

June 1, 2012

Mr. Robert Copp
Director, Decommissioning Project
Westinghouse Electric Company
Nuclear Fuels
3300 State Road P
Festus, MO 63028

SUBJECT: NRC INSPECTION REPORT 07000036/12-001(DNMS) – WESTINGHOUSE
ELECTRIC COMPANY (HEMATITE)

Dear Mr. Copp:

On April 19, 2012, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at the Westinghouse Hematite facility located near Festus, Missouri. The purpose of the inspection was to determine whether decommissioning activities were conducted safely and in accordance with NRC requirements. Specifically, the inspection focused on management organization and controls, radiation protection, effluent control and environmental protection, and waste management. The enclosed report presents the results of this inspection, which were discussed with yourself and other members of your staff during a telephonic exit meeting on April 19, 2012.

The inspection consisted of an examination of decommissioning activities at the Westinghouse Hematite facility as they relate to safety and compliance with the Commission's rules and regulations. Areas examined during the inspection are identified in the enclosed report. Within these areas, the inspection consisted of a selective examination of procedures and representative records, and interviews with personnel.

Based on the results of this inspection, the inspectors did not identify any violations of NRC requirements that were greater than minor significance.

In accordance with Title 10 Code of Federal Regulations (CFR) 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosures will be available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

R. Copp

-2-

We will gladly discuss any questions you may have regarding this inspection. If you have questions, please feel free to contact Michael LaFranzo of my staff at 630-829-9865.

Sincerely,

/RA/

Christine A. Lipa, Chief
Materials Control, ISFSI
and Decommissioning Branch
Division of Nuclear Materials Safety

Docket No. 070-00036
License No. SNM-00033

Enclosure:
Inspection Report No. 07000036/12-001(DNMS)

cc w/encl: Hematite Distribution Service List

R. Copp

-2-

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No.: 07000036

License No.: SNM-00033

Report No.: 07000036/12-001(DNMS)

Licensee: Westinghouse Electric Company, LLC

Facility: Former Hematite Fuel
Manufacturing Facility

Location: 3300 State Road P
Festus, Missouri

Inspection Period: December 23, 2011 through April 19, 2012

Inspectors: Michael LaFranzo, Senior Health Physicist
Wayne Slawinski, Senior Health Physicist
Dr. Peter Lee, Health Physicist, CHP
Lionel Rodriguez, Reactor Engineer

Approved by: Christine A. Lipa, Chief
Materials Control, ISFSI, and
Decommissioning Branch
Division of Nuclear Materials Safety

Enclosure

EXECUTIVE SUMMARY

Westinghouse Electric Company, LLC Hematite Fuel Manufacturing Facility (Decommissioning) NRC Inspection Report 07000036/12-001(DNMS)

This routine decommissioning inspection evaluated the Westinghouse Electric Company's (WEC) on-going decommissioning activities at its Hematite facility, Festus, Missouri. This routine decommissioning inspection focused on management organization and controls, radiation protection, effluent control and environmental protection, and waste management.

Management Organization and Controls

- The management oversight program was adequate to ensure U.S. Nuclear Regulatory Commission (NRC) compliance in the areas observed by the inspectors. (Section 1.0)

Radiation Protection

- The licensee's staff worked safely and in compliance with NRC regulations and licensee procedures. (Section 2.0)

Effluent Control and Environmental Protection

- The secondary containment structure of the Water Treatment System (WTS) could adequately perform its intended design function. Consequently, Inspection Follow-up Item (IFI) 07000036/11-02-01 is closed. (Section 3.1)
- Effluent release limits specified in licensee procedures was consistent with regulatory requirements and the licensee's Decommissioning Plan (DP). Consequently, IFI 07000036/11-02-02 is closed. (Section 3.2)
- Corrective actions for a previous violation associated with well sampling were adequate. Consequently, violation 07000036/11-02-01 is closed. (Section 3.3)
- The NRC continues to review the licensee's transport modeling, effluent calculations and offsite dose calculations to ensure compliance with NRC regulations. An unresolved item (URI) was generated to track resolution of this issue (URI 07000036/11-02-01). (Section 3.4)
- The licensee had not formalized plans to ensure proper water management and control liquid effluents should a significant storm event occur. An IFI was generated to further evaluate the issue. (Section 3.5)

