

June 8, 2005

EA-05-104

Mr. Hank A. Sepp
Project Director, Decommissioning
Westinghouse Electric Company, LLC
Hematite Fuel Manufacturing Facility
3300 State Road P
Festus, MO 63028

SUBJECT: NRC TEAM INSPECTION REPORT 07000036/2005-001(DNMS) -
WESTINGHOUSE ELECTRIC COMPANY, LLC (HEMATITE)

Dear Mr. Sepp:

On April 27, 2005, the U.S. Nuclear Regulatory Commission (NRC) completed a team inspection of activities at the Westinghouse Hematite decommissioning facility. 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 the implementation of nuclear criticality safety controls during the conduct of decommissioning and decontamination activities at the site. The onsite inspection began the week of January 10, 2005. Based on the results of a Westinghouse self-assessment completed immediately prior to the inspection, which identified significant deficiencies in the implementation of nuclear criticality safety controls, you voluntarily suspended decommissioning activities involving fissile materials.

During the week of January 24, 2005, we began our review of the implementation of corrective actions to address the deficiencies identified regarding the handling of fissile materials. Based on the results of our review during that inspection, you agreed to maintain decommissioning activities involving the handling of fissile materials in suspension, pending the completion of an NRC inspection to verify the implementation of additional corrective actions. Your decisions to maintain those activities in suspension were confirmed in two letters, dated January 20, and January 28, 2005. We resumed our inspection on April 25, 2005, and completed our review of the implementation of all corrective actions associated with fissile material handling. At the conclusion of our inspection on April 27, 2005, Mr. James L. Cameron, Chief of the Decommissioning Branch, and the inspectors discussed the final inspection findings with you and members of your staff.

The inspection consisted of an examination of decommissioning activities at the Westinghouse Electric Company, LLC (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, observations of activities in progress, and interviews with personnel.

Based on the results of this inspection, three apparent violations were identified and are being considered for escalated enforcement action in accordance with the Enforcement Policy. The current Enforcement Policy is included on the NRC's Web site at www.nrc.gov; select **What We Do, Enforcement**, then **Enforcement Policy**. The apparent violations pertain to your staff's failure to fully implement nuclear criticality safety controls. Since the NRC has not made a final determination in this matter, no Notice of Violation is being issued for the 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 the apparent violations has been scheduled for 1:30 p.m. (CDT) on June 22, 2005. 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 action, 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 excerpt from 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, the NRC identified two unresolved items regarding: (1) the staff's implementation of a sample collection and analysis plan to determine uranium-235 assays prior to conducting fissile material handling operations; and (2) the staff's implementation of nuclear criticality safety evaluations in different storage scenarios involving fissile material.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system

(ADAMS). The NRC's document system is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

Sincerely,

/Gary L. Shear For RA/

Marc L. Dapas, Director
Division of Nuclear Materials Safety

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

Enclosures: 1. Inspection Report 07000036/2005-001(DNMS)
2. NRC Information Notice 96-28 (Excerpt)

cc w/encls: J. Nardi, Supervisory Engineer Environment Health and Safety
S. Mahfood, Director, Missouri Department of Natural Resources
R. A. Kucera, Director, Intergovernmental Cooperation, Missouri Department of Natural Resources
B. Moore, Missouri Department of Natural Resources

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No.: 070-00036

License No.: SNM-00033

Report No.: 07000036/2005-001(DNMS)

Licensee: Westinghouse Electric Company LLC

Facility: Hematite Fuel Manufacturing Facility

Location: 3300 State Road P
Festus, Missouri

Dates: January 10 through 13, 2005
January 24 through 28, 2005
March 1, 2005
April 25 through 27, 2005

Exit Meetings: January 13 and 28, 2005 (Preliminary)
March 1, 2005 (Preliminary)
April 27, 2005 (Final)

Inspectors: William G. Snell, Senior Health Physicist
(Decommissioning), Decommissioning Branch, Division of
Nuclear Materials Safety (DNMS), Region III (RIII)

Christopher R. Martin, Reactor Inspector
(Decommissioning), Decommissioning Branch, DNMS, RIII

Dennis C. Morey, Senior Criticality Safety Specialist,
Technical Support Group, Division of Fuel Cycle Safety
and Safeguards (FCSS), Office of Nuclear Materials
Safety and Safeguards (NMSS)

