

Request for Additional Environmental Information

RAI-1

Please provide a calculation of occupational exposure in the physical upgrade (PUG) processing facility for radon-220 (Rn-220) and Rn-222.

Discussion

The average radon concentration in U.S. homes is 1.3 picocuries per liter (pCi/L), while the average outdoor radon concentration is 0.4 pCi/L (EPA, 2022). In Section 1.3.3.2.1 of Appendix F to the ER, RER conservatively calculated the predicted concentrations of Rn-220 and Rn-222 in the PUG processing facility to be 1.7×10^{-9} microcuries per milliliter ($\mu\text{Ci/mL}$) and 1.3×10^{-8} $\mu\text{Ci/mL}$, respectively (RER, 2022).

Converting to the same units, the average radon concentration in U.S. homes is 1.3×10^{-9} $\mu\text{Ci/mL}$. Therefore, RER's calculated concentration of Rn-220 in the PUG processing facility is slightly above the total average radon concentration, while the calculated concentration of Rn-222 is 10 times higher than the total average radon concentration in U.S. homes, and 3 times higher than the EPA-recommended action level of 4×10^{-9} $\mu\text{Ci/mL}$ (EPA, 2022). The calculated Rn-222 concentration is not near-ambient concentrations as suggested in Appendix F of the ER. While it is unlikely such levels will exceed occupational exposure limits, the possibility should be considered in Appendix F section 2.3.2.

Please revise Appendix F of the ER to provide a calculation of the potential worker exposure dose to Rn-220 and Rn-222 during operation of the PUG processing facility.

Basis

This information is needed to determine compliance with the following requirements:

The NRC staff requests this additional information pursuant to its regulations at 10 CFR 20.1301. The NRC staff will use this information to conduct its independent assessment of potential environmental effects of the proposed license for the Rare Element Resources Demonstration Plant.

References

RER, 2022. "Rare Element Resources, Rare Earth Element Separation and Processing Demonstration Project, Environmental Report, In support of the application for source material possession license submitted to NRC." ML22256A321. September 30, 2022.

EPA, 2022. "What is EPA's Action Level for Radon and What Does it Mean?" <https://www.epa.gov/radon/what-epas-action-level-radon-and-what-does-it-mean> (Accessed 2/03/2023)

Request for Additional Environmental Information

RAI-2

Please clarify aspects of the temporary storage of the thorium waste product on site and the movement offsite and shipment of this waste to a licensed low-level radioactive waste disposal facility.

Discussion

In Section 4.13.3 of the ER, RER states that tailings from RER's Demonstration Plant would be placed into roll-off bins (approximately 30 short tons or 29 cubic yards) and temporarily stored on-site according to license requirements and then transported by rail to the Waste Control Specialists (WCS) disposal facility in Andrews County, Texas (RER, 2022a).

RER also states in ER Section 4.13.3 that it "will verify that waste shipping contractors have plans in place to meet DOT regulations for safe handling and emergency response." (RER, 2022a)

In Section 10.9 of the Technical Report, RER states that "[t]ransport of licensed radioactive materials beyond the restricted area will comply with applicable DOT and NRC regulations." and that "[v]ehicles used to transport materials to or from the Demonstration Plant will not access the restricted area; ..." (RER, 2022b)

RER should clarify (1) where the roll-off bin containing the thorium waste product would be temporarily stored on-site; (2) how the roll-off bin would be transferred from the Demonstration Plant site to the nearby railyard managed by Tiger Transfer LLC; (3) how long the roll-off bin would remain at the railyard prior to shipment to WCS; (4) any precautions concerning the contents of the roll-off bin, if necessary, during storage at the railyard; and (5) the process to be used by Tiger Transfer LLC to ship the roll-off bin from the Upton railyard to WCS.

Basis

This information is needed to determine compliance with the following requirements:

- 10 CFR 51.45(b), "[Environmental considerations](#)," requires, in part that "[t]he environmental report shall contain a description of the proposed action, ..." and
- 10 CFR 51.45(b)(1) requires that the environmental report should also discuss "[t]he impact of the proposed action on the environment."

References

RER, 2022a. "Rare Element Resources, Rare Earth Element Separation and Processing Demonstration Project, Environmental Report, In support of the application for source material possession license submitted to NRC." ML22256A321. September 30, 2022.

