

February 22, 2011

Ms. Elizabeth Southerland, Director
Division of Assessment and Remediation
Office of Superfund Remediation
and Technology Innovation
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Mail Code: 5204P
Washington, DC 20460

SUBJECT: MEMORANDUM OF UNDERSTANDING CONSULTATION ON THE
DECOMMISSIONING OF THE HEMATITE FORMER FUEL CYCLE FACILITY,
FESTUS, MISSOURI

Dear Ms. Southerland:

This letter is intended to inform you of the decommissioning oversight actions that the U.S. Nuclear Regulatory Commission (NRC) has taken, and intends to take, for the Hematite Former Fuel Cycle Facility (Hematite) site, located in Festus, Missouri.

On October 9, 2002, the NRC and the U.S. Environmental Protection Agency (EPA) entered into a Memorandum of Understanding (MOU) on "Consultation and Finality on Decommissioning and Decontamination of Contaminated Sites." Under the MOU, EPA agreed to continue its Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) deferral policy of not listing sites on the National Priorities List that are subject to NRC's licensing authority. The MOU provides that, unless an NRC-licensed site exceeds any of three trigger criteria contained in the MOU, EPA agrees to a policy of deferral to NRC decision-making on decommissioning without the need for consultation.

For sites that trigger the criteria in the MOU, NRC will consult with EPA at two points in the decommissioning process: (1) prior to NRC approval of the license termination plan or decommissioning plan (DP), which NRC terms Level 1 consultation; and (2) following completion of the final status survey (FSS), which NRC terms Level 2 consultation.

We are sending this letter to initiate our Level 1 consultation for the Hematite site. The NRC has reviewed the August 12, 2009, Westinghouse Hematite Decommissioning Plan (DP) [ADAMS Nos. ML092330123, ML092330125, ML092330127, ML092330129, ML092330131, and ML092330132].), and the staff is considering approving the DP for implementation. The DP includes derived concentration guideline levels (DCGLs) for certain radionuclides that exceed soil concentration values in Table 1 of the MOU they are presented in Enclosure 1. The values in Enclosure 1 are of a magnitude that a Level 1 consultation with EPA is triggered.

The Hematite facility is also involved in a CERCLA action related to on-and off-site volatile organic contamination (VOC) in the ground water. The Missouri Department of Natural Resources (DNR) is performing oversight of environmental studies and response actions related to the VOC contamination in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) under the requirements of CERCLA. A Record of Decision

for Buried Waste, Impacted Soils, and Sediment (Operable Unit 1) was finalized between Missouri DNR and Westinghouse (Hematite's owner) on July 21, 2009.

The Hematite Site

The original Special Nuclear Material (SNM) License for the Hematite facility (License Number SNM-33) was issued by the Atomic Energy Commission to Mallinckrodt Chemical Works on June 18, 1956. Between 1956 and 1974, the Hematite facility was used for research and production of nuclear fuels for government-related agencies including the U.S. Army and U.S. Navy. Production products during this period included specialized Uranium Oxides, highly-enriched Uranium metal, and Uranium-Beryllium and Uranium Zirconia pellets. Between 1974 and 2001, the Hematite facility was used for commercial nuclear fuel production. During this period, the production focus was the fabrication of nuclear fuel pellets using low-enriched (less than 5 percent enrichment of the U-235 isotope) Uranium. Other operations performed at the Hematite facility during this time period were conversion of UF_6 to UO_2 , and scrap recovery of uranium compounds. In June 2001, operations were ceased at the Hematite facility and the site entered into decommissioning.

On-site burial was used as a disposal method for contaminated materials and wastes at Hematite from July 1965 until November 1970. This burial area, located east of the facility buildings, has been documented to contain 40 unlined pits. The Burial Pits were authorized by the Atomic Energy Commission (AEC) regulations found in 10 CFR 20.304 (1964). The Burial Pits purportedly were constructed pursuant to 10 CFR 20.304 regulatory requirements and a policy describing the size and spacing of the pits, the thickness of soil cover and the quantity of radioactive material that could be buried in each pit. Interviews with former Hematite employees indicate that these requirements and procedures were not necessarily followed with respect to depth or cover or distance between burials. Also, limits on the amount of material were not followed for several pits.

Site Contamination

The primary radiological contaminants encountered during site characterization activities at the Hematite site include uranium isotopes (U-234, U-235, U-238) and Tc-99. During at least the 1970s, the U.S. Department of Energy (DOE) supplied UF_6 from reprocessed spent nuclear fuels to various fuel fabrication facilities. Specifically, DOE provided the Hematite facility with UF_6 that was produced from recycled Uranium. This resulted in the introduction of Tc-99.

The DCGLs contained in the DP are presented in the enclosure. As can be seen from the enclosure, the DCGLs for Am-241, Ra-226, Tc-99, Th-232, U-234, U-235, U-238 and Total Uranium exceed the MOU soil concentration levels for the residential use scenario. The staff's determination of the residential scenario is based on the historical land use of the site, Hematite's plans for the site have not been specified. Therefore, the NRC performed their assessment based upon the most limiting scenario. Before the NRC license is terminated, the doses to the average member of the critical group at the Hematite site will be in compliance with NRC's criteria in 10 CFR Part 20. Subpart E provides an all-pathways dose criteria of no more than 0.25 millisieverts per year (25 millirem per year) and that are as low as reasonably achievable (ALARA), to an average member of the critical group. The dose criteria in Part 20, Subpart E are fully protective of the public health and safety, and were the result of a comprehensive rulemaking, including an accompanying generic environmental impact

statement. Furthermore, individuals at a decommissioned site are expected to receive doses substantially below the constraint level because of ALARA, conservative dose modeling assumptions, and the nature of the cleanup process itself, which often reduces residual contamination levels significantly below site DCGLs. The DCGLs in the DP represent the maximum levels for each radionuclide without considering the existence of other radionuclides. Thus, in applying the sum of fractions requirement, the actual cleanup values will be reduced such that the potential dose from all residual radioactivity at the site from all media is less than 25 millirem per year.

