



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION III
2443 WARRENVILLE RD. SUITE 210
LISLE, IL 60532-4352
March 24, 2014

Ms. Gay Fussell, Deputy Director
Hematite Decommissioning Project
Westinghouse Electric Company
3300 State Road P
Festus, MO 63028

SUBJECT: NRC INSPECTION REPORT 07000036/2014001(DNMS) – WESTINGHOUSE
ELECTRIC COMPANY (HEMATITE)

Dear Ms. Fussell:

On February 14, 2014, 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, radioactive waste management, environmental monitoring, and final status surveys. The enclosed report presents the results of this inspection, which were discussed with you and other members of your staff during an exit teleconference on February 14, 2014.

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 NRC has determined that two Severity Level IV violations of NRC requirements occurred. These violations are being treated as Non-Cited Violations (NCV's), consistent with Section 2.3.2 of the Enforcement Policy. These NCV's are described in the subject inspection report. If you contest the violations or significance of these NCV's, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, RIII; and the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

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

G. Fussell

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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 by Aaron T. McCraw Acting for/

Robert J. Orlikowski, Chief
Materials Control, ISFSI
and Decommissioning Branch
Division of Nuclear Materials Safety

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

Enclosure:
Inspection Report No. 07000036/2014001(DNMS)

cc w/encl: Hematite Service List

G. Fussell

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No.: 07000036

License No.: SNM-00033

Report No.: 07000036/2014001(DNMS)

License: Westinghouse Electric Company, LLC

Facility: Former Hematite Fuel
Manufacturing Facility

Location: 3300 State Road P
Festus, Missouri

Inspection Period: November 4, 2013, through February 14, 2014

NRC Inspectors: Jeremy E. Tapp, Health Physicist
Michael M. LaFranzo, Senior Health Physicist
Peter J. Lee, Health Physicist, Ph.D., CHP
Lionel Rodriguez, Reactor Engineer

Approved By: Robert J. Orlikowski, 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 07000036/2014001(DNMS)

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

Management Organization and Control

For the Corrective Action Program (CAP) Issue Reports reviewed, the inspectors found that the corrective actions were appropriate and timely, and adequately addressed and corrected the issues. In addition, the inspectors determined there have been no negative trends in the CAP over approximately the past 8 months and the licensee has been sustaining improved performance. (Section 1.1)

The inspectors identified two violations of U.S. Nuclear Regulatory Commission (NRC) requirements concerning the failure to: (1) complete Form HDP-PR-LI-005-2 for five work packages (NCV 07000036/2014001-01); and (2) to provide information supporting conclusions that a licensing evaluation is not required for a work plan or work activity (NCV 07000036/2014001-02). The licensee has entered the deficiencies into its CAP system and the NRC will review the licensee's corrective actions during a future inspection. (Section 1.2)

The licensee will not be able to complete all decontamination and demobilization activities on site on September 3, 2014 as planned. The licensee is performing scheduling analysis and is in the process to determine a more accurate completion date. The NRC will continue to monitor the licensee's schedule to properly assess the amount of time necessary to complete all decontamination and demobilization efforts. (Section 1.3)

Radiation Protection

The inspectors determined that the licensee had proper radiological controls in place for work being performed in the burial pits. In addition, for the work observed, the inspectors determined that licensee staff was working safely and in compliance with NRC regulations and licensee procedures. (Section 2.0)

Radioactive Waste Management

The licensee identified elevated radiological survey readings in the Waste Handling Area that required further evaluation. The inspectors determined that the licensee: (1) adequately evaluated the elevated radiological survey readings to determine why they occurred; (2) followed site procedures to blend waste and subsequently perform a radiological survey of the waste material; and (3) took adequate actions as a result of this occurrence. (Section 3.0)

Effluent Control and Environmental Protection

The inspectors reviewed the licensee's plans and associated evaluation to relocate four groundwater wells and determined: (1) that the new groundwater well locations were located in the direction of groundwater flow from the previous wells; and (2) were adequate to detect potential radiological contaminants migrating offsite. (Section 4.0)

Closeout Inspection and Surveys

The inspectors, with the assistance of Oak Ridge Associated Universities (ORAU) personnel, performed confirmatory final status surveys in LSA 05-03. In addition, the inspectors reviewed the report from ORAU for survey units LSA 05-01, LSA 05-02, and LSA 05-03. The inspectors determined that the results of the confirmatory surveys demonstrated that gamma walkover surveys, concrete surface scans and activity measurements, and radionuclide concentrations in soil samples and smears documented in the ORAU report were consistent with the licensee's and below the NRC approved cleanup levels, or Derived Concentration Guideline Levels (DCGLs), with a few exceptions. Three soil samples from survey unit LSA 05-01 were above the approved DCGLs, which will be evaluated by the licensee and submitted for NRC review at a later date. In addition, the inspectors determined that licensee analytical practices and procedures appear to be sufficient in providing quality radiochemical data. (Section 5.1)

The inspectors, with the assistance of ORAU personnel, performed confirmatory final status surveys in LSA 10-06 and LSA 10-07. In addition, the inspectors reviewed the report from ORAU for survey units LSA 10-06 and LSA 10-07. The inspectors determined that the results of the confirmatory surveys demonstrated that gamma walkover surveys and radionuclide concentrations in soil samples documented in the ORAU report were consistent with the licensee's and below the NRC approved DCGLs. (Section 5.2)

