flow through the biocells stops when the recycle pumps are shutdown. The sodium hydroxide pumps continued to operate normally during this planned shutdown to treat the influent acid drainage into the ASB. Troubleshooting activities conducted on January 4 through 6, 2012, restored flow through both biocells. The recirculation and ethanol pumps were restarted on January 6, 2012. However, continued troubleshooting will be required to correct several observed pipe blockages.

CUD and DS

- The HDS Treatment Plant and CUD and DS capture equipment remained winterized during the month of December.
- On December 7, 2011, Atlantic Richfield inspected the Pond 4 area for damage related to high wind conditions. One unused plastic tank was damaged; however, no other site damage was observed.

Site-wide

- Work continued on updating the Leviathan Mine Project Database with data from monitoring performed by Atlantic Richfield and various agencies.
- On December 22, 2011, a conference call was conducted with EPA to provide a general progress update.
- Began compiling information for the 2011 Annual Report (due April 10, 2012).
- Began work on the 2012 Removal Action Work Plan (RAWP) (due March 1, 2012), which will describe activities to be performed by Atlantic Richfield at the Site during 2012.

ACTIVITIES FOR UPCOMING MONTH

Aspen Seep

- Continue operation of the Bioreactor in recirculation mode and conduct winter access monitoring and maintenance as outlined in the 2011 RAWP.

CUD and DS

- Data from the 2011 HDS Treatment Plant operations will be compiled for inclusion in the 2011 Annual Report.

Site-wide

- Continue to provide project progress updates to EPA via conference call. The next conference call is currently scheduled for January 24, 2012.
- Continue compiling information for the 2011 Annual Report.
- Continue working on the 2012 Removal Action Work Plan.

* * * *

Quarterly RI/FS Progress Report

As required by Paragraph 63 of the UAO, the following Quarterly Progress Report for Remedial Investigation and Feasibility Study (RI/FS) activities describes: (a) the actions taken to comply with the UAO during the prior quarter, (b) the work planned for the next quarter, and (c) any problems encountered or anticipated including any actual or anticipated delays in schedules.

Actions Taken to Comply with the UAO

- Atlantic Richfield submitted the Quarterly Progress Report for the third quarter on October 10, 2011.
- Atlantic Richfield conducted Monthly Progress Conference Calls with EPA in November and December 2011, during which RI/FS updates were provided. The October 2011 monthly update was provided during the Technical Advisory Committee Meeting on October 26, 2011.
- Atlantic Richfield submitted a Technical Memorandum to Evaluate the Feasibility of a Subsurface Barrier at the Upper Tributary on December 12, 2011. Atlantic Richfield received confirmation from EPA on December 23, 2011 that EPA supports the overall Feasibility Study for potential long term remedial actions at Leviathan Mine. Atlantic Richfield is proceeding with formulation of the Treatability Study Work Plan.
- Atlantic Richfield conducted a teleconference with EPA to discuss the Ecological Risk Assessment Problem Formulation on October 25, 2011.
- Atlantic Richfield presented an overview of 2011 RI/FS field activities during the TAC Meeting conducted on October 26, 2011.
- Atlantic Richfield conducted a teleconference with EPA and other stakeholders to discuss the Reference FRI Work Plan on October 31, 2011.
- Atlantic Richfield conducted a teleconference with EPA and other stakeholders to review and receive comments on the Ecological Risk Assessment Problem Formulation on November 7, 2011.
- Atlantic Richfield conducted a teleconference with EPA and its technical consultant to review EPA's comments on the Reference Area FRI Work Plan on December 6, 2011.
- Atlantic Richfield conducted a teleconference with EPA to present a monthly progress update along with an overview (draft TOC, tables, and figures) of the Off-Property FRI Work Plan on December 22, 2011.
- Atlantic Richfield continued implementation of field investigation activities under the EPA approved On-Property FRI Work Plan in the fourth quarter of 2011. Atlantic Richfield notifies EPA of planned field investigation activities by providing a "Three-week Look Ahead" of upcoming work; several notifications were provided in the fourth quarter 2011. This notification also allows EPA to plan its oversight of the On-Property FRI activities. On-Property FRI investigation activities conducted in the fourth quarter are as follows:
 - Continued drilling and installation of groundwater monitoring wells and piezometers. Associated work completed consisted of the following:
 - drilled, lithologic logged, monitored water levels, and collected grab groundwater samples from 8 soil borings;

