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

September 8, 2022

MEMORANDUM TO: Bill Von Till, Chief
Uranium Recovery and Materials Decommissioning Branch
Division of Decommissioning, Uranium Recovery
and Waste Programs
Office of Nuclear Material Safety and Safeguards

FROM: Ron Linton, Project Manager /RA/
Uranium Recovery and Materials Decommissioning Branch
Division of Decommissioning, Uranium Recovery
and Waste Programs
Office of Nuclear Material Safety and Safeguards

SUBJECT: SUMMARY OF AUGUST 25, 2022, PUBLIC OBSERVATIONAL MEETING WITH HOMESTAKE MINING COMPANY OF CALIFORNIA TO DISCUSS THE LICENSE AMENDMENT REQUEST FOR BACKGROUND MONITORING LOCATION CHANGE FOR RADON AND AMBIENT GAMMA RADIATION

DATE OF MEETING: August 25, 2022

MEETING LOCATION: Virtual Microsoft Teams meeting

PURPOSE: The purpose of this meeting was for the U.S. Nuclear Regulatory Commission (NRC) staff to provide comments to the Homestake Mining Company of California (HMC) on the above referenced license amendment request and recent correspondence.

ATTENDEES: A list of attendees is provided in the enclosure to this meeting summary. Since this was a virtual meeting, publicly noticed on the NRC website for anyone to attend, not all attendees may have been identified in the enclosed list.

SUMMARY:

On August 25, 2022, a virtual public observational meeting was held between the NRC and the HMC regarding the proposed background monitoring location change for radon and ambient gamma radiation license amendment request (LAR) for the Grants Reclamation Project (GRP or site). The meeting notice was published on the NRC website on August 11, 2022, and is available in the NRC's Agencywide Documents Access and Management System (ADAMS) at Accession No. ML22223A056.

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The virtual public observational meeting began at 10:30 a.m., eastern time, with the NRC staff making opening remarks regarding the meeting background and purpose. As an observational meeting, members of the public are welcome to attend and observe the proceedings and ask questions to the NRC staff after NRC comments were provided to HMC.

The NRC staff discussed its review of the LAR and offered general comments to the HMC staff. A focus of the discussion was the recent NRC review of HMC responses to NRC request for additional information (RAI) and clarification request dated June 10, 2022 (ML22137A097) and HMC's response to NRC's clarification request, dated August 9, 2022 (ML22222A123). On August 24, 2022, the NRC staff provided HMC with talking points for the public observational meeting (Enclosure 1). The NRC staff discussed the provided talking points in detail with HMC.

The NRC staff stated that compliance with Title 10 of the *Code of Federal Regulations* (10 CFR) 20.1301, "Dose limits for individual members of the public," is based on current background conditions at the site and that the effects of operations at the site, e.g., such as changes due to the large tailings pile, evaporation ponds, and remedial activities that have taken place at the site, need to be considered. The HMC staff maintained the position that pre-operational conditions should represent current ambient conditions, but acknowledged that many conditions have changed at the site since operation of the mine through installation of tailings piles, etc. The HMC staff indicated that there is uncertainty on how much additional accuracy can be gained by further study because of complexity of issues at the site. The HMC staff indicated the possibility of remodeling site conditions with the U.S. Environmental Protection Agency's CALPUFF dispersion model using reduced emission rates in remediated areas and may look into doing more extensive modeling. The NRC staff indicated that emission rates assigned to specific points in the previous modeling domain would have to be varied based on RAI-11d in NRC's request dated September 14, 2021 (ML21237A454). The NRC staff recognized that terrain at the GRP is complex and has drainage air flow effects under certain conditions.

Following the NRC's comments to HMC and ongoing discussions, the NRC staff opened the meeting for questions and comments from the public. No questions or comments were received.

The NRC staff provided closing remarks and the meeting was adjourned at 12:10 p.m.

In accordance with 10 CFR 2.390, "Public inspections, exemptions, requests for withholding," of the NRC's "Agency Rules of Practice and Procedure," a copy of this memorandum will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's ADAMS. ADAMS is accessible from the NRC website at https://www.nrc.gov/reading-rm/adams.html.

