



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

October 3, 2016

Oscar Paulson  
Facility Supervisor  
Kennecott Uranium Co.  
P.O. Box 1500  
Rawlins, WY 82301-1500

SUBJECT: NRC INSPECTION REPORT 040-08584/2016-001

Dear Mr. Paulson:

This letter refers to the routine U.S. Nuclear Regulatory Commission's (NRC) inspection that was conducted on September 20, 2016, at your Sweetwater Uranium Project in Sweetwater 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 and representative records, observations of activities, and interviews with personnel.

The inspection findings were presented to you at the conclusion of the onsite inspection. 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 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.

O. Paulson

- 2 -

Should you have any questions concerning this inspection, please contact Dr. Robert Evans at 817-200-1234 or the undersigned at 817-200-1197.

Sincerely,

/RA Lee E. Brookhart, Acting for/

Jack E. Whitten, Chief  
Fuel Cycle and Decommissioning Branch  
Division of Nuclear Materials Safety

Docket: 040-08584

License: SUA-1350

Enclosure:

NRC Inspection Report 040-08584/2016-001

cc w/enclosure:

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B. Wood, Wyoming Department of Environmental Quality

J. O'Connor, Wyoming Department Environmental Quality

A. Gil, U.S. Department of Energy

S. Ramsay, Wyoming Homeland Security

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

Docket: 040-08584

License: SUA-1350

Report: 040-08584/2016-001

Licensee: Kennecott Uranium Co.

Facility: Sweetwater Uranium Project

Location: Sweetwater County, Wyoming

Date: September 20, 2016

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

Jose J. Valdes, PG, Hydrogeologist  
Uranium Recovery Licensing Branch  
Division of Decommissioning, Uranium Recovery and Waste Programs  
Office of Nuclear Material Safety and Safeguards

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

Approved by: Jack E. Whitten, Chief  
Fuel Cycle and Decommissioning Branch  
Division of Nuclear Materials Safety

Enclosure

## EXECUTIVE SUMMARY

Kennecott Uranium Company  
NRC Inspection Report 040-08584/2016-001

This inspection was a routine, announced inspection of decommissioning activities being conducted at the standby Sweetwater Uranium Project mill in Sweetwater County, Wyoming. In summary, the licensee was conducting decommissioning activities in accordance with license and regulatory requirements.

### Management Organization and Controls

- The licensee conducted routine site activities in accordance with license and regulatory requirements. The licensee had sufficient staff for the work in progress, conducted safety evaluations as allowed by the license, 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 requirements and the license. Occupational exposures for 2013-2015 were below regulatory limits. (Section 2.2)

### Radioactive Waste Management

- The licensee continued to inspect and maintain the tailings impoundment in accordance with license requirements. The tailings impoundment appeared to be in good condition with no observable leaks or erosion. (Section 3.2)

### Effluent Control and Environmental Protection

- The licensee conducted environmental monitoring, groundwater corrective action monitoring, and land use surveys in accordance with license requirements. The licensee reported the results in accordance with license requirements. Public doses from site operations were well below regulatory limits. (Section 4.2)

## Report Details

### **Site Status**

The Sweetwater Uranium Project mill was constructed in 1980. The mill operated from 1981-1983. The mill has been in standby since 1983. Structures still in place at the site include the mill building, solvent extraction building, maintenance shop, and administrative building. A 60-acre tailings impoundment is located at the site, and the impoundment contains approximately 2.5 million tons of tailings material. Several evaporation ponds are located within the perimeter of the tailings impoundment.

A few years ago, the licensee excavated approximately 450,000 cubic yards of diesel-contaminated soils from underneath the former diesel tanks. The tanks were located on site property but outside of the radiologically restricted area. The licensee constructed a land farm to bio-remediate the soil. At the time of the inspection, the licensee was almost complete with its bio-remediation of the soil. In the near future, the licensee plans to refill the excavated pit with remediated soil and other non-contaminated debris.

Activities in progress during the inspection included routine license compliance work such as site maintenance, environmental monitoring, and implementation of the groundwater corrective action program. The licensee's staff continued to maintain the equipment located within the mill while the mill remained in standby.

By letter dated July 24, 2014 (ADAMS Accession No. ML14251A115), the licensee requested renewal of source material license No. SUA-1350 for a 10-year term. By letter dated August 25, 2016 (ML16203A102 and ML16203A124), the NRC submitted a draft license to the licensee for review. At the conclusion of the onsite inspection, the NRC had not completed its review and approval of the renewed license.