- completed 1 boring as a monitoring well;
 - completed 37 borings as piezometers;
 - submitted select grab groundwater samples for laboratory analysis;
 - developed 12 monitoring wells, and 9 piezometers;
 - performed slug tests at 4 new piezometers and one existing well; and
 - surveyed all new monitoring wells and piezometers.
- Sample collection from the existing groundwater monitoring wells and newly installed groundwater monitoring wells.
 - Measured groundwater levels in existing wells in October and November. Both events included new wells/piezometers completed to date.
 - Continued the storm water monitoring program and performed twice weekly O&M of storm water sample collection stations. The storm water samplers were winterized at the end of October.
 - Mapped surface water during low flow conditions.
 - Conducted pond underdrain monitoring at Ponds, 1, 2N, 2S, and 3.
 - Completed additional geophysical surveys in the Leviathan Creek Study Area.
 - Continued collecting data from, and performed O&M activities for three meteorological stations.
 - Installed and began operation of the additional power supply (solar panel and battery system) for the large meteorological station.
 - Continued collecting data from, and performed O&M activities for three evaporation pans.
 - Conducted surveying activities to prepare 1-foot contour topography for Ponds, 2N, 2S, 3, and 4.
 - Installed a pond water level sensor in Pond 1, 2N, 3, and 4. Began collecting data at all five ponds in the Leviathan Creek Study Area.

Work Planned for the Next Quarter

- Atlantic Richfield plans to submit the Ecological Risk Assessment Work Plan to EPA in January 2012.
- Atlantic Richfield plans to submit the Off-Property FRI Work Plan to EPA in late January 2012.
- Atlantic Richfield plans to submit a response to comments on the Reference Area FRI Work Plan to EPA in late January 2012.
- Atlantic Richfield plans to submit a revised Reference Area FRI Work Plan to EPA in February 2012.
- Atlantic Richfield plans to submit the 2011 RI/FS Data Summary Report to EPA by March 31, 2012. This report will summarize all of the RI data collected during the 2011 field season.
- Atlantic Richfield plans to submit the Quarterly Progress Report for the first quarter of 2012 on February 10, 2011.

* * * *

If you have any questions or comments, please feel free to contact me at (714) 228-6770 or via e-mail at Anthony.Brown@bp.com.

Sincerely,

Original signed by Dave McCarthy for Tony Brown

Tony Brown
Project Manager

Attachments:

Table 1 – Aspen Seep Bioreactor Treatment System - Sample Results

Table 2 – Aspen Seep Bioreactor Treatment System - Recent pH and ORP Field Measurements

cc: Chuck Curtis, Lahontan Regional Water Quality Control Board
Ronald Halsey, Atlantic Richfield Company
Nathan Block, Esq., BP America Inc.
Adam Cohen, Esq., Davis Graham & Stubbs LLP
Dave McCarthy, Copper Environmental Consulting
Marc Lombardi, AMEC-Geomatrix Consultants, Inc.
Grant Ohland, AMEC-Geomatrix Consultants, Inc.
Sandy Riese, EnSci, Inc.

TABLE 1
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - SAMPLE RESULTS
DECEMBER 2011 MONTHLY SUMMARY
Draft - Provisional Data

