

July 23, 2009

EA-09-084
CAL 3-08-005
NMED 080232
NMED 080802

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

SUBJECT: NRC INSPECTION REPORT 070-00036/08-02(DNMS) - WESTINGHOUSE
ELECTRIC COMPANY (HEMATITE) AND NOTICE OF VIOLATION

Dear Mr. Hackmann:

This refers to the U.S. NRC inspection conducted between November 17, 2008 and June 24, 2009 at the Westinghouse Hematite decommissioning facility (Inspection Report No. 070-00036/08-002(DNMS), enclosed). 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, quality assurance, corrective action, and effluent control and environmental protection. The enclosed report presents the results of this inspection, which were discussed with you in a telephone exit meeting on June 24, 2009.

This inspection was an examination of activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel.

Based on the results of this inspection, the NRC has determined that five apparent violations were identified and are being considered for escalated enforcement action in accordance with the NRC Enforcement Policy. The current Enforcement Policy is included on the NRC's Web site at <http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html>.

The apparent violations include: 1) informing the NRC that there was less than 250 grams of uranium-235 (U-235) in the Process Buildings, which was not complete and accurate information, 2) deactivating the criticality alarms in the Process Buildings without an exemption from Part 10 CFR 70.24(a), 3) using instrumentation for licensed activities that was not properly calibrated, 4) failing to conduct adequate surveys to quantify U-235 in process piping and on building surfaces, and 5) failing to adequately train Health Physics Technicians. Since the NRC has not made a final determination in these matters, a Notice of Violation is not being issued for these inspection findings at this time. In addition, please be advised that the number and characterization of apparent violations described in the enclosed inspection report may change as a result of further NRC review.

An open Predecisional Enforcement Conference to discuss these apparent violations was discussed with you during the June 24, 2009 exit meeting. You stated you would contact us for a date for this conference following receipt of the inspection report. This conference will be conducted at the NRC Region III office in Lisle, Illinois, and will be open to public observation in accordance with Section V of the NRC Enforcement Policy.

The decision to hold a Predecisional Enforcement Conference does not mean that the NRC has determined that a violation has occurred or that enforcement action will be taken. This conference is being held to obtain information to assist the NRC in making an enforcement decision. This may include information to determine whether a violation occurred, information to determine the significance of a violation, information related to the identification of a violation, and information related to any corrective actions taken or planned. The conference will provide an opportunity for you to provide your perspective on these matters and any other information that you believe the NRC should take into consideration in making an enforcement decision. In presenting your corrective actions, you should be aware that the promptness and comprehensiveness of your actions will be considered in assessing any civil penalty for the apparent violations. The guidance in the enclosed NRC Information Notice 96-28, "Suggested Guidance Relating to Development and Implementation of Corrective Action," may be helpful.

You will be advised by separate correspondence of the results of our deliberations on this matter. No response regarding these apparent violations is required at this time.

In addition, two Severity Level IV violations of NRC requirements occurred. The violations were evaluated in accordance with the NRC Enforcement Policy. The first violation is cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding it are described in detail in the subject inspection report. The violation is being cited in the Notice because the NRC identified the issue. The violation involved a failure to provide a timely 24-hour report to the NRC following the discovery of unexpected residual U-235 contamination in the Process Buildings.

You are required to respond to the violation and should follow the instructions specified in the enclosed Notice when preparing your response. The NRC will use your response, in part, to determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

The second violation is being treated as a Non-Cited Violation (NCV), consistent with Section VI.A of the Enforcement Policy. The NCV is described in the subject inspection report. If you contest the violation or significance of the NCV, 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: (1) the Regional Administrator, Region III; and (2) the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from

E. Hackmann

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the NRC Web site at <http://www.nrc.gov/readingrm/adams.html>. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

Sincerely,

/RA By P. Loudon, Acting for/

Steven A. Reynolds, Director
Division of Nuclear Materials Safety

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

Enclosures:

1. Notice of Violation
2. Inspection Report 070-00036/08-02(DNMS)
3. NRC Information Notice 96-28

cc w/encls: D. Childers, Director, Missouri Department of Natural Resources
R. A. Kucera, Director, Intergovernmental Cooperation
Missouri Department of Natural Resources
E. Gilstrap, Missouri Department of Natural Resources

the NRC Web site at <http://www.nrc.gov/readingrm/adams.html>. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

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R. A. Kucera, Director, Intergovernmental Cooperation
Missouri Department of Natural Resources
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NOTICE OF VIOLATION

Westinghouse Electric Company, LLC
Festus, Missouri

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

During an NRC inspection conducted from November 17, 2008 through June 24, 2009, a violation of NRC requirements was identified. In accordance with the Enforcement Policy, the violation is listed below:

10 CFR Part 70.50(b), states, in part, that "Each licensee shall notify the NRC within 24 hours after the discovery of any of the following events involving licensed material: (2) An event in which equipment is disabled or fails to function as designed when: (i) The equipment is required by regulation or licensee condition to prevent releases exceeding regulatory limits, to prevent exposures to radiation and radioactive materials exceeding regulatory limits, or to mitigate the consequences of an accident; (ii) The equipment is required to be available and operable when it is disabled or fails to function; and (iii) No redundant equipment is available and operable to perform the required safety function.

10 CFR 70.24(a) states, in part, that, "Each licensee authorized to possess special nuclear material in a quantity exceeding 700 grams of contained uranium-235 ... shall maintain in each area in which such licensed special nuclear material is handled, used, or stored, a monitoring system meeting the requirements of either paragraph (a)(1) or (a)(2), as appropriate, and using gamma- or neutron-sensitive radiation detectors which will energize clearly audible alarm signals if accidental criticality occurs..."

Contrary to the above, the licensee failed to notify the NRC within 24 hours of its discovery, on November 11, 2008, of an event in which equipment was disabled when: 1) the equipment was required by regulation to prevent exposures to radiation exceeding regulatory limits or to mitigate the consequences of an accident; 2) the equipment was required to be able to be available and operate, and; 3) no redundant equipment was available and operable to perform the required safety function. Specifically, the licensee did not report, within 24 hours of its discovery on November 11, 2008, the presence of special nuclear material in a quantity greater than 700 grams in Process Building piping without the concurrent maintenance of a nuclear criticality accident monitoring system or other redundant equipment to perform the required safety function. The licensee had deactivated the previously installed nuclear criticality accident monitoring system between February 21 and March 22, 2006. The licensee notified the NRC of its discovery on November 19, 2008, eight days after its discovery of the event.

This is a Severity Level IV violation (Supplement VII).

Pursuant to the provisions of 10 CFR 2.201, Westinghouse Electric Company, LLC is hereby required to submit a written statement or explanation for the violation, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555, with a copy to the Regional Administrator, Region III, within 30 days of the date of the letter transmitting this Notice. This reply should be clearly marked as a "Reply to a Notice of Violation" and should include: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full

Enclosure 1

compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action, as may be proper, should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>, to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days.

Dated this 23rd day of July 2009

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No.: 070-00036

License No.: SNM-00033

Report No.: 070-00036/08-02(DNMS)

Licensee: Westinghouse Electric Company, LLC

Facility: Former Hematite Fuel Manufacturing Facility

Location: 3300 State Road P
Festus, Missouri

Dates: Onsite: November 17-21, 2008, January 5-9, 2009,
and January 26-30, 2009
In-Office: February 2, 2009 – June 24, 2009

Inspectors: William Snell, Senior Health Physicist, Region III
George M. McCann, Senior Health Physicist, Region III
Jeremy Tapp, Health Physicist, Region III
Bruce Watson, Senior Health Physicist, FSME
John Clements, Health Physicist, FSME
Tamara Powell, Criticality Specialist, NMSS

Approved by: Christine Lipa, Chief
Materials Control, ISFSI, and Decommissioning
Branch, DNMS, RIII

EXECUTIVE SUMMARY

Westinghouse Electric Company, LLC HEMATITE FUEL MANUFACTURING FACILITY NRC Inspection Report 070-00036/08-02(DNMS)

This inspection evaluated the Westinghouse Electric Company's (WEC) performance related to decommissioning of the Hematite facility, including management organization and controls, radiation protection, quality assurance, corrective action, and effluent control and environmental protection. The inspection also included a review of two licensee 30-day Event Reports and actions taken per Confirmatory Action Letter 3-08-005.