Tamara Powell, Criticality Safety Specialist, Technical
Support Group, FCSS, NMSS

Approved by: Jamnes L. Cameron, Chief
Decommissioning Branch, DNMS, RIII

EXECUTIVE SUMMARY
Westinghouse Electric Company, LLC
HEMATITE FUEL MANUFACTURING FACILITY
NRC Inspection Report 07000036/2005-001(DNMS)

This team inspection reviewed the Westinghouse Electric Company's and its contractor's current performance related to management organization and controls, and implementation of the nuclear criticality safety program. The inspection also included a review of the effectiveness of licensee corrective actions to NRC- and licensee-identified deficiencies in the licensee's implementation of nuclear criticality safety controls.

Maintenance and Surveillance Testing

- The inspectors concluded that licensee radiation detection instrumentation and criticality safety alarms important to safety were operational, appropriately calibrated, and met the specified calibration frequency. (Section 2.0)

Nuclear Criticality Safety

- The inspectors identified an apparent violation for a failure to store two high efficiency particulate air filter housings in accordance with approved criticality safety limits and controls. (Section 3.1)
- The inspectors identified: (1) an apparent violation involving the failure to incorporate nuclear criticality safety controls into procedures; and (2) an apparent violation involving the failure to determine the fissile mass of objects prior to placement into a NCS storage array. (Section 3.2)
- The inspectors concluded that the licensee had addressed the previously identified nuclear criticality safety program deficiencies. The inspectors also concluded that the licensee's nuclear criticality safety analyses were performed and independently reviewed by qualified nuclear criticality safety engineers, and included sufficient engineered features and human performance controls to assure subcriticality of the systems and operations. (Section 3.2)

Management Organization and Controls

- The inspectors concluded that the licensee's initial root cause determination for its failure to fully implement the NCS program requirements was not properly focused. The inspectors determined that the root cause was pressure to maintain the schedule for decommissioning activities. (Section 4.0)

Report Details¹

1.0 Introduction

Previous Inspection Findings

During a November 30 through December 3, 2004 onsite inspection, an inspector completed a partial review of the licensee's implementation of nuclear criticality safety (NCS) controls. That inspection reviewed the licensee's initial decommissioning activities that involved the handling of fissile materials. As a result of that inspection (Report No. 07000036/2005-001(DNMS)), the inspector identified a Severity Level IV violation involving the licensee's failure to maintain adequate spacing between containers of fissile material during decommissioning activities.

Following that inspection, the NRC announced a routine inspection to evaluate the overall adequacy of the licensee's implementation of its NCS program. This inspection began on January 10, 2005.

Inspection Chronology

Immediately prior to the January 10, 2005, inspection, the licensee completed a self-assessment of its NCS program. As a result, the licensee identified numerous deficiencies associated with NCS evaluation controls (e.g., fissile material spacing) and circumstances in which NCS evaluation controls were not incorporated into procedures. To address the results of the self-assessment, the licensee's Decommissioning Director suspended decommissioning activities involving fissile material operations on January 10, 2005, and developed a corrective action plan.

In a January 20, 2005 letter to the NRC, the Decommissioning Director committed to maintain fissile material operations in suspension until the root cause evaluation was completed, corrective actions developed and implemented, and the NRC verified the effectiveness of corrective actions through inspection. Based on the schedule developed by the licensee, licensee management planned to complete all actions and resume fissile material operations before the end of January 2005.

Initial Corrective Action Verification Inspection

On January 24, 2005, the inspectors initiated a followup inspection to evaluate the effectiveness of the licensee's corrective actions. The inspectors identified additional concerns and concluded that the licensee had not adequately implemented corrective actions to address the identified deficiencies. Based upon his independent assessment of the inspectors' findings, the licensee's Decommissioning Director directed that a comprehensive readiness review of the NCS program be conducted by the staff and the results of the review approved by the Plant Oversight Committee (POC) prior to resumption of fissile material operations. The Decommissioning Director submitted a second letter to the NRC, dated January 28, 2005, confirming the continued suspension of fissile material operations until additional corrective actions could be developed and implemented. Specifically, the additional corrective actions included:

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

- Reviewing the revised NCS procedures and incorporating comments identified during a Quality Assurance audit and conducting employee retraining;
- Addressing the NRC-identified deficiencies and providing the NRC with additional information, as appropriate;
- Completing the root cause analyses of an NCS violation identified during the November 29 through December 2, 2004, NRC inspection, and preliminary violations identified during the January 24 through 28, 2005, NRC inspection;
- Completing a restart readiness review and presenting the results to the Hematite POC to obtain an assessment of whether all necessary actions to support the safe handling of fissile materials had been completed;
- Briefing senior Westinghouse management on the readiness review restart results and obtaining their concurrence for restart; and
- Performing workforce retraining on any new or revised procedures.