The inspectors performed confirmatory surveys in survey unit LSA 10-05. The inspectors determined that the confirmatory gamma walkover survey results for LSA 10-05 were consistent with the licensee's results. The confirmatory gamma walkover surveys did not indicate any elevated residual radioactivity in survey unit LSA-10-05 above the general background. The results for the soil samples taken during confirmatory surveys were not available at the time of issuance of this inspection report. They will be discussed when available in a future inspection report (IFI 07000036/2014001-01). The inspectors also determined the licensee adequately classified and planned the survey and sampling methods in accordance with Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) and the Decommissioning Plan (DP). (Section 5.2)

The inspectors reviewed the report from ORAU for Reuse stockpiles 1, 2, and 3. The inspectors determined that the results of the confirmatory surveys demonstrated that gamma walkover surveys and radionuclide concentrations in soil samples documented in the ORAU report were consistent with the licensee's and below the NRC approved DCGLs. In addition, the inspectors determined that licensee analytical practices and procedures appear to be sufficient in providing quality radiochemical data. (Section 5.3)

The inspectors determined that the licensee adequately evaluated and configured the ISO-PACIFIC S3 soil sorting system to resurvey the reuse soil stockpiles for discrete materials (fuel pellets) and localized areas of contamination during the initial and first revision to the system configuration and alarm set point. The second revision to the alarm set point is currently

under NRC review and the results will be documented in a future inspection report (IFI 07000036/2014001-02). (Section 5.4)

The NRC could not fully review the impact of the Joachim Creek Flash Flood Event on the licensee's site due to a lack of information. The NRC will continue to review the licensee's assessment of the Joachim Creek Flash Flood Event to ensure radiological conditions at the site are fully analyzed for radiological final status surveys. Therefore, IFI 07000036/2013002-02 remains open. (Section 5.5)

Report Details

1.0 Management Organization and Controls (88005)

1.1 Corrective Action Program

a. Inspection Scope

The inspectors evaluated a selection of Corrective Action Program (CAP) Issue Reports initiated during this inspection period to determine if the licensee's actions were appropriate and commensurate with the safety significance of the issue in both scope and timeliness. The evaluation consisted of a document review and interviews of individuals associated with the CAP documents reviewed. As discussed in the last U.S. Nuclear Regulatory Commission (NRC) inspection report (IR), the inspectors continued to review the licensee's implementation of the CAP by monitoring for negative trends in the licensee's CAP during this inspection period to determine if there had been any degrading performance (IFI 07000036/2013002-01).

b. Observations and Findings

During the inspectors' review of the licensee's implementation of the CAP, no negative trends were identified during this inspection period. The inspectors noted that the licensee has been improving in those areas that were experiencing degraded performance approximately 8 months ago. Since no negative trends have been identified over the past 8 months and the licensee has sustained improved performance, the NRC considers Inspection Follow-Up Item (IFI) 07000036/2013002-01 closed.

No findings of significance were identified.

c. Conclusions

For the CAP Issue Reports reviewed, the inspectors found that the corrective actions were appropriate and timely, and adequately addressed and corrected the issues. In addition, the inspectors determined there have been no negative trends in the CAP over approximately the past 8 months and the licensee has been sustaining improved performance.

1.2 Corrective Actions – IR 07000036/2013004 Findings

a. Inspection Scope

Between August 29 and September 25, 2013, NRC conducted a reactive inspection (IR 07000036/2013004(DNMS)) which identified three violations of NRC requirements. The licensee sent a response to NRC dated December 19, 2013, describing the licensee's corrective actions. The inspectors reviewed the licensee's corrective actions associated with those violations.

b. Observations and Findings

On September 25, 2013, the NRC completed a reactive inspection to review the circumstances surrounding two reportable events to the NRC Headquarters Operations

Center concerning the loss of criticality controls. During that inspection, the NRC identified three violations of NRC requirements. The issues associated with the violations were entered into the licensee's CAP. In addition to the violations, the NRC noted that a full analysis prior to deploying a new radiological detection system (Lanthanum Bromide) was not adequately performed which resulted in the licensee being unable to detect quantities of uranium-235 that could have resulted in an unacceptable criticality control risk. The NRC requested the licensee provide an explanation on why a full radiological evaluation was not performed and how the licensee would address this and similar changes in procedures in the future. The reactive inspection report was issued on October 31, 2013 (ML13305B012).

On December 19, 2013, the licensee provided information associated with the NRC findings of the inspection report. As part of the response, the licensee agreed that it was not an acceptable practice to make reductions in safety margins without fully understanding the implications of those reductions and the impact those reductions would have on operational activities. Consequently, as part of the licensee's corrective actions to ensure the appropriate level of evaluation is performed for a proposed change, the licensee revised procedure HDP-PR-LI-005 to implement additional screening questions and to enhance the required response to the screening questions to ensure proposed changes are designated for further detailed evaluation when appropriate.

Condition 9 of license SNM-33 states, in part, that the authorized usage of licensed material is described in the August 12, 2009, Decommissioning Plan (DP) and associated supporting documents noted in the Hematite DP Safety Evaluation Report (SER) (ML112101630).

Section 13.0 titled "Quality Assurance" in the August 12, 2009, DP and associated supporting documents noted in the Hematite DP SER states, in part, that the Hematite facility specific Quality Assurance (QA) plan for decommissioning is detailed in the Hematite document HDP-PO-QA-001, "Project Quality Plan" or PQP. All work related to the Hematite facility decommissioning is required to comply with the PQP. The PQP and its implementing procedures establish the requirements that personnel are required to take for quality related activities.

