



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
612 EAST LAMAR BLVD, SUITE 400
ARLINGTON, TEXAS 76011-4125

August 22, 2008

Alan D. Cox
Project Manager
Homestake Mining Co.
P.O. Box 98
Grants, NM 87020

SUBJECT: NRC INSPECTION REPORT 040-08903/08-001

Dear Mr. Cox:

This refers to the inspection conducted on July 30-August 1, 2008, at the Homestake Mining site in Grants, New Mexico. The 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. Details of the inspection were presented to you at the telephonic exit briefing conducted on August 5, 2008. The inspection determined that you were conducting operations in accordance with regulatory and license requirements. No violations were identified, and no response to this letter is required.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," 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 document system (ADAMS), accessible from the NRC website at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

Should you have any questions concerning this inspection, please contact Linda Gersey, Health Physicist, at (817) 860-8299, or the undersigned at (817) 860-8197.

Sincerely,

/RA/

Jack E. Whitten, Chief
Nuclear Materials Safety Branch B

Docket No.: 040-08903
License No.: SUA-1471

Enclosure:
NRC Inspection Report
040-08903/08-001

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SUNSI Review Completed: RJE ADAMS: Yes No Initials: RJE
 Publicly Available Non-Publicly Available Sensitive Non-Sensitive

DOCUMENT NAME: s:\dnms\!NMSBB\LMG\uranium recovery\homestake\Homestake Mining
 2008-01.doc final r:_DNMS\

RIV:DNMS:NMSBB	DNMS:NMSBB	C:NMSBB	
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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.: 040-08903
License No.: SUA-1471
Report No.: 040-08903/08-001
Licensee: Homestake Mining Co.
Facility: Former Grants Mill
Location: Grants, Cibola County, New Mexico
Dates: July 30-August 1, 2008
Inspectors: Robert Evans, PE, CHP, Senior Health Physicist
Nuclear Materials Safety Branch B
Linda M. Gersey, Health Physicist
Nuclear Materials Safety Branch B
Approved by: Jack E. Whitten, Chief
Nuclear Materials Safety Branch B
Attachment: Supplemental Inspection Information

ENCLOSURE

EXECUTIVE SUMMARY

Homestake Mining Company's Former Uranium Mill NRC Inspection Report 040-08903/08-001

This inspection included a review of site status, management organization and controls, radiation protection, operator training, maintenance and surveillance testing, environmental protection, transportation and radwaste management, and emergency preparedness. In summary, the licensee was conducting decommissioning operations safely and in accordance with regulatory and license requirements.

Management Organization and Controls

- The organizational structure and staffing levels were sufficient for the work in progress. Site procedures were established and were being maintained up-to-date. Annual audits were being conducted by third-party contractors, and the audits were thorough reviews of site radiation protection activities (Section 1).

Radiation Protection

- The licensee implemented a radiation protection program that met the requirements of 10 CFR Part 20 and the license. Occupational exposures were small fractions of the regulatory limits. Bioassay sampling results suggested that no individual had experienced an intake of uranium in recent years (Section 2).

Operator Training/Retraining

- Radiation protection training was provided to site workers as required by the license (Section 3).

Maintenance and Surveillance Testing

- Instruments were being calibrated as required by site procedures. Survey meters in service appeared operable with up-to-date calibration stickers (Section 4).

Environmental Protection

- The licensee had established groundwater and environmental monitoring programs as required by the license. A review of records and original laboratory data indicated that the licensee had not released effluents into the environment in quantities exceeding the regulatory limits. The environmental and groundwater monitoring reports were submitted to the NRC as required by the license (Section 5).

Transportation of Radioactive Material and Radioactive Waste Management

- The licensee was conducting transportation and waste disposal operations in accordance with license requirements (Section 6).

Emergency Preparedness

- The licensee maintained its emergency preparedness program in a state of readiness (Section 7).

Report Details

Site Status

The Homestake Mill operated from 1958 until 1990. The mill was decommissioned during 1993-1994. Two tailings piles remain onsite. The top of the large tailings pile was still covered with an interim cover because the pile has not completely settled. Two lined water evaporation ponds were installed on top of the small tailings pile. In addition, two water collection ponds were installed adjacent to the small tailings pile.

At the time of the inspection, groundwater remediation was in progress. The two water collection ponds and the two evaporation ponds were in service to support groundwater remediation. The licensee was actively removing potentially contaminated water from the large tailings pile and surrounding grounds. The licensee was either disposing of the water through evaporation or cleaning the water through reverse osmosis. A sprinkler system was in service in the evaporation ponds to enhance the evaporation rate. Enhanced evaporation was being conducted on a seasonal basis.

In the near future, the licensee plans to construct a third evaporation pond to further enhance its water evaporation capabilities. The licensee will commence with construction of the 25-acre pond following NRC approval. The NRC subsequently approved the construction and operation of the third evaporation pond through amendment of the license on August 7, 2008.