Management Organization and Controls

- The licensee's management continues to work towards re-establishing management expectations related to strict compliance with Hematite license requirements and the programs and procedures required by the license. The licensee's management continues to work on key management staffing issues, and to address a high number of self-identified pre-existing issues that involve license, program, and/or procedural non-compliances. The licensee is also working to improve its Corrective Actions Process (CAPs) to ensure timely and adequate evaluation and follow-up on program deficiencies. Through the CAPs the licensee has identified the need to significantly improve compliance with its training program, radiation safety oversight/audit process, and the conduct of radiological surveys. (Section 1.0)

Emergency Response

- A review of the licensee's policies and procedures involving the capability to respond to a site emergency identified issues where the licensee had not maintained the expected number of qualified and trained personnel to assume the role of Emergency Manager during a site emergency. The licensee satisfactorily addressed these issues in addition to recently completing a review and update of the site Emergency Project Plan and associated procedures. (Section 2.0)

Environmental Monitoring

- The licensee was complying with the environmental monitoring commitments specified in Chapter 5, Environmental Protection, of its license. An interlaboratory comparison of soil sample analyses between WEC and the NRC resulted in comparable results. (Section 3.0)

Radiation Protection Program

- The inspectors concluded there were performance problems in the licensee's Radiation Protection Program. Apparent violations were identified for a failure to provide complete and accurate information regarding a licensing action, for removing the criticality alarms without prior NRC approval, for using instrumentation that was not properly calibrated, for conducting inadequate surveys, and for failing to adequately train Health Physics Technicians (HPTs). A violation was also cited for a failure to provide a timely 24-hour

notification to the NRC after discovering the presence of special nuclear material in a quantity greater than 700 grams in Process Building piping without the concurrent maintenance of a nuclear criticality accident monitoring system or other redundant equipment to perform the required safety function. (Section 4.0)

- The inspectors concluded there were deficiencies with the licensee's measurement program for the detection of alpha and beta surface contamination and gamma dose rate measurements. The licensee had been actively conducting surveys to characterize the contamination levels throughout the site and had identified previously unidentified contaminated materials, equipment and soils. (Section 4.0)

Report Details¹

1.0 Management Organization and Controls (88005)

a. Inspection Scope

The inspectors interviewed the licensee's Radiation Safety Officer (RSO), the Corrective Actions Director (CAD), the Corrective Actions Manager (CAM), members of the Project Oversight Committee (POC), and other Westinghouse (WEC) management and staff personnel to evaluate the licensee's compliance with NRC license conditions, and regulatory requirements pertaining to implementation of the licensee's management oversight and corrective actions process (CAPs). The inspectors also observed the activities of the licensee's Corrective Action Review Board (CARB) during two routine meetings. The inspectors reviewed and evaluated the licensee's policies, procedures, practices, and documentation related to activities, duties, and responsibilities. The inspectors reviewed the licensee's 2006, 2007, and 2008 POC quarterly and annual program review meeting minutes, as well as Corrective Action Reports, Open Issue Reports, Root Cause Analysis (RCA) reports, and management tracking systems and reports used to track corrective actions; and records of audits and surveillances, which were created during 2006, 2007, 2008, and early 2009.

The licensee's management tracking and CAPs reports and documents were created and maintained pursuant to Chapter 2 of WEC's license application and WEC internal policies and procedures, such as HDP-PR-QA-020, *HDP Corrective Actions Process*, Rev. 0, effective date, November 14, 2008; PR-QA-004, *Nonconformance*, Rev. 1, effective date, October 5, 2007; PO-GM-004, *Project Oversight Committee Charter*, Rev. 0, effective date, August 15, 2005; WEC 14.4, *Westinghouse Corrective Action Process*, Rev. 8, effective date, February 29, 2008; WEC 14.5, *Root Cause Analysis*, effective date, February 29, 2008; WEC 14.10, *Corrective Action Review Board*, and; WEC 21, *Identification and Reporting of Conditions Adverse to Safety*, effective date, July 15, 2005.

b. Observations and Findings

Management

The licensee's Decommissioning Project Director discussed with the NRC inspectors the initiatives and challenges the current WEC Hematite management faced upon taking over leadership of the project. Specifically, the Decommissioning Project Director indicated that starting at the end of calendar year 2007, it was necessary to employ essentially an entirely new management team, as a result of the project being in a shut-down mode for approximately 1½ - 2 years. Additionally, the Director indicated his staff

¹A list of acronyms used in the report is included at the end of the Report Details.

faced a significant number of high demand issues, such as the development of a decommissioning plan, responding to a number of reportable incidents, revision of site procedures, and the necessity to address a significant number of self-identified deficiencies and NRC violations. The Director indicated that he had confidence in his current staff, and that they would succeed in meeting the challenges, but that it would take some time for him and his staff to work through the issues.

The licensee's staffing levels and personnel qualifications for supervisory and managerial positions were consistent with the requirements of the licensee's Project Management Plan (PMP). However, the NRC inspectors expressed concern that the Licensing Manager position had been filled by five different persons within the previous year. The licensee's Project Director indicated that due to the high competition for personnel with nuclear licensing experience, it had been difficult to retain individuals in this position. To address this issue, the licensee was using qualified persons from other WEC facilities on an interim basis until a permanent qualified licensing person was employed.

Additionally, the inspectors discussed with the Decommissioning Project Director their concerns regarding the significant additional ancillary duties and responsibilities placed on key functional managers in addition to their day-to-day responsibilities. Specifically, it was noted that the site functional managers are members of the POC, Independent Review Group (IRG), CARB, and the decommissioning plan development team. The inspectors also noted cases where certain key group members participated in meetings telephonically, and seldom visited the site.

Project Oversight Committee (POC)

The licensee's POC met quarterly during the calendar years of 2006, 2007, and 2008 according to license commitments. The POC membership consisted of the licensee's functional site managers, including the Radiation Safety Officer, Licensing Manager, Quality Assurance (QA) Manager, Operations Manager, Environmental, Health and Safety Manager, Environmental Engineering Manager, Chairperson and Secretary. Other WEC personnel responsible for specific technical or administrative functional areas participated in the meetings on an as needed basis. The POC meeting minutes included the date and time of the meeting, members present, a summary of the deliberations and discussions, recommendations, and actions taken or needed, as specified in Section 7.4 of WEC Policy PO-GM-004, *Project Oversight Committee Charter*.

The POC meeting minutes contained discussions of general topic areas, such as: review of new open items, which included Issue Reports; Root Cause Analysis Reports; status of WEC licensing activities, which included both current amendment activities, as well as preparation of a decommissioning plan; findings resulting from NRC Inspections and actions to address the inspection findings; licensee actions related to 30-Day Reports to the NRC; operations and license activities and changes which require POC Approval; discussion and summary of CAPs Issues; radiation protection program update and review of unusual radiological events; significant work activities since the last POC meeting and upcoming work; and the status of environmental health and safety issues.

The POC minutes indicate that the licensee was actively working to address the timeliness of old issues and deficiencies, as well as a significant number of self-identified deficiencies and violations identified by the NRC. Specifically, it was noted in the POC Meeting Minutes for the Second Quarter 2008, which was held on May 14, 2008, that the open CAPs issues were summarized by the QA Manager who discussed the current effort to create a site-specific CAPs process. The licensee stated this would allow a more efficient treatment of legacy issues that continue to be discovered at Hematite, and are currently tracked under the umbrella of the corporate CAPs program. It was noted in the licensee's meeting minutes for the Third Quarter 2008 POC Meeting on September 10, 2008, that the POC discussed the completion of a review of CAPs issues self-identified over the past several years, and that the review indicated that during 2006 the number of self-identified issues dropped. This drop was assumed to be primarily the result of reductions in staff and work activities. However, the licensee's minutes indicate that beginning in 2007 the trend shows an increasing self-identification of issues as demonstrated by the number of issues entered into the CAPs system. The licensee indicated that the improvement in self-identification of issues was an indication of healthy and robust implementation of the CAPs program. The POC Minutes go on to indicate that the Hematite Decommissioning Project has also improved the issuance of corrective action review responses, as well as objective documentation of corrective actions taken.

Corrective Action Program

The licensee generated Issue Reports, Apparent Cause Analysis (ACA) Reports, and RCA Reports, which were generally compliant with the licensee's CAPs policy and procedures. The licensee's CAPs is designed to self-identify, analyze, and implement corrective actions to prevent the recurrence of failures to comply with company policies, NRC license provisions and NRC requirements. The licensee's reports described actions involved with the identification of non-compliances; the assignment of responsibility for corrective action; the documentation of the cause and corrective action taken; the implementation, evaluation, and verification of corrective action to prevent recurrence; and the reporting of the issues to the appropriate levels of management.

The licensee, in accordance with its corrective action procedures and policies, generated nine, fifty, and eighty-two new Issue Reports for calendar years 2006, 2007, and 2008, respectively. During calendar years 2007 and 2008, the licensee closed twenty-four and ninety-three Issue Reports, respectively. The licensee's CAPs Open Items Report HEM-IR-0109-003, dated January 26, 2009, identified eighty-nine Open Issues, which were broken down by program areas as follows: Licensing 3, Project Control 10, Environmental Engineering 7, Security 2, Operations 1, Quality Assurance 13, Environmental, Health and Safety 24, and Radiation Protection 29. Of the eighty-nine Open Issues, nine were specified for an ACA and nine for a RCA.

