

October 14, 2010

Mr. E. Kurt Hackmann
Director, Hematite Decommissioning Project
Westinghouse Electric Company
3300 State Road P
Festus, MO 63028

SUBJECT: WESTINGHOUSE HEMATITE DECOMMISSION PLAN REVIEW REQUESTS
FOR ADDITIONAL INFORMATION FOR DECOMMISSIONING PLAN
CHAPTERS 1, 4, 6 AND 7

Dear Mr. Hackmann:

By your letter dated August 12, 2009, you submitted a request for approval of the Westinghouse Hematite Decommissioning Plan (DP) [ADAMS Nos. ML092330123, ML092330125, ML092330127, ML092330129, ML092330131, and ML092330132]. The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed your request. As a result of that review, the staff has identified areas where additional information is required in order to complete its review. Enclosed are requests for additional information (RAIs) covering Chapters 1, 4, 6 and 7 of the DP.

The NRC will be transmitting by separate correspondence RAIs covering the remaining Chapters of the DP and other documents submitted in support of the Hematite decommissioning, e.g., the Decommissioning Fund Plan (ML091950063) and the Physical Security Plan and Contingency Procedures should they be necessary.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

E. Hackmann

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Please provide your response to the RAIs within 30 days of the date of this letter. If you have any further questions, please contact me at (301) 415-5928 or via email at john.hayes@nrc.gov.

Sincerely,

/RA/

John J. Hayes, Senior Project Manager
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Licensing Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Enclosures:

Hematite DP Chapters 1, 4, 6 & 7 RAIs

cc: Westinghouse-Hematite Service List

E. Hackmann

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Hematite Decommissioning Plan Request for Additional Information

Hematite Decommissioning Plan Chapter 1 – Executive Summary

1. (HDP)-1.3-Q1) Comment: In Section 1.3 Westinghouse Electric Company (WEC) stated that the groundwater is demonstrably not contaminated, therefore the Hematite Site meets the Decommissioning Group 4 criteria specified in NUREG-1757, Volume 1.

Basis: Groundwater is defined in NUREG-1757, Vol. 2 as water contained in pores or fractures in either the unsaturated or saturated zones below ground level. Westinghouse's utilization of the term leachate does not negate the fact that there is radiological contamination in the groundwater. The radiological contamination in the groundwater of the overburden unit is the result of activities performed during the period in which Hematite's was licensed. This must be considered as residual radioactivity. To meet the unrestricted release criteria of §20.1402, groundwater sources of drinking water and residual radioactivity must be accounted for in Westinghouse's assessment of the contamination of the site and in their performance assessment. Figure 1.1 of Volume 1 of NUREG-1757 specifies that sites with residual contamination resulting in TEDE doses less than or equal to 25 mrem/yr without institutional controls and groundwater contamination are Group 5 Decommissioning.

Path Forward: The Hematite Decommissioning Plan (HDP) should reflect a Group 5 decommissioning. Appropriate changes should be made to the HDP.

Hematite Decommissioning Plan Chapter 4 – Radiological Status of the Facility

1. (HDP-4-Q1) Comment: Section 4.1.3 does not provide a summary of the Remaining Site Structures -soil beneath buildings sampling findings. Table 4-24 provides the statistical results of soils beneath buildings to remain, however, the locations are not provided. This appears to be mirrored in RCR-09. Tables 4-46 and 4-47 provide data on subsurface soil samples, but other than GPS IDs, it is not clear where the samples were collected, i.e., under which buildings. Table 4-46 page 1 lists the statistical and analytical sample results for one sample. The significance of the one sample is not clear.

Path forward: Provide a summary of subsurface soil sample results in Chapter 4. Update the Tables in RCR-09 to include a description of the locations. Provide a figure(s) showing the locations of the samples.

2. (HDP-4.1.4-Q2) Comment: There are several structures listed in Section 4.1.5 of the HDP as "structures that may remain or be demolished." It is stated that "three of the remaining structures, Building 115, the Sanitary Wastewater Treatment Plant (SWTP) Shed and Building 235, may be demolished at some point after the HDP approval or, if deemed economically advantageous, remain intact after license termination." Additional information is needed on the current radiological status of these facilities.

