



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION IV  
1600 EAST LAMAR BOULEVARD  
ARLINGTON, TEXAS 76011-4511

October 19, 2021

EA-16-114

Mr. Brad Bingham  
Closure Manager  
Homestake Mining Company of California  
P.O. Box 98, Hwy 605  
Grants, NM 87020

**SUBJECT: HOMESTAKE MINING COMPANY OF CALIFORNIA - NRC INSPECTION  
REPORT 040-08903/2021-002 AND NOTICE OF VIOLATION**

Dear Mr. Bingham:

This letter refers to the U.S. Nuclear Regulatory Commission (NRC) inspection conducted from August 24-26, 2021, of the Grants Reclamation Project in Cibola County, New Mexico. 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, and interviews with personnel.

The preliminary results of the inspection were presented to you and your staff at the conclusion of the onsite inspection, and the final results were presented to you by telephone on September 16, 2021. The enclosed report presents the results of the inspection.

Based on the results of this inspection, the NRC has determined that two Severity Level IV violations of NRC requirements occurred. The violations involve: (1) failure to use a radiation work permit or standard operating procedure during contractor work with radiologically contaminated materials, in accordance with License Condition 24; and (2) failure to perform surveys to evaluate the magnitude and extent of radiation levels, with two examples, as required by 10 CFR 20.1501. These violations were evaluated in accordance with the NRC Enforcement Policy included on the NRC's Web site at <http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html>. The violations are cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding them are described in detail in the subject inspection report. The violations are being cited in the Notice because they were identified by the NRC during the inspection.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. The NRC will use your response, in part, to determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter, its enclosures, and your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management 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 or proprietary information so that it can be made available to the public without redaction.

Should you have any questions concerning this inspection, please contact Ms. Linda Gersey at 972-746-6984 or the undersigned at 817-200-1156.

Sincerely,



Signed by Gepford, Heather  
on 10/19/21

Heather J. Gepford, PhD, CHP, Chief  
Materials Licensing & Decommissioning Branch  
Division of Nuclear Materials Safety

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

Enclosures:

1. Notice of Violation
2. NRC Inspection Report 040-08903/2021-002

cc w/enclosures:

M. Hunter, New Mexico Environment Department  
S. Rodriguez, New Mexico Environment Department  
K. Vollbrecht, New Mexico Environment Department  
B. Tsosie, U.S. Department of Energy

HOMESTAKE MINING COMPANY OF CALIFORNIA - NRC INSPECTION REPORT  
040-08903/2021-002 AND NOTICE OF VIOLATION– DATED OCTOBER 19, 2021Distribution:

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ADAMS ACCESSION NUMBER: **ML21286A797**

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## NOTICE OF VIOLATION

Homestake Mining Co. of California  
Grants, New Mexico

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

During a U.S. Nuclear Regulatory Commission (NRC) inspection conducted on August 24-26, 2021, two violations of NRC requirements were identified. In accordance with the NRC's Enforcement Policy, the violations are listed below:

- A. Title 10 to the *Code of Federal Regulations* (10 CFR) 40.3, states that a person subject to the regulations in this part may not receive title to, own, receive, possess, use, transfer, provide for long-term care, deliver or dispose of byproduct material or residual radioactive material as defined in this part or any source material after removal from its place of deposit in nature, unless authorized in a specific or general license issued by the Commission under the regulations in this part.

NRC Materials License SUA-1471, Condition 24, states, in part, that the licensee shall be required to use a Radiation Work Permit for all work or nonroutine maintenance jobs where the potential for significant exposure to radioactive material exists and for which no standard written procedure already exists.

Contrary to the above, on six occasions from May 6, 2021, through July 23, 2021, the licensee failed to use a Radiation Work Permit for nonroutine maintenance conducted by contractors, for which the potential for significant exposure to radioactive material existed, and for which no written procedure existed. Specifically, nonroutine maintenance performed by contractors on the pond spray evaporators, which were known to be radiologically contaminated, was not conducted using a Radiation Work Permit, and no standard written procedure existed for this work.

This is a Severity Level IV violation (Section 6.3.d.3).

- B. 10 CFR 20.1501 states, in part, that each licensee shall conduct surveys that are reasonable under the circumstances to evaluate the magnitude and extent of radiation levels, and the potential radiological hazards of the radiation levels and residual radioactivity detected.

Contrary to the above, the licensee failed to conduct surveys that were reasonable under the circumstances to evaluate the magnitude and extent of radiation levels and the potential radiological hazards of the radiation levels and residual radioactivity detected, with two examples. Specifically, the licensee failed to conduct surveys to evaluate the extent of radiological contamination during the daily sampling of the reverse osmosis unit, which is known to contain radioactive contamination. In addition, the licensee had not conducted surveys of personnel during groundwater sampling of radiologically impacted wells, to evaluate the extent of radiological contamination levels.

This is a Severity Level IV violation (Section 6.3.d.3).

Pursuant to the provisions of 10 CFR 2.201, Homestake Mining Company is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Regional Administrator, Region IV, within 30 days of the date of the letter transmitting this Notice of

Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken; and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued requiring information as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

Your response will be made available electronically for public inspection in the NRC Public Document Room or in the NRC's Agencywide Documents Access and 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, proprietary, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days of receipt.

