



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
SAM NUNN ATLANTA FEDERAL CENTER  
61 FORSYTH STREET SW SUITE 23T85  
ATLANTA, GEORGIA 30303-8931

April 25, 2000

Westinghouse Electric Corporation  
ATTN: Mr. J. B. Allen, Manager  
Columbia Plant  
Nuclear Fuel Business Unit  
Drawer R  
Columbia, SC 29250

SUBJECT: NRC INSPECTION REPORT NO. 70-1151/2000-02 AND NOTICE OF VIOLATION

Dear Mr. Allen:

This letter refers to the inspection conducted on March 27-30, 2000, at the Westinghouse facility. The enclosed report presents the results of this inspection.

Based on the results of this inspection, the NRC has determined that violation of NRC requirements occurred. The 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 involves failure to adequately adhere to your configuration management program. The violation is of concern because configuration management is a far-reaching program that can affect most of the safety systems at your facility.

You are required to respond to this letter 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.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response will be made publically available.

Sincerely,

**/RA/**

Edward J. McAlpine, Chief  
Fuel Facilities Branch  
Division of Nuclear Materials Safety

Docket No. 70-1151  
License No. SNM-1107

Enclosures: (See Page 2)

Enclosures: 1. Notice of Violation  
2. NRC Inspection Report

cc w/encls:

Don Goldbach, Manager  
Regulatory Affairs  
Commercial Nuclear Fuel Division  
Westinghouse Electric Corporation  
P. O. Box R  
Columbia, SC 29250

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OFFICE	RII:DNMS		
SIGNATURE	/RA/		
NAME	DAyres		
DATE	4/25/00	4/ /00	4/ /00
COPY?	YES NO	YES NO	YES NO

## NOTICE OF VIOLATION

Westinghouse Electric Corporation  
Commercial Nuclear Fuel Division

Docket No. 70-1151  
License No. SNM-1107

During an NRC inspection conducted on March 27 through 30, 2000, violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedures for NRC Enforcement Actions," NUREG-1600, the violations are listed below:

Safety Condition No. S-1 of Special Nuclear Material License No. 1107, requires that material be used in accordance with statements, representations, and conditions in the License Application dated April 30, 1995, and supplements thereto.

Section 3.4.1 of the License Application, requires that operations to assure safe, compliant activities involving nuclear material will be conducted in accordance with approved procedures.

Procedure TA-500, "Columbia Manufacturing Plant Configuration Control" specifies the requirements associated with the licensee's configuration control program.

Contrary to the above, the licensee failed to conduct activities in accordance with the requirements of its configuration control program as evidenced by the following:

- a. Paragraph 4.6.2 of procedure TA-500 states that specification documents define the requirements and duty for the hardware in the manufacturing system. Piping specification sketch FSS003-46 indicates that welded construction is used on uranyl nitrate piping, but that threaded pipe and fittings may be used for adapting to threaded instrumentation or equipment, or when work space is not adequate for making weldment. On March 28, 2000, activities were not being conducted in accordance with sketch FSS003-46 in that threaded pipe and fittings were being used for uranyl nitrate service without the need to adapt to threaded instrumentation or equipment, and when adequate work space existed for using welded pipe and fittings.
- b. Section 7.2 of procedure TA-500 states that modifications to the process must be controlled via a formal system requiring review and approval of licensee management. On March 28, 2000, modifications had been made to permanently remove equipment from the uranyl nitrate piping system without implementing the configuration control process.

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

Pursuant to the provisions of 10 CFR 2.201, Westinghouse Electric Corporation is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555 with a copy to the Regional Administrator, Region II, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation, (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 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 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.

Because your response will be placed in the NRC Public Document Room (PDR), to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be placed in the PDR 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 2.790(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.

Dated at Atlanta, Georgia  
this 25<sup>th</sup> day of April, 2000

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 70-1151

License No.: SNM-1107

Report No.: 70-1151/2000-02

Licensee: Westinghouse Electric Company

Facility: Columbia Fuel Fabrication Facility  
Columbia, SC 29250

Date: March 27-30, 2000

Inspector: D. Ayres, Sr. Fuel Facilities Inspector

Approved by: E. J. McAlpine, Chief  
Fuel Facilities Branch  
Division of Nuclear Materials Safety

## EXECUTIVE SUMMARY

### Commercial Nuclear Fuel Division NRC Inspection Report 70-1151/2000-02

The focus of this routine, unannounced inspection was the observation and evaluation of the licensee's programs for operational safety, maintenance, and management controls. The inspection also included evaluations of the licensee's responses to previously identified issues and incidents. The report includes inspection efforts of one regional inspector. The inspector was accompanied by the Chief, Fuel Facilities Branch, NRC Region II during portions of two days during the inspection. The inspection identified the following aspects of the licensee programs as outlined below:

#### Plant Operations

- The review of operations in the chemical manufacturing areas revealed that improvements were needed in the bracing and labeling of hydrofluoric acid piping. Instrumentation was needed to warn workers of potential airborne activity due to excessive ventilation in process glove boxes. (Section 2.a)
- The uranyl nitrate piping system was not adequately being maintained per the plant configuration control program and was identified as Violation (VIO) 00-02-02. (Section 2.b)
- The licensee's reaction to the uranyl nitrate spill appropriately addressed existing outdoor areas of contamination on and adjacent to the chemical process building. The licensee's investigation had not yet fully addressed the prevention of uranyl nitrate piping leaks. (Section 2.c)

#### Management Organization and Controls

- The licensee's system for performing internal reviews and audits adequately addressed the cause(s) of high air activity. (Section 3.a)
- The Health Physics Unusual Incident Investigation Form was a useful tool for determining the cause(s) of high airborne radioactivity. However, information provided on the form pertinent to other safety disciplines was not always passed along to the appropriate safety personnel. (Section 3.a)

#### Attachment:

Persons Contacted

Lists of Items Opened, Closed, and Discussed

List of Acronyms

## REPORT DETAILS

### **1. Summary of Plant Status**

This report covered a four day period. Powder, pellet, and fuel assembly production proceeded at normal rates. There was an unusual plant operational occurrence during the onsite inspection involving a worker being sprayed by nitric acid during equipment washing. Initial preparations were being made for the licensee's annual Special Nuclear Material (SNM) inventory.

### **2. Plant Operations (O3) (IP 88020)**

#### a. Conduct of Operations (O3.01)

##### (1) Inspection Scope

Operations in the chemical manufacturing areas were reviewed to verify adherence to safety requirements and conduct of safe practices.

##### (2) Observations and Findings

The inspector toured various portions of the chemical manufacturing areas and investigated areas experiencing recent contamination control problems. During a review of a contamination event involving uranyl nitrate (see section 2.c) the inspector observed a section of unlabeled piping that was vibrating significantly due to inadequate bracing. The area operator pointed out that the piping contained hydrofluoric acid being pumped from bulk storage to a process station. The inspector found that this was a chemical safety concern due to the risk of a pipe failure and no clear indication as to the hazardous nature of the pipe's contents. The inspector notified licensee management who took quick action to brace the piping. The licensee was investigating additional improvements in the labeling and bracing of the piping.

The inspector reviewed the operation of the uranium recovery dissolver system. This system had been involved in three recent work restrictions due to high airborne radioactivity. The inspector reviewed the licensee's investigation of the high airborne activity and concluded that the cause was excessive ventilation on the three glove boxes used to introduce scrap materials to the dissolvers. Excessive ventilation can cause turbulence in the air flow through glove boxes that lowers the system's effectiveness. The inspector found that the excessive ventilation occurred for several days after modifications had been made to the ventilation system serving that area of the plant. The inspector observed that the glove boxes each had instrumentation that would indicate when there was too little ventilation, but not when there was too much ventilation. The inspector determined that instrumentation showing when excessive ventilation was present on the glove boxes could have alerted operators to the situation, minimized the airborne activity, and prevented the work restrictions. The installation of such instrumentation would be consistent with the As Low As Reasonably Achievable (ALARA) concept and will be tracked as Inspector Follow-up Item (IFI) 00-02-01.

(3) Conclusions

The review of operations in the chemical manufacturing areas revealed that improvements were needed in the bracing and labeling of hydrofluoric acid piping. Instrumentation was needed to warn workers of potential airborne activity due to excessive ventilation in process glove boxes.

b. Facility Modifications and Configuration Controls (O3.02)

(1) Inspection Scope

The licensee's uranyl nitrate piping systems were reviewed to verify that the licensee's configuration controls for facility modifications were in accordance with approved specifications and procedures for ensuring safety.