Parameter	Basis	December 7 2011 166ASPINF591 Influent (mg/L)	December 7 2011 166ASPEFF590 Effluent (mg/L)	Maximum Discharge (mg/L)	Average Discharge (mg/L)
pH	Field	2.86	6.93	-	6.0 - 9.0
Selenium	Total	0.0030	0.0026	NP	0.005
Aluminum	Dissolved	49	<0.040	4.00	2.00
Arsenic	Dissolved	0.0012	<0.00090	0.34	0.15
Calcium	Dissolved	363	375	-	-
Cadmium	Dissolved	0.0022	<0.00010	0.009	0.004
Chromium	Dissolved	0.0041	<0.00090	0.97	0.31
Copper	Dissolved	0.92	0.0024	0.026	0.016
Hardness	Dissolved	1,300	1,300	-	-
Iron	Dissolved	145	0.898	2.00	1.00
Magnesium	Dissolved	87	79	-	-
Lead	Dissolved	<0.00020	<0.00020	0.136	0.005
Nickel	Dissolved	0.47	0.052	0.84	0.094
Zinc	Dissolved	0.69	0.0070 J	0.21	0.21
Chloride	Total	4.9	4.1	-	-
Acidity	Total	610	<2.0	-	-
Alkalinity (Total)	Total	<2.00	180	-	-
Alkalinity (Bicarbonate)	Total	<2.40	219	-	-
Alkalinity (Carbonate)	Total	<1.20	<1.20	-	-
Alkalinity (Hydroxide)	Total	<0.700	<0.700	-	-
Sulfate	Total	1,770	1,740	-	-
Total Dissolved Solids	Total	2,730	2,840	-	-
Total Suspended Solids	Total	22	13	-	-

Abbreviations

< - Analyte not detected at or above the or method detection limit

- - Discharge criteria not established

J - Estimated value; analyte detected at a level less than the Reporting Limit and greater than or equal to the Method Detection Limit

mg/L - milligrams per liter

NP - Not Promulgated

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
DECEMBER 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 or 9 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
09/21/07	6.0	2.91	428.9	7.34	-268.4	7.13	-280.3	9.56	-285.8	7.13	-265.3	8.42	2.6
09/26/07	6.2	2.89	496.7	7.80	-192.1	7.36	-223.0	9.64	-195.4	7.34	-232.7	8.34	50.3
10/03/07	5.5	2.85	484.1	8.07	-127.7	8.50	-129.6	11.25	-136.5	7.64	-164.0	8.22	-5.2
10/10/07 ²	5.8	2.80	498.0	5.50	55.9	5.64	-70.5	10.00	-190.0	6.20	-171.6	7.78	-268.0
10/18/07 ²	5.9	2.83	482.4	5.00	26.8	5.68	-46.2	11.38	-112.0	6.23	-139.0	8.69	135.0
10/31/07 ²	9.0	2.88	402.7	4.26	319.3	6.85	-156.7	9.80	-170.0	6.95	-212.2	7.66	-94.3
11/08/07	6.0	2.88	418.0	7.55	-128.3	7.01	-116.7	8.23	-133.9	6.86	-125.8	7.51	-50.6
11/13/07	-	2.86	484.5	7.06	-2.3	6.84	-65.3	7.86	-42.6	6.79	-78.1	7.58	4.2
11/27/07	5.5	2.86	479.4	6.99	-38.5	6.97	-205.0	8.46	-183.9	6.91	-156.8	7.25	-1.7
