



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
1600 E. LAMAR BLVD  
ARLINGTON TX 76011-4511

October 19, 2016

John Cash, President  
Pathfinder Mines Corp.  
5880 Enterprise Dr.  
Suite 200  
Casper, WY 82609

SUBJECT: NRC INSPECTION REPORT 040-06622/2016-001

Dear Mr. Cash:

On September 21, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed a routine inspection at your Shirley Basin site in Carbon County, Wyoming. This inspection was an examination of activities conducted under your license, as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures, representative records, observations of activities, and interviews with personnel.

The NRC inspector discussed the results of this inspection with you and other members of your staff on September 21, 2016. The enclosed report presents the results of this inspection. Based on the results of this inspection, no violations were identified and no response to this letter is required.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter, its enclosure, and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy or proprietary, information so that it can be made available to the Public without redaction.

J. Cash

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Should you have any questions concerning this inspection, please contact Dr. Robert Evans at 817-200-1234 or the undersigned at 817-200-1549.

Sincerely,

/RA/

Lee E. Brookhart, Acting Chief  
Fuel Cycle and Decommissioning Branch  
Division of Nuclear Materials Safety

Docket: 040-06622

License: SUA-442

Enclosure:

NRC Inspection Report 040-06622/2016-001

w/Attachment: Supplemental Information

cc w/enclosure:

R. Schierman, Wyoming Department of Environmental Quality

B. Goodnough, Wyoming Department of Environmental Quality

S. Ramsay, Wyoming Homeland Security

A. Gil, U.S. Department of Energy

**U.S. NUCLEAR REGULATORY COMMISSION  
Region IV**

Docket: 040-06622

License: SUA-442

Report: 040-06622/2016-001

Licensee: Pathfinder Mines Corp.

Facility: Shirley Basin site

Location: Carbon County, Wyoming

Date: September 21, 2016

Inspector: Robert Evans, PhD, PE, CHP, Senior Health Physicist  
Fuel Cycle and Decommissioning Branch  
Division of Nuclear Materials Safety

Accompanied by: Daniel Radulovic, Team Leader  
Mining Compliance and Regulation  
Minerals Resources Division  
Department of State Development  
Government of South Australia

Approved by: Lee E. Brookhart, Acting Chief  
Fuel Cycle and Decommissioning Branch  
Division of Nuclear Materials Safety

Enclosure

## EXECUTIVE SUMMARY

Pathfinder Mines Corp.  
NRC Inspection Report 040-06622/2016-001

This inspection was a routine, announced inspection of activities being conducted at the Shirley Basin mill site in Carbon County, Wyoming. In summary, the licensee was conducting site activities in accordance with license and regulatory requirements.

### Management Organization and Controls

- The licensee had sufficient staff for the work in progress, conducted annual program reviews as required by regulations, and established and maintained site procedures as required by the license. (Section 1.2)

### Radiation Protection

- The licensee implemented a radiation protection program that was in compliance with 10 CFR Part 20 and license requirements. (Section 2.2)

### Radioactive Waste Management/Transportation Activities

- The licensee continued to maintain site security in accordance with regulatory and license requirements. The licensee conducted waste disposal operations in accordance with license and regulatory requirements. A previously cited violation involving the licensee's failure to provide function specific training was reviewed and closed. (Section 3.2)

### Effluent Control and Environmental Protection

- The licensee conducted groundwater corrective action monitoring and land use surveys in accordance with license requirements. The licensee reported the results in accordance with license requirements. (Section 4.2)

## Report Details

### **Site Status**

Uranium milling operations were conducted at the Shirley Basin site from 1971-1992. The mill site contains two tailings impoundments covering approximately 300 acres. A 30-acre solutions pond (Pond 3) was being used for disposal of uranium byproduct material. The licensee intends to continue using the disposal area for the foreseeable future.

Reclamation of the conventional mill has been substantially completed. Other reclamation activities completed included site grading and installation of the radon clay barrier, sand layer, topsoil, and rock mulch. Portions of the site have been reseeded for regrowth of vegetation. Recently, the licensee installed fencing around portions of the property.

The remaining structures included the office, change house/garage, wash bay, and lubrication bay. The remaining site areas that must still be reclaimed include the shop yard, stockpile area, site structures, industrial pond, and local roads. Reclamation of Pond 3 and adjacent areas will occur after the licensee discontinues disposal operations. Also, the licensee is required to construct three drainage channels after disposal operations are discontinued.

In August 2012, the licensee submitted an application to the NRC requesting a change in ownership of the license and surety provider from Areva NC, Inc. to Ur-Energy USA, Inc. The transaction date was December 20, 2013. The NRC subsequently revised Materials License SUA-0442 on June 26, 2014 (Agencywide Documents Access and Management System [ADAMS] Accession Numbers ML14079A553 and ML14079A554) to reflect the change in control and ownership of the Pathfinder Mines Corporation, Shirley Basin site.

