



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

February 16, 2001

EA-01-035

Westinghouse Electric Company, LLC  
ATTN: Mr. R. Monley, Manager  
Columbia Plant  
Commercial Nuclear Fuel Division  
P. O. Box R  
Columbia, SC 29250

SUBJECT: NRC INSPECTION REPORT NO. 70-1151/2001-01 AND NOTICE OF VIOLATION

Dear Mr. Monley:

This letter refers to the inspection conducted on January 17-19, 2001, 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 violations of NRC requirements occurred. These violations are cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding them are described in detail in the subject inspection report.

Violation A involved a non-compliance for transporting containers with external radiation in excess of NRC limits as prescribed in 10 CFR 71.5(a) and 49 CFR 173.441(b)(1). The NRC would generally consider characterization of this violation at Severity Level III in accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions - May 1, 2000," NUREG-1600, as amended on November 3, 2000 (65 Federal Register 59274) (Enforcement Policy). However, the NRC has determined that this violation should be characterized at Severity Level IV. This determination was based on the location of the external radiation and the actual container radiation levels, and the resulting low risk to the public and/or driver in exceeding any regulatory exposure limits. The regulatory and safety significance of Violation B was consistent with Severity Level IV criteria in light of the Carrier's training program associated with exclusive use shipments. Further, NRC has concluded that the information regarding the reason for the violations, the corrective actions taken and planned to correct the violations, and prevent recurrence, is already adequately addressed in this Inspection Report (70-1151/ 2001-01). Therefore, you are not required to respond to this letter unless the description therein does not accurately reflect your corrective actions or your position. In that case, or if you choose to provide additional information, you should follow the instructions specified in the enclosed Notice.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response (if you choose to provide one will be available electronically for public inspection in the NRC Public Document Room (PDR) or from the Publicly Available

Records (PARS) component of NRC's document system (ADAMS). To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be placed in the PDR and PARS without redaction. ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/NRCC/ADAMS/index.html> (the Public Electronic Reading Room).

Should you have any questions concerning this letter, please contact us.

Sincerely,

**/RA by David A. Ayres Acting For/**

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

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

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

Henry J. Porter, Assistant Director  
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R. Mike Gandy  
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Distribution w/encls: (See Page 3)

Distribution w/encls:

- A. Boland, RII
- E. McAlpine, RII
- D. Ayres, RII
- L. Roche, NMSS
- J. Muszkiewicz, NMSS
- P. Hiland, RIII
- W. Britz, RIV
- B. Spitzberg, RIV
- PUBLIC

PUBLIC DOCUMENT (circle one):    YES    NO

OFFICE	RII:DNMS	RII:DNMS	RII:DNMS	RII:ECIS
SIGNATURE	<i>/RA/</i>	<i>/RA/</i>	<i>/RA by DAA Acting for/</i>	<i>/RA by ODM Acting for/</i>
NAME	AGooden	DAyres	EMcAlpine	ABoland
DATE	2/13/2001	2/14/2001	2/16/2001	2/15/2001
E-MAIL COPY?	YES            NO	YES            NO	YES            NO	YES            NO

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## NOTICE OF VIOLATION

Westinghouse Electric Company, LLC  
Columbia, SC

Docket No. 70-1151  
License No. SNM-1107  
EA-01-035

During an NRC inspection conducted on January 17 through 19, 2001, 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:

- A. 10 CFR 71.5 (a) requires, in part, a licensee who delivers licensed material to a carrier for transport to comply with the applicable requirements of the regulations appropriate to the mode of transport of the Department of Transportation (DOT) in 49 CFR 170 through 189.

49 CFR 173.441 (b)(1) and 10 CFR 71.47(b) require, in part, that a package which exceeds the radiation level of 2 mSv/h (200 mrem/h) on the external surface to be transported by exclusive use shipment in a closed transport vehicle.

Contrary to the above, on December 7, 2000, the licensee delivered to a carrier for transport in an open exclusive use vehicle, thirty (30) metal cylinders containing licensed material that on December 8, 2000, upon receipt at the receiver facility, had contact radiation levels on three of the cylinders in excess of 2 mSv/h (2.5, 2.3, and 2.3 respectively).