1 Management Organization and Controls (88005)

1.1 Inspection Scope

Determine if the licensee had established an organization to administer the technical programs and a program to perform internal reviews, self-assessments, and audits.

1.2 Observations and Findings

The licensee provided the inspectors with a current site organization chart. Site staffing consisted of nine Homestake employees. Site staffing had not changed since the last inspection. The ranking site manager was the project manager. The project manager also filled the position of radiation protection administrator and was responsible for the implementation of the radiation safety program. Other site workers included the site supervisor, senior project engineer, environmental technician, accountant, the utility operator/radiation management and three additional utility operators. Contractors were used on an as-needed basis and included electrical workers, drillers, and security staff personnel. The inspectors concluded that the licensee had sufficient staff to conduct the work in progress including license compliance activities.

License Condition 23 requires, in part, that standard operating procedures be established for all operational activities involving radioactive materials. In addition, written procedures must be established for non-operational activities to include environmental monitoring, bioassay analysis, and instrument calibrations. The inspectors reviewed the licensee's procedures and determined that the procedures had been adequately established and implemented. The radiation protection administrator conducted annual procedure reviews.

A third-party contractor was used to conduct the annual As Low As Reasonably Achievable (ALARA) audits. The inspectors reviewed the ALARA audits for 2006-2007. The auditors reviewed the radiation protection program for trends and for potential non-compliances. The inspectors concluded that the annual ALARA audits were comprehensive, independent reviews of the licensee's radiation protection program.

1.3 Conclusions

The organizational structure and staffing levels were sufficient for the work in progress. Site procedures were established and were being maintained up-to-date. Annual audits were being conducted by third-party contractors, and the audits consisted of thorough reviews of site radiation protection activities.

2 **Radiation Protection (83822)**

2.1 Inspection Scope

Determine if the licensee's radiation protection program was in compliance with license and 10 CFR Part 20 requirements.

2.2 Observations and Findings

Occupational exposures were monitored using optically stimulated dosimeters that were exchanged quarterly. The dosimeters provided a record of external radiation exposures. The inspectors reviewed the licensee's records for 2006 through the first quarter of 2008. During this time frame, the highest annual deep dose equivalent exposure was 31 millirems with a regulatory limit of 5,000 millirems. The inspectors found that actual external exposures were small fractions of the regulatory limit.

The licensee did not conduct internal dose assessments because there was no dry, exposed tailings material. In addition, routine air sampling was not required because there was no exposed tailing material. However, the licensee voluntarily operated a high volume air sampler on top of the main tailings pile. The air was sampled for concentrations of airborne natural uranium, radium-226, and thorium-230. The air sample results were consistently below half of the respective derived air concentration values specified in Appendix B to 10 CFR Part 20.

The bioassay program requirements are specified in License Conditions 10, 23, and 32. Bioassays were conducted to monitor for potential intakes of uranium. The samples collected included baseline, termination, and semi-annual samples. Special samples were collected as required by radiation work permits. The bioassay results for 2006 through the first quarter of 2008 were reviewed. No sample result exceeded the detection limit of 5 micrograms of uranium per liter of urine. These low bioassay sample results suggest that site workers' intake of uranium was effectively controlled by the licensee.

License Condition 14 specifies the criteria for release of equipment and packages from the restricted area. The inspectors reviewed the equipment release survey records from 2006 through the first quarter of 2008. To ensure consistency, the senior radiation safety technician conducted most of the equipment release surveys. Based on the licensee's records, nothing was released from the radiologically restricted area with contamination greater than the NRC-approved contamination limits.

Routine surface contamination surveys of clean areas are not required by the license. However, the licensee conducted area spot checks once a year. No contamination control problems were identified during the 2006-2007 surveys.

All work involving tailings material, such as drilling into the large tailings pile, required a radiation work permit. During this work, spot checks were performed to verify contamination control and to measure actual exposure rates. The inspectors reviewed the radiation work permits issued during 2006-2007. The radiation work permits provided sufficient guidance for protection of personnel from potential exposures to radioactive tailings material.

Ambient gamma radiation levels were measured by the inspectors during site tours. The radiation levels were measured using an NRC-issued Ludlum Model 19 microRoentgen survey meter (NRC No. 015540, calibration due date of 02/14/09). With a background of approximately 8-10 microRoentgens per hour ($\mu\text{R/hr}$), the office building measured 9 $\mu\text{R/hr}$ (background levels). The top of the large tailings pile measured 14 $\mu\text{R/hr}$, while the slope measured 8 $\mu\text{R/hr}$. The difference was the result of the cover material present. The top of the large tailings pile has an interim cover, while the slope has a permanent cover. The interior of the reverse osmosis building measured 5 $\mu\text{R/hr}$, while prefilters in the building measured 25-40 $\mu\text{R/hr}$. The prefilters exhibited an elevated exposure rate because of the contamination that the prefilters had removed from the groundwater. Finally, the landfill measured 22 $\mu\text{R/hr}$. The landfill was located on the small tailings pile. In summary, no area was identified with ambient gamma exposure rates that met the definition of a radiation area (5,000 $\mu\text{R/hr}$).