Dated this 19<sup>th</sup> day of October 2021

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

Docket No.: 040-08903

License No.: SUA-1471

Report No.: 040-08903/2021-002

Licensee: Homestake Mining Company of California

Facility: Grants Reclamation Project

Location: Cibola County, New Mexico

Dates: August 24 – September 16, 2021

Inspectors: Linda Gersey Health Physicist  
Materials Licensing and Decommissioning Branch  
Division of Nuclear Materials Safety, Region IV

Austin Roberts, Health Physicist  
Materials Licensing and Decommissioning Branch  
Division of Nuclear Materials Safety, Region IV

Accompanied by: George Alexander, Risk Analyst  
Risk and Technical Analysis Branch  
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Office of Nuclear Material Safety and Safeguards

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Approved by: Heather J. Gepford, PhD, CHP, Chief  
Materials Licensing and Decommissioning Branch  
Division of Nuclear Materials Safety, Region IV

Attachment: Supplemental Inspection Information

Attachment

## **EXECUTIVE SUMMARY**

Homestake Mining Company of California  
NRC Inspection Report 040-08903/2021-002

This inspection was a routine, unannounced U.S. Nuclear Regulatory Commission (NRC) inspection of decommissioning activities being conducted at the Grants Reclamation Project, Homestake Mining Company's former uranium mill in Cibola County, New Mexico.

### Management Organization and Controls

- The licensee had sufficient staff for the work in progress, although the availability of contractor support for some projects had been impacted by the COVID-19 virus. The licensee used the new performance-based authorization appropriately. A previous violation for the discharge of purge water directly to the ground containing byproduct material collected during groundwater sampling is closed. The annual As Low As Reasonably Achievable audit had been submitted to the NRC as required by License Condition 42. (Section 1.2)

### Radiation Protection

- The licensee had mostly 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 and air sampling were performed as required by the radiation work permits. One violation related to the licensee's failure to perform radiological surveys, as required by 10 CFR 20.1501, while sampling the reverse osmosis system was identified by the inspectors. The licensee conducted instrument calibrations in accordance with the license and site procedures. (Section 2.2)

### Radioactive Waste Processing, Handling, Storage and Transportation

- The inspectors reviewed the performance of the evaporation and collection ponds. Pond EP-1 remains at a reduced volume but the overall evaporative capacity of the ground water program has only been reduced by approximately 5 percent. Erosion of the side slopes of the small tailings pile is ongoing and requires periodic maintenance by the licensee. One violation of License Condition 24 requirements was identified by the inspectors related to the licensee's failure to use a radiation work permit or standard operating procedure for maintenance of the evaporators. (Section 3.2)

### Effluent Control and Environmental Protection

- The licensee implemented its environmental and effluent monitoring program in accordance with license requirements. The licensee implemented the groundwater monitoring and corrective action program as required by the license, with one exception. The licensee's failure to perform radiological surveys during sampling of impacted wells was identified as a second example of the licensee's violation of 10 CFR 20.1501 requirements. The licensee conducted an annual land use survey and reported the results to the NRC as required by the license. (Section 4.2)

#### Follow-up of Confirmatory Action Letters or Orders

- The inspectors reviewed the status of Order EA-16-114. The licensee's responses to Conditions 14 and 15 were evaluated and determined to satisfy the conditions. Order Conditions 1, 3, 4, 9, 10, 11, 12, and 13 were previously evaluated and were determined to be satisfied. Order Conditions 2, 5, 6, 7, 8, and 16 remain open with pending actions. The conditions will continue to be evaluated by the NRC. (Section 5.2)



## Report Details

### Site Status

The Homestake facility was a conventional uranium mill that operated from 1958-1990. Tailings generated from milling operations were placed in two impoundments—the large tailings pile (LTP) and the small tailings pile (STP). The mill was decommissioned in 1993-1994, and the cleanup of wind-blown tailings was completed in 1995.

The side slopes of the LTP have been covered with the final radon barrier and erosion protection layer. An interim cover is being maintained on top of the LTP. Two lined evaporation ponds are situated on top of the STP. The remainder of the STP is covered with an interim cover. In addition, two water collection ponds were constructed adjacent to the STP. A third evaporation pond was constructed in 2011 to the north of the LTP.

At the time of the inspection, the licensee continued to implement its ground water corrective action program (GCAP). The licensee continued to operate injection and recovery wells as well as the reverse osmosis (RO) system and zeolite system. Both the RO and zeolite systems were operating at levels consistent with the evaporative capacity of the site. The licensee continued to dispose of wastewater into all three evaporation ponds.

## **1 Management Organization and Controls (Inspection Procedure 88005)**

### **1.1 Inspection Scope**

The inspectors reviewed the licensee's oversight and control of licensed activities.

### **1.2 Observations and Findings**

#### **a. Site Staffing**

The inspectors reviewed site staffing to ensure that the licensee had sufficient staff to implement license requirements. At the time of the inspection, site staffing consisted of 13 employees, including the closure manager, community relations specialist, senior shift supervisor, RO plant operator, health and safety superintendent, project engineer, hydrologist, administrative assistant, one environmental specialist, one environmental specialist who was qualified to be a backup radiation safety officer (RSO), and three environmental technicians. Two of the environmental technicians were new hires as of March 2021.

Contractors were used as needed for site support and projects, as well as to fill the RSO position. Contractors were also used for construction, drilling, electrical, and routine site work. The licensee stated that an average of six to ten contractors were on-site during the week. The inspectors determined that the licensee had sufficient management and support staff for the work in progress.

License Conditions 21 and 32 tie the license to NRC's Regulatory Guide 8.31, "Information Relevant to Ensuring that Occupational Radiation Exposures at Uranium Mills will be as Low As Is Reasonably Achievable," with respect to the qualifications required for an RSO. The inspectors reviewed the July 16, 2021, documentation that described the education, training, and experience qualifications for the environmental specialist designated to be a backup RSO. That individual was given the title of

Assistant RSO, and the inspectors confirmed that the individual met the qualifications of RSO as defined in Regulatory Guide 8.31. The Assistant RSO will perform RSO duties when the appointed RSO is not available.

