

**From:** [Brad Bingham](#)  
**To:** [Gersey, Linda](#)  
**Cc:** [Jennifer Ortega](#); [Randy Whicker](#); [Linton, Ron](#)  
**Subject:** [External\_Sender] radon flux monitoring questions for consideration  
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**Attachments:** [HMC Questions re planned NRC amendment to modify LC 36\(E\).docx](#)

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Linda,

Per our last meeting, HMC has prepared some questions for consideration as we work to resolve issues around LC 36(E) and radon flux monitoring. After reviewing, please let me know if you would like set up a meeting to discuss.

Respectfully,



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HMC questions regarding planned NRC changes to license condition (LC) 36(E), including deletion of reference to 2003 tie-down document (method for calculating average radon flux for the LTP), and deletion of expired milestone dates for completion of final radon barrier on tailings piles at the HMC site:

#### QUESTIONS RELATED TO COMPLIANCE WITH THE RADON FLUX STANDARD

##### 1. Use of historic radon flux data for demonstration of compliance with the radon flux standard.

The relevant regulation in 10 CFR 40 Appendix A is as follows:

***Criterion 6(2):** 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<sup>2</sup>s **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.”*

Criterion 6(2) clearly states that demonstration of compliance with the radon flux standard must be “averaged over the entire pile” based on Method 115 flux measurement procedures. Method 115 specifies the accepted approach for calculating average radon flux from a tailings pile consisting of more than one region, for example the LTP, which consists of two regions including: 1) the side slopes where final cover has been completed, and 2) the top region where only interim cover exists, and where water treatment operations continue to be conducted. Method 115 explicitly describes calculation of the arithmetic mean for each region of the pile, followed by calculation of a weighted average based on the average flux for each region weighted by the fractional area of each region relative to the total area of the pile.

HMC’s 2003 amendment request to extend the milestones for placement of final radon cover was approved by NRC [Amendment 36, February 6, 2004 (ML040400140)] based on HMC’s demonstrated compliance with the flux standard **across the entire LTP** using weighted averaging of historic (1995) final cover side slope measurements, along with new (2003) measurements on top of the LTP. This method for determination of average radon flux over the entire LTP was clear in HMC’s 2003 amendment request, and was the basis for HMC’s subsequent annual demonstrations of compliance with the flux standard across the entire LTP from 2003 until the 2017 issuance of the radon flux NOV.

Since 2017, the average annual radon flux from the LTP has been calculated based solely on annual measurements on top of the LTP, yet by regulation [Criterion 6(2) and Method 115], radon flux must also be computed for the side slopes of the LTP in order to determine a weighted average flux over the entire LTP. Moreover, new flux measurements on the side slopes of the LTP are technically infeasible as this would require removal of erosion protection (rock armor) in many areas, subjecting workers to unacceptable physical safety hazards on the steep side slopes, and potentially damaging the existing final radon barrier in the process.

**Question 1A:** Given the requirements of Criterion 6(2), is it inconsistent with the regulations to enforce compliance with the radon flux standard only on top of the LTP (i.e. only for one region of the LTP)?

**Question 1B:** Given the precedent set with NRC approval of the 2003 amendment request, and given the technical infeasibility of performing new radon flux measurements on the side slopes of the LTP, can HMC resume using weighted averaging of flux over the entire footprint of the LTP based on two regions of the pile, including the historic 1995 data for the side slopes as one region, combined with new annual measurements on the top of the LTP as the second region?

**Question 1C:** Given the above information, shouldn't reference to the 2003 tie-down document for LC 36(E) be retained in this license condition?

## 2. Deadline for completion of final radon barrier on the tailings piles.

The relevant regulation in 10 CFR 40 Appendix A is as follows:

**Criterion 6A(1):** *Deadlines for completion of the final radon barrier and, if applicable, the following interim milestones must be established as a condition of the individual license: windblown tailings retrieval and placement on the pile and interim stabilization (including dewatering or the removal of freestanding liquids and recontouring). The placement of erosion protection barriers or other features necessary for long-term control of the tailings must also be completed in a timely manner in accordance with a written, Commission-approved reclamation plan."*

This regulation requires scheduling of deadlines for placement of the final radon cover and certain interim milestones as a license condition. Also, HMC's closure plans have changed as reflected in draft updates to the Groundwater Corrective Action Plan (GCAP) as submitted to NRC in 2020, and pending 2021 final cover revision and ACL application. While Criterion 6A(2) provides considerations for extension of existing milestones, it is not a regulatory procedure for obtaining an alternate schedule based on updated site decommissioning and closure plans.

**Question 2:** Is 10 CFR 40.42(i) the appropriate regulatory procedure for requesting an alternate schedule, and is paragraph (5), shown below, an appropriate regulatory basis for HMC to establish a new schedule for final radon cover placement?

*"(5) Other site-specific factors which the Commission may consider appropriate on a case-by-case basis, such as the regulatory requirements of other government agencies, lawsuits, groundwater treatment activities, monitored natural groundwater restoration, actions that could result in more environmental harm than deferred cleanup, and other factors beyond the control of the licensee."*

A number of the above factors are likely to have an impact on a new schedule for placement of the final radon barrier, including regulatory requirements of other agencies, continued groundwater treatment activities, and possibly factors beyond the control of the licensee such as the duration of regulatory review processes for approval of the pending ACL application and final cover design. In effect, HMC is not seeking to extend the schedule currently defined in LC 36(E) for milestones related

to placement of final cover, but to establish an alternate schedule based on current site circumstances and revised site closure plans as defined in the upcoming ACL application and final cover design.