By letter dated May 26, 2016 (ML16160A360), the licensee requested a 5-year postponement of the initiation of the requirements for timely decommissioning of the Sweetwater Uranium Project per Title 10 of the Code of Federal Regulations (CFR) 40.42(f). The licensee's May 2016 request was the fifth request submitted to the NRC since 1996 for postponement of decommissioning. At the time of the onsite inspection, the NRC had not responded to the licensee's extension request.

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

#### **1.1 Inspection Scope**

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

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

At the time of the inspection, site employees included the facility supervisor who was also the radiation safety officer, administrative coordinator, resident facility technician, site operations technician, and contract security guard. In addition, the licensee used contractors as needed to conduct non-routine work, such as tailings impoundment liner repairs, fence repairs, and general site maintenance work. The inspectors concluded

that the licensee had sufficient staff for maintaining compliance with regulatory and license requirements.

In accordance with License Condition 9.3, the licensee is authorized to make changes to the facility, without prior NRC approval, under certain conditions. The inspectors reviewed the licensee's safety and environmental evaluations completed since the previous inspection. Most evaluations involved administrative changes to the safety and environmental review panel committee membership and approval of staff training. The licensee summarized its safety evaluations in the annual reports to the NRC as required by License Condition 12.3.

The licensee issued one technical evaluation since the last inspection, Safety and Environmental Evaluation SEE-23. This evaluation was approved in May 2013. The evaluation increased the groundwater pump-back rate from 25 million to 27 million gallons per year, in part, to hasten the remediation of the contamination plume. The inspectors reviewed the licensee's change in groundwater pump-back rates and concluded that the change did not require prior NRC approval.

Regulation 10 CFR 20.1101(c) requires licensees to periodically (at least annually) review the radiation protection program content and implementation. In addition, License Condition 12.3 requires the licensee to submit the As Low As Reasonably Achievable (ALARA) audit to the NRC on an annual basis. The inspectors reviewed the annual ALARA audits for 2013-2015 (ML14077A339, ML15072A362, and ML16176A065). The audits were found to be comprehensive and included discussion of employee exposures, bioassay results, site inspections, training, meetings, radiological survey results, safety and environmental review panel summaries, and potential trends in worker doses.

License Conditions 9.6 and 12.1 specify that site procedures shall be established and reviewed at least annually. The inspectors confirmed that the facility supervisor reviewed the procedures annually from 2013-2015. The inspectors reviewed the procedure manuals and concluded that the procedures were comprehensive, thorough, and accurate. The licensee's comprehensive procedures were considered to be a management strength.

### 1.3 Conclusions

The licensee conducted site activities in accordance with license and regulatory requirements. The licensee had sufficient staff for the work in progress, conducted safety evaluations as allowed by the license, 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 inspectors reviewed the licensee's occupational dose assessments for calendar years 2013-2015. As allowed by regulation 10 CFR 20.1502, the licensee is not required to conduct individual monitoring of external and internal occupational doses if an adult is likely to receive less than 10 percent of the applicable regulatory dose limits per year. The licensee continued to document that occupational doses were less than 10 percent in each annual ALARA audit.

The licensee calculated occupational exposures using a combination of external exposure rates, personal dosimeters, exposures to radon, and exposures to air particulates. When required, doses from work controlled by radiation work permits were also added to the annual exposures. (The licensee did not issue any radiation work permits in 2013-2015.) The licensee's records indicate that the highest total effective dose equivalent exposure for 2013 was 0.033 rem with a regulatory limit of 5 rem. The licensee monitored 10 individuals in 2014 and four individuals in 2015. The highest occupational exposures for 2014 and 2015 were 0.029 rem and 0.023 rem, respectively. Although these occupational doses were well below the regulatory limit, the licensee's records suggest a slight downward trend in doses over time.

The licensee conducted monthly bioassays to monitor for potential uptakes of uranium. No sample result exceeded the lowest action level since the previous inspection. The licensee also calculated the weekly maximum soluble uranium intake for comparison to the 10 milligram per week limit specified in 10 CFR 20.1201(e). The licensee's records indicate that the maximum weekly intake since 2013 was calculated to be 0.05 milligrams, an intake that was well below the regulatory limit.