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

cc: Brad Bingham
Homestake Listserv

Enclosures:
1. NRC talking points
2. List of Attendees

U.S NUCLEAR REGULATORY COMMISSION AND HOMESTAKE MINING CO. OF CA PUBLIC OBSERVATIONAL MEETING, BACKGROUND MONITORING LOCATION CHANGE FOR RADON AND AMBIENT GAMMA RADIATION LICENSE AMENDMENT REQUEST, GRANTS RECLAMATION PROJECT, AUGUST 25, 2022

TALKING POINTS

PURPOSE:

Discuss the Homestake Mining Company (HMC) License Amendment Request (LAR) for Background Monitoring Location Change for Radon and Ambient Gamma Radiation

BACKGROUND:

10 CFR 20.1301(a)(1) states –

§ 20.1301 Dose limits for individual members of the public.

(a) Each licensee shall conduct operations so that—

(1) The total effective dose equivalent to individual members of the public from the licensed operation does not exceed 0.1 rem (1 mSv) in a year, exclusive of the dose contributions from background radiation, from any administration the individual has received, from exposure to individuals administered radioactive material and released under § 35.75, from voluntary participation in medical research programs, and from the licensee's disposal of radioactive material into sanitary sewerage in accordance with § 20.2003, and

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“Background radiation” is defined in 10 CFR 20.1003 –

Background radiation means radiation from cosmic sources; naturally occurring radioactive material, including radon (except as a decay product of source or special nuclear material); and global fallout as it exists in the environment from the testing of nuclear explosive devices or from past nuclear accidents such as Chernobyl that contribute to background radiation and are not under the control of the licensee. "*Background radiation*" does not include radiation from source, byproduct, or special nuclear materials regulated by the Commission.

In its December 18, 2020, submittal, the Homestake Mining Company of California (HMC, or the licensee) requested a license amendment to change the location of the background radon and gamma monitoring station. The reason for proposing this change was that HMC determined that the current background monitoring location (HMC-16) is biased low compared to the background radon concentration at the points of public dose calculation (HMC-4, 5). According to HMC, this low bias results in a higher calculated public dose than a location(s) that is more representative of the points of public dose calculation. See Figure 1 for locations.

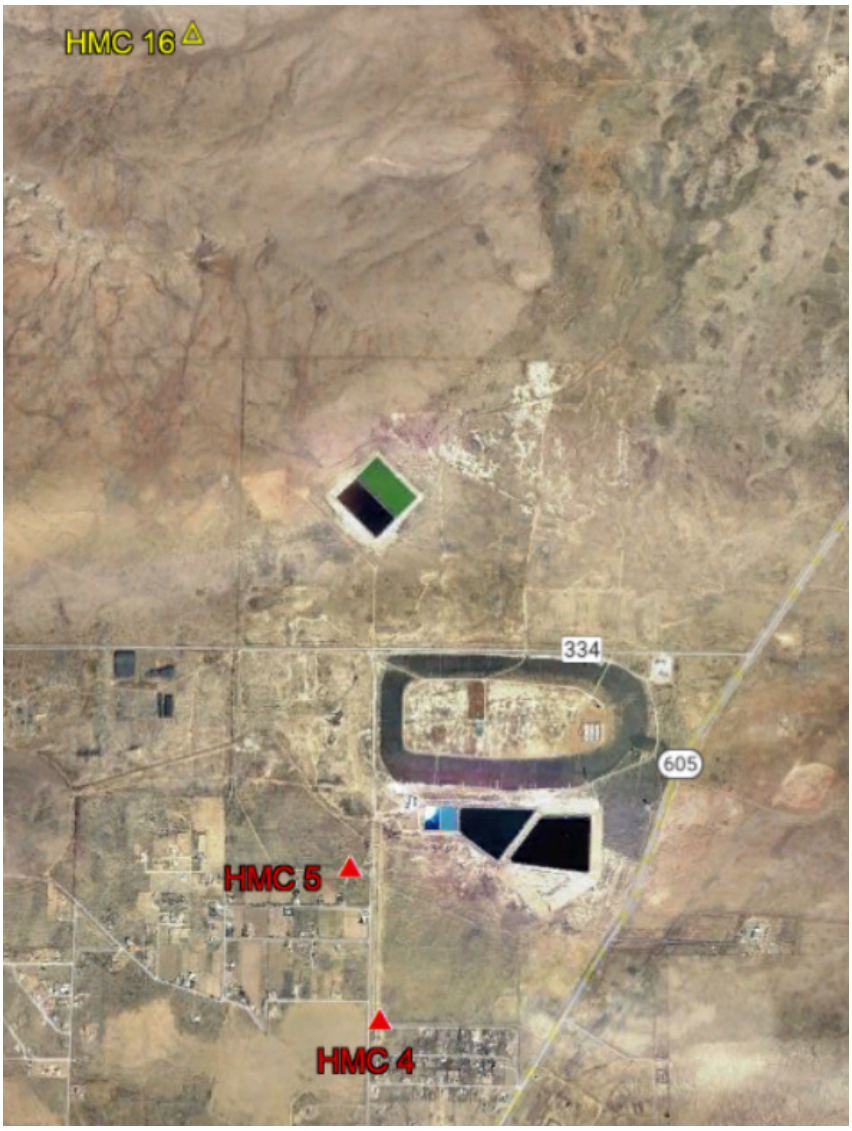

Figure 1 - Current public dose monitoring locations (HMC-4, 5) and Background radon (HMC-16)