Radioactive Waste Management

- The licensee voluntarily reduced burial pit soil excavation lift-depths to six-inches, until surface scan detection issues were resolved. An IFI was generated to review the issue during a future inspection. (Section 4.1)

- The licensee's process for classifying radioactive waste in relationship to the Guardian III box counter system was adequate. Consequently, IFI 07000036/11-02-03 is closed. (Section 4.2)
- The inspectors identified one violation of minor significance related to the failure to obtain random composite samples. The inspectors determined that corrective actions were adequate. (Section 4.3)

Report Details

1.0 Management Organization and Controls (88005)

a. Inspection Scope

The inspectors reviewed the licensee's management oversight program to determine if management meetings and management walk-arounds were effective tools to assist in the implementation of the radiological program.

b. Observations and Findings

The inspectors attended management meetings where licensed activities were discussed. The inspectors noted that the management meetings were organized and discussions were sufficiently detailed to reasonably address safety concerns on site.

The inspectors observed management walk-arounds which are designed to observe licensed activities and determine if procedures are being implemented as required. The inspectors noted that the management walk-around were adequate to determine compliance with procedural implementation.

No findings of significance were identified.

c. Conclusions

The inspectors noted that the management meetings and walk-arounds were effective tools to assist in the implementation of the radiological program.

2.0 Radiation Protection (83822)

a. Inspection Scope

The inspectors interviewed licensee staff and technicians involved in radiation protection activities to determine if they had adequate knowledge to ensure safety and compliance with NRC requirements.

Radiation protection program procedures were reviewed to determine if they were consistent with regulatory requirements and included appropriate limits, precautions and controls.

b. Observations and Findings

The inspectors observed soil excavation activities and interviewed staff associated with that activity. The inspectors found that staff had performed excavation activities in accordance with their procedures and had adequate knowledge to ensure radiological safety. Soil excavation activities were performed adequately and in accordance with sound radiation protection practices.

No findings of significance were identified.

c. Conclusions

The inspectors noted that the licensee staff worked safely and in compliance with NRC regulations and licensee procedures.

3.0 Effluent Control and Environmental Protection (88045)

3.1 Water Treatment System

a. Inspection Scope

The inspectors reviewed the licensee's design calculations to determine if the secondary containment structure of the WTS could adequately perform its intended function.

b. Observations and Findings

The inspectors performed a review of IFI 07000036/11-02-01. The item was documented as an IFI in Inspection Report (IR) No. 07000036/11-002 as the licensee had not provided the inspectors adequate documentation to verify whether the secondary containment structure of the WTS, as-built, could perform its design function. The inspectors reviewed additional documentation and determined that the supplemental information provided by the licensee was sufficient to demonstrate the secondary containment structure design function.

No findings of significance were identified.

c. Conclusions

Based upon the licensee's evaluation and NRC's independent review, the inspectors determined that the secondary containment structure of the WTS could adequately perform its intended design function. Consequently, IFI 07000036/11-02-01 is closed.

3.2 Monitoring Effluent Release

a. Inspection Scope

The inspectors reviewed the licensee's program to determine if effluent releases were in accordance with NRC requirements.

b. Observations and Findings

The inspectors reviewed IFI 07000036/11-02-02. The item was documented as an IFI in IR 07000036/11-002 as the licensee had not provided NRC sufficient information to make an independent determination regarding the adequacy and consistency of the effluent release limits in the licensee's procedures. The inspectors reviewed the licensee's procedures related to environmental monitoring, and compared the values to those approved in the DP and subsequent responses to Requests for Additional Information (RAI's). The inspectors noted that the effluent release limits as denoted in the licensee's procedures were consistent with NRC regulations and approved effluent release limits in the DP and subsequent RAI's.

The NRC reviewed the licensee's effluent releases made between 2008 to present and did not identify any releases of licensed material above NRC regulatory limits.