On March 1, 2005, an NRC management representative and an inspector observed a special POC meeting, convened by the licensee to evaluate whether previously identified findings and concerns associated with NCS were adequately addressed. The POC membership reviewed the licensee's actions to address the NCS issues, concluded they were adequately addressed, and recommended the resumption of fissile material handling.

Based on their observations during the meeting, and review of the root cause analyses, the NRC management representative and the inspector determined that the root cause analyses presented by the staff to the POC did not adequately identify the root and contributing causes for the NCS deficiencies. Following the meeting, the NRC representatives discussed their observations regarding the root cause analyses, the proposed corrective actions, and the POC decision to recommend a resumption of fissile material operations with the POC Chairman and the Decommissioning Director. The Decommissioning Director subsequently decided to maintain fissile material handling operations in suspension pending further evaluation of the root cause analysis.

Completion of Corrective Action Inspection

From April 25 through 27, 2005, the inspectors completed their review of the licensee's corrective actions to address previously identified deficiencies in the implementation of NCS controls. The inspectors determined that the licensee's final corrective actions addressed the NCS deficiencies. The licensee resumed decommissioning operations involving fissile materials on April 28, 2005.

2.0 Maintenance and Surveillance Testing (88025)

a. Inspection Scope

The inspectors reviewed selected licensee procedures and calibration records to evaluate whether licensee equipment important to safety was appropriately calibrated. The review included portable and stationary radiation detection instruments used to

assess radiological and criticality conditions and to detect radioactive contamination on personnel. The inspectors also toured the licensee's former production facility.

b. Observations and Findings

The licensee analyzed radiological air and smear samples using a Tennelec, Model LB 5100 Series II, gas proportional counter. The licensee maintained a certificate demonstrating calibration within the specified frequency for the instrument and the health physics staff verified the instrument response to radiation daily, prior to conducting any analysis. Sources used to routinely verify the instrument response were traceable to the National Institute of Standards and Technology (NIST). The licensee's health physics staff controlled the sources to prevent degradation of the radioactive material affixed to the source surfaces.

The licensee's staff routinely performed radiological surveys of building surfaces, equipment, and personnel, using various portable radiation detection instruments. The inspectors observed that all the instruments in use by the licensee's staff had certificates demonstrating calibration within the specified frequency. In addition, the instruments available to the staff to perform radiological surveys were appropriate for the expected radiological conditions. The licensee's staff verified each instrument's response to radiation daily, prior to using the instrument to conduct surveys.

The inspectors verified that the licensee maintained certificates of calibration for each of its Eberline Model EC-1 criticality safety alarms. The criticality safety alarms were calibrated annually by the manufacturer in accordance with licensee procedure PR-HP-010, "Alarm Testing," dated January 12, 2004. In addition, the licensee's health physics staff performed a quarterly calibration verification of each criticality safety alarm in service.

c. Conclusion

The inspectors concluded that licensee radiation detection instrumentation and criticality safety alarms important to safety were operational and appropriately calibrated.

3.0 Nuclear Criticality Safety (88015)

3.1 Facility Operations

a. Scope

The inspectors performed a facility walk-down to determine whether risk-significant fissile material operations were being conducted safely and in accordance with regulatory requirements. The inspectors verified the adequacy of management measures for assuring the continued availability, reliability and capability of safety-significant controls used by the licensee for controlling criticality risks. The inspectors interviewed managers, supervisors, health physics technicians and NCS engineers.

b. Observations and Findings

The licensee's decontamination activities included the removal of low enriched uranium (LEU) fuel fabrication equipment, ventilation ducting, and gross contamination as a

result of the former process operations. The licensee recovered a portion of the fissile material collected for uranium recovery and disposed of the remainder as radioactive waste. The licensee suspended its limited decommissioning activities on January 10, 2005, after an internal NCS assessment identified numerous failures to implement or comply with its NCS evaluation controls.