The inspectors reviewed the licensee's implementation of its radiation protection program. The licensee conducted gamma exposure rate surveys every six months in both restricted and unrestricted areas. These survey results were recorded and were used in the licensee's annual dose assessments. The licensee also conducted semi-annual contamination surveys in the restricted and unrestricted areas. The licensee's records for 2013-2015 indicated that no contamination was identified in the unrestricted areas. In addition, the licensee maintained records of equipment releases. These equipment releases were summarized in the annual ALARA audits. The licensee also maintained records of instrument calibrations.

The licensee's records indicated that workers were provided with routine radiation safety, respirator, industrial safety, driver safety, and fire safety training. Contractors received training as needed based on their work assignments. The licensee also conducted monthly safety meetings.

The inspectors reviewed the licensee's shipping records for core and ore samples shipped from the site in 2014, including shipments conducted by third-party shippers. The shipping papers appeared to be complete and included the required export/import licenses for shipments to Canada.

The inspectors conducted independent radiological surveys during site tours. The inspectors measured the ambient gamma exposure rates using a Ludlum Model 19 microRoentgen survey meter (NRC No. 015518, calibrated to radium-226, calibration due date of July 13, 2017). The exposure rates within the radiologically restricted areas

were comparable to the licensee's exposure rates. No elevated exposure rates were identified in the unrestricted areas.

### 2.3 Conclusions

The licensee implemented a radiation protection program that was in compliance with 10 CFR Part 20 requirements and the license. Occupational exposures for 2013-2015 were below regulatory limits.

## **3 Radioactive Waste Management (88035)**

### 3.1 Inspection Scope

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

### 3.2 Observations and Findings

The inspectors conducted site tours to observe activities in progress and equipment in operation. The mill was posted in accordance with License Condition 9.9 requirements. The inspectors observed that the tailings impoundment embankments were in generally good condition. The inspectors did not identify any leaks or significant erosion during site tours.

In accordance with License Condition 9.3, the licensee conducted Safety and Environmental Evaluation SEE-18 in June 2009 to authorize the construction of evaporation ponds on top of the existing tailings impoundment. The details for maintaining these ponds were added to procedure TOP-1, General Tailings and Evaporation Impoundment Procedures. The ponds were installed to allow for evaporation of pump-back water, reduce windblown contamination from the impoundment, and to reduce radon releases from the impoundment. The ponds were found to be in good condition, and none of the ponds appeared to be overfilled. The pump-back system was in operation, collecting seepage and transferring the liquid to the evaporation ponds.

The licensee suspended the daily and weekly mill inspections in 1983 when the mill went into standby. In accordance with License Condition 10.6, the licensee continued to conduct weekly impoundment inspections. A contract engineer conducted annual inspections of the tailings impoundment and the diversion channel. The results of these inspections were presented in the annual reports.

### 3.3 Conclusions

The licensee continued to inspect and maintain the tailings impoundment in accordance with license requirements. The tailings impoundment appeared to be in good condition with no observable leaks or erosion.



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

### **4.1 Inspection Scope**

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

### **4.2 Observations and Findings**

#### **a. Environmental Monitoring**

License Condition 11.5 provides the environmental monitoring program requirements. The licensee's program consisted of air particulate, radon, and gamma radiation monitoring at two sampling stations. Station 2 is located upwind of the site, and Station 4A is located downwind of the site. At the upwind station, the licensee is required to monitor ambient radon-222 concentrations. Air particulate, radon, and gamma radiation monitoring are required at the downwind station. During 2016, the licensee changed the type of radon-222 measuring devices used in the field, and the licensee was conducting limited tests, including duplicate sampling, to ensure that the new devices provided reasonable and accurate results.

The licensee presented the results of environmental monitoring in semi-annual reports to the NRC as required by License Condition 11.5. The inspectors reviewed the reports for 2013 through the first half of 2016 (ML13235A008, ML14077A338, ML14251A199, ML15072A355, ML15258A079, ML16176A064, and ML16238A208). The licensee reported the sample results for the each sampling station. The licensee also reported the average radon-222 flux emanating from the tailings impoundment as required by 40 CFR Part 61, Subpart W. No adverse conditions were identified within the reports that were reviewed.

The licensee conducted public dose assessments based on observed radon concentrations, airborne particulate concentrations, and gamma radiation levels. The nearest residence was assumed to be the security trailer. The licensee's calculations indicated that background doses typically exceeded the nearest residence doses, thus, the assigned annual doses to the onsite security guard (the nearest resident) was essentially zero. In summary, the nearest resident doses were well below the regulatory limit of 0.1 rem as specified in 10 CFR 20.1301(a).