No findings of significance were identified.

c. Conclusions

The inspectors determined that the effluent release limits in the procedures adequately reflected the NRC approved effluent release limits in the DP and subsequent RAIs. Consequently, IFI 07000036/11-02-02 is closed.

3.3 Monitoring Well Procedural Implementation

a. Inspection Scope

The inspectors reviewed the licensee's procedures and observed activities associated with monitoring well sampling.

b. Observations and Findings

The inspectors reviewed the licensee's corrective actions associated with a previous violation documented in IR 070000036/11-002, involving the control of monitoring wells. Corrective actions included the replacement of the well caps and retraining technicians involved in well monitoring procedural implementation. The inspectors found the new well caps were adequate to meet procedural requirements and the technicians had been retrained.

No additional issues were identified regarding well monitoring procedural implementation.

No findings of significance were identified.

c. Conclusions

Adequate corrective actions were taken to address previous well sampling procedural problems. Consequently, VIO 07000036/11-02-01 is closed.

3.4 Well Effluent Release

a. Inspection Scope

The NRC inspectors reviewed circumstances, transport modeling and effluent calculations regarding an unanticipated and unevaluated release of Tc-99 from Monitoring Well BD-02, which was tracked as URI 07000036/11-02-01. The purpose of the review was to determine if the licensee was in compliance with NRC regulations relating to radiological off-site release.

b. Observations and Findings

On June 27, 2011, the licensee obtained a water sample from Monitoring Well BD-02 for which the analysis noted substantially higher levels of Tc-99 (30,300 pCi/l) and total uranium (32.26 pCi/l) than in previous samples. Historically, the licensee's water

samples from Monitoring Well BD-02 averaged approximately 5,723 pCi/L for Tc-99 and 1.0 pCi/L for total uranium. A re-analysis of the sample yielded equivalent results.

On December 1, 2011, the licensee provided the NRC with a document titled "Fate and Transport Modeling for Well BD-02 at the Westinghouse Hematite Site" concerning possible release mechanisms of the Tc-99 to monitoring well BD-02 and pathway of the contamination from the well through the ground water.

On December 7, 2011, the licensee developed a draft document which provided, based upon licensee modeling of water intake to a member of the public, a dose estimate of 0.035 mrem/year for Tc-99 and 0.05 mrem/year for uranium, within the aquifer, at approximately 165 feet downstream of the monitoring well BD-02.

The NRC identified several licensee assumptions concerning the transport modeling and effluent release estimates that could significantly increase the licensee's estimated dose. The licensee has provided information to the NRC concerning potential off-site dose consequences. The NRC is continuing to review the licensee's transport modeling assumptions, effluent calculations and potential off-site dose calculations to ensure compliance with NRC regulations. Consequently, this issue continues to be tracked as URI 07000036/11-02-01.

No findings of significance were identified.

c. Conclusions

The NRC is continuing to review the licensee's transport modeling, effluent calculations and potential off-site dose calculations to ensure compliance with NRC regulations (URI 07000036/11-02-01).

3.5 Excavation Area Water Monitoring

a. Inspection Scope

The inspectors reviewed the licensee's ability to control and monitor water released from the site as a result of a storm event overwhelming active earthen sumps during remediation.

b. Observations and Findings

The inspectors reviewed the licensee's capability to ensure water resulting from an abnormal storm event could be managed to ensure off-site releases satisfied regulatory requirements. Specifically, Section 8.1.4, Chapter 8, of the DP states, in part, that "The potential exists for a storm event to overwhelm active earthen sumps during remediation. Weather conditions will be monitored during remediation and additional pumps and/or holding tanks will be on-site and added, if necessary, to manage water from storm events."

During interviews, the inspectors noted that licensee staff monitored site weather conditions and had contemplated strategies to cope with large storm events. However, the licensee had not formulated plans to ensure strategies would be effectively implemented. Moreover, the licensee had not established means to ensure equipment,

supplies and staffing necessary to execute water management controls were readily available.

The licensee committed to review the potential for excess storm water and develop a plan for the management of such an event. This issue is subject to further NRC review (IFI 07000036/12-01-02)

No findings of significance were identified.

c. Conclusions

The NRC determined that the licensee had not developed adequate procedures to prevent an unmonitored off-site release should a significant storm event occur.