Enclosure

Basis: Information needed on the radiological status of contaminated structures is enumerated in NUREG-1757, Vol. 1, Rev. 2, Appendix D, Section IV.a. The checklist in NUREG-1757 specifies the following:

- A list or description of all structures at the facility where licensed activities occurred that contain residual radioactive material in excess of site background levels.
- A summary of the structures and locations at the facility that the licensee has concluded have not been impacted by licensed operations and the rationale for the conclusion.
- A list or description of each room or work area within each of these structures.
- A summary of the background levels used during scoping or characterization surveys.
- A summary of the locations of contamination in each room or work area.
- A summary of the radionuclides present at each location, the maximum and average radionuclide activities in dpm/100cm², and, if multiple radionuclides are present, the radionuclide ratios.
- The mode of contamination for each surface (i.e., whether the radioactive material is present only on the surface of the material or if it has penetrated the material).
- The maximum and average radiation levels in mrem/hr in each room or work area.
- A scale drawing or map of the rooms or work areas showing the locations of radionuclide material contamination.

Path Forward: Following guidance in NUREG-1757, Vol. 1, Rev. 2, Appendix D, Section IV.a, provide additional details on the characterization of structures that may remain at the Hematite site. Provide the rationale for concluding that certain areas are non-impacted, and provide the necessary characterization data for contaminated areas. This request for additional information refers specifically to Building 115, the SWTP Shed and Building 235, but applies to any other structure that may remain after decommissioning.

3. (HDP-4.1.4-Q3) Comment: Section 4.1.4 of the HDP states that “Characterization data for structures to be demolished prior to DP approval are based largely on operational surveys, and will not be discussed in detail in this section. A summary of the operational survey results are provided in Section 4.27 of the HRCR.” Section 4.27 of the HRCR does not exist.

Path Forward: Provide the correct reference to the discussion of operational surveys for structures to be demolished prior to HDP approval, or provide such a discussion in the HDP.

4. (HDP-4.2-Q4) Comment: Additional information is needed on the radiological status of contaminated systems and equipment. Section 4.2.1 of the HDP states that “radionuclides present and activity fractions in the systems and equipment are the same as those in the contaminated structures, presented in Section 4.1.1.” This section and associated references were reviewed, and there is no clear description of radionuclides and activity fractions specific to systems and equipment.

Details on the derivation of background levels used to analyze contaminated systems and equipment were not provided. It is indicated in HDP Section 4.2.2 that a discussion of these background levels was given in Section 4.1.4. The referenced section deals with “structures to be demolished,” and provides no details on background.

The radiological status of underground systems is not defined. HDP Section 4.2.4 notes that underground systems consist of the Storm Water Drain System (Buildings to Outfall #3) and the SWTP (Buildings to Outfall #1) and states that “additional details regarding these systems are discussed in Section 4.22 of the HRCR.” Section 4.22 of the HRCR deals with “Background Soil Samples,” and provides no additional details on underground systems.

Basis: Information needed on the radiological status of contaminated structures and equipment is given in NUREG-1757, Vol. 1, Rev. 2, Appendix D, Section IV.b. The checklist in NUREG-1757 specifies the following:

- A list or description and the location of all systems or equipment at the facility that contain residual radioactive material in excess of site background levels.
- A summary of the radionuclides present in each system or on the equipment at each location, the maximum and average radionuclide activities in dpm/100cm², and, if multiple radionuclides are present, the radionuclide ratios.
- The maximum and average radiation levels in mrem/hr at the surface of each piece of equipment.
- A summary of the background levels used during scoping or characterization surveys.
- A scale drawing or map of the rooms or work areas showing the locations of the contaminated systems or equipment.

