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RE: Homestake Mining Company of California – Grants Reclamation Project – License No. SUA-1471; Docket 040-08903. HMC Reply to NRC Staff Responses Regarding HMC's Radon Flux Standard Questions

Dear Mr. Linton:

By letter dated October 20, 2021 [ADAMS Accession No. ML21257A126], the U.S. Nuclear Regulatory Commission (NRC) staff provided its responses to questions posed by Homestake Mining Company of California (HMC) by email dated May 5, 2021 [ADAMS Accession No. ML21217A166]. HMC's original questions related to the manner in which radon flux was to be calculated on HMC's Large Tailings Pile (LTP) and Small Tailings Pile (STP) and the manner in which decommissioning milestones were to be amended. HMC has reviewed the NRC staff's responses and disagrees with some of these responses. HMC expressed these differences to the staff during a video call on November 16, 2021.

This letter presents HMC's differences with the staff's responses to HMC's questions. In an effort to streamline our comments, we do not reiterate the original questions, herein, but we do provide the NRC staff responses below.

Question 1A

No. The large and small tailings piles (LTP and STP, respectively) at the Homestake facility were identified in Attachment A of the 1991 Memorandum of Understanding (MOU) between the U.S. Environmental Protection Agency (EPA) and NRC as non-operational tailings impoundments. This classification as non-operational for both the LTP and STP is consistent with previous commitments made by HMC in its Reclamation Plan, revised October 1993, and License Condition (LC) 37 of NRC Materials License SUA-1471. The operational status of a tailings impoundment is a necessary element in demonstrating compliance with the radon flux standard, as further discussed below.

Recent discussions between NRC staff and HMC concerned the operational status of the LTP and STP for the purpose of demonstrating compliance with the radon flux standard in Criterion 6(2) of Appendix A to 10 CFR Part 40 (Criterion 6(2)). A review of documentation provided by HMC to the NRC indicates that HMC understood the classification of the LTP and STP as non-operational as indicated in their October 28, 2003, license amendment request to change the milestones for final radon cover emplacement, but over time it appears that HMC's understanding may have changed. This conclusion is supported by the April 2013 Decommissioning and Reclamation Plan submission, which refers to both the LTP and the STP as being under Subpart W of 40 CFR Part 61, which applies to operating mill tailings impoundments, and the HMC September 13, 2017, response to the NOV, which refers to the STP as operational. The classification for both tailings piles is non-operational, as defined in the NRC/EPA MOU, and the NRC is not aware of any regulatory approval that would have changed that classification since that time.

Criterion 6(2) requires that emplacement of the final cover "as soon as reasonably achievable" to limit the releases of radon-222 to a level "not exceed and average release rate of 20 picocuries per square meter per second" and specifies the use of procedures described in 40 CFR Part 61, Appendix B, Method 115 (EPA Method 115) "or another method of verification approved by the Commission as being at least as effective." EPA Method 115, Section 2.12, states that for "mill tailings after disposal the pile shall be considered to consist of only one region." Because the LTP and STP are both classified as non-operational, they would each be considered to consist of a single region for the purpose of determining the radon flux.

Criterion 6(3) of Appendix A to 10 CFR Part 40 (Criterion 6(3)) provides criteria for situations when the emplacement of the final radon barrier occurs in phases. Specifically, Criterion 6(3) states in part that "verification of radon-222 release rates required in paragraph (2) of this section must be conducted for each portion of the pile or impoundment as the final radon barrier for that portion is emplaced." At the HMC site, the final radon barrier was put in place for the sides and aprons on the LTP and the radon flux measurements were made after placement of the final radon barrier and prior to the placement of erosion control as reported to the NRC in 1996. Under the phased emplacement of the radon barrier approach allowed under Criterion 6(3), once the radon flux has been measured and the erosion protection placed, the measured section is considered closed. Annual monitoring of the portions of the LTP that are not under a final radon barrier is appropriate for demonstrating compliance until the final radon barrier is emplaced for the entire LTP.

HMC's disagreements with the staff's responses are presented as follows:

Operational Status of the STP

The first part of the response to Question 1A addresses whether the LTP and STP are non-operational. The staff stated that both the LTP and STP were non-operational and cited the following:

- 1991 Memorandum of Understanding (MOU) between the U.S. Environmental Protection Agency (EPA) and the NRC (56 FR 55434);
- License amendment request to change final radon cover milestones dated, October 28, 2003 (ADAMS Accession No. ML033030501);
- April 2013 Decommissioning and Reclamation Plan submission (ADAMS Accession No. ML13107A541); and,
- September 13, 2017, Notice of Violation response (ADAMS Accession No. ML17264A070).

HMC acknowledges that the LTP is non-operational. HMC disagrees with the staff's determination

of the STP operating status. Based on our review of the regulations and 1993 reclamation plan, the STP is indeed operational.