The licensee's procedure HDP-PR-QA-020, *Corrective Actions Process*, specifies report completion due dates in Section 7.27.11, as guidelines, which are based on the type of report being generated (Issues Report, ACA or RCA). The completion guidelines are 30 days for ACAs, 75 days for RCAs, and for low and medium issues the dates are set based on the issue impact, urgency and operational priority. The noted report completion dates reflected a generally adequate agreement for compliance with due dates for the existing ACAs and low/medium issues. However, the noted completion dates for all except one of the nine existing RCAs, significantly exceeded the 75 day

guideline limit. Also, Section 6.1, of the procedure specifies that WEC personnel are responsible for the prompt identification of issues, and under normal circumstances, reporting should occur within one business day of discovery. The licensee's Issue Report # 08-290-C001, created on October 16, 2008, noted that during an internal WEC Audit A-0908-001, the following issues were identified as a result of a trend analysis of the current fiscal year corrective actions: (1) High Level CAPs issues were not being closed in the 75 day guideline period, per Section 7.11 of WEC 14.4, (2) Closed issues were being re-opened during review by the Issue Review Committee weekly meeting primarily due to lack of documented objective evidence or inadequate objective evidence for closure, and (3) CAPs Issues were not always generated within the one business day of discovery per Section 6.0 of WEC 14-4. The licensee's QA Program was assigned to address these issues, with an assigned completion date of February 26, 2009.

On February 11, 2009, the QA Manager briefed the Issue Review Committee (IRC) regarding actions to address the Issue Report as follows:

1. Actions taken to improve WEC RCA performance regarding CAPs issues exceeding 75 days.

The use of off-site Root Cause Analysts with whom site management had little control over timeliness of completing analysis, was a primary causative factor for RCAs exceeding 75 days. The licensee had previously identified the need to train site personnel to conduct root cause analyses, and had selected six in-house WEC personnel to attend off-site RCA training, which was completed during July and August 2008. The use of in-house personnel for RCAs should mitigate the time frames for the assessments going forward.

Another factor identified as delaying the completion of RCAs was the processing of legacy program performance issues. The licensee defines a legacy issue as an issue discovered during the Hematite Decommissioning Project that occurred or was the result of activities no longer performed by plant personnel.

To address this issue, the licensee revised procedure HDP-PR-QA-020, WEC's Corrective Action Process, to address legacy program issues that continue to be discovered and according to procedure require a RCA. As a result of revising the procedure the licensee was able to reclassify 7 pending RCAs to lower significant CAPs evaluation status types, which would enable the licensee to focus resources on higher level CAPs issues that were of more immediate concern.

2. Actions taken to address closed issues that are re-opened during Issue Review Committee meetings, and actions to address the timeliness of the creation of CAPs issues.

The licensee determined that the primary cause for having to reopen closed Issue Reports was the lack of objective evidence attached with the commitments during review by the Issue Review Committee.

To address this issue, the licensee emphasized to its operations managers who were also the issue owners, the requirements necessary to document objective evidence to accept and close commitments as well as clearly written responses. The operations

managers were directed to meet with their staff to discuss the detail and type of information needed to document adequate closure of issue and commitment reports. The licensee indicated that this issue would be closely followed and discussed during weekly IRC meetings. Even though the one day Issues Report creation timeframe was considered a guideline, the licensee also required all operations managers to re-enforce within their groups the responsibility requirements of site personnel for prompt identification of operational issues in one business day. Issue Report # 08-290-C001 was subsequently closed on February 23, 2009.

The inspectors' review of the licensee's CAPs Open Items Report HEM-IR-0109-003, dated February 13, 2009, identified seventy-five Open Issues, which were broken down by program areas as follows: Licensing 4, Project Control 6, Environmental Engineering 6, Security 1, Operations 0, Quality Assurance 12, Environmental, Health and Safety (EHS) 25, and Radiation Protection 25. Of the seventy-five issues, two were specified for ACAs, and two for RCAs. One of the RCAs was under legacy review and the other was within review time guidelines. The inspectors noted that the listing of the EHS Issues Reports indicated that eight of the EHS reports dealt with issues regarding compliance with training program requirements. Further, the inspectors' review of the listing of Radiation Safety Program Issue Reports noted that in general terms approximately four of the issues were associated with material control, ten with compliance with audit and oversight requirements, and the remainder involved radiological survey and procedural compliance issues.

c. Conclusion

The licensee's management continues to work towards re-establishing management expectations related to strict compliance with Hematite license requirements and the programs and procedures required by the license. The licensee's management continues to work on key management staffing issues, and to address a high number of self-identified pre-existing issues that involve license, program, and/or procedural non-compliances. The licensee was also working to improve its CAPs to ensure timely and adequate evaluation and follow-up on program deficiencies. Through the CAPs the licensee has identified the need to significantly improve compliance with its training program, radiation safety oversight/audit, and the conduct of radiological surveys.

2.0 Emergency Response (88005)

a. Inspection Scope

The inspectors reviewed the licensee's, policies, procedures, and license commitments involving the capability to respond to a site emergency.

b. Observations and Findings

During the November 2008 inspection, the inspectors reviewed the licensee's procedures for response to onsite emergencies. Procedure PR-GM-101, *Initial Emergency Actions*, dated January 21, 2004, defined the role of an Emergency Manager who would have the "overall responsibility for commanding the facility's response to an emergency." Appendix A to PR-GM-101 listed the name of the individual who would be the Emergency Manager and four alternates. However, only one of the individuals listed

(an Alternate) was still employed at Hematite, and at least two of the individuals had ceased employment over two years earlier. The licensee was also unable to provide records that the remaining individual had received any formal training in the Emergency Manager position or related procedures. Following a discussion with the licensee regarding this issue during the January 5-9, 2009 inspection, the licensee subsequently identified 4 individuals as replacement Emergency Managers that would be added to Appendix A of PR-GM-101. The inspectors determined that these individual's normal job positions were a junior health physics technician, a health physics technician, a warehouse technician, and an operations technician, all of whom had completed a generic Hazmat Incident Response Awareness and Operations training on January 14, 2007. The inspectors expressed concern over the lack of management and emergency response management experience of the individuals identified by Hematite for the Emergency Manager role. In addition, there was no indication that any of the individuals were trained and qualified on the Hematite emergency response procedures. On February 27, 2009, the licensee informed the inspectors that the NRC had been given records for the incorrect individuals regarding the Emergency Managers. The correct information was the EHS Manager and the Industrial Hygienist had been assigned to fill the Emergency Manager position since March 6, 2008. There was no assessment by the licensee as to why only two of the five slots specified in Appendix A to PR-GM-101 had been filled, or why the Appendix had not been revised to reflect the appropriate personnel. Although these above emergency response issues were not violations of regulatory requirements because the specified procedure was not required by the WEC license, they were performance weaknesses that were captured in the licensee's CAPs program.

The inspectors were also provided with an Inter-Office Memorandum containing the Annual Report to the Project Oversight Committee (HEM-08-MEMO-024) dated March 17, 2008. Within the Annual Report it stated that emergency planning documents had been reviewed and deemed adequate for the work performed in 2007. It also stated that in anticipation of active remediation, the emergency planning policy and procedures were identified for revision, but were not scheduled to be completed until the start of site decommissioning. In addition, the licensee provided the NRC with CAPs Issue Report 08-302-W002, created on October 28, 2008, to track the review of the emergency planning procedures to ensure license requirements were addressed during the review. The following emergency planning policy and procedures were subsequently reviewed, updated, and issued: 1) HDP-PO-EHS-003, *Project Emergency Plan*, Rev.1, effective date 3/11/2009, 2) HDP-PR-EHS-027, *Emergency Operations* (ERT Org. Chart in Appendix L) Rev.1, effective date 3/20/2009, 3) HDP-PR-EHS-028, *Incident Classification and Notification*, Rev. 0, effective date 3/19/2009, 4) HDP-PR-EHS-029, *Emergency Decontamination*, Rev.1, effective date 3/20/2009, and 5) HDP-PR-EHS-008, *Fire Protection*, Rev. 0, effective date 2/19/2009.

In conjunction with the re-issuance of the emergency policy and procedures, the licensee conducted formal training for Emergency Response Team members (including Emergency Managers/Incident Commanders) that was completed on February 11, 2009. Emergency Response Team members received HAZWOPER Practical Factors training on February 23, 2009, and HAZWOPER Refresher Scenarios on February 27, 2009. Additionally, formal training on the Project Emergency Plan and all related procedures for the entire HDP staff was completed on February 19, 2009.