HMC stated that the technical basis to be used in determining a more representative background monitoring location was to:

> find "…which monitoring location(s) are most representative of the annual average background concentration of radon in ambient air as measured by the monitoring stations at the HMC reclamation project area boundary and that are also unaffected by releases from the HMC tailings piles.", and that
>
> "A background radon station should lie in the bottom and center of the San Mateo Wash and at a sufficient distance from the HMC tailings piles to be representative of conditions at the boundary monitoring stations, yet also be unaffected by releases."

This approach is consistent with guidance [i.e., DUWP-ISG [Interim Staff Guidance]-01 (the radon ISG (ML15051A002) and previously stated NRC staff positions.

For example, guidance in the radon ISG states:

> Since background monitoring should be performed concurrently with operational monitoring at the boundary of the unrestricted area or receptor locations, NRC staff reviewers should be aware of the complexities of determining an appropriate background outdoor radon concentration that is representative of the receptor (or other monitoring) locations. A background location typically would need to be close to the monitoring locations, with geology similar to the site geology, so that the background location is representative of the monitoring location.
>
> NRC staff should compare results of monitoring at background locations to other locations. NRC reviewers should evaluate cases in which radon concentrations measured at the background location are consistently higher than concentrations at or around (especially downwind from) the facility. This situation may be an indication of a background location that is influenced by other radon sources or in other ways is not representative of the true background radon concentrations for the facility.

Previous Staff RAI (2016)(ML15155B689):

> Section 20.1302(a) provides that "[t]he licensee shall make or cause to be made, as appropriate, surveys of radiation levels in unrestricted….areas….to demonstrate compliance with the dose limits for individual members of the public in Section 20.1301." Such surveys and compliance determinations would include accounting for background radon-in-air levels around the Grants site that are representative not only temporally, but spatially as well. As indicated above, compliance with the 10 CFR 20.1301(a)(1) dose limit is evaluated on an annual basis. Spatial representativeness, however, implies that the background concentration is representative of the location(s) at which compliance is to be demonstrated.
>
> Given the preceding technical issues, the Licensee should:
>
> > clearly justify that determining the background radon-in-air concentration based on measurements from a single monitoring location (i.e., HMC-1Off), adequately characterizes background radon levels for all points of compliance at and around the Grants site (which may be different at each location because of varying wind directions and site influences over the course of the entire annual compliance period);

However, in its August 9, 2022, submittal (ML22222A123), HMC changed its technical basis for determining a new background monitoring location. The current technical basis is stated as the need "…to examine the spatial distribution of background radon without the influence of any facility emissions in the conditions prior to construction and operation of the HMC facility." Specifically, its analyses of background radon "…does not include any anthropogenic sources such as the tailings piles or evaporation ponds, or any cleanup of windblown tailings." See Figure 2 for extent of the cleanup of windblown tailings.

Figure 2 – Extent of remediation of windblown tailings.

HMC's August 9, 2022, submittal also stated "Although ambient radon concentrations in previously impacted areas have been reduced due to large-scale soil remediation and excavation of borrow materials, associated reductions in local "background" radon emissions are still an impact from site operations, and do not represent the average background radon concentration that existed prior to construction and operation of uranium milling facilities on the floor of the lower SMC [San Mateo Creek] valley."

DISCUSSION:

The NRC has concerns with this revised approach.

As used in the regulations, "ambient" appears to refer to current exposure conditions. As an example, it would be inconsistent to apply the use of the term "ambient" to public exposure in a manner different from how it is applied in an occupational setting.

In addition, the NRC staff questions HMC's proposed approach of leaving out impacts from its licensed operations. The construction of HMC's tailings piles and evaporation ponds, and the

cleanup of windblown tailings, were all part of HMC's licensed operations. As such, the impacts from these activities fall within the requirement of 10 CFR 20.1301(a)(1) pertaining to "licensed operation".