The inspectors followed up on an observation made during a previous onsite inspection concerning two HEPA filter housings containing fissile materials that were stored within the former process facility, Building Nos. 254, "Pelletizing," and 256-1, "Pellet Drying." The inspectors observed that the two housings were spaced significantly less than 12 feet apart, each being within 3 to 4 feet of either side of a cinder block wall. Each filter housing was posted with a sign stating that each housing must be stored more than 12 feet from other fissile materials. The licensee had posted the housings in accordance with the requirements of a nuclear criticality safety evaluation.

Section 4.1.3 of the licensee's October 29, 1993 application stated that, "the criticality safety evaluations shall consider potential scenarios which could lead to criticality and barriers erected against criticality in establishing applicable criticality safety limits and controls. These limits and controls shall be incorporated into written procedures and/or postings." In addition, Section 4.1.4 of the license application states that, "Operations involving the handling and storage of SNM shall be performed according to approved, written procedures." The licensee's failure to store two HEPA filter housings containing fissile material in accordance with approved NCS evaluation limits and controls incorporated into postings by moving them from an evaluated to an unevaluated storage configuration is considered an apparent violation of Section 4.1.4 of the licensee's application (APV 07000036/2005-001-01).

The licensee's staff promptly removed the HEPA filters containing fissile material from the two housings, determined the uranium-235 content, and properly stored the filters in an approved fissile material storage array. The quantity of fissile material in the housings was not sufficient to form a critical mass. The licensee's subsequent investigation determined that the housings were removed from Building No. 230 following decontamination and moved to the former process facility for storage (Building Nos. 254 and 256-1). The licensee stated that the housings were initially spaced 12 feet apart, but had been inadvertently moved closer together at an unknown time.

c. Conclusions

The inspectors determined that, although the licensee had initially stored the HEPA filter housings in accordance with a nuclear criticality safety evaluation and affixed postings describing the controls necessary to assure criticality safety, licensee personnel had not maintained the controls and had moved the housings closer than specified by the safety evaluation. The failure to maintain the required spacing between the housings constituted an apparent violation.

3.2 Nuclear Criticality Safety Function

a. Scope of Inspection

The inspectors reviewed selected NCS evaluations to determine whether the nuclear criticality safety of risk-significant operations was assured through engineered features and human performance controls with adequate safety margin/certainty, and were

prepared and reviewed by qualified staff. The inspectors reviewed criticality safety analyses performed by the licensee's criticality safety engineers that were associated with current decommissioning activities. The inspectors also interviewed selected licensee personnel. The inspectors reviewed selected aspects of the following documents:

- NISYS-NCS-1180-TR001, "Global Nuclear Criticality Safety Evaluation for the Primary Interference Removal Project at the Westinghouse Electric Corporation Hematite Facility," Revision 2, dated December 2004;
- NISYS-1000-TR003, "Validation of SCALE Version 4.4a and the 238-Group ENDF/B-V Cross Section Library for U-235," Revision 0, dated July 2003;
- NISYS-NCS-1180-TR005, "Nuclear Criticality Safety Evaluation for Sample Collection, Storage, and Shipping during the Primary Interference Removal Project at the Westinghouse Electric Corporation Hematite Facility," Revision 1, dated August 2004;
- NISYS-NCS-1180-TR006, "Sample Collection and Analysis Plan for 235U Enrichment Verification for the Primary Interference Removal Project at the Westinghouse Electric Corporation Hematite Facility," Revision 1, dated August 2004;
- NISYS-NCS-1180-TR008, "Determination of Deminimus Fissile Contamination Levels for the Primary Interference Removal Project at the Westinghouse Electric Corporation Hematite Facility," Revision 3, dated December 2004;
- NISYS-NCS-1180-TR010, "Nuclear Criticality Safety Evaluation for Use of the Fixed Ventilation System Hoods during the Primary Interference Removal Project at the Westinghouse Electric Corporation Hematite Facility," Revision 3; and
- E-76X-001-R0-S0, "Plant Systems 760-765 Process Ventilation Systems," Revision 0, dated April 2, 2001.

b. Observations and Findings

Background Facility Information

From 1956 until 1974, highly enriched uranium (HEU) processing operations were conducted at the Hematite facility by former operators. Details of the HEU operations were not available and the licensee did not have any records documenting the nature and extent of clean-up following cessation of HEU operations in 1974. From 1974 until the cessation of primary licensed activities and subsequent decommissioning activities, the licensee and other former operators of the facility performed LEU fuel fabrication operations in the same areas and buildings where HEU operations had been performed.