### **1 Management Organization and Control (88005)**

#### **1.1 Inspection Scope**

Ensure that the licensee and its contracted workforce are conducting site activities in accordance with license and regulatory requirements.

#### **1.2 Observations and Findings**

License Condition 11 references the license application. The license application dated August 24, 2012 (ML122541138 and ML122541143), included a copy of the organizational structure for the Shirley Basin site. The licensee's staff included the president, mine manager, and radiation safety officer (RSO). The onsite work was being conducted by a contractor, a former employee. The onsite work included receipt of waste disposal shipments, equipment release surveys, heavy equipment operations, and water sampling. The RSO conducted oversight activities and reviews as needed to maintain compliance with the license.

The licensee continued to conduct annual radiation protection program reviews as required by regulation 10 CFR 20.1101(c). Section 5.1.3 of the application provided additional details about the annual As Low As Reasonably Achievable (ALARA) audit. Further, License Condition 36 states, in part, that the annual ALARA report will be submitted to the NRC for review. The inspector reviewed the ALARA reports for 2014-2015 (ML16277A666 and ML16286A610) and discussed the results of the reports with

the RSO and company president. (The 2014 ALARA audit included calendar year 2013 due to the change in ownership at that time.) The two audits were found to be comprehensive based on the work in progress. The 2014 audit discussed an isolated incident involving the discovery of low-level contamination of a trailer and driver. The auditor recommended corrective actions including upgraded personal protective clothing and a change in radiological survey requirements. The ALARA audit for 2015 recommended additional enhancements of the waste disposal process and associated paperwork. The licensee's implementation of these audit recommendations should improve the quality of the licensee's waste disposal operations.

License Condition 33 states, in part, that standard operating procedures shall be established. Additional details for procedures are provided in Section 5.1.2 of the application. The inspector reviewed selected procedures and confirmed that the procedures provided sufficient detail for the work to be performed. The RSO continued to perform annual reviews of remaining procedures, although, the licensee could not locate the document to confirm that it had completed the annual procedure review for 2015. This finding was not considered safety significant because the procedures did not change substantially during the year.

### 1.3 Conclusions

The licensee had sufficient staff for the work in progress, conducted annual program reviews as required by regulations, and established and maintained site procedures as required by the license.

## **2 Radiation Protection (83822)**

### 2.1 Inspection Scope

Ensure that the licensee's radiation protection and training programs are in compliance with 10 CFR Part 20 requirements and the license.

### 2.2 Observations and Findings

The inspector reviewed the licensee's occupational exposure monitoring program. The licensee discontinued the use of personnel dosimeters in 2008 as allowed by regulation 10 CFR 20.1502(a), because external doses were consistently less than 10 percent of the annual limits. In addition, the licensee previously discontinued collection of bioassays and air samples. These radiation protection programs were suspended because of the reduction in work being performed and the risk of inhaling or ingesting tailings material was minimal. The licensee had not issued a radiation work permit since the last inspection.

The licensee continued to conduct equipment release and personnel surveys as required by License Condition 18 and Section 4.3 of the license application. The primary source of potential contamination was the waste disposal area. The licensee's onsite contractor conducted release surveys of waste shipment trucks and personnel vehicles that entered the disposal area. The licensee also required all individuals who entered the waste disposal area to survey out prior to exiting the site. The inspector reviewed the licensee's survey records for 2014-2016. The licensee's records indicated that no

equipment or individual was released from the site with contamination greater than the release limits.

Table 5-2 of the application provided the radiation monitoring locations to be routinely surveyed. These locations included the shop and lunch areas. The licensee suspended these surveys, in part, because licensee and contractor staff rarely entered these areas. In addition, all individuals who entered the waste disposal area were required to perform a survey upon exiting the area to limit the spread of contamination.

License Condition 15 states, in part, that certain activities shall be documented including instrument calibrations and worker training. Details about instrument calibrations are provided in License Condition 34 and Table 5-6 of the license application. The licensee had sufficient instruments available for surveys of equipment and personnel, and the licensee maintained records of instrument calibrations on file. The licensee also had the option of supplementing the onsite survey meters with meters borrowed from a different NRC-licensed site.

The inspector reviewed the licensee's training program. The training program requirements are discussed in Section 5.3 of the license application. There were no new onsite employees since the last inspection, therefore, the licensee did not provide new employee training. The licensee provided annual refresher training in 2014-2016. However, the training record for 2014 could not be located. This finding was not safety significant because there was no turnover in onsite staffing. The licensee's staff had records of other types of training that was conducted in 2014. License Condition 35 requires bi-monthly safety meetings, and the licensee maintained records of these safety meetings.

