



Homestake Mining Company of California
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November 12, 2020

Ms. Ashlynn Winton
Mining Environmental Compliance Section
Ground Water Quality Bureau
New Mexico Environment Department
P.O. Box 5469
Santa Fe, NM 87502

**RE: Response to Request for Additional Information, Corrective Action Report,
Unauthorized Discharge from Off-site Well, DP-200, Homestake Mining
Company**

Dear Ms. Winton:

On 1 September 2020, Homestake Mining Company of California (HMC) provided oral notification to the Mining Environmental Compliance Section of the New Mexico Environmental Department (NMED) of an authorized release of extraction water from the off-site collection pipeline at Well 490 at the HMC uranium mill site. Subsequent to the oral notification, a 7-day notification letter was submitted to NMED on 8 September 2020 and a Corrective Action Report (CAR) was submitted on 16 September 2020. Pursuant to the letter received on 16 October 2020 from the NMED in response to the CAR, HMC has prepared the required responses below:

NMED's request for additional information are provided below in italics, followed by a HMC response.

- 1. The permittee shall submit to NMED for review the updated standard operating procedures specific to the zeolite operation and additional personnel training that will be implemented to prevent subsequent releases of this nature. NMED also requests the permittee provide a review and discussion of mechanisms that can be implemented to ensure earlier detection of releases from the impacted groundwater extraction and conveyance system, such as timelier visual inspections upon system startup.*

HMC Response:

HMC performed an investigation of the release on 4 September 2020. The release investigation resulted in the following actions:

- Development of a checklist for start-up and shutdown activities.
- In-field crew training by the Site Supervisor on correct valving position, start-up and shutdown of the wells, and isolation valve(s) location to separate fields, if applicable.
- Adjusted well field forms so that all wells from a specific field were on one sheet and assigned daily field check responsibility to specific Technicians.
- Control of unauthorized access via fencing built around HMC property on Rabbit Lane.
- Enclosed with this correspondence is the updated standard operating procedure (SOP) specific to the zeolite operation, titled *SOP 25 – Zeolite Water Treatment Plant (1,200-gpm)*. The SOP has been updated to include zeolite system startup and shutdown checklists. The checklists outline the correct positions for valves, including the valves on the feed wells. Additional training on how to correctly turn on and shut off wells and the locations of the valves to isolate fields was provided.

2. *The permittee shall provide a work plan to NMED for approval to conduct additional soil characterization of the affected area. Specifically, NMED requests that the permittee conduct soil sampling and analyses to verify the results of the radiological dose assessment.*

HMC Response:

Prior to receipt of NMED's request for a work plan, Homestake initiated an assessment of the spill area, including a GPS-based gamma radiation survey and soil sampling. Enclosed with this correspondence is the ERG assessment, which notes that the total U-nat concentration in the soil samples collected are well below the EPA's 16 mg/kg Regional Screen Level for uranium in residential soils based on toxicological health considerations and are within the range of background concentrations previously exhibited in soil samples collected on HMC property in the area.

In correspondence from the Nuclear Regulatory Commission (NRC), received on 26 October 2020, the NRC provided HMC with an overview of a gamma survey conducted by NRC staff during the 16 September 2020 site inspection. As noted by the NRC "The GPS survey showed the discharged area gamma radiation measurements in the vicinity of Well 490 are indistinguishable from background". A copy of this correspondence is enclosed for ease of review by NMED.

Thank you for your time and attention on this matter. If you have any questions, please contact me via e-mail at bbingham@homestakeminingcoca.com or via phone at 505.290.8019.

Respectfully,



Brad R. Bingham

Closure Manager

Homestake Mining Company, Grants, New Mexico

Office: 505.287.4456 x35 | Cell: 505.290.8019

Enclosures (3)

BRB/jlo

cc: R. Linton, NRC, Bethesda, MD (electronic copy)
M. Purcell, Region VI EPA, Dallas, Texas (electronic copy)
K. Vollbrecht, Program Manager, NMED (electronic copy)
A. Maurer, Operational Team Leader, NMED (electronic copy)
A. Kuhlman, DOE (electronic copy)



SOP 25 – Zeolite Water Treatment Plant (1,200-gpm)

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SOP 25 – Zeolite Water Treatment Plant (1,200-gpm)

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SOP 25 – Zeolite Water Treatment Plant (1,200-gpm)

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HMC 1200 GPM Zeolite System Startup Checklist

Startup Date: _____

Step	Zeolite Component	Yes	No	LOTO Resolved?	
				Yes/No	Comments
1	Valve Line-Up				
	a. Confirm influent valves to system are open				
	b. Confirm ALL valves in Manifold and Corridor are open				
	c. Confirm valves in between Cells are in correct position				
	d. Confirm Discharge valves are open to Pond and closed to PTT				
2	Collection Wells				
	a. Feed well pumps turned on/discharge valve open				
	b. Sample port closed				
	c. check to make sure well field is isolated, if applicable				
3	Acid Pumps				
	a. Valves from acid tanks open				
	b. Influent valves below acid pump open				
	c. Confirm acid pump in Auto				
4	Leak Check				
	a. Check ALL wells on Well Log Form for leaks				
	b. Check ALL influent lines for leaks (from well to zeolite system)				
	c. Check ALL wells connected to active line for leaks and proper valve position				

Operator Signature: _____

Site Supervisor Signature: _____

In case of unplanned shutdown due to power loss, weather, or any other upset conditions, use of this form is not required if the system can be brought back online within four hours of shutdown and the listed systems above have not been changed.