It should be noted that during its review the NRC staff identified issues associated with the DCGLs. These issues were addressed in the staff's Requests for Additional Information (RAI), and was documented in NRC document (ADAMS No. ML101760058) dated July 12, 2010. Westinghouse responded on August 11, 2010 (ADAMS No. ML102290015), September 15, 2010 (ADAMS No. 102740175), and October 7, 2010 (ADAMS No. ML102850223). Some issues remain after reviewing Westinghouse's responses. The NRC will be discussing these issues with Westinghouse. It is anticipated that discussions will result in DCGLs which are lower than those in the existing DP and presented here in Enclosure 1

Nevertheless, in view of the extent to which the proposed cleanup values exceed the MOU trigger levels, and based on NRC's decommissioning experience, a Level 2 consultation may be necessary because the levels of residual radioactivity remaining after remediation may still exceed the MOU trigger levels. If this is the case, NRC will consult with the EPA in accordance with the MOU.

As part of the DP review and approval process, the NRC staff will prepare an environmental assessment (EA) to document how the remediation at the Hematite site would ensure protection of the public health and safety and the environment. The EA will be published in the *Federal Register*.

Next Steps

In accordance with the MOU, the NRC is requesting EPA's views on the DP. To help expedite the present Level 1 consultation, NRC staff would like to meet with you and representatives of your staff within the next two weeks to present our technical findings in greater detail. We believe such a meeting can provide you with additional details concerning the Hematite decommissioning and answer any questions you or your staff may have. It is the NRC's objective to complete the Hematite decommissioning licensing action, including this consultation process, by mid-spring 2011. This would enable Westinghouse to initiate decommissioning of the Hematite site by the summer 2011.

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. Southerland

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If you have any questions concerning the above, please contact me at (301) 415-7295 or via email at keith.mcconell@nrc.gov.

Sincerely,

/RA/

Larry W. Camper, Director
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and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Enclosure:
Hematite Cleanup Values

cc:
Hematite Service List
Stuart Walker, U.S. EPA

Docket No.: 70-0036
License No.: SNM-033

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Proposed DCGL Values

Westinghouse proposes 4 sets of DCGLs in Chapter 5 of the Decommissioning plan (ADAMS No. ML092330129) each based on a separate conceptual site model. These DCGL values relate to two different source term geometries, a three stratum geometry and a uniform geometry. In the three stratum geometry, different DCGL values were generated for different layers of the subsurface soil. In the uniform geometry, the same DCGL value is used for the entire thickness of the contaminated zone. Compliance with the 25 mrem dose criteria will be demonstrated for different areas of the site using either the three stratum approach or the uniform approach. A description of the four categories of DCGL values generated by Westinghouse is listed below.

Three stratum geometry approach:

- Surface - surface soil to a depth of 15 cm below the ground surface;
- Root - subsurface soil starting at 15 cm and extending to 1.5 m below the ground surface to include the entire root stratum; and
- Excavation - subsurface soil located below 1.5 m (i.e., below the root stratum) and extending to the bottom of the Contaminated Zone which was conservatively estimated to be 6.7 m below the ground surface.

Uniform geometry approach:

- Uniform - uniform soil contamination from the ground surface to the bottom of the Contaminated Zone (6.7 m).

The Surface, Root, and Excavation DCGL values presented in the following table correspond to a dose of 25 mrem assuming that the other two layers do not contain any contamination. If contamination exists in more than one layer, the sum of fractions approach will be used to demonstrate compliance and the maximum allowable remaining contamination would be less than listed in the table. The Excavation DCGL values were generated based on a scenario in which the soil is excavated to construct the basement for a house. In the Decommissioning Plan, Westinghouse also proposed a set of Deep DCGLs, which were an alternative to the Excavation DCGL. However, Westinghouse has committed not to use Deep DCGLs based on Response to an NRC Request for Additional Information (Chapter 5 Question 9), [ML102850223].

Radionuclide	Table 5-7 Surface DCGL (pCi/g)	Table 5-8 Root DCGL (pCi/g)	Table 5-12 Excavation DCGL (pCi/g)	Table 5-10 Uniform DCGL (pCi/g)	EPA Residential Soil Concentration (pCi/g)
Am-241	220.7	118.5	229.3	79.3	187.0
Np-237	17.3	5.0	11.3	0.3	Not Listed
Pu-239	239.5	84.8	246.5	83.1	259.0
Ra-226	6.0	2.2	5.2	2.0	5.0
Tc-99	161.9	31.4	79.3	26.9	25
Th-232+C	5.1	2.2	5.7	2.2	5.0
U-234	545.9	255.0	935.6	207.0	401.0
U-235+D	109.8	90.6	223.2	77.8	20.0
U-238+D	319.3	198.6	591.1	181.0	74.0
Total Uranium**	1000 mg/kg	633 mg/kg	1860 mg/kg	575 mg/kg	47 mg/kg

*The reported DCGLs are the activities for the parent radionuclide as specified

** The total uranium concentration was calculated by the NRC based on the DCGLs provided by Westinghouse.

The following radionuclides have proposed DCGLs which are greater than the EPA Residential Soil Concentration MOU value: Am-241, Ra-226, Tc-99, Th-232, U-234, U-235, U-238 and Total Uranium. Please note that NRC anticipates that some of the DCGL values listed in the above table will be revised to be more conservative (lowered) based on responses to requests for additional information.