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February 6, 2018

Deputy Director  
Decommissioning and Uranium Recovery Licensing Directorate  
Division of Waste Management and Environmental Protection  
Office of Federal and State Materials and  
Environmental Management Programs  
Mailstop T8-F5  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

**RE: License SUA-442, Docket No. 40-6622  
Annual ALARA Report for 2017**

Dear Deputy Director,

Please find behind this cover the Annual ALARA report for your records.

If you have any questions regarding this submittal, please feel free to contact me at our Casper office.

Regards,



Mr. John W. Cash  
President

Cc: Mr. Dominick Orlando, U.S. NRC via email  
Mrs. Theresa Horne, Ur-Energy Littleton Office

**Annual ALARA Audit For 2016-2017 PATHFINDER MINES  
CORPORATION Shirley Basin Mine Source Material License SUA-442**

**December 14, 2017**

**A. Introduction**

An annual ALARA audit of the radiation safety program at the Shirley Basin site was conducted December 5 thru December 14, 2017 by John Cash, President of Pathfinder Mines Corp. The audit was conducted in fulfillment of License Condition 36 of NRC License Number SUA-442. This audit covers the period November 2, 2016 through December 6, 2017. The audit entailed a review of the radiation safety records and an evaluation of conformance with requirements of the license for this period. The audit also included a site visit on December 12, 2017.

**B. Review of By-Product Material Shipping and Disposal Records**

A total of 20 roll-off containers on 16 shipments of ISL byproduct waste were received at the Shirley Basin Site during the period. A spot check of the shipping and disposal manifest records showed them to be complete (all required forms filed including description of material, total activity, signature, and volume). Likewise, the radiological release surveys for the shipping trucks were also complete and in good order.

**C. Personnel Dose Records**

No doses were assigned during the period. The mill has been decommissioned, and the tailings area has been reclaimed for many years now, eliminating most sources of personnel exposure at the site. The remaining un-reclaimed portion of the tailings area consists of approximately 25 acres in the Pond 3 basin dedicated to the licensed disposal of byproduct waste material from ISL licensees. This disposal activity has been ongoing for over seventeen years, and the historical exposure/dose records for the site have demonstrated very low exposure potential due to the way the incoming wastes are handled.

There continues to be only one worker (contractor) on site on a part-time basis. Over the period, the site Radiation Safety Program has been overseen by the Radiation Safety Officers (RSO), of Pathfinder Mines Corporation (Corporate RSO for Ur-Energy USA Inc.). The RSO visited the site periodically when disposal activities were occurring. The lack of recent exposure records is consistent with the requirements of 10 CFR 20.1502 since individual exposure monitoring is required if the external exposure is greater than 500 mrem, or if the internal exposure is greater than 10% of the applicable ALIs from Appendix B to 10 CFR 20. Historic individual TLD monitoring had indicated zero external dose for over ten years prior to 2008, and the highest recorded average individual annual ALI for the previous nine years was 0.7 uCi Rn 222 with daughters, well below the 10 uCi threshold that requires monitoring. Other previously monitored radionuclides such as Unat and Ra-226 measured zero or near-zero intake for years prior to 2008.

#### **D. Bioassays**

No bioassay samples were taken during the period. The NRC license does not require routine urinalyses, and no measurable intakes were indicated for bioassays done prior to 2008 for many years.

#### **E. Inspections**

During the period, there were no NRC inspections.

#### **F. Radiological Surveys and Sampling Data**

Surveys of equipment (primarily ISL waste *delivery* trucks) prior to release from the restricted area were reviewed. They were found to be well documented with no significant concerns noted. Typical surface alpha and gamma levels were at or near background levels. Besides ISL waste delivery trucks, various items, namely personal vehicles, were also released with documented surveys demonstrating that residual surface alpha and gamma levels were well below release limits. The truck drivers are routinely monitored by Ken Hurley for alpha contamination prior to leaving the property. No other radiological surveys or sampling were done during the period, consistent with the site status.

#### **G. Equipment Used for Exposure Control**

Overall, the radiation safety instrumentation program is in order. A review was made to determine that all instruments were in appropriate calibration and usable status. Calibration records for all instruments were reviewed and they were determined to be current.

#### **H. Reports on Overexposures**

There were no overexposures during the period.

#### **I. Standard Operating Procedures Review**

The annual review of the SOPs is in progress and is expected to be completed before the end of the calendar year.

#### **J. Radiation Work Permits**

There were no radiation work permits (RWP's) issued during the period.

#### **K. Annual Land Use Survey and Semi-Annual Effluent Reports**

In accordance with License Condition 21, the Annual Land Use Survey records show that the survey was completed on August 11, 2017 with the results submitted to the NRC. Since there is no effluent monitoring pursuant to 10 CFR 40.65, letters were submitted to NRC stating no data had been collected (February 23, 2017 and August 11, 2017).

#### **L. Annual Surety Update**

In accordance with License Condition 27, the annual surety update was submitted to the NRC on September 6, 2017.

#### **M. Semi-Annual Groundwater Monitoring Report**

Semi-Annual Groundwater Monitoring Reports were submitted to the NRC on February 28, 2017 and August 30, 2017 as required. The water quality trends remain below the approved ACLs with no trends of concern.

#### **N. Field Audit**

On December 12, 2016 Mr. Cash visited the site to ensure compliance with regulatory and license commitments. The weather was relatively warm, around 30 degrees, with light remnant inches of snow on the ground.

The tailings dam appears to be in good condition with no bulging, cracks, weeping or significant erosion.

Personnel surveys are being performed and records are in order.

All dumped waste material was covered except a load that had been received the morning of the site visit.

There are no open trenches within 100 feet from the dam. Material within the trench had been covered as required.

#### **O. Resolution of Recommendations from 2015-2016 ALARA Audit**

1. Revise the regulatory schedule to include annual refresher training for the site contractor and other radiation workers. Resolution - Schedule revised and hanging on wall in Mine Manager's Office.
2. Consider purchase of modern, more reliable, instrumentation. Current instruments are calibrated and functioning but their age could begin to affect reliability. Resolution - Items have been maintained in good working order, however, this item remains a recommendation.
3. Empty byproduct containers should be returned to the sender as "Empty" if they are below the interior and exterior DOT release limits. Resolution - Company has worked with each shipper to ensure return shipments are properly shipped in compliance with DOT requirements.
4. Continue to emphasize good housekeeping and personal hygiene practices as a means to avoid contamination problems, particularly in conjunction with ISL waste shipments delivery and dumping into the disposal cell. Resolution - Proper hygiene and prevention of contamination have been topics of safety meetings. No issues have been noted.


5. Continue to conduct bi-monthly safety meetings during times of operation. Resolution – Completed as required.
6. Continue careful attention to calibration due dates for survey instrumentation. Resolution – Completed as required. No issues noted.

**P. Recommendations from 2016-2017 Audit**

1. Improve upon the frequency of QA/QC samples collected when sampling groundwater samples. This item has been discussed with the sampler and changes are being implemented.
2. Provide additional emergency response information at the trailer office (names and phone numbers of emergency contacts and site coordinates).

**Q. Summary/Conclusions**

During period radiation doses were likely at background levels with only one-part time contractor and/or company employee on site to handle the limited ISL waste shipment deliveries and disposal operations. In summary, the radiation safety program at Shirley Basin conforms to the requirements of NRC License Number SUA-442 and it is appropriate for the kind and level of activity at the site.

  
John Cash, President

  
Alex Buehrle, RSO