MC 1200 GPM Zeolite System Shutdown Checklist

Shutdown Date: _____

Step	Zeolite Component	Yes	No	LOTO Resolved?		Comments
				Yes/No		
1	Acid Pumps					
	a. Shut-off/Unplug/LOTO					
	b. Close influent valves below acid pump					
	c. Close valves to acid tanks/LOTO					
2	Collection Wells					
	a. Feed well pumps turned off/discharge valve closed					
	b. Sample port open					
	c. check to make sure well field is isolated, if applicable					
3	Valve Line-Up					
	a. Confirm Discharge valves are open to ponds and closed to PTT					
4	Leak Check					
	a. Check ALL wells on Well Log Form for leaks					
	b. Check ALL influent lines for leaks (from well to zeolite system)					
	c. Check ALL wells connected to active line for leaks and proper valve position					

Operator Signature: _____

Supervisor Signature: _____

In case of unplanned shutdown due to power loss, weather, or any other upset conditions, use of this form is not required if the system can be brought back online within four hours of shutdown and the listed systems above have not been changed.



TECHNICAL MEMORANDUM	
To: Brad Bingham (HMC)	Date: October 30, 2020
From: Randy Whicker (ERG)	Project: HMC Grants Reclamation Project
Direct: 970-556-1174	Task(s): Radiation Safety Officer
Cc: Adam Arguello (HMC); Jennifer Ortega (HMC); Kyle Martinez (HMC); Chuck Farr (ERG)	
Subject: Assessment of gamma survey data and soil samples collected to investigate impacts from the recent groundwater spill at Well 490.	

Dear Mr. Bingham,

This memorandum provides an assessment of a GPS-based gamma radiation survey and analytical laboratory results for soil samples collected to evaluate potential radiological impacts to soil from the recent spill of offsite groundwater at Well 490, in a vacant lot owned by Homestake Mining Company (HMC) south of the Grants Reclamation Project (Site). Results of the gamma survey (performed on October 7, 2020) in relation to the locations of Well 490 and spill-affected areas (Figure 1) indicate no significant impacts within the spill-affected areas from gamma emitting radionuclides [namely radium-226 (Ra-226)].

The gamma data suggest that imported material has been applied as road base to the surfaces of roadways within the lot, resulting in lower gamma exposure rates in these locations due to shielding of photon emissions from underlying soils. The range of measured exposure rates across the lot are consistent with background conditions across soils within the alluvial valley in which the HMC Site is located.