(2) Observations and Findings

The inspector reviewed the licensee's procedure for configuration control in the manufacturing plant. The inspector observed various areas of the licensee's uranyl nitrate piping system, including the area involved in a recent contamination event (see Section 2.c). The licensee indicated that the contamination event was due to the failure of a piece of threaded pipe on a uranyl nitrate sample port. The inspector reviewed the drawing referenced by the system's Integrated Safety Assessment (ISA) and noted that the drawing was last updated in April 1998. The drawing indicated a piping specification of welded construction, with the provision that threaded connections could be used when adequate work space was not available for welding, or when adapting to threaded instrumentation or equipment. Neither of these provisions applied to the failed piping that led to the contamination event. The inspector also found that drawing included a piping manifold with six valves that had been removed from the manufacturing area without being reviewed and approved through the configuration control program. Although the removed valves were no longer being used, this rendered the process information referenced by the ISA inaccurate. The inspector also observed the uranyl nitrate piping in several other areas of the plant and found places where threaded fittings had been used instead of the specified welded fittings. All of these findings are examples of failure to maintain safety-related operations per the plant configuration management program and are identified as Violation (VIO) 00-02-02.

(3) Conclusions

The uranyl nitrate piping system was not adequately being maintained per the plant configuration management program and was identified as VIO 00-02-02.

c. Review of Previous Events (O3.07)

(1) Inspection Scope

The licensee's response to the uranyl nitrate spill reported in NRC Event Notice No. 36727 and Nuclear Material Event Database (NMED) Event No. 000144 was reviewed to verify that appropriate actions were being taken to prevent recurrence and ensure safety.

(2) Observations and Findings

The inspector observed the area where the spill occurred and the pathway for contamination to reach the outdoor concrete pad. The uranyl nitrate piping ran from a set of bulk storage tanks, passed over a concrete pad in a non-controlled area, entered the process building at below the floor level, turned upward and penetrated through the floor to the indoor process area. The uranyl nitrate had been spilled inside the indoor process area, seeped through the floor around the pipe penetrations, and flowed out of the building onto the concrete pad. Although the contamination reached the outdoor area, the inspector observed that piping and equipment created obstacles such that the outdoor contaminated area was not easily accessible to workers. The inspector observed that the area had been thoroughly cleaned, but some fixed contamination remained in isolated spots. It was not clear whether these isolated areas of fixed contamination were due to the reported event, or due to previous small leaks. The licensee continued to investigate options for either removing or sealing the contaminated concrete. The licensee recognized that any remaining fixed contamination was required to be addressed in the facility decommissioning plan.

The inspector observed that the licensee had begun removing many of the pipes penetrating through the floor and wall where the spill occurred. These pipes were for obsolete operations and were no longer being used. The inspector was informed that sealant would be applied around the remaining pipe penetrations and the floor would be sloped to divert any future indoor spills away from the penetrations. The inspector determined that this action would prevent a similar spill from reaching outdoor areas. However, this action would not prevent further contamination of the concrete pad in the non-controlled area if a leak occurred in an outdoor section of the piping. Also, this action did not address prevention of indoor uranyl nitrate leaks to maintain contamination ALARA. The inspector found that the configuration management of the uranyl nitrate piping system was inadequate for preventing such leaks (see Section 2.b).

The inspector observed that the licensee had been very aggressive in inspecting all of the outdoor walls of the process facility for signs of contamination. The licensee had found three other areas where contamination had seeped through the walls via pipe penetrations or cracks between the floor and walls of the facility due to past spills in the process areas. The inspector observed that the licensee had completed cleaning two of the areas and was working on the third area.

(3) Conclusions

The licensee's reaction to the uranyl nitrate spill appropriately addressed existing outdoor areas of contamination on and adjacent to the chemical process building. The licensee's investigation had not yet fully addressed the prevention of uranyl nitrate piping leaks.

d. Follow up on Previously Identified Issues (O3.08)

(1) Inspection Scope

The licensee's actions in response to IFI 99-06-01 and IFI 99-06-02 were reviewed for adequacy and closure.

(2) Observations and Findings

The inspector discussed IFI 99-06-01 concerning the potential failure of safety alarms and controls due to level probe failures in the uranyl nitrate bulk storage tank system identified in December 1999. This task had been forwarded to the engineering group and was still under investigation. This item remained open.

The inspector reviewed the licensee's response to IFI 99-06-02 concerning the lack of detailed instructions for taking uranyl nitrate samples to be used as backup criticality controls. The inspector observed that a procedure change had been implemented that specified an amount of solution to drain from the system prior to taking the sample. The inspector found that the procedure change adequately ensured that the sample taken was representative of the tank's contents. This item was closed.

(3) Conclusions

Inspector Follow-up Item 99-06-01 had not been completed and remained open. Item 99-06-02 had been adequately addressed and was closed.

**3. Management Organization and Controls (O5) (IP 88005)**

a. Internal Reviews and Audits (O5.03)

(1) Inspection Scope

The licensee's system for performing internal reviews and audits of incidents of high air activity was reviewed to verify that safety related problem areas were being adequately addressed.