Current Operations

The licensee perform limited decommissioning activities of the facility under its operating license. The limited activities consisted of the removal of former process equipment and piping, ventilation and off-gas duct work, and other contaminated items from the facility for approved radioactive disposal. The licensee had removed some uranium residues

from the affected equipment and shipped the residues to the Westinghouse Electric Company fuel fabrication facility, located in Columbia, South Carolina, for reuse and uranium recovery. As a result of these activities, fissile material that had been dispersed throughout the facility in the form of uranium dioxide powder and process residues was concentrated at work tables, processing hoods, and storage arrays.

The licensee estimated that approximately 1,200 kilograms of uranium at various assays less than 5 weight percent (wt%) uranium-235 remained in the facility. The licensee estimated that approximately 450 kilograms of uranium at those assays was residue in the former process facility ventilation and off-gas systems.

Water intrusion, in the form of water lines and roof leaks, was neither prevented, nor controlled; therefore, water (moderator) is readily available in the former process facility. However, the licensee had characterized fissile material at the facility as optimally moderated and in the form of uranium dioxide mixed with water. The licensee considered these to be conservative characterization assumptions for use in determining safe geometries and mass quantities, with regard to criticality safety.

The inspectors estimated that the minimum critical mass for optimally moderated uranium dioxide powder at 5 wt% uranium-235 mixed with water to be approximately 34 kilograms. The inspectors determined that approximately 10 gallons of water would be necessary to produce criticality with that quantity of enriched uranium. The licensee's decommissioning activities resulted in the accumulation of enriched uranium on processing tables and in storage arrays.

Uranium Assay Sampling Plan

The licensee developed NCS Evaluation No. NISYS-NCS-1180-TR006, a sample collection and analysis plan for uranium-235 enrichment, to establish the assay (a quantitative analysis to determine the isotopic components) prior to beginning decommissioning activities involving fissile material handling. The licensee determined that the sampling plan was necessary due to the lack of available information regarding the results of cleanup efforts following the previous HEU operations at the facility. The inspectors noted that all of the NCS analyses were predicated on the assumption that 5 wt% uranium-235 (LEU) was the maximum assay within the former production facility. The licensee based the development of appropriate NCS controls on the uranium assay, which became the bounding assumption for all analyses and was the initial and fundamental NCS control. Controls developed and implemented to assure subcriticality of materials containing LEU assays would be ineffective and inappropriate for HEU assays.

The licensee's sample collection and analysis plan, NISYS-NCS-1180-TR006, required the licensee to obtain 59 valid samples, subdivided by building, to establish 95 percent confidence that 95 percent of samples would be 5 wt% assay uranium-235 or below prior to initiating fissile material handling operations. The analysis plan required additional sampling in the event that any sample contained insufficient material for assay determination. The inspectors identified that the licensee's sampling results indicated that only 45 of the 59 samples contained sufficient radioactive material to produce an analytical determination of the uranium assay. The inspectors also identified that the licensee began fissile material handling throughout the facility after only eight samples had been collected from Building No. 254 and analyzed to confirm

that the uranium assay was less than 5 wt% uranium-235. On January 26, 2005, the licensee received the uranium assay results for the remaining 14 samples.

The licensee's implementation of its sampling plan to determine the uranium-235 assay prior to initiating decommissioning activities involving fissile materials remains under further NRC review. The adequacy of the licensee's implementation of NISYS-NCS-1180-TR006 is considered an Unresolved Item (URI) 07000036/2005-001-01 pending completion of the NRC's review.

Nuclear Criticality Safety Program Implementation

The licensee conducted an audit of its NCS program in the week immediately prior to the January 10, 2005 inspection. The licensee identified numerous findings, including the failure to determine fissile mass of an object prior to placement in a fissile material storage array, and some instances in which NCS controls were not incorporated into procedures. The inspectors noted that an independent annual audit of the radiological and nuclear criticality safety programs, dated June 30, 2004, also identified the lack of NCS controls in procedures. The audit contained a recommendation to ensure that all of the criticality safety controls were incorporated into procedures.