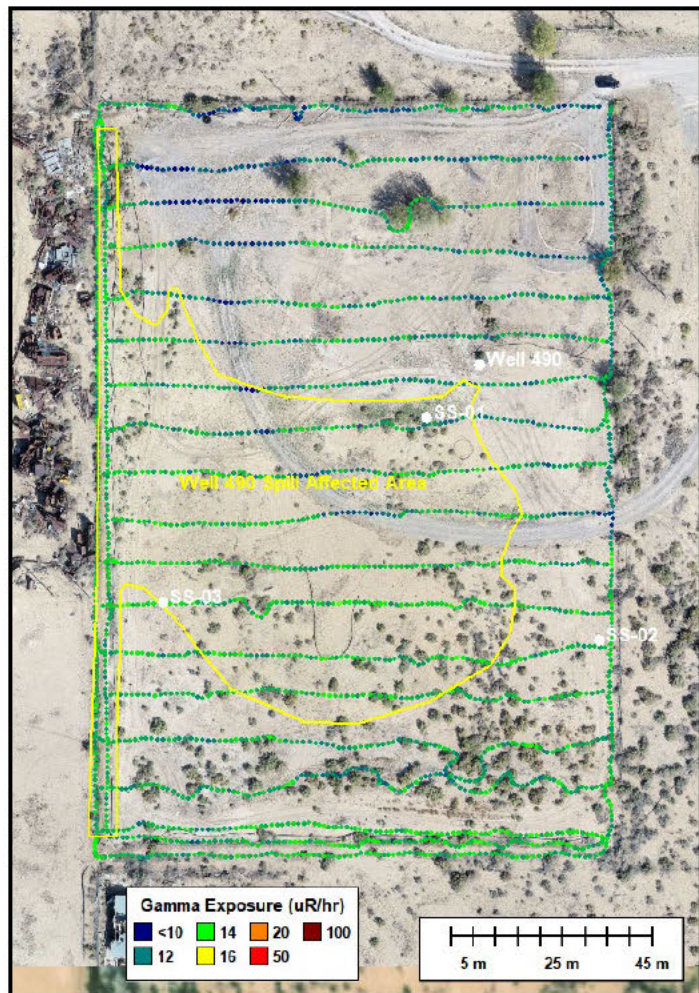


Figure 1: Gamma radiation survey results, expressed as exposure rate ($\mu\text{R/hr}$). The location of Well 490, the estimated spill affected area, and locations of three soil samples collected are also shown.

A summary of analytical laboratory data for three soil samples collected in conjunction with the gamma survey investigation are shown in Table 1. Analytes included natural uranium (U-nat), radium-226 (Ra-226) and natural thorium (Th-232). Inadvertent specification of “thorium” without isotopic identification on the analyte request form, resulted in default analysis by the laboratory of natural thorium by Inductively coupled plasma mass spectrometry (ICP-MS), rather than Th-230 (a decay product of uranium) by alpha spectroscopy as intended. Given that offsite groundwater has not been impacted by Th-230, this oversight does not materially affect the below assessment of radiological impacts to soil due to the spill at Well 490 (only U-nat is known to be elevated in offsite groundwater aquifers).

Table 1: Analytical results for three samples of surface soil (0-15 cm) collected at the locations shown in Figure 1.

Location ID	Sample Date	U-nat (mg/kg)	RL* (mg/kg)	Ra-226 (pCi/g)	RL* (pCi/g)	Th-232 (mg/kg)	RL* (mg/kg)
SS-01	10/7/20	2.6	0.3	1.1	0.2	5	1
SS-02	10/7/20	2.4	0.3	1.6	0.2	10	1
SS-03	10/7/20	2.5	0.3	1.6	0.2	9	1

*Laboratory Reporting Limit (limit of detection for specific analyte and method)

The U-nat concentration measured at sample location SS-01 (near the head of the spill as shown in Figure 1) is 0.2 mg/kg higher than the U-nat at the unaffected background location (Sample location SS-02). The initial calculated estimate of the increase in soil U-nat concentrations in surface soils (0-15 cm) due to the spill was 0.16 mg/kg (HMC, 2020; ERG, 2020), suggesting that the predicted incremental increase due to the spill agrees reasonably well with the measured difference between the spill-affected area and the unaffected background location. However, given a reporting level for U-nat of 0.3 mg/kg (Table 1), and since spatial variability in background U-nat levels in unimpacted surface soils in the nearby former Section 34 land application area ranged from 0.58 to 5.85 pCi/g (0.86 to 8.6 mg/kg) (HMC, 2017), it cannot be concluded that the slightly higher U-nat result at sample location SS-01 is due to the spill. The same is true for the measured U-nat concentration at sampling location SS-03 within the spill-affected area.

If the slightly higher U-nat concentrations measured at locations SS-01 and SS-03 were due to the spill, the radiological impacts to human health would be negligible (orders of magnitude lower than 1 mrem/yr) as was concluded by the previous dose assessment (ERG, 2020). In addition, the total U-nat concentration in each of the collected samples are well below the EPA’s 16 mg/kg Regional Screening Level for uranium in residential soils based on toxicological health considerations (EPA, 2017). Relative differences in measured Ra-226 soil concentrations within the spill-affected area (sample locations SS-01 and SS-03) versus the unaffected background sampling location (SS-02) suggest that the spill had no influence on Ra-226 concentrations in surface soils within the lot. The observed variability in Ra-226 levels was likely present before the spill occurred. This is consistent with expectations as like Th-230, offsite groundwater aquifers are not known to be impacted by Ra-226 (only U-nat).

References:

Environmental Restoration Group, Inc. (ERG). 2020. Technical Memorandum: Dose assessment for offsite groundwater spill (Well 490). September 8, 2020.

Homestake Mining Company of California (HMC). 2017. Land Application Impact Assessment. Submission of the Land Application Report required under Conditions 14 and 15 of the Confirmatory Order of March 28, 2017 modifying License No. SUA-1471, EA-16-114. September 25, 2017.

Homestake Mining Company of California (HMC). 2020. NMED 15-Day/NRC 30-Day Corrective Action Report for the Unauthorized Discharge from Off-site Well. Homestake Mining Company, Grants Reclamation Project, License Source Materials License SUA-1471, Docket Number 40-8903; NMED Discharge Permit DP-200. September 16, 2020.

U.S. Environmental Protection Agency (USEPA). 2017. Regional Screening Levels (RSLs) - Generic Tables (June 2017). URC: <https://semspub.epa.gov/work/03/2245073.pdf> (accessed 10-1-17).