Procedurally required table top exercises (semi-annual), drills (annual), and a full functional drill are also planned for April 5, August 24, and September 24, 2009, respectively.

c. Conclusion

A review of the licensee's policies and procedures involving the capability to respond to a site emergency identified issues where the licensee had not maintained the expected number of qualified and trained personnel to assume the role of Emergency Manger during a site emergency. The licensee satisfactorily addressed these issues in addition to recently completing a review and update of the site Emergency Project Plan and associated procedures.

3.0 Environmental Monitoring (88045)

a. Inspection Scope

The inspectors evaluated the licensee's performance to determine if the licensee was complying with the environmental monitoring commitments specified in Chapter 5, Environmental Protection, of its license. The inspectors also reviewed the licensee's action to address a previously identified degradation of a sewer line.

b. Observations and Findings

A review of the WEC HDP environmental monitoring procedures was performed. The HDP Environmental Monitoring Plan lists a number of water sample points across the site encompassing burial pit wells, site outfalls, surface ponds, and other groundwater locations. During the November 2008 inspection a request was made to the Licensing Manager to provide the last year's data/results associated with water sample points WS11, WS15, WS18, WS19, WS20, WS29, WS30, and WS31. Procedure PR-EM-003, *Surface Water Sampling*, was reviewed, and the "Field Sampling Log, Appendix C" to PR-EM-003 was requested for the last year for sampling points WS18, WS19, and WS20. A request was also made to provide the NRC with any quality audits for outside laboratories that were performing water testing. A Qualified Supplier List (QSL) was provided, and quality audits for Teledyne Brown Engineering, PDC Laboratories, and TestAmerica (formerly Severn Trent Laboratories) were also provided. The quality audits rated each off-site laboratory as satisfactory, and the annual reviews of each lab were to be up to date.

The inspectors were provided a spreadsheet printout indicating the last year's results for the requested water samples. The requested PR-EM-003 "Appendix C" for WS18, WS19, and WS20 was also provided. It was noted that the monitoring results spreadsheet did not indicate what procedure was used or the laboratory performing the testing. Actual test results were then requested for WS18 (May 2008), WS19 (August 2008), and WS20 (January 2008). The "Report of Analysis" and "Chain of Custody" sheets were provided for WS18, WS19, and WS20 for January, May, and August 2008. The results were satisfactory, and the results were consistent with the spreadsheet printout provided earlier. No issues were identified with the documented results that were reviewed.

Between June 24 and June 26, 2008, personnel from the Oak Ridge Institute for Science and Education (ORISE) provided an independent environmental assessment and verification for the NRC. The ORISE personnel performed surveys and soil samples of the proposed rail spur area and to conduct an interlaboratory comparison, soil sample analyses were split with WEC for independent analysis. The results of the assessment and verification were documented by ORISE in, "Final Report - Independent Confirmatory Survey Summary and Results for The Hematite Decommissioning Project," and forwarded to the NRC by letter dated March 18, 2009 (ML090780020). The Report stated that "the confirmatory surface scans of the roofs of Buildings 110 and 230, including the HEPA room of Building 230, did not identify radiation levels greater than background levels. The gamma scans of the proposed rail spur area identified elevated radiation levels that were consistent with the licensee's findings." However, significant differences were reported between WEC and ORISE as a result of the interlaboratory comparison of soil samples analyzed by alpha spectroscopy and the Tc-99 analyses. The differences in the Tc-99 analyses were most likely due to the differences in procedures used (analyzing the samples dry versus wet). The inspectors notified WEC that the apparent cause of different values/results of the levels of Tc-99 in the soil samples was due to WEC's lab performing dry analysis of the soils whereas the soil samples need to have a wet analysis performed.

To further evaluate the soil result differences, ORISE accompanied NRC Inspectors during the on-site inspection the week of January 5-8, 2009, and performed additional surveys of two areas, the proposed rail spur area and Outfall #1 Discharge area. (Outfall #1 is the discharge from the site sanitary wastewater treatment plant to the tributary downstream of the Site Pond on the southwest side of the site.) For the proposed rail spur area, ORISE again split soil samples with WEC for independent analysis. The lab WEC sent samples to performed Tc-99 analysis on wet samples and the WEC results were now consistent with ORISE results, resolving the Tc-99 underreporting issue. The results of the analysis of the ORISE soil samples collected during January 5-8 were documented in reports from ORISE to the NRC dated March 2, 2009 (ML090780017) and June 17, 2009 (ML091800302).

During 2007 WEC hydro-lased the effluent piping to Outfall #1 to remove tree roots and other obstructions in the pipe. The ORISE surveys of the Outfall #1 Discharge area performed during January 5-8, 2009, identified radiation levels of 8000 counts per minute (cpm) above background, including two hot spots of 10,000 cpm above background. The soil samples collected for analysis by ORISE also identified elevated levels of uranium. These results are documented in the March 2, 2009 report. It is noted that this area was remediated a few years ago by WEC. WEC communicated to the inspectors in February 2009 that they would be performing surveys and soil sample analysis.

c. Conclusion

The licensee was complying with the environmental monitoring commitments specified in Chapter 5, Environmental Protection, of its license. An interlaboratory comparison of soil sample analyses between WEC and the NRC resulted in comparable results.

4.0 Radiation Protection Program (83822, 88035, 86740)

a. Inspection Scope

The inspectors conducted an in-depth review of the licensee's radiation protection program. Areas evaluated included license requirements, policies, procedures, calibration and survey records, radiological instrumentation, and training records. The inspectors also reviewed the results of recent surveys of the Process buildings, implementation of the respiratory protection program, the conduct of routine radiological surveys, use and calibration of radiation detection instrumentation, and the training and qualification of health physics technicians.

b. Observations and Findings

Inaccurate Information

By letter dated October 5, 2004 (ML051310063), the licensee requested authorization to dismantle and demolish buildings at the Hematite facility. In a March 17, 2006, response (ML060800265) to a Request for Additional Information, the licensee stated that, based on surveys performed and measured results, they estimated that the residual contamination remaining on the surfaces within the buildings was approximately 5 kg of UO₂ at less than 5% enrichment (250 grams of uranium-235). In addition, the licensee stated that there were zero grams of inventoried SNM (U-235) mass for the Process buildings. This information was used by the NRC to support granting a license amendment. Specifically, in the Safety Evaluation Report (SER) supporting Amendment 52, the NRC stated, "NRC has determined that the licensee has described the types and activities of radioactive materials contamination at the site sufficiently to allow NRC staff to evaluate the potential safety issues associated with building dismantlement and demolition of the facilities onsite." Additionally the NRC stated, "NRC staff determined that the licensee is not required to have a criticality accident alarm system for building demolition because the conservative estimate of mass of U235 in the buildings (i.e., 250 grams U235) is less than the action limit in 10 CFR Part 70.24 (i.e., 700 grams of U235)." On June 30, 2006, Amendment 52 to Westinghouse's Hematite License No. SNM-00033 was issued, (ML061280324), authorizing the licensee to dismantle and demolish onsite buildings.

On November 11, 2008, during surveys within the Process buildings to re-verify previous characterizations of residual radiological contamination, the licensee identified residual U-235 in former process pipes. Following additional surveys, and using a conservative methodology specified by procedure, the licensee estimated the mass of U-235 in the pipes at 2,638 grams. This was significantly in excess of the 10 CFR Part 70.24 action limit of 700 grams which formed the bases for the Amendment 52 licensing action for the dismantlement and demolition of onsite buildings and the conclusion in the SER that it was acceptable to remove the nuclear criticality alarms from the Process buildings. This is an apparent violation of 10 CFR 70.9 (a) which requires, in part, that, "Information provided to the Commission by a licensee shall be complete and accurate in all material respects." (APV 070-00036/2008002-01)

Process Buildings Surveys

On November 11, 2008, during surveys within the Process buildings to re-verify previous characterizations of residual radiological contamination, the licensee identified residual U-235 in former process pipes. Following additional surveys, and using a conservative methodology specified in Procedure LVI-HP-50, *Criticality Safety Related 235U Mass Estimates*, Revision 4, dated September 29, 2005, on November 11, 2008, the licensee estimated the mass of U-235 in the pipes at 2,638 grams.

The NRC was informed of the discovery of U-235 during a routine conference call on November 14, 2008. Subsequently, the licensee issued a Stop Work Order and limited access to the Process buildings. On November 19, 2008, the Licensee made a 24-hour notification to the NRC (Event No. 44668) pursuant to 10 CFR Part 70, Appendix A (b)(1) based on the fact that there was greater than 250 grams of U-235 identified in the Process buildings. On December 15, 2008, the NRC issued a Confirmatory Action Letter (CAL No. 3-08-005), which will remain in effect until the NRC confirms that the licensee is in compliance with their license requirements for the Process Building. By letter dated December 18, 2008, (ML090050061) the licensee provided the NRC with the 30-day event report.