12/12/07	-	3.01	482.2	7.20	-25.3	7.20	-115.2	7.64	-107.7	7.04	-129.7	6.90	-31.9
01/15/08	4.8	2.98	483.3	6.76	5.9	6.73	-85.5	7.89	-94.3	6.67	-137.4	6.71	-33.0
02/07/08 ³	-	-	-	-	-	-	-	-	-	-	-	5.77	20.2
02/12/08	7.0	2.76	487.4	6.67	44.6	-	-	7.39	-45.6	6.42	-88.0	6.70	-15.3
03/18/08	6.0	2.88	375.1	7.85	3.6	-	-	8.80	-189.2	7.23	-211.3	7.05	-95.3
04/10/08	7.5	2.90	397.7	6.74	-80.0	6.70	-163.4	7.50	-142.6	6.57	-165.3	7.39	-24.5
05/15/08	7.3	2.97	442.2	6.24	21.2	6.55	-265.4	6.55	-233.7	5.60	-183.7	7.29	-143.3
05/27/08	7.0	3.00	464.1	7.11	-16.3	6.85	-242.2	6.98	-191.1	6.80	-235.2	7.26	-19.5
06/09/08	7.0	3.10	455.4	7.40	-47.5	7.09	-251.2	7.70	-178.8	6.97	-219.7	7.19	-61.5
06/17/08	7.5	2.91	443.9	7.42	-22.7	6.90	-283.0	7.29	-131.0	6.88	-244.3	7.30	-82.5
07/10/08	7.3	2.98	470.9	7.32	-34.1	6.90	-238.4	7.05	-172.6	6.90	-215.0	7.85	-113.5
07/22/08	7.0	2.99	455.5	6.94	-272.5	6.97	-267.4	7.07	-190.6	7.01	-248.9	7.35	-89.1
08/04/08	6.8	2.89	450.7	7.60	-94.4	6.94	-266.0	6.19	-173.1	7.02	-251.2	-	-
08/05/08	-	3.05	445.3	-	-	-	-	-	-	-	-	7.29	-70.0
08/18/08	7.3	3.93	478.9	7.46	-166.7	7.08	-291.9	7.40	-202.6	7.07	-268.8	7.40	-52.4
08/22/08	-	2.89	473.7	7.97	-212.9	7.08	-301.8	7.74	-224.0	7.03	-275.9	7.67	-27.8
08/25/08	-	2.93	470.5	7.77	-287.7	7.18	-286.1	6.89	-205.6	7.12	-273.8	8.02	-108.4
08/26/08	-	2.91	468.8	7.95	-255.4	7.09	-305.4	7.75	-281.2	7.14	-273.1	7.77	-41.4
09/24/08	-	3.03	423.2	7.18	-107.8	6.99	-255.4	7.11	-205.7	6.89	-245.2	7.70	-87.7
09/30/08	-	3.02	434.3	7.77	-151.9	6.89	-267.5	-	-	6.92	-269.9	8.10	-94.0
10/13/08	5.8	3.34	433.1	7.17	-98.7	6.94	-218.3	6.80	-157.2	7.01	-206.1	8.32	-101.0
10/27/08	5.8	3.21	247.8	7.34	-162.5	6.96	-175.3	7.20	-152.3	6.98	-126.8	7.88	273.7
11/19/08	5.5	2.83	453.7	7.20	-104.5	6.77	-204.7	7.12	-82.2	6.71	-154.7	7.74	-35.1
12/03/08	5.3	3.56	453.0	7.23	-45.0	6.86	-141.3	7.06	-100.1	6.84	-135.6	7.65	-47.5
01/9/09 ⁴	-	3.15	458.3	-	-	-	-	-	-	-	-	6.95	-43.0
01/12/09	5.3	2.94	466.3	6.36	-82.8	6.38	-245.1	-	-	6.82	-259.0	7.11	-74.0
02/19/09 ⁴	5.3	2.78	480.1	6.60	-3.2	6.74	-145.1	7.26	-117.6	6.25	-162.3	6.68	-18.1
03/10/09	5.0	2.88	481.2	-	-	-	-	-	-	-	-	7.36	34.3
04/13/09	7.0	2.78	532.7	7.45	-9.9	7.04	-185.5	7.50	-65.8	6.98	-175.4	7.77	-32.2