The inspector conducted a site tour to observe the site status. During the site tour, the inspector conducted radiation surveys using a Ludlum Model 19 microRoentgen survey meter (NRC 015518, calibration due date of July 13, 2017, calibrated with radium-226). The background ambient gamma exposure rate was approximately 20 microRoentgen per hour. The most elevated levels observed by the inspector was adjacent to the Pond 3 waste disposal area which measured 80-100 microRoentgen per hour. The inspector did not identify any area with exposure rates above 5,000 microRoentgen per hour (5 millirem per hour), which would require posting as a radiation area.

## 2.3 Conclusions

The licensee implemented a radiation protection program that was in compliance with 10 CFR Part 20 and license requirements.

## **3 Radioactive Waste Management/Transportation Activities (88035/86740)**

### 3.1 Inspection Scope

Determine if the licensee had established and maintained an effective program for managing radioactive wastes.

### 3.2 Observations and Findings

#### a. Site Operations

The inspector toured the site, in part, to observe the security features in place at the facility. The security requirements are discussed in Section 5.4 of the license application. Buildings, fences, gates, and equipment were observed during the site tour. The access gates were functional, and fences were posted. The inspector determined that licensed material was adequately secured within the site property as required by 10 CFR 20.1801 and the license application.

License Condition 46 authorizes the licensee to dispose of byproduct material generated onsite or from other licensed facilities. The licensee was actively disposing of byproduct material wastes from other sites. Although no shipments were being received during the site tour, the inspector observed the licensee's waste disposal area and reviewed selected shipping records. Licensee staff described the shipping and disposal process, and the inspector compared the process to procedure requirements. The licensee's program included instructions for receipt of wastes, disposal of wastes, and surveys for release of the trailers and trucks. The licensee's staff were found to be implementing the requirements provided in License Condition 46 and site procedures.

The inspector reviewed representative shipping papers for inbound shipments and the release records for outbound shipments. The inbound records met U.S. Department of Transportation (DOT) requirements. The outbound survey records met procedural requirements.

#### b. (Closed) Violation 040-06622/1301-01: Failure to provide recurrent transportation training

During the September 2013 inspection, documented in NRC Inspection Report 040-06622/13-001 dated November 26, 2013 (ML13331A935), the NRC cited the licensee for its failure to provide recurrent transportation training to a site worker. Regulation 10 CFR 71.5(a) requires licensees involved in transportation activities to comply with DOT regulations. Regulation 49 CFR 172.704 provides the training requirements for hazmat employees. During the September 2013 inspection, the NRC identified that one member of the licensee's staff had not been completely trained as required by DOT regulations.

The licensee responded to the NRC's Notice of Violation by letter dated December 31, 2013 (ML14006A283). The licensee provided the required DOT training to the individual by November 25, 2013. Since DOT function-specific training was valid for three years, the individual's training was valid until November 2016. The licensee's records indicate that function-specific training was also provided to the individual in September 2015, extending the individual's training to September 2018.

### 3.3 Conclusions

The licensee continued to maintain site security in accordance with regulatory and license requirements. The licensee conducted waste disposal operations in accordance with license and regulatory requirements. A previously cited violation involving the licensee's failure to provide function specific training was reviewed and closed.



## **4 Effluent Control and Environmental Protection (88045)**

### **4.1 Inspection Scope**

The inspector reviewed the licensee's effluent and environmental protection programs to ensure compliance with license and regulatory requirements.

### **4.2 Observations and Findings**

Amendment 52 to the license dated February 13, 2003, deleted the environmental monitoring program requirements with the exception of groundwater and surface water sampling. License Condition 47 provides the current groundwater and surface water sampling requirements, and License Condition 22 specifies that the results of all effluent and environmental monitoring shall be reported to the NRC in semi-annual reports. The inspector reviewed the semiannual groundwater reports for 2014-2015 (ML16286A619, ML16286A667, ML16286A658, and ML16286A649).

The current compliance monitoring program includes sampling of 14 wells and five surface water locations. Based on the information provided in these reports, all sample results were below the corresponding groundwater protection standards at the point of compliance wells in 2014. However, in the first half of 2015, two sample results (gross alpha and combined radium-226 and radium-228) exceeded the standards at point of compliance well NP01. At that time, these sample results were considered as outliers and not representative of negative trends. The licensee's records indicate that it conducted verification analysis of the samples, and results of verification sampling were less than the protection standards. During the second half of 2015, all sample results remained below the respective groundwater protection standards, including gross alpha and combined radium-226 and radium-228 at point of compliance well NP01.