Path Forward: Following guidance in NUREG-1757, Vol. 1, Rev. 2, Appendix D, Section IV.b, provide additional details on the characterization of contaminated systems and equipment at the Hematite site. This description should be provided for the areas specified in Section 4.2 of the HDP (Buildings 110, 230, 231, the SWTP Shed, the Underwater Storm Water Drain, and SWTP piping system) and other systems and equipment that are not approved for removal prior to decommissioning.

5. (HDP-4.5.4-Q5) Comment: It is stated in HDP Section 4.5.4 that “...in addition to the very limited number of positive results from the sand/gravel and bedrock aquifers, a review of the location and time of the sample collection indicates a very disparate and disconnected pattern for the positive results. As discussed in Reference 4-7, it appears that the positive results from the bedrock wells could be attributed to sampling or analytical anomalies.” There is no Reference 4-7.

Path Forward: Provide Reference 4-7 or further discussion on the results from bedrock well sampling.

6. (HDP-4-Q6) Figures 4-6 and 4-7, Impacted Area – Surface Soil Contamination, show areas under buildings that have significant radioactivity. How were these areas and the radioactivity contours determined?

Path Forward: Provide details on how the radioactivity under the buildings was determined and how the radioactivity contours determined.

7. (HDP-4-Q7) Comment: Figure 4-11 Impacted Area – Sub-Surface Soil Contamination – Th-232 shows that the Burial Pits Soils have a thorium-232 mean specific activity of 34.74 pCi/g and a maximum of 6870 pCi/g. The legend shows that this area is well within the red colored areas used to designate these activity levels but there is no red colored areas identified.

Path Forward: Update Figure 4-11 to reflect the burial pit soil data consistent with the legend for the Figure.

8. (HDP-4-Q8) Comment: It is indicated in HDP Section 4.5.4, that additional monitoring wells will be installed in the vicinity of the hybrid wells with positive indications of the presence of radionuclides. The purpose of these wells will be to determine if the radionuclides detected in the sand/gravel aquifer were caused by the well screen extending from the overburden to the underlying sand/gravel aquifer.

Path Forward: Provide an update on the proposed investigation of the sand/gravel aquifer where radionuclide-impacted hybrid wells were involved. Include well construction and monitoring data for all the monitoring wells used in the investigation.

9. (HDP-4-Q9) Comment: Table 4-28 and Table 4-29 summarized groundwater monitoring data based on all sampling data and provided statistics of a subset with values above the respected detection limits for all of the hydrogeologic units. The detailed analytical data of each monitoring well from different sampling events were not included.

Basis: Due to the lack of spatial and temporal information, the staff cannot evaluate the monitoring data provided in these tables to determine whether the spatial and temporal extent of radionuclides is adequately defined in each hydrostratigraphic units.

Path Forward: Provide a monitoring data table for each of the different hydrostratigraphic units. Include in the table field information (e.g. pH and Redox potential measurements), and analytical results of samples. Also attach a map with monitoring well location and important radionuclide concentrations for each different hydrostratigraphic units.

10. (HDP-4-Q10) Comment: Statistical results of surface water monitoring were given in Table 4-27. However, the locations for the monitoring stations and analytical data were not included.

Path Forward: Provide a monitoring data table for each monitoring stations, with an updated Figure 4-13 showing the surface water monitoring stations.

11. (HDP-4-Q11) Comment: Some of the values for the concentration of radionuclides in Tables 4-28 and 4-29 appear inconsistent with each other.

Basis: The maximum value for Tc-99 in the Sand/Gravel aquifer is 13.4 pCi/L in Table 4-28 and 5.95 pCi/L in Table 4-29. Similarly, the maximum values for U-234, U-235, and

U-238 in the Overburden Unknown Screen Depth are different in the two tables. The text states that the difference between the two tables is that Table 4-29 only includes data that exceed the analytical detection limit and that the quality control data have been removed. The removal of the quality control data and the measurements that were less than the analytical detection limit should not have affected the maximum values measured.

Path Forward: Provide clarification about the difference in the values between these two tables.

12. (HDP-4-Q12) Comment: Groundwater is defined in NUREG-1757, Vol. 2 as water contained in pores or fractures in either the unsaturated or saturated zones below ground level. Westinghouse's utilization of the term leachate does not negate the fact that there is radiological contamination in the groundwater.