Section 12 titled "Instructions, Procedures and Drawings," of Hematite Document Number HDP-PO-QA-001, PQP requires, in part, that activities affecting quality are prescribed by and performed in accordance with documented policies, procedures, plans, and/or drawings.

Section 7.0 titled "General" of HDP-PR-LI-005, Revision 3, developed and implemented on November 26, 2013, states, in part, that "Initiating documents will contain screening criteria to determine if further evaluation is required for determination of a License Amendment submittal for the DP and NRC approval prior to implementation of the change or initiation of the work activity." Section 7.1 titled "Screening Criteria" requires, in part, that Form HDP-PR-LI-005-2 be used to assist with the determination of the need for further evaluation by Licensing.

During the inspection, the inspectors identified that the licensee did not complete Form HDP-PR-LI-005-2 for five packages that were revised after November 26, 2013. The packages were WP-ECC-2010-508, Revision 8, titled "Handling and Transport of Fissile

Material;" HDP-ECC11-WP-001, Revision 4, titled "Site Preparation and Maintenance Work Activities;" HDP-ECC13-WP-011, Revision 0, titled "Isolation and Control Measures;" HDP-ECC13-WP-014, Revision 0, titled "Rail Area Modifications;" and HDP-ECC13-WP-013, Revision 0, titled "Sanitary Wastewater Treatment Plant Sludge Pumping & Filter Press Operation." **Failure to complete Form HDP-PR-LI-005-2 for five work packages is a violation of NRC requirements (NCV 07000036/2014001-01).**

The licensee initiated an Issue Report (#14-023-W0009) within the CAP which documented the licensee's failure to complete the required form. The licensee does not believe a significant licensing issue resulted in the failure to properly analyze the changes within noted packages. The NRC will review the licensee's corrective actions during a future inspection to determine if compliance has been achieved.

Condition 9 of license SNM-33 states, in part, that the authorized usage of licensed material is described in the August 12, 2009, DP and associated supporting documents noted in the Hematite DP SER.

Section 13.0 titled "Quality Assurance" in the August 12, 2009, DP and associated supporting documents noted in the Hematite DP SER states, in part, that the Hematite facility specific QA plan for decommissioning is detailed in the WEC document HDP-PO-QA-001, "Project Quality Plan" or PQP. All work related to the Hematite facility decommissioning is required to comply with the PQP. The PQP and its implementing procedures establish the requirements that personnel are required to take for quality related activities.

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Form HDP-PR-LI-005-2 states, in part, "Provide a summary of why the work plan, work activity or revision does or does not result in a change as described in the question. If it is determined that there is no change then provide information supporting that conclusion."

On December 12, 2013, the licensee signed and dated a Form HDP-PR-LI-005-2 for document HDP-TBD-WM-910, Revision 0, a work activity. Of the seven (7) licensing screening criteria questions, the department manager/owner checked the box "no" to all seven questions. However, there was no information supporting the statement. In addition, the department manager/owner checked a box "is not required" for determination if a licensing evaluation is needed but did not provide information supporting that conclusion. **Failure to provide information supporting conclusions**

that a licensing evaluation is not required for a work plan or work activity is a violation of NRC requirements (NCV 07000036/2014001-02).

The licensee initiated an Issue Report (#14-028-W001) within the CAP which documented the licensee's failure to complete the required form. The licensee does not believe a significant licensing issue resulted in the failure to properly analyze the changes within noted packages. The NRC will review the licensee's corrective actions during a future inspection to determine if compliance has been achieved.

c. Conclusions

The inspectors identified two violations of NRC requirements concerning the failure to: (1) complete Form HDP-PR-LI-005-2 for five work packages; and (2) to provide information supporting conclusions that a licensing evaluation is not required for a work plan or work activity. The licensee has entered the deficiencies into its CAP system and the NRC will review the licensee's corrective actions during a future inspection.

1.3 Hematite Decommissioning Project (HDP) Schedule

a. Inspection Scope

The inspectors reviewed the licensee timetables and assumptions used to create the HDP schedule.

b. Observations and Findings

The licensee provided the inspectors a HDP Summary Schedule dated January 17, 2014. The schedule included start and stop dates for completing remediation tasks at the site which included, but was not limited to, the burial pits, barn slabs/red room and cistern barn pit areas, process building slab and soil beneath slab, underground piping, site pond and site creek, leach field and evaporation pond, Technetium-99 (Tc-99) area, and waste handling area. According to the schedule provided, the licensee will have completed all decontamination and demobilization on September 3, 2014.

The inspectors reviewed the HDP Summary Schedule and interviewed licensee staff regarding assumptions used to create the schedule. The NRC identified that the licensee had added a certain number of general contingency days for unanticipated events (e.g., weather) but those days had already been used at the time of the inspection. The inspectors noted that the licensee did not address specific potential delays into the schedule, such as effects of heat, cold, rain or snow on equipment or staff which could reduce optimum efficiency, which could affect the schedule. The licensee could also not explain the rationale for determining the timeframes for each remediation task.

The licensee informed the NRC that the presented HDP Summary Schedule does not accurately represent the amount of time necessary in order to complete all decontamination and demobilization efforts at the site and that the September 3, 2014, timeframe to complete all decontamination and demobilization of the site will not be met. The licensee is in the process of performing additional schedule estimates to more accurately define the timeframe necessary to complete decontamination and

demobilization efforts at the site. The licensee estimated that the analysis will be complete in March 2014. The NRC will continue to monitor the licensee's schedule to properly assess the amount of time necessary to complete all decontamination and demobilization efforts.

c. Conclusions

The licensee will not be able to complete all decontamination and demobilization activities on site on September 3, 2014, as planned. The licensee is performing scheduling analysis and is in the process to determine a more accurate completion date. The NRC will continue to monitor the licensee's schedule to properly assess the amount of time necessary to complete all decontamination and demobilization efforts.