The inspectors discussed with licensee staff the impacts of the COVID-19 virus on site operations. As a result of the virus, some work was delayed or conducted at a reduced rate due to difficulty in obtaining contractor support for projects. Other impacts included implementation of new work controls, social distancing rules, and use of remote work as appropriate. None of the COVID-19 virus impacts directly affected the ability of the licensee to maintain compliance with regulatory and license requirements.

b. Review of Licensee's Change Process

By letter dated July 14, 2021 (ADAMS Accession No. ML21155A088) the NRC amended the license to allow performance-based program changes to be made in certain situations without a license amendment. New License Condition 16 authorizes the licensee to make changes to its program under the review of a Safety and Environmental Review Panel (SERP) if certain conditions are met. The inspectors reviewed the August 9, 2021, SERP memo related to an experiment to evaluate the effectiveness of copper sulfate to mitigate algae growth in the zeolite medium. The memo included a review of potential radiological safety aspects and appropriate personal protective equipment. The inspectors concluded that the licensee had performed the SERP process in accordance with license requirements and that the test could be performed without a license amendment.

c. Review of Operational Procedures

License Condition 23 states, in part, that procedures shall be established for all activities involving radioactive materials that are handled, processed, or stored. The inspectors reviewed the following standard operating procedures (SOPs) and found them to be adequate:

- SOP 4, "Reverse Osmosis Operations Monitoring"
- SOP 10, "Procedure for Conducting a Safety and Environmental Review Panel"
- SOP 17, "Groundwater Monitoring"
- SOP 20, "Environmental Monitoring"
- SOP 25, "Zeolite Water Treatment Plant (1,200-gpm)"
- SOP 23, "Collection and Evaporation Pond Operations & Tailings Inspections"

During the last inspection, a violation (040-08903/2021-01-001) was identified by the inspectors related to the licensee's failure to ensure that radiologically impacted well purge water generated during groundwater sampling was contained and disposed in a lined holding pond or evaporation pond. By letter dated June 16, 2021 (ADAMS Accession No. ML21167A261), the licensee responded to the violation and described their corrective actions, including the revision of SOP 17, "Groundwater Monitoring." The revisions to SOP 17 include the requirement to collect all purge water during well sampling and place the water into a holding pond. The inspectors reviewed the corrective actions and the revised SOP and found them to be adequate to prevent a recurrence of the violation. In addition, the inspectors observed licensee staff perform groundwater monitoring using the revised procedure and concluded that licensee staff was using the procedure satisfactorily. This violation is closed.

By letter dated March 30, 2021 (ADAMS Accession No. ML21090A199), the licensee notified the NRC of a liner tear in evaporation pond EP-1 during brine transfer from EP-2 to EP-1. Based on the duration of the discharge and the size of the tears in the liner, the licensee estimated that a minimal volume of brine may have leaked into the underlying tailings. The licensee discussed that EP-1 is located upgradient of the hydraulic barrier, which would act to mitigate any potential leakage. The inspectors concluded that based on the volume of potential leakage, the location of the leak site, and the presence of the hydraulic barrier that the potential impacts from any leakage are not risk significant. To avoid future leakage from transfer activities, the licensee repaired the tears to the EP-1 liner and placed additional high-density polyethylene and conveyor belt material under the discharge pipe from EP-2. The inspectors concluded that these corrective actions should limit further tearing of the EP-1 liner during transfers.

During this inspection, the inspectors reviewed procedure SOP 25, "Zeolite Water Treatment Plant (1,200-gpm)" and observed the licensee walk through the procedure. Several locations in the zeolite piping were observed to be dripping. These leaks were located within the self-contained zeolite system. The licensee discussed that these leaks are addressed during shutdown and cleanout of the individual treatment trains. The inspectors observed that the algae that was removed from the zeolite system during cleanout was placed in plastic bags and those bags are disposed of on top of the STP. The licensee discussed that the bags are placed into the disposal pits and compacted.

d. Audits, Inspections, and Reviews

An annual radiation protection and As Low As Is Reasonably Achievable (ALARA) audit is required by 10 CFR 20.1101(c) and License Condition 32. In addition, License Condition 42 requires the licensee to submit the ALARA audit to the NRC as part of the annual report. The most recent ALARA audit was conducted in December 2020 by an outside contractor and was submitted to the NRC as an appendix to the licensee's Annual Monitoring Report and Performance Review on March 30, 2021 (ADAMS Accession No. ML21090A190). The ALARA audit included three recommendations to the licensee: (1) Clarify the ambiguous labels on the survey record form EDF-15 as to what kind of contamination was being surveyed; (2) Take accurate background counts; the background counts that were taken once a day were not truly indicative of the background in the area which changes throughout the day; and (3) Put emphasis on the importance of dosimeter badge tracking; several badges were lost throughout the year. The issues were addressed by the licensee as follows: (1) Form EDF-15 was modified to specify that the surveys were looking for alpha contamination; (2) Background counts are now taken twice a day to accurately reflect the changing background through the day; and (3) There is a strong emphasis on badge handling. The Assistant RSO stressed the importance of keeping track of the badges and conducts weekly checks to ensure that all badges are accounted for. The inspectors concluded that the ALARA audit report was appropriately detailed and met license and regulatory requirements.

1.3 Conclusions

The licensee had sufficient staff for the work in progress, although the availability of contractor support for some projects had been impacted by the COVID-19 virus. The licensee used the new performance-based authorization appropriately. A previous violation for the discharge of purge water directly to the ground containing byproduct material collected during groundwater sampling is closed. The annual As Low As

Reasonably Achievable audit had been submitted to the NRC as required by License Condition 42.