Chapter 4 of the license application stated that, "the criticality safety evaluations shall consider potential scenarios which could lead to criticality and barriers erected against criticality in establishing applicable criticality safety limits and controls. These limits and controls shall be incorporated into written procedures and/or postings," and "Operations involving the handling and storage of SNM [fissile material] shall be performed according to approved, written procedures." The fundamental criticality safety limits include, but are not limited to, fissile mass determinations.

The inspectors identified that the licensee had not incorporated any of the 58 NCS controls contained in its NCS evaluations into any procedures prior to handling fissile material. For example, NCS Evaluation No. NISYS-NCS-1180-TR001/R3, contained a spacing control: "The path used for transport of a safe vacuum cleaner or safe volume container shall be walked down prior to moving the item and verified to contain no open containers or items with a volume greater than 4.49 gallons." The licensee did not incorporate the control into any procedure until after the January 2005 self-assessment. Following the self-assessment, the licensee incorporated the control into Procedure MCP-HE-OP-205, "Radioactive Material Handling," Revision 3.

The licensee initiated decommissioning activities involving fissile material handling in November 2004 and continued through January 10, 2005. During this period, the licensee processed approximately 34 kilograms of uranium, which equaled the minimum critical mass for 5 wt% assay, without incorporating NCS evaluation controls into its procedures. The failure to incorporate NCS evaluation controls into procedures prior to initiating fissile material operations constitutes an apparent violation of NRC regulatory requirements (APV 07000036/2005-001-02).

As a result of the self-assessment, the licensee identified that numerous objects were placed in fissile material storage arrays between November 2004 and January 10, 2005, without a determination of fissile mass. The placement of objects in NCS storage arrays without a corresponding fissile mass determination resulted in a failure to implement a fundamental criticality safety limit (APV 07000036/2005-001-03).

On January 27, 2005, based on the licensee's review of the inspectors' concerns, the Decommissioning Director continued the self-imposed suspension of fissile material operations until all NCS program deficiencies could be adequately addressed.

Nuclear Criticality Safety Evaluations

The inspectors identified that the licensee's staff applied a fissile material spacing requirement from NCS Evaluation No. E-76X-001-R0-S0, to a pair of HEPA filter housings (described in Section 4.1) relocated to the former process buildings. The staff received approval and independent review by NCS specialists to conduct the change affecting the storage of fissile material. Following the NCS Specialists' review, the staff placed postings, requiring a minimum of 12-foot spacing from other fissile material, on each HEPA filter housing located in Building Nos. 254 and 256-1. The licensee was unable to provide the inspectors with documentation of the approval or independent review conducted by the NCS specialists. The licensee's staff acknowledged that facility changes affecting the handling or storage of fissile material must be approved, independently reviewed, and documented by qualified NCS specialists.

The licensee's implementation of its facility change program associated with the handling and storage of fissile material remains under further NRC review. The adequacy of the licensee's NRC review and implementation of a 12-foot spacing for HEPA filter housings stored in Building Nos. 254 and 256-1 is considered an Unresolved Item (URI) 07000036/2005-001-02 pending completion of the NRC's review.

Nuclear Criticality Safety Corrective Actions

In response to the inspectors' findings, the licensee's management team acknowledged that they had not fully implemented the requirements of NCS evaluations during fissile material operations. The licensee completed the following corrective actions prior to the resumption of fissile material operations:

- The Decommissioning Director suspended fissile material operations on January 10, 2005, until the extent of the NCS program condition could be identified and corrective actions could be developed;
- The licensee performed a root cause analysis to determine the reason for its NCS program deficiencies;
- The licensee completed a corrective actions plan to address the self-identified and NRC-identified NCS program deficiencies that included, incorporation of NCS evaluation controls in procedures and additional NCS program training;
- The licensee incorporated all NCS evaluation controls in decommissioning procedures that involved the handling of fissile material;
- The licensee conducted workforce and staff retraining on its NCS program requirements, including new and revised procedures that contained NCS evaluation control(s);

- The licensee conducted a readiness review of its NCS program to determine that their corrective actions were complete, and that the NCS program met the applicable licensee conditions; and
- The Decommissioning Director briefed senior Westinghouse corporate management on the results of the readiness review and obtained their concurrence to resume fissile material operations.

c. Conclusions

The inspectors identified: (1) an apparent violation involving the failure to incorporate nuclear criticality safety controls into procedures; (2) an apparent violation involving the failure to determine the fissile mass of objects prior to placement into a NCS storage array; (3) an unresolved item involving the adequacy of the licensee's implementation of a nuclear criticality safety evaluation to determine the uranium assay prior to initiating fissile material operations; and (4) an unresolved item involving the adequacy of the licensee's implementation of its facility change program associated with the handling and storage of fissile material.

