STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
Division of Land Protection – Remediation Branch
Oak Ridge Office
761 Emory Valley Road, Oak Ridge, Tennessee 37830

August 10, 2026

Mr. Roger Petrie
U.S. Department of Energy
Oak Ridge Office of Environmental Management
Post Office Box 4067
Oak Ridge, TN 37831

Dear Mr. Petrie

Re: Transmittal of the Summary Report for the Technology Demonstration 2: Sorption of Mercury in Waste Containers, Oak Ridge, Tennessee (DOE/OR/01-3026&D1)

The Tennessee Department of Environment and Conservation (TDEC), Division of Land Protection-Remediation Branch, Oak Ridge Office, received the above referenced Federal Facility Agreement (FFA) secondary document (letter from M. Carden and Roger Petrie to J. Dawson and E. Marcillo) on May 11, 2026. The following comments are relevant to the State's Review:

General Comments:

1. Are the methods reviewed in this document being considered for material disposed at the Environmental Management Waste Management Facility (EMWMF) or the Environmental Management Disposal Facility (EMDF)?

2. Part of this study focuses on the potential for mercury vapor to condensate into liquid mercury in waste containers during storage and shipping activities. If it does condensate into containers during projects on the Oak Ridge Reservation, how does the "recoverable" designation apply to this liquid mercury?

3. Details should be included regarding how the FerroBlack-H40-coated vermiculate placed in the waste containers will be characterized and disposed of after the storage and shipping process.

4. Throughout this document, it is stated that these sorbents can be used to "absorb the mercury vapors". Considering the FerroBlack-H40 is used as a coating on vermiculite, please clarify as to whether any form of mercury is adsorbed, as well.

5. Were the boxes used in this study pressure tested to ensure there is no potential for air leaking?

6. Was the Mercury-Contaminated Debris (MCD) characterized before use in this study to determine the known level of contamination?

Specific Comments:

1. **Page ES-2, first paragraph, first sentence**
   According to *Page 3 (third paragraph)* "The potential risk of occurrence may increase as the waste levels of mercury contamination within the MCD increase in the future." Considering the uncertainty regarding the mercury contamination level of the MCD used for this test, will future technology development studies further evaluate the hypothesis that "mercury vapors do not readily condense" with more contaminated material?

2. **Page ES-2, first paragraph, first sentence**
   An explanation should be included to describe how the mercury vapor levels were reduced. Was the FerroBlack-H40-coated vermiculite characterized at the end of the study to confirm whether any mercury was absorbed/adsorbed?

3. **Page ES-2, second paragraph, first sentence**
   According to Figure 7 and Figure 9 in this document, the mercury vapor regularly returned to "the Jerome J505 maximum reading value of 0.5 mg/m^3 or higher". This occurred at the end of both the 2-day test and the 23-day test. Given its tendency to consistently return to a level above the measuring capabilities of the equipment, it appears difficult to determine the mercury vapor levels were overall reduced at the conclusion of the test. Is there a plan during Phase 3 to collect samples that are able to analytically evaluate the overall reduction in mercury vapor?

4. **Page 3, second paragraph**
   Considering the conditions within the waste containers for this study, is there a hypothesis of why mercury condensation did not occur?

5. **Page 6, third bullet**
   Please include an explanation as to why applying toxicity characteristic leaching procedure (TCLP) is the best method for determining "mercury stability".

6. **Page 11, first paragraph, third sentence**
   Remove the word "vapor" from this sentence.

7. **Page 15, Section 5.2 and Page 16, Section 5.3**
   One of the objectives of this study, as outlined on *Page 7*, is to "determine temperature change effects on the absorption"; however, temperature effect is not discussed within the experiment results other than noting the fluctuations were insufficient to facilitate the presence of elemental mercury. Given that temperature and humidity are not independent variables of each other, it is unreliable to attempt to distinguish whether it is specifically temperature or humidity that is having an individual impact on mercury vapor concentrations.

As stated under *Page 15, Section 5.2 Field Testing Phase I,* the comparative effect of temperature on mercury vapor between the two boxes cannot be assessed at this time. Please provide additional clarification as to how a determination can be made regarding the comparative effect of humidity on mercury vapors independent of temperature.

8. **Page 16, Figure 8** and **Page 17, Figure 10**
   To better understand the environmental conditions during this testing, an alternative Y-axis should be included to represent the temperature range.

9. **Page 16, second paragraph**
   The lower levels of mercury reduction in the 23-day study are attributed to a smaller range of temperature fluctuations. Presumably, this determination is based on the tendency for mercury to vaporize at higher temperatures and condense at lower temperatures. However, page *ES-2 (first paragraph)* states that free liquid mercury did not form in the containers and that the study indicated "mercury vapors do not readily condense into liquid mercury". Please add further clarification as to how a narrower temperature fluctuation range results in lower levels of mercury reduction in the containers. Or is this claim simply regarding the maximum temperature reading for the testing period?

10. **Page 16, Section 5.3, second paragraph**
    Considering the limits of the Jerome meter measurement at 0.5 mg/m^3, will air samples be collected for Phase 3 to more accurately determine the mercury vapor concentrations and discrepancy between the *Test* and *Control* boxes?

11. **Page 17, Figure 9 and Figure 10**
    While it is helpful to show a compressed timespan to review minute changes over time, additional clarification would be beneficial to acknowledge if this ~2 day trend was typical throughout the 23-day testing period.

12. **Page 18, second paragraph, last sentence**
    Please provide additional clarification for the proposed evaluation. For example, how does evaluating "at lower temperature ranges" inherently provide further insight on mercury response "when greater temperature variations are experienced". Will the boxes be moved from colder to hotter environments to experience greater fluctuations?

13. **Page 19, second paragraph, first sentence**
    The U.S. Department of Energy (DOE) should include the metrics used to support the determination from these study results that FerroBlack-H40-coated vermiculite is a potentially effective sorbent that can be used for waste containers.

TDEC acknowledges that DOE will manage all waste shipments appropriately and in accordance with Waste Acceptance Criteria (WAC) of the receiving facility. The FFA tri-parties reserve the right to comment on the use and/or implementation of any proposed technologies as they are presented in future primary documents.

Review of this document meets the requested review cycle protocol of 90 days. Questions or comments concerning the contents of this letter should be directed to Cody Juneau at Cody.Juneau@tn.gov or by phone at (865) 314-2328.

Sincerely

Eileen Marcillo Digitally signed by Eileen Marcillo
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FFA Project Manager
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