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

### **2.1 Inspection Scope**

The inspectors reviewed the licensee's radiation protection program, including instrument calibrations, to verify compliance with 10 CFR Part 20 and license requirements.

### **2.2 Observations and Findings**

The licensee's Manual of Standard Practices provided the instructions for implementing the various aspects of the radiation protection program. At the time of the inspection, the radiation protection program consisted of external occupational dose monitoring, bioassays, contamination surveys, radiation work permits (RWPs), and instrument calibrations.

The inspectors reviewed the following RWPs that were closed since the previous inspection:

RWP-20-2020	Well abandonment on top of the LTP
RWP-2-2021	Reverse Osmosis Membrane Exchange

The inspectors reviewed the RWP documentation, controls, and personnel protective equipment requirements and concluded that the requirements were appropriate for the scope of work described. Required training was documented and surveys (personnel and equipment/materials) were conducted as specified in the RWP. Air sampling was conducted and documented for any RWP that required air sampling.

The inspectors reviewed the licensee's personnel monitoring program. During the first two quarters of calendar year 2021, employees, contractors, and vendors were monitored for external doses using optically stimulated luminescent dosimeters. The maximum recorded dose for the first two quarters of calendar year 2021 was 3 millirem, received by a contractor working on the well abandonment project atop the LTP. In general, measured doses to contractors were routinely reported as below the minimal reporting capabilities of the dosimeter.

The licensee maintained radiological survey instruments to implement its radiation protection program. This equipment was used to measure exposure rates, surface contamination, and removable contamination levels. The inspectors reviewed the calibration records and determined the instruments were being calibrated at the proper interval. Radiological survey records were reviewed. All surveys were conducted with calibrated instruments, and each instrument used was appropriate for the type of survey being performed.

The licensee used an automated spreadsheet to complete some sections of Form EDF-5, its survey results form. The licensee used this form to record the results of surveys associated with onsite waste disposals, offsite water transfers, routine building surveys and other operations. The spreadsheet was programmed to

automatically convert counts per minute to disintegrations per minute by applying background counts per minute, instrument efficiency, and surface efficiency. The spreadsheet compared survey results to a table of site activity limits and displayed "PASS" or "FAIL" depending on whether one or more limits was exceeded. The inspectors examined the form and confirmed that the formulas and conditional formatting in the spreadsheet were appropriate.

While observing licensee staff performing water sampling of the RO system, the inspectors noted that no radiological surveys were conducted to determine the extent of radiological contamination in the area where the water sample was taken, and no personnel contamination surveys were conducted after the procedure was concluded. The water from the reverse osmosis system is known to be radiologically contaminated. This inspection finding is a violation of 10 CFR 20.1501, which states, in part, that each licensee shall conduct surveys that are reasonable under the circumstances to evaluate the magnitude and extent of radiation levels, and the potential radiological hazards of the radiation levels and residual radioactivity detected (VIO 040-08903-2021-02-001). A second example related to this violation can be found in Section 4.2(a) of this report.

## 2.3 Conclusions

The licensee had mostly 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 and air sampling were performed as required by the radiation work permits. One violation related to the licensee's failure to perform radiological surveys, as required by 10 CFR 20.1501, while sampling the reverse osmosis system was identified by the inspectors. The licensee conducted instrument calibrations in accordance with the license and site procedures.

## 3 **Radioactive Waste Processing, Handling, Storage and Transportation (Inspection Procedure 88035)**

### 3.1 Inspection Scope

The inspectors interviewed licensee representatives, toured the site, and reviewed applicable records to determine if the licensee had established and maintained an effective program for managing radioactive wastes.

### 3.2 Observations and Findings

#### a. Site Inspections

The NRC inspectors toured the site and observed the LTP, STP, evaporation ponds, collection ponds, zeolite systems, and RO system. Rilling and areal loss of soil was observed on the side slopes of the STP. No significant erosion problems were identified on the LTP, although sedimentation and precipitated salts were observed at the base of the LTP side slopes. The licensee stated that the soils at the base of the LTP have been tested and the salts were determined to be primarily sulfates and nonradioactive. Site fences, gates, and perimeter postings were being maintained by the licensee. The inspectors observed that there were considerably fewer monitoring wells on the LTP

resulting from HMC's efforts to close unneeded wells that were previously used in the LTP tailings flushing program.

During site tours, the inspectors conducted independent radiological surveys using a Ludlum Model 19 survey meter (NRC No. 015518, calibration due date of February 8, 2022). With a background of approximately 15 microRoentgen per hour ( $\mu\text{R/hr}$ ), the ambient gamma radiation levels on top of the LTP were observed to be 25  $\mu\text{R/hr}$ . Exposure rates within the RO building were 10-15  $\mu\text{R/hr}$ . No area was identified that was required to be posted as a radiation area ( $\geq 5000 \mu\text{R/hr}$ )

b. Status of Site Ponds

The water level of EP-1 remained drawn down; however, the salts at the bottom of the pond are covered. As discussed in the previous inspection report, the decrease in water level was estimated as only reducing the total evaporative capacity by approximately 5 percent. This is discussed further in Section 4 of this report.

The inspectors reviewed the evaporator runtime logs, which relate to the groundwater treatment capacity. It appeared that the licensee was operating the evaporators within the wind, temperature, and humidity constraints. The licensee was currently operating 21 of 24 evaporators. Three evaporators on EP-1 were awaiting repairs.

During this inspection, the inspectors identified that the maintenance of the evaporator units, which are known to be radiologically contaminated, was being conducted by contractors without using either an SOP or an RWP. This finding was identified as a violation of License Condition 24, which states, in part, that use of an RWP shall be required for all work or nonroutine maintenance jobs where the potential for significant exposure to radiation exists and for which no SOP already exists (VIO 040-08903-2021-02-002).