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
DECEMBER 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 or 9 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
05/06/09	5.5	2.89	444.4	-	-	6.47	-221.3	-	-	6.56	-206.5	7.62	-86.6
06/03/09	6.5	2.91	445.9	6.98	-145.1	6.62	-260.8	7.07	-192.8	6.65	-260.4	7.55	-15.4
06/16/09	6.5	2.98	388.0	7.09	-186.6	6.79	-319.3	7.16	-233.2	6.80	-298.2	7.70	-158.1
07/01/09	6.0	2.95	376.5	7.43	376.5	6.93	-366.2	7.42	-310.8	6.97	-350.5	7.89	-189.6
07/14/09	5.8	2.97	394.4	-	-	6.85	-338.8	-	-	6.98	-331.9	7.90	-146.2
07/29/09	6.0	2.78	404.5	7.24	-175.5	7.39	-427.7	8.10	-260.2	7.29	-403.7	8.05	-135.6
08/05/09	5.5	2.89	433.8	-	-	-	-	8.73	-120.7	-	-	8.17	-146.0
08/19/09	5.1	2.97	425.7	-	-	-	-	8.25	-37.6	-	-	7.54	47.0
09/17/09	5.3	2.38	490.6	7.27	-91.3	6.81	-180.3	7.75	-120.2	6.85	-182.3	6.95	-24.7
09/30/09	5.0	2.96	503.7	8.03	-18.9	8.99	-253.1	7.75	-217.2	7.03	-276.6	7.98	-17.0
10/15/09	5.5	2.93	496.6	6.57	-121.4	7.63	-301.0	8.33	-148.5	7.71	-314.5	7.85	-41.2
10/28/09	4.9	2.96	487.6	8.79	-69.9	7.28	-216.4	9.08	-143.0	7.24	-162.8	7.94	2.8
11/11/09	5.0	2.91	420.8	8.34	-15.3	7.49	-243.7	8.42	-163.9	7.51	-199.3	7.74	60.6
12/17/09 ⁵	5.0	2.90	416.5	4.65	100.2	5.00	15.3	-	-	5.12	-1.8	5.91	-26.4
01/14/10 ⁵	4.8	2.85	417.7	6.96	-89.0	6.82	-186.4	-	-	6.84	-206.1	6.45	-67.4
02/02/10 ⁵	4.7	2.94	484.0	7.58	-46.7	6.85	-129.6	-	-	6.67	-131.1	6.95	-48.1
03/09/10	4.8	2.74	474.7	8.27	-78.3	7.95	-204.2	8.74	-208.9	8.10	-220.8	7.75	-5.9
04/26/10 ⁶	12.0	2.85	479.5	5.14	135.1	5.61	-19.0	5.04	109.2	5.60	-29.6	6.15	35.9
05/17/10	9.7	2.97	436.9	6.26	196.9	7.04	-283.9	7.79	-235.1	7.08	285.4	7.76	-73.8
05/24/10	9.4	3.16	418.0	7.43	-156.1	7.00	-259.9	7.27	-171.4	6.89	-282.6	7.11	-78.6
05/27/10	9.6	3.18	423.1	5.52	-225.1	7.58	-316.7	8.86	-318.2	6.74	-296.8	7.07	-98.7
06/01/10	10.5	3.11	444.0	8.47	-32.2	7.72	-292.6	9.00	-	6.74	-300.9	7.01	-31.5
06/14/10	10.0	2.99	427.7	7.40	-81.7	6.85	-272.5	8.22	-220.2	6.61	-181.6	7.48	-93.7
06/15/10	-	-	-	8.04	-221.6	6.89	-347.7	-	-	6.17	-355.9	-	-
06/16/10	-	2.99	427.7	7.40	-81.7	6.85	-272.6	8.22	-220.2	6.61	-181.6	7.48	-93.7
06/18/10	9.1	-	-	7.72	-211.7	6.79	-335.6	-	-	6.69	-336.7	-	-
06/21/10	9.0	3.21	409.4	7.99	-242.7	6.96	-364.1	7.86	-303.4	6.78	-349.5	7.70	-142.3
06/30/10	10.0	2.59	451.5	8.73	-216.2	8.73	-216.2	-	-	6.78	-337.9	7.96	-164.5
07/01/10	-	2.82	422.4	-	-	-	-	-	-	-	-	7.94	-241.9
07/13/10	10.0	2.62	479.5	7.52	-112.1	6.90	-279.5	8.02	-255.2	6.90	-294.0	7.76	-65.8
07/21/10	10.0	2.93	475.1	7.90	-70.5	7.15	-301.5	7.80	-212.4	7.27	-315.3	8.09	-95.7
07/29/10	10.0	2.90	465.3	7.73	-168.6	7.25	-318.1	7.08	-192.5	7.15	-318.5	7.06	-45.6
08/03/10	9.0	2.94	458.6	7.69	-193.3	7.16	-311.4	7.16	-311.4	7.17	-324.5	7.39	-66.3
08/12/10	9.0	2.85	476.3	7.98	-255.3	7.07	-299.3	7.50	-235.2	7.06	-307.0	7.55	-26.2
08/17/10	9.5	2.64	470.9	8.09	-47.2	7.54	-306.0	8.47	-206.8	7.37	-320.0	7.86	-74.0
08/24/10	9.2	3.04	250.0	7.81	-129.9	7.21	-151.9	7.20	-202.9	7.09	-147.9	7.81	2.9
09/02/10	9.2	2.84	503.9	7.70	-208.4	-	-	8.15	-227.0	7.32	-267.2	7.97	-20.2
09/16/10	8.0	3.21	455.8	8.40	-219.9	7.29	-209.3	8.66	-197.0	7.32	-279.7	7.76	-76.4