Basis: The radiological contamination in the groundwater of the overburden unit is the result of activities performed during the period in which Hemtatite's was licensed. This must be considered as residual radioactivity. To meet the unrestricted release criteria of §20.1402, groundwater sources of drinking water and residual radioactivity must be accounted for in Westinghouse's assessment of the contamination of the site and in their performance assessment.

Path Forward: Provide a discussion and figures to illustrate the extent of the groundwater contamination for each radiological contaminant in the overburden (i.e., found above the bedrock aquifer, the clay and sand/gravel layer). The figures should show by well name and/or number the extent of the contamination and the activity found in each well for that sampling event. Figures should be provided for multiple sampling events that best represent temporal and spatial changes seen for contaminants in the groundwater of the overburden.

13. (HDP-4-Q13) Comment: The information provided does not allow the staff to determine whether the background bedrock monitoring wells are located in appropriate sampling locations.

Basis: Figure 3-32 in the HDP indicates that well BR12RB may be downgradient of the site, but the figure lacks sufficient detail to provide a clear understanding of the groundwater flow regime. This ambiguity is significant because bedrock well BR12RB appears to have the highest level of 234U when compared to all other bedrock well data provided in the Radiological Characterization Report.

Path Forward: Provide figures for all bedrock well locations. The figures should include detailed potentiometric elevation maps for each bedrock unit pre and post Festus municipal well shut down.

14. (HDP-4-Q14) Comment: The background statistical data for bedrock wells BR12RB and BR12JC are not provided in Table 4-1 of the Hematite Radiological Characterization Report.

Basis: The background statistical data for bedrock wells BR12RB and BR12JC is necessary to establish a better understanding of the methodology used for the background statistical evaluation.

Path Forward: Provide the background statistical data for bedrock wells BR12RB and BR12JC. Also provide a discussion that should include the statistical method used to determine background conditions, number of samples used in the analysis and a table to further summarize the results.

15. (HDP-4-Q15) Comment: Table 4-28 shows that the maximum concentrations of gross alpha and gross beta exceed background levels established for the bedrock aquifers and EPA drinking water standards.

Basis: Gross alpha and gross beta measurements provide indications whether drinking water aquifers were impacted due to activities performed by the licensee.

Path Forward: Evaluate the nature and extent of gross alpha and gross beta in the bedrock aquifers at the Hematite site and any relationship to total uranium concentrations in these aquifers.

16. (HDP-4-Q16) Comment: Hybrid wells screened in both the overburden clay and sand/gravel aquifer have the potential to create a hydraulic interconnection between the two overburden units.

Basis: Contamination in the overburden units has the potential to migrate vertically downward and impact bedrock drinking water supplies as evidenced in the nature and extent of chlorinated hydrocarbon contamination that originated at the Hematite site.

Path Forward: Evaluate the relationship between radiological contamination found in the hybrid wells and water quality in the lower aquifer-units..

Hematite Decommissioning Plan Chapter 6 - Environmental Information

1. (HDP-6-Q1) Comment: In HDP Section 6.1.1, a wetland area is identified but the section does not provide what, if anything is going to be done during decommissioning with respect to the wetlands.

Path Forward: Provide what remediation actions will be taken relative to the wetland area on the Hematite site.

2. (HDP-6-Q2) Comment: In HDP Section 6.1.2, it is stated that the Site Creek/Pond and the Northeast Site Creek could potentially require remediation to remove contamination in sediment and nearby soil. Given this uncertainty, there is a potential for inadequate financial assurance since those decommissioning tasks are ill defined.

Path Forward: Describe the remediation actions which will be taken for the Site Creek/Pond and the Northeast Site Creek. If actions have not been determined, provide which actions are under consideration and describe how these potential actions have been accounted for with respect to ensuring adequate decommissioning funding.

3. (HDP-6-Q3) Comment: In HDP Section 6.2, it is stated that a letter was received from U. S. Fish and Wildlife Service which indicated "...no federally listed, proposed or candidate species or critical habitat occurs on or near the project site...". This letter is outdated; consequently, information on Federally-listed species and habitat needs to be updated.