The inspectors concluded that the licensee had addressed the previously identified NCS program deficiencies. The inspectors also concluded that the licensee's NCS analyses were performed and independently reviewed by qualified NCS engineers, and included sufficient engineered features and human performance controls to assure subcriticality of the systems and operations.

4.0 Management Organization and Controls (88005)

a. Inspection Scope

The inspection included observation of a special meeting of the licensee's Project Oversight Committee (POC), convened on March 1, 2005, to review corrective actions associated with NCS program deficiencies. The inspectors reviewed the licensee's root cause analyses that were the subject of the meeting, as well as the licensee's proposed corrective actions.

b. Observations and Findings

The purpose of the POC meeting was for the membership to evaluate whether the licensee's corrective actions adequately addressed NCS program deficiencies prior to the resumption of fissile material operations. The inspectors noted that the POC membership did not specifically evaluate the root cause analyses during the meeting, but rather reviewed and evaluated whether the issues and concerns associated with NCS had been addressed. The POC membership had reviewed the documents associated with NCS prior to the March 1, 2005, meeting. The membership had reviewed the documents and discussed NCS program requirements with the licensee's staff, including the:

- (1) regulatory issues and concerns;
- (2) root cause analysis;
- (3) status of corrective actions;
- (4) resolution of regulatory issues and concerns;
- (5) readiness review of the NCS program prepared by the staff;

- (6) fissile material operations resumption plan; and
- (7) lessons learned.

The POC membership and chairman, based on the information presented at the meeting, concluded that the facility had adequately addressed the NCS deficiencies, and recommended the resumption of fissile material operations.

Following the meeting, the inspectors discussed the adequacy of the licensee's root cause analysis with the Decommissioning Director and the POC Chairman. The licensee had concluded that the root cause for its failure to fully implement the NCS program was the use of inadequately qualified and inexperienced contractors to implement NCS evaluation controls, and that Westinghouse and contractor project managers were not working or communicating together effectively. However, the root cause determination failed to address that the licensee had identified multiple previous examples in which significant pressure was placed on management and staff to maintain the production schedule.

The Decommissioning Director, after considering the inspectors' observations, decided to maintain fissile material operations in suspension pending further evaluation of the root cause and associated corrective actions. Subsequently, the licensee determined that production pressure, resulting from poor management oversight, was the root cause for the failure to fully implement the NCS program. The inspectors noted that the revised root cause and associated corrective actions were consistent with the facts of the root cause analysis.

c. Conclusions

The inspectors concluded that the licensee's initial root cause determination for its failure to fully implement the NCS program requirements was not properly focused. The inspectors determined that the root cause was pressure to maintain the schedule for decommissioning activities.

5.0 Closure of Previous Violations

VIO 07000036/2004-003-01: During facility tours, the inspector evaluated the licensee's corrective actions associated with the failure to maintain security of licensed material. The licensee's actions to address the violation should preclude any further degradation in the security of licensed materials; therefore, this issue is closed.

6.0 Exit Meeting Summary

The NRC inspectors presented preliminary inspection findings to members of the facility management team following each onsite inspection. On April 27, 2005, the inspectors discussed the final inspection findings with the site decommissioning director. The licensee acknowledged the findings presented. The licensee did not identify any documents or processes reviewed by the inspectors as proprietary.

PARTIAL LIST OF PERSONS CONTACTED

Westinghouse Electric Company, LLC

- *H. Sepp, Decommissioning Director
- *K. Craig, Licensing and Regulatory Affairs Manager
- *P. Malich, D&D Project Manager
- *J. Novak, Operations Manager
- *K. Hayes, Manager Environment, Safety and Health
- *G. Vytlačil, Quality Assurance Manager
- *C. N. Horton, Radiation Protection Manager
- *T. Chance, Criticality Safety Supervisor
- *H. Anagnostopoulos, Health Physics Supervisor
- *C. Werner, Contracts Manager
- *S. Welch, Document Control Administrator
- *N. Lambha, Senior Criticality Safety Engineer (NYSIS Corporation)
- *J. Justice, Criticality Safety Engineer (NYSIS Corporation)
- *J. Nardi, Radiation Safety Chairman (participated by telephone)

State of Missouri

- *B. Moore, Missouri Department of Natural Resources

* Indicates those individuals present at an exit meeting.