2.3 Conclusions

The licensee implemented a radiation protection program that met the requirements of 10 CFR Part 20 and the license. Occupational exposures were small fractions of the regulatory limit. Bioassay sampling results suggested that no individual had experienced an intake of uranium in recent years.

3 **Operator Training/Retraining (88010)**

3.1 Inspection Scope

Determine whether the licensee was complying with regulations and license requirements related to the training of employees.

3.2 Observations and Findings

Site worker training requirements are provided in License Conditions 10 and 21. Initial and annual refresher training is required for people working with groundwater or physical work with tailings material. Training was conducted by a third-party contractor in conjunction with the annual ALARA audit. The licensee's records indicated that refresher training was conducted during December 2006 and November 2007. In addition, the radiation protection administrator attended refresher training at an offsite location during May 2007. Although the radiation safety officer's U.S. Department of Transportation training had expired, the licensee has not shipped any radioactive material in several years.

3.3 Conclusions

Radiation protection training was provided to site workers as required by the license.

4 **Maintenance and Surveillance Testing (88025)**

4.1 Inspection Scope

Determine whether surveillance tests and calibrations were being conducted in accordance with license requirements and site procedures.

4.2 Observations and Findings

License Condition 22 requires that instrument calibration records be maintained. The inspectors reviewed the licensee's records and determined that survey instruments were being routinely calibrated. The licensee used a calibration schedule to keep track of instrument calibration due dates. The inspectors reviewed survey meters in service during the inspection, and the survey meters appeared operable with up-to-date calibrations. As part of the annual ALARA audit, the auditor reviewed the maintenance and calibration records. No compliance problems were identified during the annual ALARA audits for calendar years 2006 and 2007.

In accordance with instructions provided in site procedures, the licensee was calibrating survey meters on an annual basis. However, Table 3 specifies a semi-annual calibration frequency. The inspectors determined that an annual calibration frequency was acceptable, in part, because the instrument vendor recommends an annual calibration cycle. The licensee agreed to submit an amendment to the NRC to correct this discrepancy between Table 3 and site procedures.

4.3 Conclusions

Instruments were being calibrated as required by site procedures. Survey meters in service appeared operable with up-to-date calibration stickers.

5 **Environmental Protection (88045)**

5.1 Inspection Scope

Determine if the environmental and effluent monitoring programs were effective to monitor the impacts of site activities on the local environment.

5.2 Observations and Findings

a. Environmental Monitoring

License Condition 10 specifies, in part, the environmental monitoring program requirements. The program consists of air particulate, radon gas, and direct radiation sampling. The inspectors compared the program in operation at the time of the inspection to the requirements specified in the license. The inspectors confirmed that the licensee was implementing the environmental monitoring program as required by the license.

License Condition 36E states, in part, that the licensee is to verify compliance with the radon flux standard of 20 picoCuries per meter squared second (pCi/m²s) by performing an annual radon flux survey on the large and small tailings piles. In 2006, the large tailings pile averaged 20.6 pCi/m²s, a value slightly above the radon standard. In July 2007, NRC staff performed a non-routine inspection in response to the licensee's reporting of this exceedance. During the July 2007 inspection, NRC reviewed the licensee's corrective actions, which included installation of additional interim cover material. The effort appeared to be successful because the 2007 average radon flux measurement for the large tailings pile was 14.1 pCi/m²s.

License Condition 15 requires, in part, that the licensee submit effluent and environmental monitoring reports to the NRC. The inspectors confirmed that the licensee submitted the required reports to the NRC since the last inspection.

The environmental monitoring sample results for 2006-2007 were compared to regulatory limits. The licensee used six air particulate monitoring stations with continuous high volume air sample pumps. The air filters were exchanged weekly and analyzed quarterly for natural uranium, radium-226 and thorium-230 concentrations. All sample results were significantly less than the respective effluent concentration limits specified in 10 CFR Part 20, Appendix B, Table 2.

The licensee continuously sampled for radon-222 concentrations in eight locations using track-etch passive radon monitors. The radon canisters were analyzed semi-annually. All radon-222 concentrations were found to be well below the effluent concentration limit of 1.0 E-8 microcuries per milliliter.

The licensee monitored direct gamma radiation levels at seven locations using optically stimulated dosimeters. The dosimeters were exchanged on a semi-annual basis. The annual result for 2007 was 38 millirems, with background included.