10 CFR Part 70, Appendix A(b), addresses events that are to be reported to the NRC Operations Center within 24 hours of discovery, followed by a written report within 30 days. In the December 18, 2008 report, the licensee indicated that they were in fact not required to make the 24-hour notification pursuant to 10 CFR Part 70, Appendix A, and that they were not subject to Subpart H of 10 CFR 70.61 through 70.76, based on 10 CFR 70.60 which states that the regulations in 10 CFR 70.61 through 70.76 do not apply to decommissioning activities performed pursuant to 10 CFR 70.38. At the time of the event the licensee was conducting decommissioning activities pursuant to 10 CFR 70.38(c). However, the licensee did indicate a 24-hour notification was still required pursuant to 10 CFR 70.50(b)(2), which requires a 24-hour notification following the discovery of an event in which equipment is disabled and the equipment is required by regulation to mitigate the consequences of an accident, and no redundant equipment is available and operable to perform the required safety function.

10 CFR 70.24 (a) states that, "Each licensee authorized to possess special nuclear material in a quantity exceeding 700 grams of contained uranium-235 ... shall maintain in each area in which such licensed special nuclear material is handled, used, or stored, a monitoring system meeting the requirements of either paragraph (a)(1) or (a)(2), as appropriate, and using gamma- or neutron-sensitive radiation detectors which will energize clearly audible alarm signals if accidental criticality occurs..." However, as discussed in the next section under Tests and Calibrations, the licensee had deactivated the nuclear criticality monitoring alarms between February 21 and March 22, 2006. In addition, no redundant equipment was available and operable to perform the required safety function.

Contrary to the above, the licensee failed to notify the NRC within 24 hours of its discovery, on November 11, 2008, of an event in which equipment was disabled when: 1) the equipment was required by regulation to prevent exposures to radiation exceeding regulatory limits or to mitigate the consequences of an accident; 2) the equipment was required to be able to be available and operate, and; 3) no redundant equipment was

available and operable to perform the required safety function. The licensee did not report, within 24 hours of its discovery on November 11, 2008, the presence of special nuclear material in a quantity greater than 700 grams in Process Building piping without the concurrent maintenance of a nuclear criticality accident monitoring system or other redundant equipment to perform the required safety function. The licensee had deactivated the previously installed nuclear criticality accident monitoring system between February 21 and March 22, 2006. The licensee notified the NRC of its discovery on November 19, 2008, eight days after its discovery of the event. This is a violation. (VIO 070-00036/2008002-01)

Tests and Calibrations

The inspectors reviewed the WEC procedure PR-HP-010, *Alarm Testing*, Rev. 0, during the November 2008 portion of the onsite inspection. This procedure specified the requirements and frequency for testing emergency alarms and criticality alarms as well as the associated documentation of such tests. The procedure listed the criticality alarms to be tested and noted that at least two alarms should be tested each month and that every alarm would be tested at least once per quarter. Appendix A, Nuclear Alarm Checklist, to PR-HP-010 was used for documentation of the alarm checks. The inspectors requested copies of the previous two year's Nuclear Alarm Checklists. Appendix A for January 2008 to November 2008 was available on a clipboard in the Health Physics (HP) Office and was provided to the NRC, while Appendix A from 2007 was retrieved from archives and provided. Upon reviewing the 2007 and 2008 Nuclear Alarm Checklists it was noted that only one alarm was tested in 2007 and 2008 (the Building 230 alarm). The other alarms from the Process buildings were listed as "N/A". While in the HP Office a binder labeled "Monthly, Quarterly, and Annual Inspections" was observed. This binder was found to contain various checklists, some of which included the Nuclear Alarm Checklists from 1996 – 2003.

One observation stemming from reviewing the alarm check records was that it was not made clear when or why testing of the criticality alarms had ceased in the Processing Buildings. While it was known by the licensee that the criticality alarms were removed from the Process Buildings during 2006, there did not appear to be any documentation to support when this occurred. The licensee was requested to provide a copy of the work order associated with the removal of the alarms, but they were unable to locate a work order or other documentation pertinent to the removal of the alarms. This issue was discussed with licensee management and no significant additional information was provided before the inspection team left the site on November 21, 2008. In a subsequent letter to the NRC dated December 12, 2008 (ML083500576), the licensee provided additional information based on a further review of the alarm test records, stating that "the criticality detectors in the Process Buildings were deactivated between February 21, 2006, and March 22, 2006."

This is an apparent violation of 10 CFR 70.24 (a) which requires, in part, that, "Each licensee authorized to possess special nuclear material in a quantity exceeding 700 grams of contained uranium-235 ... shall maintain in each area in which such licensed special nuclear material is handled, used, or stored, a monitoring system meeting the requirements of either paragraph (a)(1) or (a)(2), as appropriate, and using gamma- or neutron-sensitive radiation detectors which will energize clearly audible alarm signals if accidental criticality occurs..." When the criticality alarms were deactivated, the licensee

was authorized to possess special nuclear material exceeding 700 grams of contained uranium-235. (APV 070-00036/2008002-02)

Respiratory Protection Program

During the November 17-21 inspection, the inspectors reviewed the licensee's respiratory protection program and toured the respirator storage facility with a Health Physics Technician (HPT). During the tour the inspectors observed a shelf labeled "cleaned only" that held respirators in individual plastic bags. It was noted that each bag included a sticker with an inspection date and the name of an EHS technician who performed the inspection of the respirator. The HPT was queried as to the process an employee must go through to receive a respirator and the training required. The HPT indicated that the first step is to ensure the person requesting a respirator is on the list of employees qualified to wear a respirator. The process included: 1) verification of documentation of a physical exam approving the use of a respirator; 2) photo-copying the physical exam paperwork and placing it in the candidate's training file; 3) conducting classroom training; 4) taking a written exam; and 5) if the exam is passed, the candidate would then be eligible for a fit test using the PortaCount. The HPT indicated that the fit test results for the respirators were generated by the PortaCount, and that the originals went to the employee's training file. The HPT also noted there was a location on the PortaCount results for a signature for both the operator and the candidate.

The inspectors determined during a review of PortaCount records that the minimum fit requirements were not compliant with 10 CFR Part 20. The inspectors determined that the PortaCount had a Pass Level set at 500 for the Assigned Protection Factor (APF), which was consistent with the Occupational Safety and Health Administration requirement in 29 CFR 1910.134, Table 1, but was less than the NRC requirement in 10 CFR Part 20, Appendix A, which specifies an APF of 1000. The inspectors reviewed several PortaCount Fit Test Reports and determined that the actual fit factors reported were in all cases in excess of 1000, such that even though the Pass Level was set low, that actual protection factors were acceptable. This issue, along with other program concerns, was captured in an Issue Report (08-254-W008) in the licensee's Corrective Action Program on September 10, 2008. The Pass Level was corrected by the licensee as part of their corrective actions in addressing Issues Report 08-254-W008, which included developing two procedures, one for radiological uses of respirators and one for non-radiological uses. All of the action items implemented to address Issues Report 08-0254-W008 were captured in five separate action items: 1) Inspect Respirator Cleaning – Storage Area, 2) Change TSI PortaCount Instrument Parameters, 3) Review Fit Test Reports, 4) Analysis of Respiratory Protective Practices for Regulatory or Functional Compliance Concerns, and 5) Expedite Final Review/Approval and Implementation of MCP-HE-HS-200 Respiratory Protection Procedure. Items 1) through 4) were addressed and closed by the licensee between September 17 and October 23, 2008. The procedure revisions addressed in Item 5) were issued with an effective date of March 5, 2009. The inspectors reviewed these procedures after they were issued and identified no concerns. This failure constitutes a violation of minor safety significance and is not subject to formal enforcement action.