2.0 Radiation Protection (83822)

a. Inspection Scope

The inspectors performed site tours to assess radiological conditions and controls. 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, radiation work permits, and evaluations were reviewed to determine if they were consistent with regulatory requirements and included appropriate limits, precautions and controls. The inspectors observed licensee staff perform remediation activities to ensure adequate procedure use and adherence.

b. Observations and Findings

The inspectors observed remediation activities such as soil excavation and visual and radiological surveys in the burial pits. They also interviewed licensee staff associated with those activities. The inspectors found that staff had adequate knowledge to ensure radiological safety when performing the excavation and remediation activities. The remediation activities observed were performed adequately with proper radiological controls and in accordance with sound radiation safety practices.

No findings of significance were identified.

c. Conclusions

The inspectors determined that the licensee had proper radiological controls in place for work being performed in the burial pits. In addition, for the work observed, the inspectors determined that licensee staff was working safely and in compliance with NRC regulations and licensee procedures.

3.0 Radioactive Waste Management (88035)

a. Inspection Scope

The inspectors reviewed the circumstances surrounding waste material that was identified by the licensee at the Waste Handling Area (WHA) as having elevated readings that

required further evaluation before being sent offsite as radioactive waste. The purpose of the review was to determine why this occurred, if the licensee was following their procedures as required, and the adequacy of the licensee's actions as a result of this occurrence.

b. Observations and Findings

The licensee's process for preparing and consolidating waste for shipment offsite to the NRC approved disposal facility includes blending of waste that has higher concentrations of radioactive material to waste that has lower concentrations. After blending the waste material, the licensee adds it to the appropriate waste stream which eventually reaches the WHA. At the WHA, all waste material is radiologically surveyed to ensure it will meet the disposal requirements of the offsite radioactive waste disposal facility.

The inspectors noted that the licensee determined the material did not blend as necessary due to plastic material in the waste stream, which kept the material from blending properly. In addition, they noted that the licensee determined the radiological contaminant was radium, not uranium, which the action levels for further evaluation were based on. Therefore, the material would have still met the radiological requirements of the offsite radiological waste disposal facility. Due to these results of the licensee's evaluation, the licensee removed the plastic and associated waste material out of the waste stream and added it to similar waste. The inspectors also noted that the licensee performed training of personnel involved in blending and waste operations to ensure they were informed of the potential issues involved with plastic and other similar material in the waste stream.

No findings of significance were identified.

c. Conclusions

The inspectors determined that the licensee: (1) adequately evaluated the elevated radiological survey readings to determine why they occurred; (2) followed site procedures to blend waste and subsequently perform a radiological survey of the waste material; and (3) took adequate actions as a result of this occurrence.

4.0 Effluent Control and Environmental Protection (83890)

a. Inspection Scope

The NRC reviewed the licensee's plan and associated evaluation for the relocation of four groundwater wells required by NRC regulations. The purpose of the review was to determine if the new groundwater well locations were adequate to detect potential radiological contaminants migrating offsite from similar onsite locations as the previous wells.

b. Observations and Findings

During the inspection period, the NRC reviewed the licensee's relocated four groundwater wells required by the Decommissioning Plan (DP) and the site's environmental monitoring program. Specifically, NRC personnel in Headquarters (HQ)

reviewed the information provided by the licensee. The NRC was satisfied that an adequate amount of information was provided to ensure that the monitoring wells were positioned appropriately to monitor groundwater similar to the originally placed four wells concerning any potential radiological contaminants migrating offsite. NRC experts in HQ did not have additional questions regarding the relocation at this time.

No findings of significance were identified.

c. Conclusions

The NRC determined that the new groundwater well locations were adequately relocated to detect potential radiological contaminants migrating offsite.

5.0 Closeout Inspection and Survey (83890)

5.1 Barns Area Confirmatory Surveys

a. Inspection Scope

From November 12 through 13, 2013, the NRC contracted with Oak Ridge Associated Universities (ORAU) to perform confirmatory surveys and sampling of the western portion of Survey Unit LSA 05-03, a Class 1 survey unit, to determine if residual radioactivity in the soil was less than the approved cleanup levels, or Derived Concentration Guideline Levels (DCGLs), discussed in the DP. This area was part of the former barns area footprint. Confirmatory surveys were only performed in the western portion of the survey unit because ORAU had already performed surveys on the eastern portion in August 2013. A gamma walkover survey and random soil sampling were performed with biased soil sampling, where necessary.

On January 14, 2014, ORAU submitted a report (ML14036A284) to the NRC for the confirmatory surveys performed in the former barns area footprint, red room roof burial area, and limestone burial area, since June 2013. These areas consisted of survey units LSA 05-01, LSA 05-02, and LSA 05-03. The inspectors reviewed this report to determine if the results of the confirmatory surveys were similar to the licensee's and below the NRC approved DCGLs (IFI 07000036/2013003-01). The specific confirmatory survey activities performed were discussed in NRC IR's 07000036/2013001, 07000036/2013002, and 07000036/2013003.

b. Observations and Findings

The inspectors noted during the review of the ORAU report that three judgmental soil samples collected from survey unit LSA 05-01 exceeded the approved DCGLs. All other soil samples in this survey unit did not. The inspectors discussed these results with the licensee and determined the licensee's soil sample results were elevated in those same areas. The licensee had stopped remediating in those areas and could not remediate the areas any further because it was near Missouri State Road P and any further excavation could have destabilized the roadway. Since the licensee was performing their final status surveys in accordance with Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) methodology, they have stated they plan to evaluate these elevated results using the Elevated Measurement Comparison (EMC) method

allowed by MARSSIM. The licensee plans to provide this evaluation for NRC review in their submittal of the final status survey release record for survey unit LSA 05-01.