3.3 Conclusions

The inspectors reviewed the performance of the evaporation and collection ponds. Pond EP-1 remains at a reduced volume, but the overall evaporative capacity of the ground water program has only been reduced by approximately 5 percent. Erosion of the side slopes of the small tailings pile is ongoing and requires periodic maintenance by the licensee. One violation of License Condition 24 requirements was identified by the inspectors related to the licensee's failure to use a radiation work permit or standard written procedure for maintenance of the evaporators.

**4 Effluent Control and Environmental Protection (Inspection Procedure 88045)**

4.1 Inspection Scope

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

## 4.2 Observations and Findings

### a. Effluent and Environmental Monitoring Program

License Condition 15 requires the licensee to report the results of the effluent and environmental monitoring program to the NRC on a semi-annual basis. The inspectors reviewed the 2<sup>nd</sup> Half Semi-Annual Environmental Monitoring Report dated February 25, 2021 (ADAMS Accession No. ML21067A499), the 2020 Annual Monitoring Report/ Performance Review dated March 30, 2021 (ADAMS Accession No. ML21090A190), and the data used in the development of the reports. The inspectors concluded that the licensee collected the required number of samples and reported the sample results. However, several reported concentrations either met or exceeded the groundwater protection standards for Th-230 concentrations.

In Table 2.1.3 of the Annual Monitoring Report, Th-230 was reported as having met or exceeded the groundwater protection standard at Sample Point (SP) 2 on January 28, 2020, and December 29, 2020. Upon discussion with the licensee, it was determined that the elevated Th-230 concentrations reported on these dates were not valid. On those dates, SP1, which is the point in the process after the RO treatment but before the addition of the zeolite system and San Andres-Glorieta aquifer water streams, did not exceed the groundwater protection standard for Th-230. Because the water from the zeolite system and San Andres-Glorieta aquifer do not contain significant quantities of Th-230, the actual Th-230 concentrations at SP2 would not have exceeded the groundwater protection standards. The licensee will provide an explanation in the next annual monitoring report regarding the incorrect Th-230 sample results.

In Table 4.3-1 of the Semi-Annual Environmental Monitoring Report, the concentration of Th-230 was reported as exceeding the groundwater protection standards on August 27, 2020. It was determined that this was a reporting error as the analytical report for this sample showed Th-230 concentration of less than the groundwater protection standard. The licensee will provide an explanation in the next semi-annual environmental monitoring report regarding the incorrect Th-230 sample results.

The licensee recorded weekly air sampling results in a computer spreadsheet which included formulas to perform calculations such as converting cubic feet to milliliters and summing weekly sampling volumes for the entire quarter. The inspectors examined the spreadsheet and confirmed the formulas were appropriate.

During the inspection, while observing groundwater monitoring, a second example of the licensee's failure to perform surveys as required by 10 CFR 20.1501 was identified by the inspectors (VIO 040-08903-2021-02-01). The inspectors noted that licensee staff did not perform personnel or equipment radiological surveys after handling contaminated purge water during well sampling. In addition, no evaluation for potential radiological contamination had been performed by the licensee for well sampling activities. See Section 2.2 for the first example of this violation.

### b. Annual Radon Flux Measurements

License Condition 36.E requires the licensee to conduct annual radon flux measurements on the LTP and STP. The results of 2021 radon flux measurements will be discussed in a separate letter to be issued by the NRC's program office.

c. Groundwater Monitoring and Corrective Action Program

License Condition 35 states that the licensee shall implement a groundwater compliance monitoring program (GCAP) to assess the performance of the groundwater restoration program. The inspectors reviewed the licensee's control and operation of various site systems used to implement the GCAP.

The licensee continued to operate a series of extraction and injection wells. The groundwater from onsite and offsite extraction wells was routed to the RO and zeolite treatment systems, respectively. The treated water from the two treatment systems was mixed with fresh water from the San Andres-Glorieta aquifer in the post-treatment tank and injected into the subsurface aquifers.

During the inspection, the licensee stated that the RO system was operating at an average of 600 gallons per minute (gpm). The zeolite system was operating at a flow rate of 225 gpm. These flow rates were well below the total design capacity of 2,700 gpm and effective capacity of 1,950 gpm. However, the inspectors and the licensee discussed during a previous inspection that the groundwater treatment rate is limited by the evaporative capacity of the site (ADAMS Accession No. ML19129A405).

During this inspection, the licensee discussed that: (1) the recovery efficiencies for the RO and zeolite are approximately 72 percent and 75 percent, respectively, and (2) their calculated treatment capacity for the site is approximately 700 gpm. The licensee also noted that this treatment capacity varied based on seasonal and annual evaporation rates.

The previous inspection report noted that the 2020 groundwater treatment rate of 383 gpm was significantly below the evaporative capacity of the site. During this inspection, the treatment rate was determined to be 825 gpm. Because the approximate 700 gpm treatment capacity was an annualized average, treatment rates can exceed that value for a period of time and the system is not at risk of exceeding the evaporative capacity. The inspectors determined that the site was meeting License Condition 36.B, which states, in part, that reclamation, to ensure required longevity of the covered tailings and ground-water protection, shall be completed as expeditiously as is reasonably achievable..."