The inspectors reviewed a licensee audit of the respiratory protection program (Audit No. A-0208-004 dated February 28, 2008). During the audit the licensee identified that on January 25, 2008, a worker was fit tested for a respirator without having a physician's medical determination prior to the fit test. In response to the audit finding the licensee wrote Issue Report 08-063-W013 on March 3, 2008. The worker subsequently received a medical evaluation the following week which determined he was fit to wear a respirator, and the licensee modified the PortaCount printout to specify the date of the medical exam to indicate that the medical record was conducted and current. The Issue Report was closed June 11, 2008. However, the licensee failed to identify that this was a violation of 10 CFR 20.1703 Subpart H (c)(5)(i), Use of Individual Respiratory Protection Equipment, which states in part, "the licensee shall implement and maintain a respiratory protection program that includes a determination by a physician that the individual user is medically fit to use respiratory protection equipment before the initial fitting of a face sealing respirator." Since this violation was non-repetitive, licensee identified and corrected, it is being treated as a Non-Cited Violation, consistent with Section VI.A.8 of the NRC Enforcement Policy. (NCV 070-00036/2008002-01)

Radiological Surveys

On September 8, 2008, during a bi-weekly status call between the NRC and Westinghouse, the licensee indicated that a walkdown of the Process buildings had identified 12 fuel pellets underneath a conveyor. The total U-235 discovered was 2.8 grams. An additional fuel pellet was subsequently discovered in the leg of a piece of equipment. During the November 17-21, 2009 inspection, the inspectors discussed with the licensee their continuing surveys to reevaluate any remaining residual radiological contamination, in particular the residual U-235 identified in former process piping in the Process buildings. (See above section, Process Building Surveys.)

Because the licensee's estimation of 2,638 grams of U-235 in the process piping was inconsistent with the information provided by the licensee in support of Amendment 52 to SNM-00033 (see discussion at the beginning of Section 4.0), the inspectors requested the licensee provide radiological surveys and other quality documents that had been used to support the Amendment 52 licensing request. The inspectors reviewed Procedure LVI-HP-50, *Criticality Safety Related 235U Mass Estimates*, Work Instruction (WI)-023, *ISOCS Operation and Data Verification for Gamma Spectral Analysis*, Procedure HP-05-008, *ISOCS Technical Basis*, NISYS Corporation Report NISYS-NCS-1180-TR011/R2, *A Study of Dose Rate vs. ²³⁵U Deposit inside the Different Sizes of Schedule 40 SS Pipes for the Primary Interference Removal Project*, and the limited number of contamination, radiation, and survey records provided. It was noted that the ISOCS (InSitu Object Counting System) is an InSitu Gamma Spectrometer detector that was used extensively to perform surveys of the process buildings during equipment removal activities. Procedure LVI-HP-50 specified that micro-R meter readings were to be obtained on Schedule 40 piping as a means of estimating the U-235 mass in accordance with NISYS-NCS-1180-TR011/R2. Based on the review, the inspectors concluded that the procedure was not in all cases followed during the Primary Interference Removal Project survey activities in 2005-2006, because 1) the micro-R surveys required by the procedure would have identified the residual U-235 the same as the licensee was able to identify the U-235 using a micro-R meter during November 11-18, 2008, 2) the licensee was not able to locate any previous micro-R

survey records for the pipes in question, 3) had the residual U-235 been identified, those pipes should have been removed, and 4) had the residual U-235 been identified but intentionally not removed as part of the dismantlement activities, it would have had to be included as inventoried material, which was contrary to the licensee's conclusion there was zero inventoried mass. In a letter to the NRC dated April 17, 2009 (ML091270237) WEC provided their results of a probable cause evaluation regarding the identification of unexpected U-235 in the piping. The licensee determined, in part, that there was "no evidence that surveys were conducted of all items remaining in the Process Buildings to determine their radiological status, including any residual U-235." The failure to estimate the U-235 mass in some Schedule 40 piping as indicated by LVI-HP-50, WI-023 and HP-05-008 was inconsistent with Section 2.7 of Chapter 2 of the license application which states that procedures are mandatory and followed during work activities.

NRC inspectors reviewed Westinghouse HP instrument calibration procedures and records. The inspectors reviewed limited contamination surveys of the walls and floors of the Process buildings used to establish the grams of U-235 remaining in the buildings in support of License Amendment 52. In the amendment request the licensee stated that the Process buildings contained approximately 250 grams of U-235 and that the residual U-235 was principally in the surface contamination on the floors and walls. The inspectors concluded that both the alpha and beta measurements for residual contamination on the building surfaces were not consistent with NRC and industry guidelines because the measurements did not account for surface and detector efficiencies. This guidance is contained in NUREG-1507, "Minimum Detectable Concentrations with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions (1997)" and ISO-7503, "Evaluation of Surface Contamination, (1998)." The inspectors concluded that because the licensee's methodology did not account for surface and detector efficiencies, the actual residual U-235 contamination on the walls and floors could have been twice as high. Based on the measurements taken on the building surfaces, the NRC inspectors determined that there was approximately 500 grams of U-235 remaining on the process building floors and walls.

In March 2006, the licensee submitted information to support a license amendment request which stated that surveys showed that the Process Building contained less than 250 grams U-235. However, throughout 2005 – 2006, Westinghouse failed to conduct surveys that adequately characterized the quantity of U-235 on building surfaces and in piping. This is an apparent violation of 10 CFR 20.1501(a)(2) which requires, in part, that licensees make surveys that are reasonable under the circumstances to evaluate the concentrations or quantities of radioactive material. (APV 070-00036/2008002-03)

In response to the 2007-2008 event regarding the Mississauga Metals & Alloys returning waste to Hematite, the licensee conducted a root cause investigation. The NRC reviewed the licensee's response to this event, including the preliminary results of the root cause investigation during inspection activities between November 2007 and March 2008 (see Inspection Report No. 070-00036/07-02, dated April 8, 2008, ML081000240). During this inspection the inspectors reviewed the licensee's final Root Cause Analysis Report (CAPS-RCA-07-3050W012, Rev. 0) dated September 17, 2008, for this event. The inspectors concluded, in conjunction with the survey issues discussed above, that the root cause of the Mississauga shipping event was the inability to perform accurate and reliable radiological measurements. The failure of the licensee's radiological measurements program significantly underestimated the number

of grams on U-235 in the shipments and failed to identify fuel pellets in the packages. This root cause was not determined by Westinghouse, which attributed the event to inadequate management oversight and follow-up.

For the post dismantling surveys, Procedure HP-05-008 specified the calibration and set-up of the ISOCS to conduct surveys. It stated that 1-3 inches of interior contaminant (U-235) should be assumed to be resident in the piping and HVAC equipment. In a December 12, 2008, Westinghouse letter (ML083500576), the licensee stated that the records of ISOCS measurements found to date had assumed a thickness of contamination of 0.3 and 0.4 inch. The inspectors also noted that the procedure relied on the manufacturer's templates for calibration and source geometries and assumed source configurations, which were not in many cases consistent with what existed in the Process buildings. The inspectors determined that the procedure was technically inadequate in that the procedure relied on the manufacturer's templates for calibration and source geometries and assumed source configurations. To accurately assess uranium holdup using Insitu Gamma Spectroscopy, a technically defensible verification process and test measurement plan was necessary. The inspectors concluded that WEC Procedure HP-05-008 appeared technically inadequate to achieve the stated objectives and sensitivity to adequately detect residual gram quantities of U-235 using the ISOCS. Therefore, WEC's use of the ISOCS for post dismantling surveys was inadequate to identify the remaining U-235 in the process pipes. Although this issue was not a violation of regulatory requirements because the specified Procedure HP-05-008 was not required by the WEC license, it was a performance weakness that was captured in the licensee's CAPs program.

In addition to reviewing Procedure HP-05-008, the inspectors reviewed the ISOCS vendor's technical bases documents, instrument calibration procedures and records. During the review, the inspectors determined that the licensee continued to use the ISOCS in various field measurements for shipments that were returned from the Mississauga, Metals & Alloys Company in Canada, in spite of gain shifts and source check failures. It was also noted that although the Mississauga packages were returned to Hematite in March 2007, significant discrepancies had been noted (measurements were low by as much as a factor of 17x) in the U-235 gram measurements as early as February 2007 in a licensee Root Cause Analysis. However, the ISOCS measurement issues were not addressed by the licensee until September 2008 during a Corrective Action Review Board meeting (HEM-MM-08-06, Rev. 1). The ISOCS was subsequently returned to the manufacturer for repair. During the January 5-9, 2009 inspection, the licensee was still waiting for the return of the ISOCS system from the vendor in order to re-survey and to determine the gram quantities in the Mississauga packages.

The continued use of the ISOCS system during 2007 and 2008, in spite of failed channel and source checks that indicated the instrumentation was not operating within the calibration parameters, is an apparent violation of 10 CFR 20.1501(b) which requires that licensees ensure that instruments and equipment used for quantitative radiation measurements (e.g. dose rate and effluent monitoring) are calibrated for the radiation measured. (APV 070-00036/2008002-04)

HPT Training / Qualification

The inspectors reviewed the licensee's Issue Reports related to radiation protection (RP) performance. It was noted that there was a significant increase in issue reports during 2008 in the RP area with 48 reports versus nine Issue Reports for the entire site during 2007. Of these, the inspectors noted that in 2008 there were 21 HPT performance issues, including four issues with Tennelec™ proportional counter operations. The HPT performance issues dealt mainly with health physics fundamentals and included: the use of black and yellow rope as a radiation barrier, failure to include a chain of custody form with samples shipped offsite, using gross counts for instrument checks, radiation sources not decay corrected, failure to follow survey procedures for contamination control during the Mississauga package investigations, the replacement of a HEPA filter, and the recent process pipe survey measurements. Based on the frequency and types of HPT issues, there appeared to be an HPT procedure compliance issue with field activity performance.