4.0 Radioactive Waste Management (88035)

The licensee's waste evaluation program consists of three parts: (1) In-Situ Radiological Surveys; (2) Guardian III System (Box Counter); and (3) Composite Soil Samples.

4.1 In-Situ Radiological Surveys

a. Inspection Scope

The inspectors reviewed the licensee's program to determine if they could adequately determine whether radioactive waste could be characterized and disposed of in accordance with NRC requirements.

b. Observations and Findings

As part of the radioactive waste characterization program, the licensee performs radiological surveys (or scans) using a NaI probe on a flat plot of potentially contaminated soil. The licensee refers to this as the in-situ radiological survey program. The in-situ radiological survey program scans 100% of the surface soil to ensure the removal of discrete material and determine the concentrations of uranium (U)-235. The scan cannot detect technetium (Tc)-99 in the soil.

The inspectors reviewed the licensee's in-situ radiological survey program and could not determine whether concentrations of U-235 of the discrete material could be detected as required by the DP. Specifically, the licensee was performing in-situ radiological surveys and then removing the first 12 inches of the soil for disposal or re-use and the NRC had additional questions on whether the licensee scans could: (1) detect material with an average concentration exceeding 0.1 grams/liter of U-235 within 12 inches of soil; (2) detect 15 grams of U-235 within 12 inches of soil.

The DP and associated Safety Evaluation Report (SER) and responses to RAIs (ML110270200) define Nuclear Criticality Safety (NCS) Exempt Material as the following: "Unless otherwise defined and justified within a nuclear criticality safety evaluation, NCS Exempt Material is conservatively defined as material containing U-235 with an average nuclide fissile concentration not exceeding 0.1 grams U-235/liter, or material that comprises no greater than 15 grams U-235 and is enclosed within a container with a volume of at least 5 liters." In addition, the DP and associated documentation describe

the purpose of the Gamma Walkover Surveys (GWSs) as the following: “The objective of the in-situ radiological surveys is to identify materials that do not satisfy the NCS Exempt Materials criteria.”

Figure 1 of HEM-12-MEMO-041 provides an illustration that appears to indicate that the licensee may not be able to detect 15 grams of U-235 below approximately 6 inches of soil with a radiological detection set point of 19,000 counts per minute (19 K). In addition, the same document does not definitively state that the licensee could detect 15 grams of U-235 or exceeding 0.1 grams of U-235/liter in the first 12 inches of soil. Also, the scan set point of 19 K is based on a concentration of U-235 of 0.924 g/cc in the lump of soil (Table 2-3, NSA-TR-10-12 Rev. 2). The actual concentration of U-235 in the discrete material or lump of soil could be greater than 0.924g/cc. Due to the attenuation of low energy gamma emitted from U-235, the detector response could be much less than 19 K.

In order to identify and remove the non-NCS exempt material from the burial pit, licensee may have to lower the scan set point below 19 K or reduce the thickness of the lift, such as from 12 inches to 6 inches.

The licensee voluntarily reduced the thickness of soil removal after each in-situ scan from 12 inches to 6 inches depth so the NRC could perform additional reviews to ensure compliance with licensee commitments.

c. Conclusions

The inspectors determined that the licensee could not ensure that radiological in-situ surveys could determine that waste meets NCS Exempt Materials contained in 12 inches of soil as stated in the DP (IFI 07000036/12-01-01). The licensee committed to reduce the depth of soil removal after each in-situ surface scan from 12 inches to 6 inches until the NRC can ensure the licensee can meet the conditions of the license.

4.2 Guardian III System

a. Inspection Scope

The NRC inspectors reviewed the licensee’s Guardian III System (Box Counter) to determine whether the system could be adequately used to characterize onsite soils for radioactive waste disposal. The NRC inspectors toured the Box Counter system and reviewed procedures related to the operation of the system. The inspectors also interviewed licensee personnel with oversight of the system and contractor personnel with the responsibility of operating the system.

b. Observations and Findings

As part of the radioactive waste characterization program, the Guardian III system is used to assist in the determination of radiological concentrations in soil. Due to the limited detection capabilities of the system, the use of the Guardian III is limited to general characterization of the waste assuming a reasonable homogeneous mix of uranium in the soil. The system is not capable of detecting Tc-99.