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
DECEMBER 2011 MONTHLY SUMMARY
 Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 or 9 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
09/22/10 ⁷	8.0	3.06	476.5	8.50	-151.0	7.25	-276.9	8.30	-257.8	7.39	-279.9	7.93	-112.0
09/30/10 ⁷	7.6	3.16	503.3	8.49	-263.9	7.32	-265.4	8.53	-221.9	7.26	-267.8	8.61	94.1
10/06/10 ⁸	9.0	3.28	479.3	7.83	-287.5	7.39	-305.8	8.25	-246.7	7.62	-305.1	8.17	-235.5
10/11/10	8.0	3.20	479.3	7.52	-190.4	7.00	-284.4	8.28	-227.4	7.15	-290.4	7.85	26.4
10/19/10	8.0	2.89	447.3	8.75	-157.3	7.43	-310.4	8.52	-203.0	7.22	-310.6	8.15	130.4
10/28/10	8.0	2.95	579.0	7.23	-282.8	6.98	-368.9	8.50	-384.7	7.12	-402.6	7.73	-30.7
11/02/10	8.0	2.69	366.7	7.89	-285.1	7.14	-385.2	8.46	-307.5	7.00	-385.7	7.62	-31.5
11/15/10	8.5	2.94	361.7	7.79	-273.2	7.08	-381.9	8.04	-269.3	6.89	-384.5	7.64	-2.2
12/07/10 ⁹	8.5	3.01	387.2	6.97	-298.4	6.82	-375.1	-	-	6.57	-353.5	6.41	-112.4
01/07/11 ⁹	8.5	2.92	434.1	6.50	-134.0	5.98	-200.1	-	-	6.08	-216.2	6.15	-4.9
02/01/11 ⁹	8.0	3.07	423.8	6.75	-332.2	6.86	-279.7	-	-	6.59	-297.0	6.62	-9.3
03/11/11	8.5	3.05	384.7	7.66	-239.2	7.11	-344.7	-	-	6.85	-370.1	7.05	-73.4
4/19/2011 ¹⁰	30.0	2.61	454.9	-	-	-	--	-	-	-	-	4.72	172.9
04/26/11	29.0	2.91	362.1	7.45	-199.2	6.58	-346.5	7.42	-232.8	6.41	-369.7	7.22	-144.6
05/03/11	27.0	2.90	355.0	7.70	-264.8	6.56	-361.5	7.81	-264.9	6.54	-402.2	7.60	-137.5
05/11/11	24.0	2.84	344.2	6.81	-198.2	6.31	-229.0	6.99	-200.7	6.23	-204.0	6.99	-139.2
05/20/11	17.0	3.03	372.4	8.10	-282.2	7.09	-361.8	7.89	-219.6	6.39	-367.9	7.36	-44.1
06/01/11	17.5	2.92	378.6	8.18	-175.7	7.11	-360.0	8.14	-272.8	6.55	-337.9	7.32	-50.3
6/15/11 ¹¹	15.6	3.18	407.7	-	-	-	-	8.60	-231.3	-	-	8.15	-3.9
6/21/11 ¹¹	14.7	3.09	415.6	-	-	-	-	8.15	-184.2	-	-	-	-
6/28/11 ¹²	15.0	2.95	204.5	7.66	-503.6	6.94	-581.5	8.44	-458.1	6.93	-581.5	7.52	-85.1
07/06/11	14.0	2.95	237.1	8.37	-50.3	6.98	-525.6	8.10	-382.9	6.75	-550.2	7.81	-249.1
07/13/11	13.8	2.88	352.2	8.46	-312.3	6.83	-412.1	5.43	-48.5	6.67	-420.1	7.84	-37.4
07/19/11	13.0	3.11	304.3	7.27	-462.3	6.93	-434.0	8.40	-407.5	6.85	-436.0	8.0	-86.6
07/28/11	-	2.98	320.8	8.32	-294.3	7.10	-393.6	8.55	-165.4	6.99	-376.0	7.90	-70.4
08/04/11	12.0	3.12	337.7	7.88	-416.0	7.20	-437.3	8.73	-437.5	7.11	-431.8	8.14	-155.7
08/11/11	12.0	2.85	360.2	7.72	-456.0	7.27	-421.6	8.95	-421.9	6.87	-443.0	8.04	-162.8
08/17/11	12.0	3.00	362.5	6.93	-291.8	6.84	-415.5	8.60	-338.3	6.92	-437.7	7.97	-187.8
08/24/11	12.0	3.01	362.8	6.42	-257.0	7.08	-405.5	8.30	-277.9	6.84	-402.2	7.85	-164.4
08/30/11	12.0	2.90	350.9	8.23	-321.5	7.27	-433.4	7.49	-366.0	7.05	-428.0	7.63	-63.5
09/08/11	12.0	2.98	362.2	7.66	-387.0	6.98	-405.5	7.55	-375.2	6.80	-402.3	7.91	-183.6
09/15/11	12.0	3.01	385.0	8.16	-194.0	6.97	-372.7	8.38	-359.1	6.90	-342.6	8.07	-146.1
09/23/11 ¹¹	12.0	2.99	400.1	-	-	-	-	6.81	-142.1	-	-	8.30	-295.9
09/28/11	12.0	2.86	429.9	7.29	-312.1	6.76	-232.9	7.11	-108.4	6.71	-224.1	7.54	-131.1
10/06/11	12.0	2.96	389.0	6.73	-220.1	6.48	-281.5	6.55	-250.8	6.80	-331.8	7.01	-159.3
10/20/11	-	-	-	-	-	-	-	7.50	-375.9	6.93	-365.1	-	-
10/21/11	-	-	-	-	-	-	-	3.14	416.8	6.86	-365.1	-	-