The inspectors also noted that ORAU discussed three elevated alpha-plus-beta surface scan areas on the concrete pad surveyed in survey unit LSA 05-01. This survey unit's main radionuclide of concern was Technetium-99, which is a beta radiation emitter. The inspectors evaluated the highest instrument response recorded by ORAU, and determined the result was less than the maximum activity allowed for beta radiation emitter contamination on surfaces.

In addition, the ORAU report stated, and the inspectors noted, that the results for the split soil samples taken during confirmatory survey activities indicated a high level of comparability between the licensee and ORAU radiological laboratories.

No findings of significance were identified.

c. Conclusions

The inspectors determined that the results of the confirmatory surveys demonstrated that gamma walkover surveys, concrete surface scans and activity measurements, and radionuclide concentrations in soil samples and smears documented in the ORAU report were consistent with the licensee's and below the NRC approved DCGLs, with a few exceptions. Three soil samples from survey unit LSA 05-01 were above the approved DCGLs, which will be evaluated by the licensee and submitted for NRC review at a later date. In addition, the inspectors determined that licensee analytical practices and procedures appear to be sufficient in providing quality radiochemical data. Due to the completion of the review of survey and sample results from LSA 05-01, LSA 05-02, and LSA 05-03, the NRC considers IFI 07000036/2013003-01 closed.

5.2 South Burial Pits Confirmatory Surveys

a. Inspection Scope

From December 17 through 19, 2013, the NRC contracted with ORAU to perform confirmatory surveys and sampling of survey units LSA 10-06 and LSA 10-07, both Class 1 survey units, to determine if residual radioactivity in the soil was less than the approved DCGLs discussed in the DP. These units are located in the south portion of the burial pits where the licensee has completed remediation and excavation activities. A gamma walkover survey and random soil sampling were performed in each area along with biased soil sampling, where necessary. On February 11, 2014, the inspectors received the confirmatory survey report for LSA 10-06 and LSA 10-07 from ORAU. The inspectors reviewed this report to determine if the results of the confirmatory surveys were similar to the licensee's and below the NRC approved DCGLs.

From January 22 through 23, 2014, the inspectors performed an independent confirmatory survey of survey unit LSA-10-05, a Class 1 survey unit, to determine if residual radioactivity in the soil was less than the approved DCGLs discussed in the DP. This survey unit is also located in the south portion of the burial pits. The inspectors performed an approximate 100% gamma walkover survey of the survey unit with a calibrated Sodium Iodide (NaI) scintillation detector and associated Global Positioning System (GPS) equipment to track and record the survey results (see Attachment 2). The inspectors also

collected six random soil samples. The samples were sent to ORAU, the NRC's contractor, for laboratory analysis. In addition, the inspectors reviewed the licensee's final status survey plan to determine if the survey unit was classified and surveys and sampling planned in accordance with MARSSIM and the DP.

b. Observations and Findings

The inspectors noted during the review of the ORAU report for LSA 10-06 and LSA 10-07 that an area in LSA 10-07 had count rates that exceeded the background count range. A soil sample was taken at this location and the result showed that this area was below the required DCGLs.

The inspectors' gamma walkover confirmatory survey results for LSA 10-05 are shown in Attachment 2 of this report as a survey map. The inspectors determined the general background for the survey to be about 14,000 counts per minute (cpm). The background varied depending on the surface of the area being surveyed, the surrounding topography, natural radiological variability and typical instrument response variations. This is shown on the survey map as the olive green shaded areas (count rates between 11,231 to 17,000 cpm).

Some areas displayed slightly higher readings, as depicted by the yellow shaded areas of the survey map (count rates between 17,000 cpm and 20,000 cpm). The inspectors determined that the higher readings were caused by the topography of the survey unit, which allowed an additional surface (the sidewall in addition to the ground) to contribute to the survey instrument response. Therefore, the inspectors did not consider the higher readings to be indicative of elevated contamination which would warrant additional radiological surveys.

The survey map also shows a discrete location with a corresponding note which contains a yellow and red shaded area with elevated count rates (count rates between 20,000 cpm and 26,030 cpm). The inspectors resurveyed the discrete location and could not reproduce the original survey results. The resurvey only identified general background count rates at the location. Therefore, the inspectors determined that the original elevated readings were due to an instrument anomaly.

The ORAU report documenting the soil sample results of LSA 10-05 was not complete at the conclusion of the inspection period. The final results of those soil samples will be discussed in a future inspection report once the final report is issued by ORAU and reviewed by the NRC (IFI 07000036/2014001-01).

No findings of significance were identified.

c. Conclusions

The inspectors determined that the results of the LSA 10-06 and LSA 10-07 confirmatory surveys demonstrated that gamma walkover surveys and radionuclide concentrations in soil samples documented in the ORAU report were consistent with the licensee's and below the NRC approved DCGLs.

The inspectors determined that the confirmatory gamma walkover survey results for LSA 10-05 were consistent with the licensee's results. The confirmatory gamma

walkover surveys did not indicate any elevated residual radioactivity in survey unit LSA 10-05 above the general background. The soil sample results will be discussed when available in a future inspection report (IFI 07000036/2014001-02). The inspectors also determined the licensee adequately classified and planned the survey and sampling methods in accordance with MARSSIM and the DP.