Path Forward: Westinghouse should secure from the U. S. Fish and Wildlife Service updated information on Federally-listed species and habitats. The DP should be revised reflect this information, including the date it was acquired.

Hematite Decommissioning Plan Chapter 7 – ALARA Analysis

1. (HDP-7-Q1) Comment: Section 7.4 of the HDP provides an As Low As Reasonably Achievable (ALARA) evaluation for residual radioactivity levels for building surfaces. In Section 7.4.1, Westinghouse provides the basis for concluding that washing of walls is not justified by the ALARA evaluation. The NRC staff considers the basis for that conclusion to be insufficient.

Basis: In Section 7.4 of the HDP, on page 7-12, Westinghouse provides results of the calculation for washing walls, in terms of a ratio of concentration [average concentration being evaluated] to the DCGL_w, or Conc/DCGL_w. Results are provided for cases of zero and 0.07 (7%) discount rates. For zero discount rate, the Conc/DCGL_w result is 0.21, which generally indicates that if the actual average concentration is greater than 21% of the DCGL_w, then washing of walls should be performed. Westinghouse indicates that use of a zero discount rate is considered overly conservative "...based on the effort and practicality of performing surveys for residual contamination levels at 21 percent of the DCGL, and the costs to remediate to 21 percent of the DCGLs." The NRC staff considers this statement unsupported by the ALARA calculation. The calculations are intended to address costs of performing the action being evaluated (which can include costs of surveys and costs of needed remediation), so if costs have been factored into the calculation, the calculation result provides the indication of whether the costs are reasonable for the benefit. In this case, the result (value of 0.21) appears to indicate that costs are reasonable for the benefit, when the concentration averages greater than 21% of the DCGL.

In addition, NRC guidance in NUREG-1757, Vol. 2, Chap. 6 and Appendix N, states that for ALARA during decommissioning, all licensees should use typical good-practice efforts such as floor and wall washing and removal of readily removable radioactivity in buildings. This indicates that washing building surfaces is usually considered a good-practice effort, and should usually be considered ALARA, independent of the results of the cost-benefit ALARA evaluation. Westinghouse has not provided justification that building surface washing should not be performed as a good-practice ALARA effort. The NRC staff concludes that the current ALARA evaluation has not sufficiently justified not performing building surface washing.

Path Forward: Please commit to washing building surfaces or provide a clear justification that such washing is not ALARA.

2. (HDP-7-Q2) Comment: Section 7.4.2 of the HDP provides an ALARA evaluation for scabbling building surfaces and a conclusion that scabbling is not reasonable. The NRC staff considers the basis for that conclusion to be insufficient.

Basis: Westinghouse provides an initial calculation for zero discount rate, which has a result of 0.21, indicating that scabbling could be reasonable for ALARA when concentrations average greater than 21% of the DCGL. However, Westinghouse further indicates that further reduction of DCGLs is likely to result in additional remedial actions and costs, which were not considered in the initial calculation. Westinghouse then provides an *example* that further reduction in DCGLs *could* require certain actions and cost. However, it is not stated that these actions will be required; this appears to be only an example. The result of the revised calculation is a $\text{Conc}/\text{DCGL}_w$ value greater than 1, which would indicate that reduction of DCGLs with scabbling is not justified. However, if the revised calculation is just an example, that would seem to NRC staff to indicate that scabbling may be ALARA in some cases but not in others. NRC staff considers that if this is only an example, then Westinghouse has not sufficiently justified that the action (scabbling and reduction of DCGLs) is not reasonable to take.

Path Forward: Please clarify which calculations in Section 7.4.2 are representative for scabbling building surfaces. In particular, please clarify whether the revised calculation for zero discount rate is representative, or is just an example that *might* apply. If that calculation is an example, please address how other possible example calculations would impact the conclusions of the ALARA evaluation (i.e., given that the initial calculation provides a conflicting result (less than 1)).