State of Utah

SPENCER J. COX
Governor

DEIDRE HENDERSON
Lieutenant Governor

Department of
Environmental Quality

Kimberly D. Shelley
Executive Director

DIVISION OF WASTE MANAGEMENT
AND RADIATION CONTROL

Douglas J. Hansen
Director

March 28, 2023

Vern C. Rogers, Director of Regulatory Affairs
Energy*Solutions*, LLC
299 South Main Street, Suite 1700
Salt Lake City, UT 84111

RE: Federal Cell Facility Application Request for Information

Dear Mr. Rogers:

The Division of Waste Management and Radiation Control (Division) hereby provides Requests for Information (RFI) regarding the Federal Cell Facility Application (Application) dated August 4, 2022. Each individual paragraph in the attached document is numbered and represents an issue discovered in a review of the application. When responding to an RFI, please use the assigned number representing the question. The Division will track all responses and provide regular updated information to the public and reviewers.

The current review does not represent a comprehensive evaluation of the Application's merit and additional RFI's will follow where appropriate.

If you have any questions regarding this letter, please call Otis Willoughby at (385) 622-2213.

Sincerely,

Douglas J. Hansen, Director
Division of Waste Management and Radiation Control

DJH/OHW/jk

Enclosure: Federal Cell Application Review, Request for Information or Updates to the Application (RFI)

c: Jeff Coombs, EHS, Health Officer, Tooele County Health Department
Bryan Slade, Environmental Health Director, Tooele County Health Department
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DRC-2023-002477

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Federal Cell Application Review

Request for Information or Updates to the Application (RFI)

General

- Each RFI has been assigned an identifier with a numbering convention as follows:
    - Application/Appendix Section
        - Section/Appendix Subsection
            - Section/Appendix Subsubsection (when applicable)
                - Sequential numbering

Example: A question in Section 1, subsection 1, subsubsection 1 -The first RFI # would be 1.1.1-1, the next question in that section/subsection would be numbered 1.1.1-2
Please refer to the assigned RFI number when submitting a response.

Appendix O:

Validate the Model Assumptions and Formulation:

- **O-31**

  The PA for the Federal Cell depends on the validity of the percolation rate predicted with a water balance model that has not been validated with field data. The model needs the necessary validation. Apply the methodology used to create and parameterize the unsaturated zone model for the earthen cover to similar covers in Utah, which have extensive performance data, namely the water balance covers at the White Mesa Mill in Blanding, Utah, and the Monticello Uranium Mill Tailings Disposal Facility in Monticello, Utah. Compare the predictions made by the model for each site, particularly percolation vs. time, to measured field data documented for these sites. Describe and explain any differences between measured and predicted percolation.

Number of Realizations and Statistical Sufficiency:

- **O-32**

  Predictions from the water balance model are now being used directly to characterize the uncertainty in the performance of the earthen cover and the broader uncertainty assessment for the Federal Cell. Understanding whether the distribution of predicted outputs is comprised of a sufficient number of realizations is necessary to have confidence in the subsequent predictions from the GoldSim analysis. NAC-0015_R5 indicates that 1000 realizations were simulated, each for the 1000-yr meteorological record. Outputs from these simulations are then input directly to GoldSim for further analysis, avoiding the abstraction employed previously. Provide documentation indicating that 1000 realizations are sufficient to define the probabilistic characteristics of the model predictions, especially in the tails.

Sidewall Ingress:

- **O-33**

  Output from the 2-D models described in NAC-0015_R5 indicate that the percolation rate will be higher on the side slopes than on the top deck. Higher percolation rate on the side slope results in higher water saturation and lower matric potential in earthen materials under the side slopes than in the materials beneath the top slopes. The gradients in matric potential caused by these two different

conditions can result in pore water in the side slope area migrating laterally into the materials below the top slope, which will be drier and have higher matric potential. This type of phenomenon was predicted for the Hanford Barrier at the US Department of Energy's Hanford Site in Richland, Washington, and lateral ingress as addressed by ensuring sufficient overhang of the top deck. The cover for the Federal Cell includes an earthen cover on the top slopes and rock-armored surfaces on the side slopes. Provide documentation confirming that the higher percolation rate on the side slopes will not cause porewater to migrate laterally inward, increasing the overall amount of water entering and flowing through the material below the top slope.

NAC-0015 R5 Reference Excel File:

- **O-34**

  NAC-0015_R5 indicates that "A complete listing of the inputs and outputs of the simulations are provided as an electronic attachment to this document." However, the version of NAC-0015_R5 that was provided in the application has no electronic attachments. This spreadsheet is needed to interpret the outcomes of the modeling. Please provide the following Excel file that is cited in NAC-0015_R5:

  - *HYDRUS 1D Inputs and Outputs v2.0 Sept 2021.xlsx*

Electronic files:

- **O-35**

  A preliminary review of the Federal Cell License application and its appendices identifies several electronic files that the license application indicates are included in the application but were not located. Some files could have been requested in earlier RFIs and additional review of the application may find other electronic files necessary for the review. These electronic files are needed to verify and interpret the results of the modeling. Please provide the electronic files or indicate where they are in the application. These files, listed under the appropriate appendices, are:

Atmospheric Modeling
- Cowherd Particle Resuspension Model
- AERMOD
- CAP-88

Biological Modeling
- GoldSim files (general request for all analyses)

Deep Time Assessment
- ES external DCF modifiers.xlsx

Dose Assessment
- Dose Assessment Appendix II.xls
- DCF conversions QAed Rev 1.xlsx
- Ingestion dose conversion factors (DCF_Ing)

Embankment Model
- GoldSim files

Erosion Modeling

- RHEM/ KINEROS2 input and output files
- SIBERIA input and output files
- IRS and HEM input and output files
- CLIGEN climate station database

Geochemical Modeling

- Visual MINTEQ input and output files

Model Parameters

- Clive PA Model Parameters.xls

Saturated Zone Modeling

- Hydraulic Cond.xls
- Auto-regressive, moving-average (ARMA) models input and output

Sensitivity Analysis and Results

- GBM algorithm, input and output files

Unsaturated Zone Modeling

- HYDRUS 1-D and 2-D input and output files (ask for in a separate question)
- WGEN/SWAT input and output files

Waste Inventory

- 100105 9021-33 Iso with Calcs.xls

Appendix Y:

- **Y-6-1**

  A response to RFI Y-6 stated that Appendix V (Corporate Quality Assurance and Procedures) included the procedure ES-AD-PR-008, Condition Reports. This procedure could not be located. Please provide the operating procedure ES-AD-PR-008, Condition Reports.