(2) Observations and Findings

The inspector reviewed the licensee's system for investigating occurrences of high airborne radioactivity in the process areas. The inspector observed that upon discovery of a high airborne reading, the area operators were required to complete a Health

Physics Unusual Incident Investigation Form. On this form, the area operator communicated the potential cause(s) of the high airborne activity to the health physics (HP) group based on observed operational problems. The inspector found this to be a good tool for determining the cause of airborne activity problems. However, the inspector noted that during investigations at the uranium dissolvers, several observations of red smoke coming from the dissolvers were made by the operators. Red smoke is indicative of nitrogen oxide (NO<sub>x</sub>), a significant chemical hazard. The inspector found that although the operators' exposure to NO<sub>x</sub> fumes was minimal, the presence of red smoke was not recognized as a potential hazard by the HP group, and thus was not properly reported to the responsible chemical safety engineer. The inspector discussed this with the HP manager and the chemical safety engineer who indicated that better communication of potential hazards between the safety disciplines would be developed.

The inspector reviewed the licensee's investigation of the high airborne activity that resulted in one work restriction at a pellet press. Since maintenance activity was in progress at a nearby station, air flow tests were performed that determined it was not a contributor to the activity. The licensee's inspection of the pellet press showed that it was experiencing excessive vibration that caused a crack to develop in its powder feed hopper. The licensee found that the crack in the feed hopper caused a small amount of powder to leak into the pellet press hood. This caused the station's air sampler to detect high airborne activity such that the area operator was placed on work restriction. Subsequent bioassay tests showed that the operator did not receive a significant intake of radioactivity.

(3) Conclusions

The licensee's system for performing internal reviews and audits adequately addressed the cause(s) of high air activity. The Health Physics Unusual Incident Investigation Form was a useful tool for determining the cause(s) of high airborne radioactivity. However, information provided on the form pertinent to other safety disciplines was not always passed along to the appropriate safety personnel.

**4. Exit Meeting**

The inspection scope and results were summarized on March 30, 2000, with those persons indicated in the Attachment. The inspectors described the areas inspected and discussed in detail the inspection results, including any apparent violation(s). Although proprietary documents and processes were reviewed during this inspection, the proprietary nature of these documents or processes has been deleted from this report.

## ATTACHMENT

### **PARTIAL LIST OF PERSONS CONTACTED**

#### Licensee Personnel

- \*J. Allen, Manager, Columbia Plant
- \*B. Monley, Deputy Plant Manager
- \*J. Bush, Manager, Manufacturing
- \*D. Goldbach, Manager, Environment, Health & Safety (EH&S)
- \*W. Goodwin, Advisory Engineer, EH&S
- \*J. Heath, Manager, Integrated Safety Engineering
- \*S. McDonald, Manager, Technical Services
- \*C. Perkins, Manager, Maintenance
- \*T. Shannon, EH&S Technician
- \*R. Likes, Senior Regulatory Engineer, EH&S

### **INSPECTION PROCEDURES USED**

- |          |  |
|----------|--|
| IP 88005 | Management Organization and Controls                   |
| IP 88020 | Regional Nuclear Criticality Safety Inspection Program |

### **LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**

#### Opened

- |     |          |   |
|-----|----------|---|
| IFI | 00-02-01 | Provide method to monitor for excessive ventilation in glove boxes.<br>(Section 2.a)  |
| NOV | 00-02-02 | Inadequate configuration management of uranyl nitrate piping system.<br>(Section 2.b) |

#### Closed

- |     |          |  |
|-----|----------|--|
| IFI | 99-06-02 | Evaluate providing more detailed instructions in procedures for ensuring representativeness of samples taken for criticality safety verification.<br>(Section 2.d) |
|-----|----------|--|

#### Discussed

- |     |          |   |
|-----|----------|---|
| IFI | 99-06-01 | Evaluate and correct the disabling of safety alarms and controls caused by a failure of the uranyl nitrate tank level probe system. (Section 2.d) |
|-----|----------|---|

**ACRONYMS and ABBREVIATIONS**

ALARA	As Low As Reasonably Achievable
EH&S	Environment, Health & Safety
HP	Health Physics
IFI	Inspector Follow-up Item
ISA	Integrated Safety Assessment
NMED	Nuclear Materials Event Database
NO <sub>x</sub>	Nitrogen Oxide(s)
NRC	Nuclear Regulatory Commission
SNM	Special Nuclear Material
VIO	Violation