In summary, the results of the licensee's 2006-2007 environmental monitoring sampling program indicated that doses to members of the public were well below the 100-millirem dose limit specified in 10 CFR 20.1301(a).

b. Environmental Groundwater and Surface Water Sampling

License Condition 15 states that the results of all effluent and environmental monitoring required by the license shall be reported to the NRC. The inspectors conducted random reviews of the licensee's groundwater monitoring program. The licensee was found to be sampling and reporting the data from the point of compliance wells and the background well as required by the license. The inspectors compared actual environmental groundwater data, as reported by the laboratory, to the data included in the reports being submitted to the NRC. The licensee was accurately reporting the groundwater data to the NRC in these routine reports.

c. Groundwater Restoration Program

License Condition 35 requires, in part, that groundwater compliance monitoring be implemented to assess the performance of the groundwater restoration program. The inspectors reviewed the procedures for the corrective action program and the annual

reports for 2006-2007. The inspectors concluded that the licensee had complied with the requirements of their license.

5.3 Conclusions

The licensee had established groundwater and environmental monitoring programs as required by the license. A review of records and original laboratory data indicated that the licensee had not released effluents into the environment in quantities exceeding the regulatory limits. The environmental and groundwater monitoring reports were submitted to the NRC as required by the license.

6 Transportation of Radioactive Materials and Radioactive Waste Management (86740 and 88035)

6.1 Inspection Scope

Determine if transportation and waste disposal activities were being conducted in compliance with license requirements.

6.2 Observations and Findings

License Condition 12 specifies, in part, that periodic embankment inspections be conducted and the inspection report be included in the annual report to the NRC. An annual visual inspection of the tailings piles and ponds were conducted in October 2006 and November 2007. Documentation of the annual embankment inspections was included in the 2006-2007 annual reports. The consultant who performed the annual inspections concluded that the tailings impoundments and evaporation ponds were in generally good condition and were being maintained within the operating limits of the license.

The licensee continued to dispose of radioactive wastes in a portion of the small tailings pile that was not covered by Evaporation Pond 1. The disposed material included inoperative pumps, reverse osmosis filters, and reverse osmosis membranes.

License Condition 26 specifies, in part, that the licensee shall keep records of transfers of all mill tailings. The licensee stated that, since the previous inspection, there were no outgoing shipments of tailings material and no incoming shipments of waste material for disposal. Further, the licensee does not expect to ship any mill tailings or to receive material for disposal at any time in the future.

License Condition 41 specifies, in part, the reporting and documentation requirements for unplanned releases, spills, leaks, and excursions. Based on the licensee's records and employee interviews, the inspectors determined that no spills, leaks, or excursions have occurred since the last inspection.

6.3 Conclusions

The licensee was conducting transportation and waste disposal operations in accordance with license requirements.

7 Emergency Preparedness (88050)

7.1 Inspection Scope

Determine if the licensee's emergency preparedness program was being maintained in a state of readiness.

7.2 Observations and Findings

The licensee maintained an emergency response program for fire, spills and personnel accidents. The licensee maintained fire protection capability that included fire extinguishers. The licensee also maintained the capability to respond to spills of liquids with available equipment that could be utilized for spill cleanup activities. The inspectors reviewed the Loss of Control Manual which contained current procedures for emergency response such as accident reporting and personnel first aid.

7.3 Conclusions

The licensee maintained its emergency preparedness program in a state of readiness.

8 Exit Meeting Summary

The inspectors presented the preliminary inspection results to the licensee's representatives at the conclusion of the onsite inspection on August 1, 2008. A final inspection briefing was held telephonically with the radiation protection administrator on August 5, 2008. Representatives of the licensee acknowledged the findings as presented. During the inspection, the licensee did not identify any information reviewed by the inspectors as propriety.

ATTACHMENT

PARTIAL LIST OF PERSONS CONTACTED

Licensee

A. Cox, Project Manager
D. Kump, Senior Project Engineer
A. Venable, Senior Radiation Safety Technician

ITEMS OPENED, CLOSED, AND DISCUSSED

Open

None

Closed

None

Discussed

None

INSPECTION PROCEDURES USED

IP 83822	Radiation Protection
IP 86740	Transportation of Radioactive Material
IP 88005	Management Organization and Control
IP 88010	Operator Training/Retraining
IP 88025	Maintenance and Surveillance Testing
IP 88035	Radioactive Waste Management
IP 88045	Environmental Monitoring
IP 88050	Emergency Preparedness

LIST OF ACRONYMS USED

ALARA	as low as is reasonably achievable
$\mu\text{R/hr}$	microRoentgens per hour
NRC	Nuclear Regulatory Commission
$\text{pCi/m}^2\text{s}$	picoCuries per meter squared second