Please let me know if you have questions or need more information.

Thanks,

*Randy Whicker, CHP
Radiation Safety Officer,
HMC Grants Reclamation Project*



Environmental Restoration Group, Inc.
8809 Washington St. NE, Suite 150
Albuquerque, NM 87113
Email: RandyWhicker@ergoffice.com



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 26, 2020

Mr. Brad R. Bingham
Closure Manager
Grants Reclamation Project
Homestake Mining Company of California
P.O. Box 98
Grants, NM 87020

SUBJECT: U.S. NUCLEAR REGULATORY COMMISSION REVIEW OF HOMESTAKE MINING COMPANY OF CALIFORNIA CORRECTIVE ACTION REPORT FOR THE UNAUTHORIZED DISCHARGE FROM OFF-SITE WELL [WELL 490], MATERIALS LICENSE SUA-1471, DOCKET NUMBER 040-08903

Dear Mr. Bingham:

The Homestake Mining Company of California (HMC) provided, in a letter dated September 16, 2020,¹ the details regarding an unauthorized discharge of extraction water from the off-site collection pipeline through Well 490. The extraction water was being pumped to the HMC zeolite system for treatment and removal of uranium contamination. HMC estimated the discharge was 133,000 gallons, but also calculated that the discharge may have been as high as 216,000 gallons.

HMC calculated an increase in uranium-soil concentration of 0.11 pCi/g due to the discharge from Well 490 based on the higher estimated discharge of 216,000 gallons and a uranium concentration of 0.3 mg/L. Based on that increase in soil concentration, HMC calculated a dose of 0.0066 mrem/yr at t=0 years using the RESRAD computer code. Greater than 70 percent of that dose was projected to be due to external exposure to a receptor who spends 25 percent of their time outdoors. The U.S. Nuclear Regulatory Commission (NRC) staff reviewed the calculation of uranium-soil concentration and the projected RESRAD doses and determined that they are both reasonable. This calculated dose is well below the requirement in Title 10 *Code of the Federal Regulations* (10 CFR) 20.1301 that the total effective dose equivalent to individual members of the public from the licensed operation does not exceed 100 mrem/yr in a year, exclusive of the dose contributions from background radiation.

During a recent NRC inspection,² the NRC staff conducted a gamma survey of the discharge area with a Ludlum 19 that showed dose rates of 9-15 microR/hr (the Ludlum 19 survey meter has a sodium iodide detector and is capable of detecting gamma, but not alpha or beta). Subsequently, HMC conducted a Global Positioning System (GPS) based gamma survey on the property where the discharged occurred. The GPS survey showed the discharged area

¹ Agencywide Documents Access and Management System (ADAMS) Accession No. ML20260H379.

² ADAMS Accession No. ML20288A492.

gamma radiation measurements in the vicinity of Well 490 are indistinguishable from background.³ HMC's results were comparable to the NRC staff measurements. The NRC staff does not have any additional requests for additional information at this time. The NRC staff will review any additional information provided in response to the New Mexico Environment Department request for additional information related to this discharge.⁴

In the September 16, 2020, unauthorized discharge report, HMC indicated that additional corrective actions that HMC will implement include updating standard operating procedures specific to zeolite operation, and additional personnel training. The NRC staff agrees with this approach and would also encourage HMC to review its startup procedures for zeolite system and rate of inspection of the off-site collection areas.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice and Procedure," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's document system ADAMS. ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

If you have any questions regarding this letter or the enclosures, please contact me at (301) 415-7777 or by email to Ron.Linton@nrc.gov.

Sincerely,

Ron C. Linton, Project Manager
Uranium Recovery and Materials
Decommissioning Branch
Division of Decommissioning, Uranium Recovery
and Waste Programs
Office of Nuclear Materials Safety
and Safeguards

Docket No.: 04008903
License No.: SUA-1471

Cc via ListServ:
Mark Purcell (EPA)
Kurt Vollbrecht (NMED)
Bernadette Tsosie (DOE)
Chris Burrus (OSE)

³ ADAMS Accession No. ML20297A441.

⁴ ADAMS Accession No. ML20295A574.

SUBJECT: U.S. NUCLEAR REGULATORY COMMISSION REVIEW OF HOMESTAKE MINING COMPANY OF CALIFORNIA CORRECTIVE ACTION REPORT FOR THE UNAUTHORIZED DISCHARGE FROM OFF-SITE WELL [WELL 490], MATERIALS LICENSE SUA-1471, DOCKET NUMBER 040-08903

DATED: October 26, 2020

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***via email**

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OFFICE	RIV	DUWP	DUWP
NAME	HGepford	BvonTill*	RLinton*
DATE	10/22/2020	10/26/2020	10/26/2020

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