During the November 17-21, 2008 inspection, the inspectors reviewed the training and qualifications records for the six HPTs currently performing licensed activities at Hematite. The inspectors noted that many of the records did not contain personal resumes of the HPTs documenting their training and qualifications. The records for five of the six HPTs were subsequently updated by the licensee and during the January 5-9, 2009 inspection the inspectors were able to further evaluate the HPT's qualifications. The resume of the sixth HPT was provided the week of January 25 and reviewed at that time.

Section 2.6.1 of Chapter 2 of the Westinghouse Hematite License Application specifies that Health Physics training for Health Physics Technicians (HPTs), "shall be designed to provide suitably experienced personnel with information necessary to effectively meet responsibilities, and verify qualification commensurate with project HP job requirements." Westinghouse Procedure PO-HP-002, ALARA Policy, Section 7.5 specifies Technical Qualifications of the Health Physics Staff. In Section 7.5.2, Health Physics Technician, it states in part that an HPT should have one of the following combinations of education, training and experience:

- An Associates degree or 2 years of study in sciences, engineering or health-related field, 4 weeks of HP training relevant to uranium facilities, and one year of HP, Industrial hygiene or industrial safety experience, or
- A high school diploma, 3 months of specialized training in relevant RP to uranium facilities, and two years relevant work experience in applied radiation protection.

The resumes reviewed indicated that one of the six HPTs was a junior HPT and a second was in the process of qualifying as an American National Standards Institute (ANSI) 3.1 HPT. Neither one of these individuals had any formal education or training in health physics. One had a degree in agriculture and only very limited experience at another nuclear site, and the other's HP experience had only been at Hematite beginning in April 2007. While the criteria specified in Procedure PO-HP-002 are consistent with the minimal industry standard for HPT qualifications, WEC has not committed to meet that minimal standard, and in fact has not in all cases met that standard.

License Application Section 2.6.1, Health Physics Training, specifies project specific training components. It includes an in depth presentation of 5 job-specific topics including: 1) Instrumentation and dosimetry fundamentals of operation, 2) Calculation of Derived Air Concentrations (DAC) values from air sample information, 3) Standard emergency response practices, 4) Evaluation of off-normal conditions and proper standard response, and 5) Elements of surveillance and control (job coverage). "To familiarize HP personnel with project specific radiological requirements, as well as potential radiological hazards," the License Application also specifies project-specific training on the following: 1) Review of the Radiological Protection Plan and procedures, 2) Review of project emergency procedures, and, 3) Radiological hazards specific to the project including radionuclide distribution, internal exposure hazard and criticality. Westinghouse Procedure PO-GM-002, Training Plan, Section 4.1 defines, "Health Physics Technician – an individual responsible for evaluating radiological conditions, supporting the work of Hematite D&D project in radiological areas and meeting the training requirements specified in SNM-00033."

However, the licensee was not able to provide documentation that the in-depth HP Training indicated by License Application Section 2.6.1 was provided or completed. Although the HP Technicians had performed a number of documented practical factors tests on routine HP tasks, no emergency response training was provided for the Technicians (except for procedure read and signs). Other than one evacuation drill, no spill drills, contaminated injured person, or fire drills had been performed onsite since at least September 2007.

License Application Section 2.6.3 specifies both written tests and practical factors to evaluate the qualifications of HPTs. However, the licensee had no records on file that any written tests had been administered to evaluate the HPTs qualifications. Section 2.6.3 specifies that, "Each worker's knowledge, competency, and understanding will be evaluated with regard to the radiation protection aspects of specific job to be performed. The evaluation consists of a written test with a practical factors session as described in Sections 2.6.1." The inspectors determined that two of the HPTs were designated by the Radiation Safety Officer as HPTs in April 2007 and were assigned significant radiation protection activities, e.g., surveys of personnel, equipment, and vehicles and materials for offsite release. The licensee was not able to provide any information indicating that written tests had been administered to evaluate the HPTs qualifications.

During the inspection on January 26-30, 2009, the inspectors reviewed a "Health Physics Technician Test" that was administered by the Hematite Training Manager on January 8, 2009. The inspectors concluded that the exam was at a level of difficulty equivalent to the licensee's General Employee Training, well below the level of knowledge expected of a Health Physics Technician. Additionally, one of the HPTs scored a 74% on the test. Hematite Procedure PR-GM-002, Training of Hematite FFCF Project Personnel, Section 6.4, Classroom Training, specified that the minimum test pass requirement was a score of 80%. Further, the HPT continued to perform the duties of a Health Physics Technician after failing to pass the test, as evidenced by the performance of a radiation survey conducted by this individual on January 13, 2009. The RSO stated that he did not learn of the individual's test score until after January 13, and that, once informed, he curtailed the responsibilities of the individual to that of a Junior HPT.

The inspectors determined that from April 2007 to January 2009, the licensee failed to implement its radiation protection program in that the licensee failed to adequately select and train personnel to fill the HPT position commensurate with Chapter 2 of the WEC License Application, and WEC Procedures PO-HP-002, ALARA Policy, PO-GM-002, Training Plan, and PR-GM-002, Training of Hematite FFCF Project Personnel. Specifically, the licensee had an individual fulfilling the position of a Health Physics Technician who: had not achieved the combination of education, training and experience specified in Section 7.5.2 of PO-HP-002; had not completed the in-depth training specified in Section 2.6.1 of the License Application; had not been evaluated for competency through the administration of written tests as specified in Section 2.6.3 of the License Application; and, continued to work after being administered a test in which a passing score of 80 percent was not achieved. This is an apparent violation of 10 CFR 20.1101(a) which requires that licensees develop, document and implement a radiation protection program commensurate with the scope and extent of licensed activities and sufficient to ensure compliance with the provisions of this part. (APV 070-00036/2008002-05)

The inspectors reviewed the following nine events that were identified by the licensee over the past several years for commonality. The month and year the licensee identified the event followed by when the event occurred are included in parentheses.

- 1) Fuel Pellets found in Mississauga shipment packages (May 2008/October 2005)
- 2) Contaminated Paperwork Potentially Stored Improperly (October 2007/May 2007)
- 3) Mississauga shipment packages U-235 gram assessment was low by a factor of up to 16 and 17.6 for two of the measurements. (November 2007/2005 and January 2007)
- 4) Contaminated forklift outside the Radiological Controlled Area (January 2008/October 2006)
- 5) Contaminated Log Books released offsite (January 2008/prior to 1992)
- 6) Waste oil drum found outside Radiological Controlled Area containing 50 pCi/l U-235 without required RAM Labeling. (April 2008/July 2007)
- 7) Criticality system detector sources (pellets) found outside the Radiological Controlled Area (April 2008/June 2004)
- 8) Contaminated soil area outside the site restricted area fence. (August 2008/prior to May 2000)
- 9) Fuel Pellets found in Process Building. (September 2008/prior to 2006)

The inspectors noted that the licensee had done a good job in identifying these situations, but had concerns that they had not assessed whether there was a commonality as to why they occurred in the first place. Based on the violations

discussed above, the common root cause of repeated events appears to be related to a repeated failure to conduct adequate surveys and unqualified personnel performing surveys.

c. **Conclusions**

The inspectors concluded there were performance problems in the licensee's Radiation Protection Program. Apparent violations were identified for a failure to provide complete and accurate information regarding a licensing action, for removing the criticality alarms without prior NRC approval, for using instrumentation that was not properly calibrated, for conducting inadequate surveys, and for failing to adequately train HPTs. A violation was also cited for a failure to provide a timely 24-hour notification to the NRC after discovering the presence of special nuclear material in a quantity greater than 700 grams in Process Building piping without the concurrent maintenance of a nuclear criticality accident monitoring system or other redundant equipment to perform the required safety function.

The inspectors also concluded there were deficiencies with the licensee's measurement program for the detection of alpha and beta surface contamination and gamma dose rate measurements. The licensee had been actively conducting surveys to characterize the contamination levels throughout the site and, had identified previously unidentified contaminated materials, equipment and soils.

5.0 30-Day Event Reports

Review of Licensee Commitment per Confirmatory Action Letter No. 03-08-005

On November 19, 2008, the licensee submitted a 24-hour report to the NRC (Event Notification Report 44668), with a follow-up report provided on November 21, 2008. The report was in response to the identification of U-235 in the piping and high efficiency particulate air (HEPA) filter units within the Process buildings. The report was based upon the licensee's determination that the quantity of U-235 present was potentially greater than that previously reported to the NRC and used as a basis for an NRC License Amendment (Amendment 52, issued June 30, 2006) and might be of sufficient quantity to require criticality monitoring in accordance with 10 CFR 70.24.