The NRC inspectors reviewed the proposed use of the Guardian III system and what quality assurance processes were in place to ensure the system was functioning appropriately. The NRC inspectors also reviewed procedures related to the licensee's radioactive waste classification process and found no abnormal issues. The inspectors interviewed licensee staff and determined that each had adequate knowledge to ensure proper operation of the guardian system and compliance with NRC requirements.

No findings of significance were identified.

c. Conclusions

The inspectors determined that the licensee's process for classifying radioactive waste in relationship to the Guardian III system was adequate. Consequently, IFI 07000036/11-02-03 is closed.

4.3 Soil Sampling

a. Inspection Scope

The inspectors reviewed the licensee's procedures and interviewed staff associated with soil sampling to determine compliance with licensee procedures and NRC regulations.

b. Observations and Findings

As part of the radioactive waste characterization program, the licensee uses a composite soil sampling program as the primary determinant in the determination of soil concentrations including Tc-99 in soil.

On March 22, 2012, the inspectors interviewed several technicians regarding the implementation of Section 14.3.2.3.1 of the DP and identified that, on numerous occasions, while survey methodologies were utilizing the High Resolution Gamma Spectroscopy system and following a scan survey, the licensee did not collect a composite sample, consisting of four or more aliquots collected at random.

Condition 9 of License SNM-33, Amendment 59 dated November 9, 2011, states, in part, that the authorized usage of licensed material is described in the August 12, 2009 DP.

Section 14.3.2.3.1(e) of the August 12, 2009, DP states, in part, that while survey methodologies are utilizing the High Resolution Gamma Spectroscopy system that following a scan survey, a composite sample, consisting of four or more aliquots collected at random, will be submitted for laboratory analysis.

The composite sample is to support the licensee's analysis of soil that will be re-used at the site after remediation of the burial pits.

The inspectors determined that the licensee, on numerous occasions between March 1 and March 22, 2011, had taken a composite sample consisting of four or more aliquots based upon the highest radiation levels of the soil being analyzed. This is considered a biased sample rather than a random sample. The inspectors noted that sampling technique was conservative but that it was not in accordance with the licensee's DP.

The failure to collect soil samples randomly is a violation of minor safety significance because biased samples yielded a conservative assessment of soil conditions.

The licensee immediately suspended all soil sampling until all technicians could be trained on the strict adherence to procedures. The licensee completed the retraining within two days of the finding.

One violation of minor safety significance was identified.

c. Conclusions

The inspectors identified one violation of minor safety significance related to the failure to obtain a random composite sample. The inspectors determined that corrective actions were adequate.

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Westinghouse Electric Company

R. Copp, Director, Hematite Decommissioning Project
G. Rood, Radiation Safety Officer
K. Davis, Interim Manager, Licensing
K. Harris, Environmental, Health & Safety Manager
C. Cummin, Waste Management/Transportation Specialist
W. Mattern, Manager, Security Operations
D. Atchison, Training Supervisor

INSPECTION PROCEDURES USED

IP 88005 Management Organization and Controls
IP 83822 Radiation Protection
IP 88045 Effluent Control and Environmental Protection
IP 88035 Radioactive Waste Management

ITEMS OPENED, CLOSED, AND DISCUSSED

<u>Opened</u>	<u>Type</u>	<u>Summary</u>
IFI 07000036/12-01-01	IFI	Adequacy of Soil In-Situ Radiological Surveys
IFI 07000036/12-01-02	IFI	Excessive Storm Event Evaluation
<u>Closed</u>	<u>Type</u>	<u>Summary</u>
VIO 07000036/11-02-01	VIO	Failure to lock Eight Monitoring Well caps
IFI 07000036/11-02-01	IFI	Adequacy of WTS secondary containment structure to perform intended design function
IFI 07000036/11-02-02	IFI	Adequacy and consistency of effluent release limits in procedures
IFI 07000036/11-02-03	IFI	Adequacy of process for classification of radioactive waste