1. The staff cites the 1991 MOU between the EPA and the NRC. MOUs are not an official basis by which licensing decisions can be made. As evidence, 10 CFR 2.103 states that compliance with the requirements of the Atomic Energy Act, Energy Reorganization Act, and Chapter I (Nuclear Regulatory Commission) is required to obtain an approval for a license or amendment. Consequently, MOUs are not licensing documents and cannot be used for licensing decisions.

2. "Operation" is defined in 10 CFR 40, App. A, Introduction, Definitions. This definition states that operation means that a uranium or thorium mill tailings pile or impoundment is being used for the continued placement of byproduct material or is in standby status for such placement. A pile or impoundment is in operation from the day that byproduct material is first placed in the pile or impoundment until the day final closure begins. Note that the term "final closure" is not defined in the regulations; however, the term "Closure" is defined.

3. Closure is defined in 10 CFR 40, App. A, Introduction, Definitions. This definition states that closure means the activities following operations to decontaminate and decommission the buildings and site used to produce byproduct materials and reclaim the tailings and/or waste disposal area.

4. HMC's 1993 Reclamation Plan, pg. 32, states as follows: "The collection system (which includes the collection wells, brine ponds and evaporation pond) [see Figure 2] will require operation for a considerable period of time after the reclamation of the tailing facility. This is because seepage will continue for some time after elimination of standing water from the tailing impoundment until storage of water in the tailings is down to or near its specific retention."

To date, the STP has been used to dispose of 11e.(2) byproduct material. Byproduct material being managed at the STP includes an evaporation pond (EP-1) constructed on top of the STP and a disposal area for residuals from all of HMC's remedial activities. Furthermore, no final radon barrier has been constructed on the pile. Because the STP has been and is currently used to manage 11e.(2) byproduct material, the STP is operational, and the STP cannot be in closure if it is still operational. Therefore, the STP should not be included in the radon flux calculations, because the regulations in 10 CFR 40, Appendix A requires radon flux calculations for only non-operational impoundments or piles.

LTP Radon Calculations

The next portion of the staff's response addresses whether the entire impoundment or only the top portion of the LTP must be included in calculating average radon flux emissions from the LTP as required by license condition (LC) 36.E. The staff's position is that only the top, unfinished, portion of the LTP is included in the radon flux calculations. HMC disagrees with the staff based on the following:

1. NRC staff's response quotes Criterion 6(2); however, the staff's quote is not entirely correct. The "as soon as reasonably achievable language" in Criterion 6(2) applies to verification of the radon flux standard after emplacement of the final cover. That language does not apply to the emplacement of the final cover itself. The full Criterion 6(2) states the following:

   "As soon as reasonably achievable after emplacement of the final cover to limit releases of radon-222 from uranium byproduct material and prior to placement of erosion protection barriers or other features necessary for long-term control of the tailings, the licensee shall verify through appropriate testing and analysis that the design and construction of the final radon barrier is effective in limiting releases of radon-222 to a level not exceeding 20

pCi/m^2s averaged over the entire pile or impoundment using the procedures described in 40 CFR part 61, appendix B, Method 115, or another method of verification approved by the Commission as being at least as effective in demonstrating the effectiveness of the final radon barrier."

2. 59 FR 28222 – Statements of Consideration, specifically states that the radon flux standard is applicable when "averaged over the pile or impoundment".

   Therefore, Method 115, being applicable to calculating radon flux to meet the Criterion 6 standard, consists of one region and that is the entire impoundment after final radon barrier installation. However, this is not the case in a phased approach.

3. Criterion 6(3) states: "When phased emplacement of the final radon barrier is included in the applicable reclamation plan, the verification of radon-222 release rates required in paragraph (2) of this criterion must be conducted for each portion of the pile or impoundment as the final radon barrier for that portion is emplaced."

   Therefore, in a phased approached, the Method 115 region is that portion of the barrier that is emplaced. For example, Western Nuclear, in 1998, submitted its radon flux analysis that was completed in phases over 4 years (ADAMS Accession No. ML11209B926). The final radon flux was the average of all the phased radon barrier installations. NRC staff approved this report in 1999 (ADAMS Accession No. ML20093A766).

4. Table 2 in the 1993 Reclamation Plan shows a phased schedule; radon barrier installation on the side slopes then barrier installation on the top. The top radon barrier schedule was originally based on settlement. However, because HMC missed the milestone for the top portion and applied for an extension (ADAMS Accession No. ML033030501), the staff invoked Criterion 6A(2) to change the final barrier installation schedule.