In summary, the licensee collected the required number of water samples and analyzed the samples for the required chemical and radiological constituents. The sample results were less than the protection standards listed in the license, with the exception of the two outliers discussed above.

License Condition 21 requires the licensee to conduct annual surveys of land use. The annual land use surveys for 2013-2016 were reviewed during the inspection (ML13282A268, ML16286A627, ML16286A636, and ML16286A652). The nearest residence continued to be located 3 miles from the site. The land use within 5 miles continued to include livestock grazing and seasonal hunting. The inspector partially confirmed the accuracy of the land use surveys during site tours.

### **4.3 Conclusions**

The licensee conducted groundwater corrective action monitoring and land use surveys in accordance with license requirements. The licensee reported the results in accordance with license requirements.

## **5 Exit Meeting Summary**

The inspector presented the inspection results to the licensee's representative at the conclusion of the onsite inspection on September 21, 2016. During the inspection, the licensee did not identify any information reviewed by the inspector as proprietary.

## **SUPPLEMENTAL INSPECTION INFORMATION**

### PARTIAL LIST OF PERSONS CONTACTED

#### Licensee

J. Cash, President  
C. Pederson, Radiation Safety Officer

#### Wyoming Department of Environmental Quality

B. O'Brien, Uranium Recovery Program Engineer, Land Quality Division

### INSPECTION PROCEDURES (IPs) USED

IP 83822	Radiation Protection
IP 86740	Inspection of Transportation Activities
IP 88005	Management Organization and Controls
IP 88035	Radioactive Waste Management
IP 88045	Effluent Control and Environmental Protection

### ITEMS OPENED, CLOSED AND DISCUSSED

#### Opened

None

#### Closed

040-06622/1301-01 VIO Failure to provide recurrent transportation training

#### Discussed

None

### LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
DOT	U.S. Department of Transportation
IP	Inspection Procedure
NRC	U.S. Nuclear Regulatory Commission
RSO	radiation safety officer

J. Cash

- 2 -

Should you have any questions concerning this inspection, please contact Dr. Robert Evans at 817-200-1234 or the undersigned at 817-200-1549.

Sincerely,

/RA/

Lee E. Brookhart, Acting Chief  
Fuel Cycle and Decommissioning Branch  
Division of Nuclear Materials Safety

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R. Schierman, Wyoming Department of Environmental Quality  
B. Goodnough, Wyoming Department of Environmental Quality  
S. Ramsay, Wyoming Homeland Security  
A. Gil, U.S. Department of Energy

ADAMS ACCESSION NUMBER: **ML16291A562**

<input checked="" type="checkbox"/> SUNSI Review By: RJE	ADAMS: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Sensitive <input checked="" type="checkbox"/> Non-Sensitive	<input type="checkbox"/> Non-Publicly Available <input checked="" type="checkbox"/> Publicly Available	Keyword NRC-002
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NAME	REvans		LEBrookhart	
SIGNATURE	/RA/		/RA/	
DATE	10/18/16		10/19/16	

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Letter to John Cash from Lee Brookhart dated October 19, 2016

SUBJECT: NRC INSPECTION REPORT 040-06622/2016-001

**DISTRIBUTION:**

RIV Regional Administrator (Kriss.Kennedy@nrc.gov)  
RIV Deputy Regional Administrator (Scott.Morris@nrc.gov)  
DNMS Director (Mark.Shaffer@nrc.gov)  
DNMS Deputy Director (Linda.Howell@nrc.gov)  
FCDB Branch Chief (Jack.Whitten@nrc.gov)  
RIV Senior Health Physicist (Robert.Evans@nrc.gov)  
NMSS Project Manager (Ted.Carter@nrc.gov)  
NMSS Branch Chief (Bruce.Watson@nrc.gov)  
NMSS Hydrogeologist (Jose.Valdes@nrc.gov)  
Fee Coordinator (Marisa.Herrera@nrc.gov)

**Pathfinder Mines Corp. Distribution List**

Ryan Schierman  
Uranium Recovery Program Manager  
Land Quality Division  
Wyoming Department of Environmental Quality  
200 W. 17th Street  
Cheyenne, WY 82002

Dr. April Gil  
U.S. Department of Energy  
Office of Legacy Management  
2597 Legacy Way  
Grand Junction, CO 81503

Brian Goodnough  
Natural Resources Analyst  
Land Quality Division  
Wyoming Department of Environmental Quality  
200 W. 17th Street, Suite 10  
Cheyenne, WY 82002

Scott W. Ramsay  
Radiological Services Supervisor  
Wyoming Homeland Security  
5500 Bishop Blvd.  
Cheyenne, WY 82002  
[scott.ramsay@wyo.gov](mailto:scott.ramsay@wyo.gov)