TECHNICAL REVIEW
OF GROUND-WATER MONITORING DATA
AT PATHFINDER MINES CORPORATION-LUCKY MC MINE

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The Semi-Annual Ground-Water Monitoring Reports for Lucky Mc Mine, dated August 2011 and January 2012 by Hydro-Engineering, LLC presents the ground-water monitoring data collected at the Lucky Mc tailing site in the 1st and 2nd Quarters, and 3rd and 4th Quarters of 2011, respectively. Ground-water monitoring was conducted based on condition 60B of Source Material License No. SUA-672. License Condition 60B requires monitoring of groundwater from Well T1-12 (POC well), Well AL-6 (POE well), and other selected wells, AL-1 and AL-7.
The table below lists the measured concentrations for POC well T1-12:

Groundwater Monitoring Data at POC well T1-12, with Established Protection Standard

Chemical Constituents	Arsenic	Beryllium	Cadmium	Chromium	Nickel	Ra226+228	Selenium	Thorium-230	Uranium
Protection Standard	**0.05**	**0.07**	**0.02**	**0.05**	**0.85**	**7.5**	**1.1**	**13.2**	**1.7**
3/24/2011	0.001	<0.01	<0.010	<0.05	0.28	3.5	0.265	0.07	0.378
6/8/2011	-	-	-	-	-	-	-	-	-
8/18/2011	0.002	<0.01	<0.010	<0.05	0.26	3.7	0.26	0.2	0.364
11/17/2011	<0.001	<0.01	<0.005	<0.05	0.19	4	0.24	0.1	0.362
Note: All concentrations in mg/l except for radium and thorium in pCi/l.									

The uranium concentrations observed during 2011 at POC well T1-12 are consistent with the previous 11 years of sampling results (i.e., since approximately 2000), with concentration values fluctuating just below 0.4 mg/l. The uranium concentrations at downgradient POE well AL-6 varied from 0.671 mg/l to 0.733 mg/l in 2011, similar to the concentrations observed in previous years. The uranium concentrations at AL-6 have always been above the concentrations observed at the POC well T1-12 from 1988 to the present. The highest uranium concentrations at AL-6 reached approximately 1.6 mg/l between 2000 and 2002. However, the uranium concentrations at well AL-1, located upgradient of POE well AL-6 have increased from 0.939 mg/l in March 2011 to 2.42 mg/l in November 2011. These elevated uranium concentrations at well AL-1 also occurred between 1995 and 2003. There appears

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to be no indication of leakage of impacted groundwater from the tailings impoundment that may result in these recent spikes of uranium concentrations at downgradient well AL-1.

The selenium concentrations at both POC well T1-12 and POE well AL-6 are significantly below the established protective level of 1.1 mg/l. The selenium concentrations at T1-12 have continued to decrease since late 1990s. The activities of radium-226 and radium-228 measured at both POC well T1-12 and POE well AL-6 during 2011 are well below the site protection level of 7.5 pCi/l.

Other measured chemical constituents include chloride, sulfate, and TDS . The chloride concentrations in the POC well T1-12 have been decreasing since the late 1980's, with a current concentration of 200 mg/l. The chloride concentration at well AL-6 (POE) fluctuates between 50 and 250 mg/l, with the background level at about 50 mg/l in well T1-6. The sulfate concentrations at the POC well T1-12 have been steady overall for the last five years at approximately 2500 mg/l. The TDS at the POC well T1-12 has been steady at about 6200 mg/l since 2005.

No monitoring data were reported for the 2nd quarter of 2011.

Conclusion:

The NRC staff concur with the conclusion that the present concentrations of chemical constituents monitored at the POC well T1-12 are significantly below the levels established to be protective for the site. However, the uranium concentrations at well AL-1, located upgradient of POE well AL-6 has increased from 0.939 mg/l in March 2011 to 2.42 mg/l in November 2011, which is above the site protection level of 1.7 mg/l. Since the uranium concentrations at upgradient POC well T1-12 have been consistently below 0.4 mg/l, it is not likely that leakage of impacted groundwater from the tailings impoundment is the source of these elevated levels. Further evaluation and/or monitoring of the increase of uranium concentrations at well AL-1 is needed before the site transfer to DOE-Legacy Management for long-term stewardship.