RER, 2022b. "Rare Earth Element Separation And Processing Demonstration Project Application For Source Material Possession License Submitted To The US Nuclear Regulatory Commission." ML22256A322. September 30, 2022.

Request for Additional Environmental Information

RAI-3

Please discuss how the various acids, ammonia water, and organic reactants to be stored in the Chemical Containment Area (CCA) would be transferred to the Main Process Building as needed and in time to support RER's process.

Discussion

In item 2 of RSI-7, the NRC staff requested that RER discuss how the various acids, ammonia water, and organic reactants to be stored in the CCA would reach the Main Process Building as needed and in time to support RER's process to extract rare earth elements from the exploration sample (NRC, 2022).

By letter dated September 13, 2022, RER resubmitted its license application to address changes committed to its response to NRC's RSIs, with Table 1 to RER's letter providing a brief description of the changes made (RER, 2022). RER's response to item 2 of RSI-7 directs the reader to section 9.2.3 of the Technical Report. This section states that "[m]odifications to the existing [CCA] area include ... the installation of piping, pumps and appurtenances associated with filling and emptying the bulk storage tanks." but does not indicate how the various acids, ammonia water, and organic reactants would reach the Main Processing Building.

Basis

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- 10 CFR 51.45(b)(1) requires that the environmental report should also discuss "[t]he impact of the proposed action on the environment."

References

NRC, 2022. "U.S. Nuclear Regulatory Commission Staff Acceptance Review and Request for Supplemental Information for the Rare Element Resources Application for a Source Material License." ML22206A150. July 28, 2022.

RER, 2022. "Rare Element Resources, Rare Earth Element Separation and Processing Demonstration Project Application for Source Material Possession License - Response to Request for Supplemental Information." ML22238A107. August 26, 2022.

Request for Additional Environmental Information

RSI-4

Please provide a referenced meteorological report.

Discussion

In section 3.6.2, “Local Meteorology and Climate,” in the ER, it states that RER had installed a meteorological station in 2012 to measure air temperatures, precipitation, wind speed, and wind direction near the proposed Demonstration Plant site (RER, 2022). Figure 10 in the ER presents a wind rose compiled using wind speed and direction measurements made at the meteorological station from June 8, 2020 to June 7, 2021. The text references the “Rare Element Resources Upton Meteorological Monitoring Network Annual Report June 2020-June 2021” prepared by Inter-Mountain Laboratories (IML) [RER, 2022].

In section 3.2.2 in Appendix F to the ER, meteorological inputs for precipitation, temperature, and humidity from RER’s Upton meteorological station were used in RER’s modeling of annual radiological doses to members of the public. The text references the IML annual report for June 2020 to June 2021 (RER, 2022).

Please provide a copy of the referenced 2021 IML report. The NRC staff will make use of this report in its independent evaluation of annual radiological doses to members of the public.

Basis

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- 10 CFR 51.45(b)(1) requires that the environmental report should also discuss “[t]he impact of the proposed action on the environment.”

References

RER, 2022. “Rare Element Resources, Rare Earth Element Separation and Processing Demonstration Project, Environmental Report, In support of the application for source material possession license submitted to NRC.” ML22256A321. September 30, 2022.

Request for Additional Environmental Information

RSI-5

Please provide the locations for water monitoring stations CCI and CCO.

Discussion

In Table 3-5 of the ER, RER presents a summary of surface water monitoring exceedances, with data for 2018 shown for locations CCI and CCO. In Tables 20 and 21 of Appendix C to the ER, surface water flow data is provided for stream gage locations CCI and CCO. Map 16 in the ER identifies gage stations in the vicinity of the proposed Demonstration Plant, but designations for these gage stations are not provided (RER, 2022).

Please provide text descriptions for the locations of gage stations CCI and CCO and indicate on a map where these stations can be found relative to the proposed Demonstration Plant site.

Basis

This information is needed to determine compliance with the following requirements:

- 10 CFR 51.45(b), "[Environmental considerations](#)," requires, in part that "[t]he environmental report shall contain a description of the proposed action, ..." and
- 10 CFR 51.45(b)(1) requires that the environmental report should also discuss "[t]he impact of the proposed action on the environment."

References

RER, 2022. "Rare Element Resources, Rare Earth Element Separation and Processing Demonstration Project, Environmental Report, In support of the application for source material possession license submitted to NRC." ML22256A321. September 30, 2022.