#### **b. Groundwater Corrective Action Program**

License Condition 11.3 requires the licensee to implement a groundwater corrective action program. The program included monitoring of wells and use of pump-back wells to improve the performance of the corrective action program. Additional details about implementation of the groundwater program are provided in License Condition 11.5. Further, License Condition 12.3 requires the licensee to annually report the progress towards attaining the groundwater protection standards. The inspectors reviewed the annual program reports for 2013-2015 (ML14077A340, ML14155A038, ML15072A372, and ML16176A068).

The inspectors confirmed that the licensee had sampled the wells specified in the license. However, the inspectors had questions regarding contradictory information

provided in the licensee's annual reports which described all perched wells as "dry," yet the licensee reported water level measurements for three of these wells (TMWs 54, 55, and 67). The inspectors observed site personnel obtaining water level and total depth measurements in 16 perched wells selected by the inspectors. Ten of the wells (TMWs 19, 22, 21, 30, 34, 38, 65, 88, 80, and 85) were found to be dry, but six wells (TMWs 54, 55, 67, 74, 87, 86) contained between 3 and more than 19 feet of water. The inspectors concluded that this finding was not safety significant, but future groundwater corrective action reports should be modified to reflect the as-found conditions in the field.

By letter dated August 25, 2016 (ML16203A102 and ML16203A124), the NRC submitted a draft renewal license to the licensee. The NRC staff noted that the current corrective action plan, specified in License Conditions 11.3 and 11.5, was not achieving compliance with the groundwater protection standard limits approved for the site. In particular, the NRC noted that groundwater contamination may extend beyond the western boundary, and this area may not be fully characterized by the licensee.

The licensee responded to the NRC's observations by letter dated September 1, 2016 (ML16250A354). The licensee committed to develop a characterization plan to better delineate the western margins of the potential groundwater plume. The licensee subsequently submitted a proposed characterization plan to the NRC by letter dated September 15, 2016 (ML16263A073). This program area will be reviewed by the NRC as part of the license renewal process. The NRC staff will continue to review the licensee's implementation of the groundwater corrective action program during future inspections, to ensure that the licensee's corrective action program continues to be implemented with the objective of returning the groundwater concentrations to NRC-approved levels.

c. Annual Survey of Land Use

In accordance with License Condition 11.2, the licensee conducted annual land use surveys for areas located within 5 miles of the mill. License Condition 12.3 requires the licensee to submit the results of the annual land use survey to the NRC. The inspectors reviewed the land use surveys conducted in 2013-2015 (ML14077A337, ML15072A365, and ML16176A066). Land use within 5 miles included mineral development, animal grazing, wildlife habitat, hunting, and camping. The inspectors confirmed the accuracy of the reports during site tours.

4.3 Conclusions

The licensee conducted environmental monitoring, groundwater corrective action monitoring, and land use surveys in accordance with license requirements. The licensee reported the results in accordance with license requirements. Public doses from site operations were well below regulatory limits.

**5 Exit Meeting Summary**

The inspectors presented the inspection results to the licensee's representative at the conclusion of the onsite inspection on September 20, 2016. During the inspection, the licensee did not identify any information reviewed by the inspectors as proprietary.

## **SUPPLEMENTAL INSPECTION INFORMATION**

### **PARTIAL LIST OF PERSONS CONTACTED**

#### **Licensee**

O. Paulson, Facility Supervisor

#### **Wyoming Department of Environmental Quality**

B. O'Brien, Uranium Recovery Program Engineer, Land Quality Division  
R. Schierman, Uranium Recovery Program Manager, Land Quality Division  
A. Thompson, Project Geologist, Land Quality Division

### **INSPECTION PROCEDURES (IPs) USED**

IP 83822	Radiation Protection
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**

None

#### **Discussed**

None

### **LIST OF ACRONYMS USED**

ADAMS	Agencywide Documents Access and Management System
ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
IP	Inspection Procedure
NRC	U.S. Nuclear Regulatory Commission

O. Paulson

- 2 -

Should you have any questions concerning this inspection, please contact Dr. Robert Evans at 817-200-1234 or the undersigned at 817-200-1197.

Sincerely,

/RA Lee E. Brookhart, Acting for/

Jack E. Whitten, Chief  
Fuel Cycle and Decommissioning Branch  
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ADAMS ACCESSION NUMBER: **ML16273A138**

<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
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DATE	09/28/16	09/28/16	10/03/16	

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Letter to Oscar Paulson from Jack Whitten dated October 3, 2016

SUBJECT: NRC INSPECTION REPORT 040-08584/2016-001

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