

U.S. Nuclear Regulatory Commission Staff's Comments on "FY-22 DOE-LM Bluewater Disposal Site, Bluewater, NM: Subsurface Investigation Plan, June 2022"

By letter dated July 28, 2022, the U.S. Department of Energy, Office of Legacy Management (DOE-LM) submitted for the U.S. Nuclear Regulatory Commission (NRC) staff's review and comment, a report titled, "FY-22 DOE-LM Bluewater Disposal Site, Bluewater, NM: Subsurface Investigation Plan, June 2022," (report).

The NRC staff has completed its review of the report and has identified the following comments for DOE's consideration. The NRC staff's comments are organized by section of the report.

Section 1 - Background

Staff does not have any comments on this section of the report.

Section 2 – Objectives

1. Staff understands the design objectives are to understand the radon barrier thickness, the subsurface soil properties, pore water pressures within the tailings, and the identification of suitable soils for the new cover system. The investigation goals support the design objectives. One additional aspect of the investigation and design that should be considered is developing a better understanding of the consolidation characteristics of the subsurface soils. The past analysis related to primary consolidation being complete is likely erroneous, as evidenced by the continued development of the depression on the cover. Does DOE plan to utilize the information obtained during the investigation to better understand/quantify the consolidation behavior of the soils? How will the design account for and accommodate future settlement?
 - **USACE Response: Updated paragraph 2.1 "Design Objectives" with new item: "F. Use data collected during subsurface investigation to estimate potential for future settlement of the cell and inform the design alternatives as how to address the potential settlement."**

Section 3 – Exploration Team

Staff does not have any comments on this section of the report.

Section 4 – Existing Information

Staff does not have any comments on this section of the report.

Section 5 – Scope and Methodology

1. Why are the depths of the cone penetration tests (CPTs) limited to 40 feet? Is this to avoid going through the bottom of the disposal cell or is the focus more on the near surface soils?
 - **USACE Response: Updated paragraph 5.1.2 "Cone Penetration Test (CPT) – Disposal Cell". Added new 2nd sentence: "Penetrating to this depth will allow for the probe to pass through and characterize the entire layer of tailings as well as characterize the upper layer of the foundation soils."**
2. Is the pattern/spacing of the wick drains known? Will the presence of the wick drains be an issue for the CPT? The NRC staff suspects they will not be, but their presence should be remembered in the event of an odd/unexplained result.
 - **USACE Response: Updated paragraph 5.1.2 "Cone Penetration Test (CPT) – Disposal Cell". Added 3rd paragraph addressing the presence of the wick drains and the anticipation that they should not interfere with the CPT data collected. New paragraph reads: "The abandoned wick drain system is not anticipated to interfere**

with the CPT investigation. However, the investigation team is aware of its presence and will monitor data collected for any overt signs of erroneous readings potentially caused by interference from a wick drain.”

3. What testing is planned for the Shelby tube samples? The NRC staff understands that past field work at Bluewater has indicated that the radon barrier is between 24 and 28 inches thick. Does DOE anticipate that the Shelby tube samples will enter the tailings or are the Shelby tube samples intended to stay within the radon barrier? If they are intended to stay within the radon barrier, how does DOE plan to control the depth of the Shelby tube samples?
 - **USACE Response: All Shelby Tubes shall be tested in accordance with section 6.2 “Shelby Tube Sample Testing”. It is anticipated that no Shelby Tube will penetrate into the tailings. To ensure that the Shelby Tubes do not penetrate through the 24” thick radon barrier and into the tailings, the tubes used to collect the samples will be 18-inches long in accordance with paragraph 5.1.3 “Shelby Tube Sample Collection – Disposal Cell”.**

4. Is the intent of the vegetation survey described in 5.2.2 to identify an analog site, or to get a sense of what types of vegetation the soils are able to support?
 - **USACE Response: The intent of the survey is to do both of these things. The analog comparison will aid in predicting the future condition of the new vegetative cover, which will be constructed primarily using the native borrow, and its capability to support native vegetation and also to document what types of vegetation the borrow area soils are able to support to aid the development of seed mixes.**

5. The report should state that the standard health physics protocols will be in place, specifically:
 - establishment of background and response/operability check for the meters before use;
 - survey of personnel, equipment and personal protective equipment at the end of the work;
 - pre-job briefing, and;
 - radiological work permits;
 - other protocols, as needed.