In response to this finding, on December 15, 2008, the NRC issued Confirmatory Action Letter No. 03-08-005 that identified specific actions that the licensee intended to implement, including:

- 1) Maintain in effect a "Stop Work Order" on all activities associated with the Process Building by restricting entry to the Process Building and its roof. The Stop Work Order was initiated on November 20, 2008.
- 2) Develop an approach (methodology) to regain access to the Process Building that includes the following:
 - a. Description of the appropriate safety precautions necessary to regain access;

- b. Description of the types of measurements needed to complete the assessment of the remaining mass of U235 within the structure.
- 3) Prior to termination of the Stop Work Order, discuss the methodology, including safety precautions, with the NRC.
- 4) Provide the approach (methodology), including major milestones, to the NRC by December 19, 2008.
- 5) Before any Process Building piping or equipment removal or demolition activities are conducted, discuss the methodology, including safety precautions with the NRC.

During the inspection the inspectors verified that the licensee was continuing to maintain the Stop Work Order implemented on November 20, 2008 (Item 1). The inspectors verified that all work activities were suspended and access to the building was restricted. By letter dated December 18, 2008 (ML090050061), the licensee addressed Item 4 by providing an approach, including major milestones, for addressing NRC's concerns and regaining access to the Process buildings. The NRC and Westinghouse continued to discuss the necessary controls and agreeable approach regarding access to and work activities in the Process building (to address Items 2, 3 and 5). By letter dated February 5, 2009 (ML090400746), the licensee submitted a request for an exemption from the requirements for a criticality monitoring system per 10 CFR 70.24(a), and provided additional supporting information by letter date February 25, 2009 (ML090640309). By letter dated June 22, 2009, the NRC approved the exemption request in part, permitting Westinghouse to re-enter the process buildings to complete characterization without installing criticality monitoring systems. A revision to the Confirmatory Action Letter that reflected the June 23, 2009, exemption approval was issued by NRC letter, dated July 9, 2009 (ML091900453).

NMED Items

(Closed) NMED Item Number 080232

On April 18, 2008, Westinghouse Electric Company LLC (WEC) made a required 30 day telephone report to the NRC describing the reported loss of a 5.5 gram depleted uranium pellet. A subsequent written report was submitted to the NRC dated May 19, 2008 (ML081410491). The pellet contained 2.779 microCuries of total activity. It was one of several that were installed and used in Eberline gamma detectors to provide an indication of continuous operability. The loss was discovered on April 4, 2008, while technicians were removing 10 detectors from the former Hematite Process buildings, at the time a restricted area, for potential reuse. During the removal activity, it was discovered that only nine of the ten detectors had sources. Inspection of the source holder showed residual epoxy and tape that had been used to secure the source to the holder. A physical search and radiological surveys conducted on April 7, 2008, failed to locate the source. Also, Hematite records were reviewed to ascertain if further information was available regarding the depleted uranium pellets that have been used as detector sources or possible disposition of the missing pellet, but no further information was found. The licensee believes that the pellet was packaged and shipped offsite either as Special Nuclear Material (SNM) inventory or as radioactive waste, during the previous dismantlement activities that took place in the site Process buildings during

2003 through 2005. The licensee has taken the following measures to preclude reoccurrence: 1) the depleted uranium pellets that had been installed as sources in the Eberline gamma detectors have been removed and accounted for as part of the formal Hematite Material Control and Accounting Program and 2) the depleted uranium pellets installed as sources in the two operational Eberline gamma detectors located in Building 230 have been added to the Hematite radiological source inventory to ensure proper tracking and control.

The inspectors reviewed the NMED report, associated corrective action document, WCAP-08-129-W001, and corrective actions taken. No violations were identified. This NMED item is closed.

(Closed) NMED Item Number 080802

On November 19, 2008, Westinghouse Electric Company LLC (WEC) made a required report after identifying radioactive contamination within the Process buildings that was greater than expected. The results of previous characterization data indicated that the residual mass was approximately 250 grams of U-235. However, preliminary results of more recent characterization surveys and sampling provided information that suggests the contamination was greater than 700 grams U-235. The contamination was fixed to interior surfaces of the building, piping, and interior of equipment that remain within the building. WEC issued a Stop Work Order and assured all necessary personnel have been briefed to restrict access and all work activities associated with the Process buildings.

The licensee's corrective actions are still ongoing and include responding to a Confirmatory Action Letter issued by the NRC. The inspectors reviewed the licensee's actions surrounding the issues in this NMED item during the inspection and documented the associated violations in this report. This NMED item is closed.

6.0 Exit Meeting Summary

The NRC inspectors presented inspection findings to members of the facility management team following the onsite inspections on November 21, 2008, January 9, 2009, and January 29, 2009, and by telephone on March 4, 2009, April 21, 2009, and June 24, 2009. The licensee acknowledged the findings presented.

ATTACHMENT:
Supplemental Information

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Westinghouse Electric Company

⁰¹²³⁴⁵ E. Kurt Hackmann, Director, Hematite Decommissioning Project
⁰²³ D. Ridenhower, Manager, Environmental Health & Safety/Community Relations
⁰¹²³⁴⁵ G. Rood, Radiation Safety Officer
⁰¹³⁵ K. Harris, Manager, Environmental Engineering
⁰¹²³⁴⁵ R. Reynolds, Manager, Quality Assurance
²³⁴⁵ A. Noack, Operations Manager
⁰²³⁴⁵ G. Couture, Licensing Manager

- ⁰ Attended the interim onsite exit meeting on November 21, 2008.
¹ Attended the interim onsite exit meeting on January 9, 2009.
² Attended the interim onsite exit meeting on January 29, 2009.
³ Participated in the exit meeting via telephone on March 4, 2009.
⁴ Participated in the exit meeting via telephone on April 21, 2009.
⁵ Participated in the final exit meeting via telephone on June 24, 2009.

INSPECTION PROCEDURES USED

IP 83822 Radiation Protection
IP 86740 Transportation Activities
IP 88005 Management Organization and Controls
IP 88035 Radioactive Waste Management
IP 88045 Effluent Control and Environmental Protection

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened	Type	Summary
APV 07000036/2008-02-01	APV	Informed NRC there was less than 250 grams of U-235 in the Process buildings, which was not complete and accurate information.
APV 07000036/2008-02-02	APV	Deactivated criticality alarms without exemption from 70.24(a).
APV 07000036/2008-02-03	APV	Failed to conduct adequate surveys
APV 07000036/2008-02-04	APV	Failed to adequately calibrate ISOCs system.
APV 07000036/2008-02-05	APV	Inadequate training for HPTs.
VIO 07000036/2008-02-01	VIO	Failed to provide a timely 24-hour report following discovery of unexpected residual U-235 in Process buildings.
Opened and Closed	Type	Summary
NCV 07000036/2008-02-01	NCV	Failed to fit test a worker for a respirator with a required medical evaluation.

Closed

NMED Item Number 080232

NMED Item Number 080802

Discussed

CAL 3-08-005

PARTIAL LIST OF DOCUMENTS REVIEWED

Westinghouse Electric Company, Chapters 1-8, of SNM-00033 Materials License Application

LIST OF ACRONYMS USED

ACA	Apparent Cause Analysis
ADAMS	Agencywide Documents Access and Management System
ANSI	American National Standards Institute
APF	Assigned Protection Factor
APV	Apparent Violation
CAD	Corrective Actions Director
CAL	Confirmatory Action Letter
CAM	Corrective Actions Manager
CAPs	Corrective Actions Process
CARB	Corrective Actions Review Board
CFR	Code of Federal Regulations
DAC	Derived Air Concentration
DNMS	Division of Nuclear Materials Safety
EHS	Environmental, Health and Safety
HDP	Hematite Decommissioning Project
HEPA	High Efficiency Particulate Air
HP	Health Physics
HPT	Health Physics Technician
IRG	Independent Review Group
ISOCS	Insitu Object Counting System
MMA	Mississagua Metals and Alloys
NCV	Non-Cited Violation
NMED	Nuclear Material Events Database
NRC	U.S. Nuclear Regulatory Commission
ORISE	Oak Ridge Institute for Science and Education
POC	Plant Oversight Committee
PDR	Public Document Room
PMP	Project Management Plan
QA	Quality Assurance
QSL	Qualified Supplier List
RCA	Root Cause Analysis
RSO	Radiation Safety Officer
SNM	Special Nuclear Material
VIO	Violation
WEC	Westinghouse Electric Company