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT pH and ORP FIELD MEASUREMENTS
DECEMBER 2011 MONTHLY SUMMARY

Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 5 or 4 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 or 9 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)	pH (s.U.)	ORP (mV)
10/27/11	-	3.13	424.5	-	-	-	-	6.91	-189.7	-	-	-	-
10/28/11	11.5	2.91	375.7	7.26	-186.5	6.68	-246.5	7.41	-215.3	6.84	-265.3	7.10	-159.0
11/08/11	-	3.12	368.8	-	-	-	-	-	-	-	-	-	-
11/10/11	11.8	3.08	369.9	-	-	-	-	7.13	-213.9	-	-	-	-
11/15/11	11.5	3.08	371.9	7.89	-335.8	7.21	-223.6	7.54	-252.3	6.68	-348.3	7.14	-109.9
12/07/11	11.0	2.86	375.4	7.30	-260.8	7.01	-347.1	7.51	-387.9	6.72	-334.1	7.21	-114.9

Notes

1. Aspen Seep Bioreactor Influent Flow measurements are field measurements completed with a graduated bucket and stop watch.
2. Biocell 1 was flushed on 10/08/07, 10/09/07, and 10/18/07; Biocell 1 was bypassed during this flushing period. Low pH readings in Manhole 1 from 10/10/07 through 10/31/07 were caused by drainage into pretreatment pond from failed seal in weir box cap.
3. Measurements are believed to be erroneous due to calibration error. Parameters were re-evaluated on 02/12/08.
4. Low pH measurements due to a power outage and associated chemical pump shutdown.
5. Low pH measurements caused by stripped gears on NaOH pump head that interrupted dosing to Manhole 6 between 11/11/09 and 12/17/09 site visits.
6. Low pH measurements due to increase in system flow rates; chemical dosing rates lagged behind these system flow rate increases and were unable to prevent decrease in system pH.
7. Effluent readings were collected from the centrifuge discharge location on these dates due to sludge dewatering. Water was not being discharged from Pond 4.
8. Effluent readings were collected from the Pond 4 sample location on this date. Water was not being discharged from Pond 4 at the time of water quality measurement.
9. Low pH measurements due to power outage and associated chemical pump downtime during the inverter failure on November 29, 2010.
10. Low pH measurement due to increase in system flow rates.
11. Field measurements at intermediate bioreactor manholes were not collected when recirculation operations were interrupted due to sludge dewatering operations or biocell flushing.
12. ORP measurements may be inaccurate due to probe calibration issues.

Abbreviations

- - not measured, not recorded, or bioreactor operation did not have flow at given location on the specified date.
gpm - gallons per minute ORP - oxidation/reduction potential
mV - millivolts s.U. - standard unit