5.3 Reuse Piles 1 – 3 Confirmatory Surveys

a. Inspection Scope

On January 14, 2014, ORAU submitted a report (ML14036A282) to the NRC for the confirmatory survey activities performed of Reuse stockpiles 1, 2, and 3 since March 2013. These stockpiles contained overburden soils from the burial pit area that the licensee believed met the NRC approved DCGLs and could be used as backfill material onsite. The inspectors reviewed this report to determine if the results of the confirmatory surveys were similar to the licensee's and below the NRC approved DCGLs (IFI 07000036/2013001-01 and IFI 07000036/2013002-03). The ORAU confirmatory survey activities consisted of gamma walkover surveys, soil sampling and analysis to include split sample analysis, and licensee document reviews. The specific confirmatory survey activities performed were discussed in NRC IRs 07000036/2013001 and 07000036/2013002. The ORAU report also documents an evaluation of the licensee's soil sorting system that is currently onsite, which is discussed in Section 5.4 of this IR.

b. Observations and Findings

The inspectors noted during the review of the ORAU report that three locations of the Reuse stockpiles were identified to have elevated readings during gamma walkover surveys. Soil samples were taken at all three locations and the results showed that each area was below the required DCGLs. The ORAU report stated, and the inspectors also noted, that the results for the split soil samples taken during confirmatory survey activities indicated a high level of comparability between the licensee and ORAU radiological laboratories.

In addition, the inspectors noted that the ORAU report documented a number of issues surrounding observations of Hematite soil sampling activities. These issues were documented in NRC IR 07000036/2013002.

No findings of significance were identified.

c. Conclusions

The inspectors determined that the results of the confirmatory surveys demonstrated that gamma walkover surveys and radionuclide concentrations in soil samples documented in the ORAU report were consistent with the licensee's and below the NRC approved DCGLs. In addition, the inspectors determined that licensee analytical practices and procedures appear to be sufficient in providing quality radiochemical data. Due to the completion of the review of survey and sample results from Reuse stockpiles 1, 2, and 3, the NRC considers IFIs 07000036/2013001-01 and 07000036/2013002-03 closed.

5.4 Reuse Soil Stockpiles Resurvey Process

a. Inspection Scope

The inspectors, with assistance from ORAU personnel, reviewed the licensee's new process and evaluation for detecting fuel pellets or discrete radioactive materials and localized areas of contamination in reuse stockpiles 1 and 3 through 7 (IFI 07000036/2013003-02). As discussed in the previous IR, the licensee had developed two processes to resurvey the material in the reuse piles and the inspectors had completed the review for the reuse stockpile 2 process. After the issuance of that IR, the licensee decided not to perform the process reviewed for reuse pile 2 and to instead, include reuse stockpile 2 materials into the new process being evaluated in this section. Therefore, all reuse stockpiles 1 through 7 will be evaluated for discrete radioactive materials and localized areas of contamination by the licensee's new process. The purpose of the inspectors' review was to determine if the licensee's new process and associated system alarm set point evaluation was adequate to detect discrete radioactive material and localized areas of contamination. During the inspection period, the licensee revised the alarm set point evaluation twice. All three versions of the evaluation were reviewed.

This new resurvey process consists of surveying all soils in reuse stockpiles 1 through 7 in the ISO-PACIFIC S3 soil sorting system. This system is comprised of NaI detectors that survey the soils on a conveyor belt that then directs the soils to either a "clean" or "dirty" pile, depending on whether any of the NaI detectors record a result higher than the set point input into the system. The inspectors and ORAU personnel focused the majority of their review on the alarm set point evaluation performed by the licensee. In addition, the inspectors and ORAU personnel performed independent testing of the system by adding fuel pellets to known clean soils on the conveyor belt. The system readings vs. the set point were observed as well as whether the system rejected the fuel pellet appropriately and sent it to the "dirty" pile. The tests the inspectors and ORAU performed used the same fuel pellets within the same configurations as Hematite did when they performed their own testing of the system.

b. Observations and Findings

The inspectors noted during their review of the soil sorting system and the associated evaluation that the initial configuration and alarm set points were conservative and diverted all contaminated material as expected, along with a substantial amount of "clean" soil. This observation was also noted by the inspectors' during their review of the ORAU report documenting their evaluation of the soil sorter. The ORAU evaluation was documented in the Reuse stockpiles 1, 2, and 3 report discussed in Section 5.3 above.

The licensee, in response to the substantial amount of "clean" soil that was being rejected, revised their evaluation of the soil sorting system and changed the alarm set point to a less conservative value. The inspectors noted during the review of the revised evaluation that the licensee had adequately justified the new alarm set point using both analytical and new test data. It would still ensure discrete material (fuel pellets) and localized areas of contamination would be appropriately rejected to the "dirty" pile.

In December 2013, the licensee revised the system configuration and evaluation of the soil sorting system alarm set point for a second time to decrease the amount of "clean"

material that the licensee had determined was rejected to the “dirty” pile. This evaluation also consisted of both analytical and new test data. The inspectors developed some questions and concerns after their review of the second revision to the alarm set point evaluation. For example, (1) a test data point from the first round of the soil sorter system testing was not included in the evaluation and (2) it appeared no calculation was performed for the probability of the error for discrete material (fuel pellets) passing through the system without being appropriately rejected. The licensee developed a response to the inspectors’ questions and concerns and the NRC will review it during the next inspection period to determine its adequacy (IFI 07000036/2014001-03).