 - **USACE Response: Radiological controls/instruments are discussed in Attachment A of the Accident Prevention Plan. For SCAPSS truck and other USACE operations on the cell, a Health Physicist will be present for all work activities. A Radiation Work Permit (RWP) is typically not specifically used by the USACE. Workers will have daily briefs on the applicable Activity Hazard Analysis and Accident Prevention Plan.**

6. The NRC staff has concerns with the plan to take soils samples based on the microR meter radiation survey numbers to develop a correlation between the survey results and the concentrations in the soil and then using the survey results in lieu of soil sample collection in the future. Specifically, NRC is not sure that the data collected is going to be sufficient to support a strong correlation between the two types of data. Coupled with the issues with the contents and construction techniques for the tailings pile not being uniform, the data might (under best case scenario) be representative of the north side of the cell where it was collected but could not be applied uniformly across the cell.
 - **USACE Response: The intent is to take radiation readings where soil samples are collected to develop such correlations in the future and to fill data gaps. The use of a specific reading (20 uR/h) off cap is based on a historical screening level that indicated soil samples may contain Ra-226 at concentrations > 5 pCi/g. On cap readings are taken to determine before and after levels to demonstrate no**

contaminated material was brought to the surface. There is no plan to sample contents of the cap. Any radon barrier samples taken will not include contaminated material from the cell.

7. The report indicates the CPT unit has a sodium iodide detector built in behind the CPT and the CPT vehicle includes a high-pressure wash system with water collection box to decontaminate the probe and the detector. The wastewater is collected and mixed with grout to fill the voids created by use of the CPT system seems appropriate. Is there a process for checking the CPT probe and detector to determine it is appropriately decontaminated between uses? The verification of the lack of radioactive material and soils on the CPT probe between measurements is not described or addressed.

- **USACE Response: The CPT probe does NOT have a built-in sodium iodide detector. The intent is to use a Ludlum portable instrument with a waterproof cable attached to a 0.5inx0.5in sodium iodide detector via a 100ft water proof cable that has been prepositioned just above the CPT probe. A qualitative radiation profile will be generated by manually recording count rate information as a push is being made. This portable system will need to be purchased, calibrated, and tested prior to use. The process controls for monitoring and decontamination of the CPT probe is discussed in Attachment 1 of the APP.**

8. The NRC staff agrees with the plans to use a microR meter to perform initial and final surveys, the first to establish the baseline, and the second to verify that the radiation levels are returned to appropriate levels after the testing, grouting of the voids created, and replacement of the riprap removed to allow use of the CPT probe. The NRC staff supports the 100 percent gamma walkover with GPS positioning proposed in the report.

- **USACE Response: Concur.**

9. The subsurface investigation will result in work that breaches the radon barrier. The NRC staff understands the need to perform the radon flux test to verify that impacts to the radon barrier did not change the flux. Regarding the radon flux using activated carbon canisters measurements over the impacted areas, the report does not indicate how DOE will address an increase in radon flux, if identified.

- **USACE Response: Use of radon flux canisters has been replaced with an alternative method in the work plan (Section 5.0 “Scope and Methodology”, paragraph 4). In lieu of canisters, an initial and final surface level radon survey will be performed. The following language detailing this has been added to paragraph 4:**

“The initial radon surface survey will be performed to establish baseline radon flux levels which will be compared against the post-investigation levels after restoration procedures of the radon barrier are complete. Each CPT location will be sealed with grout to ensure surface level radon flux levels do not exceed the established baseline levels. In the event that the post-investigation surface level radon flux is higher than the baseline and higher than the threshold of 20 pCi/m²-s established by NUREG CR-3166, the location will be regouted and subsequent surface level radon measurements taken.”

10. The report discussed the collection of samples (Shelby Tubes or the hand collected samples). However, there was no information associated with use of a survey meter to verify the samples were not contaminated on the outside or to determine the approximate concentration of radioactive material present in the sample for the shipping paperwork.

- **USACE Response: The radon barrier is not expected to be breached during Shelby tube sampling. There will be a Health Physicist present to screen samples to ensure**

no radioactive material is present. No radioactive material will be shipped and any portion of the sample that indicates radioactive material is present will be separated from the rest of the sample and put back down hole during the grouting process. There is no plan to sample contents of the cap. Any radon barrier samples taken will not include contaminated material from the cell.

- **Attachment A of the APP will be updated to reflect radiological precautions to be taken during Shelby tube operations on the cap.**

Section 6 – Laboratory Testing

1. Has DOE considered performing moisture content (note, this might be captured in one of the other American Society for Testing Materials procedures) and hydraulic conductivity testing on the radon barrier material?
 - **USACE Response: DOE-LM has performed these tests during previous investigations and did not believe it necessary to repeat them as part of this effort.**

Section 7 – Environmental Compliance

Staff does not have any comments on this section of the report.

Section 8 – Applicable Publications

Staff does not have any comments on this section of the report.

Section 9 – Consolidated Subsurface Investigation Plan

Staff does not have any comments on this section of the report.

Section 10 – Laboratory Testing Plan

Staff does not have any comments on this section of the report.

Section 11 - References

Staff does not have any comments on this section of the report.

Appendices

Staff does not have any comments on this section of the report.