Since the previous inspection, the licensee replaced the membranes in the Low-Pressure Skid 3. The licensee was also preparing for a 10-day shutdown of the RO plant for annual maintenance of clarifier 1, flash mix tank, sumps, microfiltration tank, lime-slacker and slurry tanks.

d. Land Use Survey

License Condition 42 specifies that a land use survey be conducted and submitted in the annual report to the NRC. The inspectors reviewed the most recent land use survey included as Appendix E to the annual report dated March 30, 2021 (ADAMS Accession No. ML21090A190). The land use survey summarized current land uses and identified changes to land use in proximity to the site. For licensee-owned properties, the land uses included livestock grazing and residential uses. The land uses for properties not owned by the licensee were mainly residential. All residential properties are on the municipal water supply. The inspectors concluded the licensee conducted an annual



land use survey and reported the results to the NRC in the annual monitoring report and performance review as required by the license.

#### 4.3 Conclusions

The licensee implemented its environmental and effluent monitoring program in accordance with license requirements. The licensee implemented the groundwater monitoring and corrective action program as required by the license, with one exception. The licensee's failure to perform radiological surveys during sampling of impacted wells was identified as a second example of the licensee's violation of 10 CFR 20.1501 requirements. The licensee conducted an annual land use survey and reported the results to the NRC as required by the license.

### **5 Follow-up of Confirmatory Action Letters or Orders (Inspection Procedure 92703)**

#### 5.1 Inspection Scope

On March 28, 2017, the licensee agreed to, and was issued, Order EA-16-114 (ADAMS Accession Package No. ML17060A752) as a result of alternative dispute resolution mediation. Section V of the Order includes 16 conditions with actions the licensee was required to implement. Conditions 1, 3, 4, 9, 10, 11, 12, and 13 of the Order were previously reviewed and closed. Provided below is a summary of the conditions that remain open or were closed based on the results of this inspection.

#### 5.2 Observations and Findings

##### a. Condition 2

Condition 2 requires, in part, that within 30 days of submitting the root cause protocol (RCP) to the NRC, the licensee will use the RCP to analyze the reasons for the five apparent violations documented in the NRC's October 4, 2016, letter (ADAMS Accession No. ML16251A526). In addition, the licensee will submit any proposed corrective actions to the NRC for review and approval within 60 days of completing the root cause analysis (RCA).

The licensee requested an extension in submission of the RCA of the five apparent violations by letter dated August 23, 2017 (ADAMS Accession No. ML17237C046). The NRC granted approval to extend the submittal due date to September 15, 2017, by email dated August 24, 2017 (ADAMS Accession No. ML17243A234). The NRC subsequently provided formal approval of the extension request by letter dated October 19, 2017 (ADAMS Accession No. ML17241A299). The October 19, 2017, letter also acknowledged receipt of the licensee's September 15, 2017, RCA of the five apparent violations (ADAMS Accession No. ML17263A125). The licensee concluded that the common root cause for each of the five apparent violations was lack of communications by licensee management to other licensee staff and corporate managers and a lack of understanding of regulatory compliance by licensee management.

The licensee submitted the corrective action plan for the five apparent violations to the NRC by letter dated November 14, 2017 (ADAMS Accession Package No. ML17320A118). The licensee also provided an update for the corrective action plan by letter dated July 17, 2018 (ADAMS Accession No. ML18200A068). The NRC staff

responded to the submissions in a letter dated March 16, 2020 (ADAMS Accession No. ML18192A700).

Condition 2 of the Order will remain open until the NRC has reviewed and approved the licensee's proposed corrective actions associated with this condition and Condition 6.

b. Condition 5

Condition 5 of the Order, requires, in part, that any changes or additions to the license or procedures resulting from this Order will be submitted to the NRC as a license amendment request for NRC approval or an update to the appropriate licensee procedure after notification to the NRC. Condition 5 requires that the licensee submit to NRC all license amendment requests resulting from the Order within 60 days of receiving the results of the NRC audits. The Order requires three NRC audits under Conditions 4d, 8, and 10.

The NRC staff audit of the licensee's self-assessment submitted in response to Condition 4d was completed on March 19, 2020 (ADAMS Accession No. ML19120A145), and included eight recommendations. The NRC's audit of the licensee's mass balance methodology results, submitted in response to Condition 8, were provided to the licensee by letter dated October 29, 2019 (ADAMS Accession No. ML19221B533), and included three recommendations. The NRC audit results for the impact of exceedances submitted in response to Condition 10 were provided to the licensee by letter dated October 29, 2019 (ADAMS Accession No. ML19289B451), and included one recommendation. In the March 19, 2020, self-assessment audit letter, the NRC staff reminded the licensee that the appropriate corresponding license amendment requests to Materials License SUA-1471 were required to be submitted within 60 days of receipt of the letter. By letter dated May 5, 2020 (ADAMS Accession No. ML20128J233), the licensee requested a 120-day extension to submit its proposed amendment requests or make procedural changes as required by Condition 5. By letter dated May 15, 2020 (ADAMS Accession No. ML20134H851), the NRC approved the extension to submit proposed amendment requests or make procedural changes under Condition 5 to September 19, 2020.

By letter dated September 18, 2020 (ADAMS Accession No. ML20262H284), HMC submitted its "Response to recommendations included in the October 29, 2019 NRC Letter concerning the audit of the 'Collection for Re-Injection Mass Balance/Removal Analysis' report submitted pursuant to Condition 8 of the Order EA-16-114," for review. By letter dated September 18, 2020 (ADAMS Accession No. ML20262H286), HMC submitted its "Completion of Corrective Actions Pursuant to Condition 5 of Order EA-16-114" for review that provided responses to NRC audits for Order Condition 4(d), 8, and 10.

The NRC staff completed its review of Conditions 4(d) and 10 in response to NRC audits. Condition 4 of the Order was determined to be satisfied during inspection 040-08903/2020-001 dated August 28, 2020 (ADAMS Accession No. ML20241A110) and Condition 10 of the Order was determined to be satisfied during this inspection (040-08903/2021-001).