It appears the reduction in background radon concentrations at the points of public exposure, compared to surrounding areas, is a direct result of HMC's licensed operation. Ignoring the impacts caused by HMC by applying a higher, preoperational background radiation value to its public dose assessment may result in a lower calculated dose from HMC's current licensed activities.

In addition, it appears there is residual licensed material in the vicinity of the public dose compliance locations that may be contributing to measured radon values (e.g., previous tailings spill).

It appears that HMC's reduced background radiation emissions from HMC's licensed activities should be factored in when determining the public dose in accordance with 10 CFR 20.1301(a)(1).

In demonstrating compliance with 10 CFR 20.1301(a)(1), when a licensee takes credit for subtracting background radiation, a licensee should use background radiation as it currently exists at the point(s) of public dose determination.

Other issues:

HMC's Figure 17, Predicted vs. measured radon values:

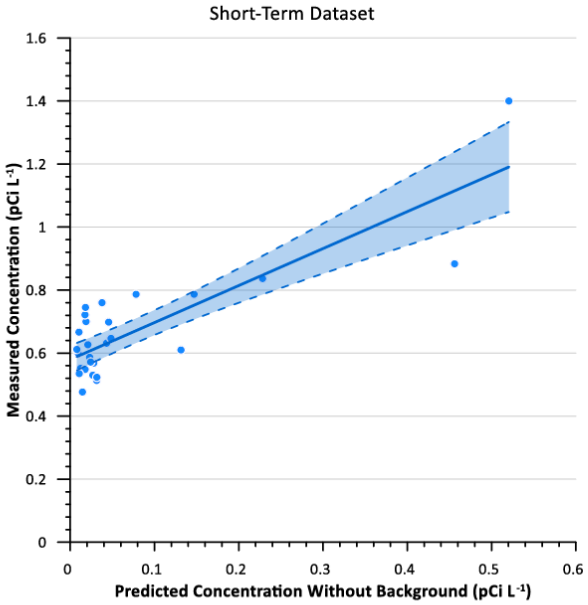

Figure 17. Regression of the measured radon concentration vs. the predicted concentration without background for the short-term dataset.

- NRC staff does not see the relevance of this figure for determining a specific background radon value at HMC-4,5.

- Study cited by HMC characterized natural radon emissions in terms of an estimated range of background radon concentrations based on monitoring data.

- Monitoring data from emissions in cited study was distributed over approximately 70 square kilometers (km^2)(27 square miles (mi^2).

- Monitoring data from HMC emissions (R1, R2, R12, R15) distributed over approximately 1.2 km^2 (0.5 mi^2).

- The majority of monitored locations used in the HMC analysis are distributed within the previously remediated or disturbed areas.

- It is not clear to the NRC staff how HMC can derive a background radon value using data from remediated areas, then apply that derived value outside of the remediated area (HMC-1OFF). HMC's position has been that a background monitoring location impacted by the remediated or disturbed areas is not appropriate.

- It is not clear to the NRC staff that the R1 location (top of large tailings pile) exhibits the same influences of background radon as other locations.

Background gamma monitoring location:

- HMC provides a general discussion, does not provide a specific quantitative discussion on the decision for locating the background gamma monitoring location to HMC-1OFF vs. another location.

- HMC does not discuss why, consistent with Regulatory Guide 4.14, HMC-6, the particulate monitoring station, is not an acceptable background gamma monitoring location.

LIST OF ATTENDEES:

AUGUST 25, 2022, PUBLIC OBSERVATIONAL MEETING WITH HOMESTAKE MINING COMPANY OF CALIFORNIA TO DISCUSS THE LICENSE AMENDMENT REQUEST FOR BACKGROUND MONITORING LOCATION CHANGE FOR RADON AND AMBIENT GAMMA RADIATION

Name	**Organization**
Ron Linton	NRC
Ron Burrows	NRC
Mike Mazaika	NRC
Patricia Jehle	NRC
Ian Irvin	NRC
Linda Gersey	NRC
Laurel Bauer	NRC
Dave McIntyre	NRC
Martha Poston-Brown	NRC
Brittany Bolz	NRC
Jane Marshall	NRC
Brad Bingham	HMC
JoAnne Martinez	HMC
Adam Arguello	HMC
Daniel Lattin	HMC
Randy Whicker	HMC
Art Rood	HMC
Elizabeth Rudolf	HMC
Jennifer Graham	U.S Department of Energy (DOE)
Susan Gordon	Public
Tomas Gallegos (Heinrich)	Public
Larry Carver	Public
Ann Maest	Public
E. Schneider	Public
Toby Wright	Public
Thomas (no additional information)	Public