No findings of significance were identified.

c. Conclusions

The inspectors determined that the licensee adequately evaluated and configured the ISO-PACIFIC S3 soil sorting system to resurvey the reuse soil stockpiles for discrete materials (fuel pellets) and localized areas of contamination during the initial and first revision to the system configuration and alarm set point. The second revision to the alarm set point is currently under NRC review and the results will be documented in a future inspection report.

5.5 Joachim Creek Flash Flood Event

a. Inspection Scope

The inspectors reviewed the licensee’s “Joachim Creek Flash Flood Event” technical report to determine the radiological impact on surrounding land resulting from a rain and flooding event which occurred on April 18, 2013.

b. Observations and Findings

On January 27, 2014, the licensee issued technical report HDP-RPT-EM-006 titled “Joachim Creek Flash Flood Event,” which documented the impact of a rain and flooding event that affected the site on April 18, 2013.

The inspectors reviewed the report content and requested additional information to support the licensee’s conclusion that the radiological results identified no area requiring additional cleanup or removal of material attributable to the flood (IFI 07000036/2013002-02). The NRC plans to compare the licensee’s data with radiological samples taken in flood affected areas by NRC inspectors. The samples were analyzed by ORAU and results were provided to the NRC in a report dated June 5, 2013 (ML13162A793). Additional information from the licensee is necessary to ensure that the areas are appropriately classified during the performance of FSS.

c. Conclusions

The NRC could not fully review the impact of the Joachim Creek Flash Flood Event on the licensee’s site due to a lack of information. The NRC will continue to review the licensee’s assessment of the Joachim Creek Flash Flood Event as additional information from the licensee is necessary to ensure that the areas are appropriately classified during the performance of FSS. Therefore, IFI 07000036/2013002-02 remains open.

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Westinghouse Electric Company

J. Smetanka, Managing Director, Hematite Decommissioning Project
D. Richardson, Deputy Director, Hematite Decommissioning Project
J. Guido, Radiation Safety Officer
K. Davis, Manager, Licensing/Environmental
J. Gearhart, Quality Assurance
R. Neveau, Rad Engineer/FSS
M. Bresnahan, Health Physics

INSPECTION PROCEDURES

IP 88005	Management Organization and Controls
IP 83822	Radiation Protection
IP 88035	Radioactive Waste Management
IP 88045	Effluent Control and Environmental Protection
IP 83890	Closeout Inspection and Survey

ITEMS OPENED, CLOSED, AND DISCUSSED

<u>Opened</u>	<u>Type</u>	<u>Summary</u>
NCV 07000036/2014001-01	NCV	Failure to complete Form HDP-PR-LI-005-2
NCV 07000036/2014001-02	NCV	Failure to document Conclusions on Form HDP-PR-LI-005-2
IFI 07000036/2014001-01	IFI	LSA 10-05 Sample Results
IFI 07000036/2014001-02	IFI	Soil Sorting System Set Point Change Review
<u>Closed</u>	<u>Type</u>	<u>Summary</u>
NCV 07000036/2014001-01	NCV	Failure to complete Form HDP-PR-LI-005-2
NCV 07000036/2014001-02	NCV	Failure to document Conclusions on Form HDP-PR-LI-005-2
IFI 07000036/2013001-01	IFI	ORAU Reuse Pile 2 Surveys and Sample Results
IFI 07000036/2013002-01	IFI	Monitor CAP Trending

IFI 07000036/2013002-03	IFI	ORAU Reuse Piles 1 and 3 Surveys and Sample Results
IFI 07000036/2013003-01	IFI	ORAU LSA 05-01, 05-02, and 05-03 Surveys and Sample Results
IFI 07000036/2013003-02	IFI	Reuse Piles 1 and 3 – 7 Resurvey Evaluation Process

Discussed

IFI 07000036/2013002-02	IFI	Flash Flood Event Report Review
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LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
CAP	Corrective Action Program
CFR	Code of Federal Regulations
cpm	counts per minute
DCGL	Derived Concentration Guideline Level
DNMS	Division of Nuclear Materials Safety
DP	Decommissioning Plan
EMC	Elevated Measurement Comparison
GPS	Global Positioning System
HDP	Hematite Decommissioning Project
HPT	Health Physics Technician
HQ	Headquarters
IFI	Information Follow-Up Item
IP	Inspection Procedure
IR	Inspection Report
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
NaI	Sodium Iodide
NCV	Non-Cited Violation
NRC	U.S. Nuclear Regulatory Commission
ORAU	Oak Ridge Associated Universities
PQP	Project Quality Plan
QA	Quality Assurance
SER	Safety Evaluation Report
Tc-99	Technetium-99
WEC	Westinghouse Electric Company
WHA	Waste Handling Area

DOCUMENTS REVIEWED

The following is a list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspectors reviewed the documents in their entirety, but rather, that selected sections of portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

Decommissioning Plan, "Hematite Decommissioning Plan," dated August 2009 (ML092330136)

HDP-ECC11-WP-001, "Site Preparation and Maintenance Work Activities" Revision 4

HDP-ECC13-WP-010, "Soil Sorting System," Revision 0

HDP-ECC13-WP-011, "Isolation and Control Measures," Revision 0

HDP-ECC13-WP-013, "Sanitary Wastewater Treatment Plant Sludge Pumping & Filter Press Operation," Revision 0

HDP-ECC13-WP-014, "Rail Area Modifications," Revision 0

Form HDP-PR-HP-311-1, "Radiological Survey Report":