In a letter dated September 30, 2021 (ADAMS Accession No. ML21270A024), the NRC staff suspended review of HMC's September 18, 2020, letter regarding HMC's

Condition 8 responses pending NRC review of the ACL application. Additionally, the NRC staff did not review all the SOPs listed in Attachment 1 of the September 18, 2020, letter submitted for Order Condition 5 and will do so in a future inspection.

Condition 5 of the Order remains open.

c. Condition 6

Condition 6 of the Order requires, in part, the licensee to submit a revised GCAP to the NRC by the end of calendar year 2018, including amendments to the license approved by that date. The licensee's November 17, 2017, letter (see Condition 3 above) expressed uncertainty in meeting the due date of December 31, 2018, for submission of the revised corrective action program due to the extended time frame needed to complete the self-assessment discussed in Condition 3 of the Order.

On October 11, 2018, the licensee requested that the due date for the revised GCAP be extended from January 1, 2019, to December 18, 2019 (ADAMS Accession No. ML18289A400). Based on a review of the information provided by the licensee, the NRC granted the extension request to allow the GCAP to be submitted on or before December 18, 2019 (ADAMS Accession No. ML18355A893). By letter dated December 18, 2019 (ADAMS Accession No. ML19354B960), HMC submitted a license amendment request to the NRC as a license tie-down document for groundwater corrective action, to replace the 1989 GCAP and the 1998 update to the GCAP specified in License Condition 35C. In addition, the letter stated that the Environmental Report (ER) associated with the license amendment request identified in Criterion 9 of 10 CFR 40, Appendix A, and needed for NRC to meet its obligations under 10 CFR 51, would be provided as a separate submittal by February 28, 2020. The licensee submitted the ER by letter dated February 28, 2020 (ADAMS Accession No. ML20080M078). The NRC staff reviewed the GCAP and ER and responded to the licensee with a request for supplemental information by letter dated June 18, 2020 (ADAMS Accession No. ML20142A195).

The licensee submitted a revised GCAP and ER dated November 13, 2020 (ADAMS Accession Package No. ML20358A192) and also stated in the submission its intent to submit an ACL application in calendar year 2021. In a letter dated April 30, 2021, the NRC staff responded that the GCAP did not provide sufficient technical information to conduct a detailed review. Additionally, in the April 30, 2021, NRC letter, the NRC staff suspended the review of the GCAP pending the licensee's submission of an ACL application.

Condition 6 of the Order remains open while the review of the GCAP is suspended.

d. Condition 7

Condition 7 of the Order requires, in part, that the licensee conduct initial and annual refresher training for all individuals (employees and vendors, commensurate with their duties) engaged in licensed activities. Section (a) of this condition required initial and annual training to address awareness and understanding of regulatory and license requirements, including but not limited to informing licensee employees of the jurisdiction of the NRC, the U.S. Environmental Protection Agency, and the New Mexico Environment Department over the GRP. Section (b) of this condition required the

licensee to maintain documentation for each training session conducted, which will include a summary of the contents of the training and individual attendance.

The inspectors reviewed the status of the licensee's training program. The licensee conducted Regulatory Framework training as part of its Health, Safety and Environmental Orientation training given annually to licensee employees. The Orientation presentation contains Regulatory Framework training as one of its components. The NRC determined that the licensee had made reasonable efforts to comply with the requirements of Condition 7.

Condition 7 of the Order remains open. The licensee will continue to provide refresher training and the NRC staff will review its training requirements under Condition 7 until the Order has been terminated by the NRC.

e. Condition 8

Condition 8 of the Order requires, in part, the licensee to use the mass balance methodology described in the revised 2012 groundwater corrective action program submittal to complete an analysis of the re-injection system's impact to the time estimate for completion of the GCAP. The analysis was required to be completed within 120 days of issuance of the Order, and the licensee was required to discuss the methodology, data, and analysis with the NRC, no less than 30 days prior to its finalization of the re-injection analysis.

The licensee and the NRC discussed the methodology, data, and analysis during a teleconference on June 26, 2017, and during a follow-up teleconference on June 27, 2017. Notes summarizing the discussions during the teleconferences on June 26 and 27, 2017, as well as the licensee's presentations are publicly available (ADAMS Accession No. ML17352B067).

The licensee submitted the impact analysis for the re-injection system and exceedance apparent violations by letter dated July 26, 2017 (ADAMS Accession Package No. ML17212A010). Condition 8 of the Order requires NRC to perform an audit of the analysis and provide, in writing, the NRC audit results, including any recommended changes. The NRC staff completed an audit of the July 26, 2017, submission and documented the results of its audit in a letter dated October 29, 2019 (ADAMS Accession No. ML19221B533). The NRC audit resulted in three recommendations. The licensee responded to the three recommendations in a letter dated September 18, 2020 (ADAMS Accession No. ML20262H284). The NRC staff had planned to review the September 18, 2020, response in conjunction with the GCAP that was submitted on November 13, 2020 (ADAMS Accession Package No. ML20358A192). However, since the GCAP was not accepted for review and the licensee stated its intent to submit an ACL application in 2021, the NRC staff determined it would wait until additional groundwater modeling is performed and submitted in the ACL application to finish review of the licensee's Condition 8 response. In a letter dated September 30, 2021 (ADAMS Accession No. ML21270A024), the NRC staff suspended review of HMC's September 18, 2020, letter regarding HMC's condition 8 responses pending NRC review of the ACL application.

Condition 8 of the Order remains open pending the NRC staff review of the licensee's 2021 ACL submission.

f. Condition 14

Condition 14 of the Order requires, in part, that the licensee identify sources of supply water, soil and groundwater data, and associated reports, and use that data to develop a land application assessment of any impacts due to the use of the irrigation water containing byproduct material to past, current, or foreseeable future uses of the land application areas. The HMC land application assessment was required to be submitted within 180 days of issuance of the Order. Additionally, the licensee was required to take immediate action to ensure that the land application areas were not being used to produce crops for human consumption.