INSPECTION PROCEDURES USED

IP 88005	Management Organization and Controls
IP 88015	Criticality Safety
IP 88025	Maintenance and Surveillance Testing
IP 88104	Decommissioning Inspection Procedure For Fuel Cycle Facilities

ITEMS OPENED, CLOSED, AND DISCUSSED

<u>Opened</u>	<u>Type</u>	<u>Summary</u>
APV 07000036/2005-001-01 APV		Failure to store two HEPA filter housings containing fissile material in accordance with approved NCS evaluation limits and controls
APV 07000036/2005-001-02 APV		Failure to incorporate NCS evaluation controls into procedures
APV 07000036/2005-001-03 APV		Failure to determine the mass of fissile materials placed in storage arrays.
URI 07000036/2005-001-01 URI		The licensee's implementation of its sampling plan prior to initiating decommissioning activities involving fissile materials .

URI 07000036/2005-001-02 URI The licensee's implementation of its facility change program associated with the handling and storage of fissile material.

Closed

VIO 07000036/2004-003-01 VIO Failure to maintain security of licensed material.

Discussed

None

PARTIAL LIST OF DOCUMENTS REVIEWED

Nuclear Criticality Safety Evaluation No. NISYS-NCS-1180-TR001, entitled "Global Nuclear Criticality Safety Evaluation for the Primary Interface Removal Project at the Westinghouse Electric Corporation Hematite Facility," Revision 1, dated July 2004;

Nuclear Criticality Safety Evaluation No. NISYS-1000-TR003, entitled "Validation of SCALE Version 4.4a and the 238-Group ENDF/B-V Cross Section Library for U-235," Revision 0, dated July 2003; and E-76X-001-R0-S0 "Plant Systems 760-765 Process Ventilation Systems," Revision 0, dated April 2, 2001;

Nuclear Criticality Safety Evaluation No. NISYS-NCS-1180-TR005, entitled "Nuclear Criticality Safety Evaluation for Sample Collection, Storage, and Shipping during the Primary Interference Removal Project at the Westinghouse Electric Corporation Hematite Facility," Revision 1, dated August 2004;

Nuclear Criticality Safety Evaluation No. NISYS-NCS-1180-TR006, entitled "Sample Collection and Analysis Plan for U-235 Enrichment Verification for the Primary Interference Removal Project at the Westinghouse Electric Corporation Hematite Facility;"

Nuclear Criticality Safety Evaluation No. NISYS-NCS-1180-TR008, entitled "Determination of Deminimus Fissile Contamination Levels for the Primary Interference Removal Project at the Westinghouse Electric Corporation Hematite Facility," Revision 3, dated December 2004;

Nuclear Criticality Safety Evaluation No. NISYS-NCS-1180-TR010, entitled "Nuclear Criticality Safety Evaluation for Use of the Fixed Ventilation System Hoods during the Primary Interference Removal Project at the Westinghouse Electric Corporation Hematite Facility," Revision 3;

Nuclear Criticality Safety Evaluation No. NISYS-1000-TR003, entitled "Validation of SCALE Version 4.4a and the 238-Group ENDF/B-V Cross Section Library for U-235," Revision 0, dated July 2003; and

Nuclear Criticality Safety Evaluation No. E-76X-001-R0-S0, entitled "Plant Systems 760-765 Process Ventilation Systems," Revision 0, dated April 2, 2001.

LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
APV	Apparent Violation
CFR	Code of Federal Regulations
DNMS	Division of Nuclear Material Safety
FCSS	Division of Fuel Cycle Safety and Safeguards
HEPA	High Efficiency Particulate Air
HEU	Highly Enriched Uranium
LEU	Low Enriched Uranium
NCS	Nuclear Criticality Safety
NIST	National Institute of Standards and Technology
NMSS	Office of Nuclear Material Safety and Safeguards
NRC	U.S. Nuclear Regulatory Commission
PDR	Public Document Room
POC	Plant Oversight Committee
RPM	Radiation Protection Manager
SNM	Special Nuclear Material
URI	Unresolved Item
VIO	Violation
wt%	Weight Percent