"Contamination/gamma walkover survey of radium soil spill from B-25 box into RMA area," dated December 9, 2013

Form HDP-PR-HP-311-3, "Radiological Survey Report – Walkover Surveys":

"Contamination/gamma walkover survey of radium soil spill from B-25 box into RMA area," dated December 9, 2013

Form HDP-PR-HP-413-1, "ISOCS Sample Verification Form":

"UO2 Pellet Fragment," dated June 5, 2013

"Pellet Fragment Identified in between Stockpiles 5 and 6 on 7/17/13," dated July 18, 2013

"Pellet Fragment found in LSA-05-03 on 7/18/13," dated July 18, 2013

"Pellet Fragment," dated July 29, 2013

"fuel pellet 80Kncpm," dated September 3, 2013

"fuel pellet 57Kncpm," dated September 18, 2013

"Fuel Pellet Collected from LSA-05-03 on 9-17-13," dated September 20, 2013

HDP-INST-FSS-LSA10-05, "Final Status Survey Plan and Instructions for Survey Area & Unit: LSA 10-05," Revision 0

HDP-INST-FSS-LSA10-06, "Final Status Survey Plan and Instructions for Survey Area & Unit: LSA 10-06," Revision 1

HDP-INST-FSS-LSA10-07, "Final Status Survey Plan and Instructions for Survey Area & Unit: LSA 10-07," Revision 1

HDP-PO-HP-100, "Radiation Protection Plan," Revision 2

HDP-PO-PSP-002, "Protection of Safeguards Information and Security-Related Information," Revision 2

HDP-PO-QA-001, "Project Quality Plan (PQP)," Revision 1

HDP-PR-EHS-004, "Stop Work Authority," Revision 3

HDP-PR-HP-311, "Radiological Surveys," Revision 1

HDP-PR-HP-601, "Remedial Action Support Surveys," Revision 21

HDP-PR-HP-602, "Data Package Development and Isolation and Control Measures to Support Final Status Survey," Revision 1

HDP-PR-LI-005, "Facility Change Management," Revision 3

HDP-RPT-EM-006, "Joachim Creek Flash Flood Event," Revision 0.1

HDP-TBD-HP-406, "Preliminary Evaluation and Test Plan for ISO 3 for Assaying and Segregating Soil at HDP that is Potentially Contaminated with Uranium," Revision 0

HEM-11-25, Attachment 1, Figure 5, "Location of Monitoring Wells Central Site Tract," Revision 5

HEM-11-25, Attachment 1, Figure 9, "Groundwater Elevation Jefferson City Formation 3Q10," Revision 3

HEM-13-144, "Hematite Decommissioning Project: Report of Trace Investigation of Railcar Shipment Manifest Number RW-13-456 (License No. SNM-00033, Docket No. 070-00036)," dated November 27, 2013

HEM-13-153, "Hematite Decommissioning Project: Report of Trace Investigation of Railcar Shipment Manifest Number RW-13-494 (License No. SNM-00033, Docket No. 070-00036)," dated December 19, 2013

HEM-13-MEMO-094, "Evaluation of the ISO-PACIFIC S3 Soil Sorting System," dated November 12, 2013

HEM-13-MEMO-097, "Evaluation of the ISO-Pacific S3 Soil Sorting System," dated November 15, 2013

HEM-13-MEMO-102, "Evaluation of the ISO-Pacific S3 Soil Sorting System," dated December 13, 2013

ISO-01, Appendix A, "Hematite Calibration Procedure," dated November 11, 2013

Issue Report 13-266-W007, "Transmitted Safeguards Information to the NRC Inner Package did not contain the name of the recipient," dated September 23, 2013

Issue Report 13-317-W007, "Time Out Directive for 'Radium Plate Area'," dated November 13, 2013

Issue Report 13-345-W010, "independent contractor slipped (back injury)," dated December 11, 2013

Issue Report 13-346-W010, "B-25 box tipped over spilling content during attempted forklift transport from the WCA," dated December 12, 2013

Issue Report 13-351-W002, "HP technician Operating Large Excavator," dated December 17, 2013

Issue Report 13-353-W007, "Assess Project Conditions Related to Employee Perceptions," dated December 19, 2013

Issue Report 13-354-W013, "improperly labeled radioactive material," dated December 20, 2013

Issue Report 14-028-W001, "Form HDP-PR-LI-005-2 for HDP-TBD-WM-910 r0 Was Incompletely Filled In," dated January 28, 2014

NRC License Number SNM-00033, "Westinghouse Electric Company LLC," Amendment No. 63 (ML13280A397)

NRC SER, "U.S. NRC Safety Evaluation Report on Westinghouse Amendment Request for Approval of Hematite Decommissioning Plan and Associated Supporting Documents," dated October 2011 (ML112101630)

ORAU, "Final Report for Independent Confirmatory Survey Summary and Results for Survey Units LSA 05-01, LSA 05-02 and LSA 05-03 for the Hematite Decommissioning Project, Festus, Missouri," dated January 14, 2014 (ML14036A284)

ORAU, "Final Report for Independent Confirmatory Survey Summary and Results of Reuse Stockpiles 1, 2, and 3 for the Hematite Decommissioning Project, Festus, Missouri," dated January 14, 2014 (ML14036A282)

ORAU, "Final Interim Report - Independent Confirmatory Survey Summary and Results for Survey Units LSA 10-06 and LSA 10-07 for the Hematite Decommissioning Project, Festus Missouri," dated February 20, 2014

WP-ECC-2010-508, "Handling and Transport of Fissile Material," Revision 8