By memorandum dated June 16, 2017 (ADAMS Accession No. ML17328A507), the licensee provided verification that they were not using the former land application areas to produce crops for human consumption. The licensee submitted the land application impact assessment to the NRC by letter dated September 25, 2017 (ADAMS Accession No. ML17270A066). A proposed final status survey plan for release of the former land application areas was submitted by letter dated November 14, 2017 (ADAMS Accession No. ML17340A406). The data obtained for the final status survey was intended to augment the existing soil data within the land application impact assessment that was submitted on September 25, 2017. The licensee subsequently submitted the final status survey report, documenting the results of the final status survey, to the NRC by letter dated July 2, 2018 (ADAMS Package Accession No. ML18186A577).

The NRC staff completed its review of the land application impact assessment and final status survey report on April 29, 2021 (ADAMS Accession No. ML21032A306). The NRC staff determined that the licensee's dose calculations considered reasonably foreseeable land use scenarios, appropriate exposure pathways, and site-specific parameter values that provide reasonable assurance that doses are below the NRC's regulatory limits and satisfy ALARA requirements. The NRC staff determined that HMC fulfilled its requirements under Condition 14 of the Order.

Condition 14 of the Order was determined to be satisfied during this inspection (040-08903/2021-002).

g. Condition 15

Condition 15 of the Order requires, in part, that if the results of the analysis discussed in Condition 14 of the Order indicate that radiological doses and non-radiological risks are in excess of the NRC-approved remedial action levels, the licensee will propose appropriate measures to control both use and access to the impacted areas, a corrective action plan if necessary to achieve the NRC-approved remedial action levels, and final status survey plans to demonstrate that the radiological doses and non-radiological risks are below NRC-approved remedial action levels.

Since NRC staff determined that the results of HMC's analysis discussed in Condition 14 of this section indicates that radiological doses and non-radiological risks are not in excess of the NRC-approved remedial action levels (i.e., the concentrations of constituents of concern in the land application areas meet the requirements for unrestricted release in accordance with 10 CFR Part 40, Appendix A, Criterion 6(6) and Criterion 6(7)), HMC is not required to take further corrective actions as discussed in

Condition 15. The NRC staff determined that HMC fulfilled its requirements under Condition 15 of the Order.

Condition 15 of the Order was determined to be satisfied during this inspection (040-08903/2021-002).

h. Condition 16

Condition 16 of the Order requires the licensee to provide an integrated table that sets forth all actions taken pursuant to the Order. An updated integrated table will be provided semi-annually, until all license and procedure changes under the Order are completed. The last two integrated tables were provided to the NRC by letters dated March 30, 2021 (ADAMS Accession No. ML21090A198) and September 29, 2021 (ADAMS Accession No. ML21273A185).

Condition 16 of the Order will remain open until all license and procedure changes under the Order are completed.

5.3 Conclusions

The inspectors reviewed the status of Order EA-16-114. The licensee's responses to Conditions 14 and 15 were evaluated and determined to satisfy the conditions. Order Conditions 1, 3, 4, 9, 10, 11, 12, and 13 were previously evaluated and were determined to be satisfied. Order Conditions 2, 5, 6, 7, 8, and 16 remain open with pending actions. These conditions will continue to be evaluated by the NRC.

**6 Exit Meeting Summary**

The inspectors presented the preliminary inspection results at the conclusion of the onsite inspection on August 26, 2021, and the final inspection results to the licensee's representatives by telephone on September 16, 2021. During the inspection, the licensee did not identify any information reviewed by the inspectors as proprietary that was included in the report.

## **SUPPLEMENTAL INSPECTION INFORMATION**

### **Partial List of Persons Contacted**

#### Licensee

W. Archuleta, Senior Shift Supervisor  
A. Arguello, Hydrologist  
B. Bingham, Closure Manager  
J. Ortega, Health and Safety Superintendent  
R. Shirley, Project Engineer  
R. Whicker, RSO,  
Environmental Restoration Group, Inc.

### **Inspection Procedures (IPs) Used**

IP 83822	Radiation Protection
IP 88005	Management Organization and Controls
IP 88035	Radioactive Waste Processing, Handling, Storage, and Transportation
IP 88045	Effluent Control and Environmental Protection
IP 92703	Follow-up of Confirmatory Action Letters or Orders

### **Items Opened, Closed and Discussed**

#### Opened

040-08903/2021-02-001	VIO	Failure to conduct work under an RWP or SOP
040-08903/2021-02-002	VIO	Failure to perform surveys

#### Closed

040-08903/2021-01-001	VIO	Discharge of liquid effluents containing byproduct material to the ground surface in a manner not approved by NRC
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#### Discussed

None

### **List of Acronyms Used**

ADAMS	Agencywide Documents Access and Management System
ALARA	as low as is reasonably achievable
CFR	Code of Federal Regulations
EP	evaporation pond
ER	Environmental Report
GCAP	Groundwater Corrective Action Program
gpm	gallons per minute
HMC	Homestake Mining Company
IP	Inspection Procedures
LTP	large tailings pile
μR/hr	microRoentgen per hour
NRC	U.S. Nuclear Regulatory Commission
RCA	root cause analysis
RCP	root cause protocol
RO	reverse osmosis
RSO	radiation safety officer
RWP	radiation work permits
SERP	Safety and Environmental Review Panel
SOP	standard operating procedure
SP	sampling point
STP	small tailings pile
VIO	violation