5. Criterion 6A(2) states the following: The Commission may approve a licensee's request to extend the time for performance of milestones related to emplacement of the final radon barrier if, after providing an opportunity for public participation, the Commission finds that the licensee has adequately demonstrated in the manner required in paragraph (2) of Criterion 6 that releases of radon-222 do not exceed an average of 20 pCi/m2s. If the delay is approved on the basis that the radon releases do not exceed 20 pCi/m2s, a verification of radon levels, as required by paragraph (2) of Criterion 6, must be made annually during the period of delay.

   The staff says that the radon flux calculations are only applicable to the unfinished portion, hence its assertion that only one region is used for the Method 115 calculation.

6. In addition, 59 FR 28223 – Statements of consideration states the following:

   "Paragraph (2) of Criterion 6A adds specific criteria for certain circumstances under which the NRC may extend the time allowed for completion of key milestones once enforceable dates have been established. An opportunity for public participation will be provided in a decision to extend the time allowed in these cases. The Commission may approve an extension of the Schedule for meeting milestones if it is demonstrated that radon emissions do not exceed 20 pCi/m^2s averaged over the entire impoundment."

   Because the entire impoundment contains a finished and unfinished portion, two regions must be used for the Method 115 computation.

7. Furthermore, 59 FR 28222 states:

   "Because of practical reasons, the verification of radon flux levels must take place after

emplacement of the final radon barrier but before completion of erosion protection features. In order for the results of the verification to remain valid, erosion protection features must be completed before significant degradation of the earthen barrier occurs."

Because HMC installed the erosion protection on the finished portions of the LTP and before degradation occurred, the radon flux results over the finished areas are valid and must be used in the Method 115 radon flux calculation to meet the "averaged over the entire impoundment" requirement.

Question 1B

No. In accordance with EPA Method 115, the LTP consists of a single region because it is a (singular) non-operational tailings pile, as discussed in the response to question 1A. Annual monitoring to demonstrate compliance with the radon flux requirements, as provided in LC 36.E, is only required for that portion of the LTP that has an interim cover in place (as noted in the response to question 1A). Those portions of the LTP that have the final radon cover in place with erosion protection are considered closed. There are no regulatory provisions for averaging closed portions of the pile with those portions that are under interim radon covers.

HMC disagrees with this staff response based on Item No. 7 presented above. Because HMC installed the erosion protection over the final radon barrier in a timely manner, the radon flux results are still valid and must be used for the radon flux calculations. Consequently, HMC disagrees with the staff's assertion that the completed portions of the LTP are closed and may no longer be used in radon flux calculations.

HMC's disagreements with the staff's responses are presented as follows:

Method 115, as presented in 40 CFR 61, Appendix B, presents an issue for NRC-regulated tailings impoundments or piles. Section 2.1.2 of Method 115 states that, "For mill tailings after disposal the pile shall be considered to consist of only one region." The problems with this statement are as follows:

1. The term "disposal" is not defined; however, for the sake of argument, HMC will assume that the current stage of the LTP is "after disposal".

2. Method 115 does not state which region should be considered the "one region".

3. Method 115 merely presents a procedure for collecting radon flux measurements; it does not present the standards that apply to uranium mill tailings impoundments regulated under UMTRCA Title II.

4. As stated multiple times in 10 CFR 40, Appendix A and associated statements of consideration, the radon flux standard is enforceable over the entire impoundment and through the final radon barrier. Yet, Criterion 6A(2) allows for milestone extensions if the radon flux standard is met over the entire impoundment, which because milestones have not been met, will include unfinished and finished portions.

HMC concludes that a conflict appears to exist between 10 CFR 40, Appendix A, and 40 CFR 61, Appendix B, Method 115 regarding the number of regions to be considered in the radon flux measurements. Based on our analysis, two possibilities exist:

- Criterion 6A controls the substantive determination of what area is to be evaluated for annual radon flux limits. Method 115 is merely a technical methodology, promulgated by another agency, and used by NRC to outline procedures for measuring emissions and evaluating them against compliance standards. UMTRCA Title II specifically authorizes the NRC to regulate tailings impoundments and not EPA. Consequently, the entire LTP,

consisting of two regions, must be included in the annual radon flux measurements to comply with the "averaged over the entire pile or impoundment" requirement of Criterion 6(2); or,

- The "one region" referred to in Method 115 must be the finished portion of the LTP to comply with the "after emplacement of the final cover" provision of Criterion 6(2).

In either case, HMC does not find a regulatory justification for only measuring radon flux over the unfinished portion of the LTP.

Question 1C

No. Please refer to the NRC May 5, 2021, letter withdrawing the contested NOV for details on the need for modification of license condition 36.E.

LC 36E references procedures that HMC determines are the proper methods for calculating radon flux for the LTP. HMC suggests a meeting with the NRC staff to discuss the need for modifications to LC 36E, to ensure that HMC is properly complying with NRC's regulations.

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,

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