<u>Discussed</u>	<u>Type</u>	<u>Summary</u>
URI 07000036/11-02-01	URI	Adequacy of transport modeling and effluent calculations from Tc-99 release from monitoring well BD-02

LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
CFR	Code of Federal Regulations
DNMS	Division of Nuclear Materials Safety
DP	Decommissioning Plan
GWS	Gamma Walkover Survey
HDP	Hematite Decommissioning Project
IFI	Inspection Follow-Up Item
IP	Inspection Procedure
IR	Inspection Report
NCS	Nuclear Criticality Safety
NRC	U.S. Nuclear Regulatory Commission
RAI	Request for Additional Information
SER	Safety Evaluation Report
URI	Unresolved Item
VIO	Violation
WEC	Westinghouse Electric Company
WTS	Water Treatment System

DOCUMENTS REVIEWED

Calculation, "Secondary Containment Calculation Water Treatment System" Rev. 0 (November 7, 2011 and December 9, 2011)

Calculation, "Structural Calculations for WTS Secondary Containment" (December 9, 2011)

DO-08-004, "Hematite Decommissioning Plan" Rev. 0

ECC-WP-2010-503 "Construction Storm Water Management"

ECC-WP-2010-505 "Excavation and Exhumation"

HDP-ECC11-WP-001 "Site Preparation and Maintenance Activities" Rev. 1

HDP-PO-EM-001, "Effluent and Environmental Monitoring Plan" and Rev 3

HDP-PO-HP-100-2 (Form), "HDP Effluent and Site Release Limits" Rev 1 (January 10, 2012 and March 15, 2012)

HDP-PR-EM-016 "Pumping of Accumulated Surface Water" Rev. 0

HDP-PR-FSS-710 "Final Status Surveys and Radiological Sampling of Re-Use Soil"

HDP-PR-HP-413, "ISOCs Operation and Data Verification" Rev. 5

HDP-PR-HP-423 "HPGe Sample Analysis" Rev. 1

HDP-PR-HP-425 "Sample Analysis Quality Control" Rev. 0

HDP-PR-HP-501 "Radiation Work Permits" Rev. 3

RWP-RP-12-G005 "Burial Pit and Other Site Remediation Zones"

RWP-RP-12-G006 "Radioactive Material Areas"

HDP-PR-HP-601 "Remedial Action Support Surveys" Rev. 0

HDP-PR-HP-606 "Sampling in NCS Designated Areas" Rev. 0

HDP-PR-LI-005 "Facility Change Management" Rev. 1

HDP-PR-WM-905 "Waste Sampling Method, Labeling and Custody" Rev. 1

HDP-PR-WM-906 "Waste Classification, Sample Analysis and Reporting" Rev. 0

HEM-10-137 (Attachment 1) "Responses to Requests for Additional Information on Decommissioning Plan Chapters 8 and 9" January 24, 2011

HEM-12-MEMO-041 "Compliance with USEI Disposal Criteria" April 18, 2012

HRP-3750 – HASP “RO “ECC Health and Safety Plan”

NSA-TR-10-12 Rev. 2 “Calibration Analysis for 235U Response from Burial Pit Waste Materials at the Hematite Facility”

NSA-TR-09-15 Rev. 1 “Nuclear Criticality Safety Assessment of Buried Waste Exhumation and Contaminated Soil Remediation at the Hematite Site”

Technical Basis Document for use of GARDIAN-III for Survey of WEC/Hematite Soils

US NRC SER on Westinghouse Amendment Request for Approval of Hematite DP and Associated Supporting Documents (October 2011)

WP-2009-031 Rev. 3, “Work Plan for Pumping of Accumulated Storm Water”

WP-ECC-2010-501 Rev. 0 “Waste Staging, for approval by the Hematite Decommissioning Project (HDP)”

WP-ECC-2010-504 Rev. 4 “Waste Loading and Handling, for approval by the Hematite Decommissioning Project (HDP)”

WP-ECC-2010-508 Rev. 0 “Handling and Transport of Fissile Material”

WP-ECC-2010-510, Rev. 1 “Waste Staging”

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