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

- B. 10 CFR 71.5 (a) requires, in part, a licensee who delivers licensed material to a carrier for transport to comply with the applicable requirements of the regulations appropriate to the mode of transport of the DOT in 49 CFR 170 through 189.

49 CFR 173.441 (c) and 10 CFR 71.47(c) require, in part, for shipments made under exclusive use, the offeror shall provide specific instructions for maintenance of the exclusive use shipment controls to the carrier, and the instructions must be included with the shipping paper information.

Contrary to the above, on December 7, 2000, the licensee delivered to a carrier for transport in an open exclusive use vehicle, thirty (30) metal cylinders containing licensed material, but no instructions were provided regarding maintenance of the exclusive use shipment controls to the carrier.

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

The NRC has concluded that information regarding the reason for the violations, the corrective actions taken and planned to correct the violations and prevent recurrence and the date when full compliance will be achieved is already adequately addressed in this Inspection Report (70-1151/2001-01). However, you are required to submit a written statement or explanation pursuant to 10 CFR 2.201 if the description therein does not accurately reflect your corrective actions or your position. In that case, or if you choose to respond, clearly mark your response as a "Reply to a Notice of Violation," and send it to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 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).

If you choose to respond, your response will be made publicly available. Therefore, to the extent possible, the response should not include any personal privacy, proprietary, or safeguards information so that it can be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/NRC/ADAMS/index.html> (the Public Electronic Reading Room).

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

Dated at Atlanta, Georgia  
this 16<sup>th</sup> day of February 2001

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 70-1151

License No.: SNM-1107

Report No.: 70-1151/2001-01

Licensee: Westinghouse Electric Company, LLC

Facility: Commercial Nuclear Fuel Division

Location: Columbia, South Carolina

Dates: January 17-19, 2001

Inspector: A. Gooden, Health Physicist

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

## EXECUTIVE SUMMARY

### Commercial Nuclear Fuel Division NRC Inspection Report 70-1151/2001-01

This announced, reactive inspection was conducted in the area of transportation of radioactive materials. The inspection included an observation of transportation activities, a review of selected records, and interviews with plant personnel. The inspection disclosed the following:

- A violation was identified for shipment of three uranium hexafluoride (UF<sub>6</sub>) cylinders on December 7, 2000, with radiation levels in excess of the limits in 10 CFR Part 71.47 and 49 CFR Part 173.441 (Paragraph 2.a).
- A violation was identified for failure to include specific instructions with the Bill of Lading in accordance with 10 CFR Part 71.47(c) regarding exclusive use shipments (Paragraph 2.a).
- The licensee's response to the incident was both prompt and effective (Paragraph 2.a).

#### Attachment:

Persons Contacted

Inspection Procedures

List of Items Opened, Closed, and Discussed

List of Acronyms

## REPORT DETAILS

### 1. Summary of Plant Status

During the inspection, there were no unusual plant operational occurrences.

### 2. Transportation (86740) (R4)

#### a. Preparation of Packages for Shipment (R4.01)

##### (1) Inspection Scope

Transportation activities associated with a shipment of thirty (30) metal cylinders used for transport of uranium hexafluoride (UF<sub>6</sub>) were reviewed, to determine if activities were in accordance with NRC and the Department of Transportation (DOT) regulations in 10 CFR 71 and 49 CFR Parts 171 through 180.

##### (2) Observations and Findings

The inspector reviewed procedures, shipping documentation, instrument calibration data, and conducted a walk-through with personnel involved in the December 7, 2000 shipment (UF<sub>6</sub> cylinders), to assess familiarity and performance in pre-loading inspections, radiation surveys, labeling, and container markings. Based on interviews and documentation, the inspector determined that with two exceptions, the licensee's performance in container labeling, loading, contamination surveys, markings, and shipping paper documentation was appropriate. The two exceptions involved the shipping paper documentation and radiation surveys. Regarding radiation surveys, all instrumentation used by Westinghouse personnel was within calibration and based on interviews and documentation, the inspector noted that surveys were performed in accordance with procedures. However, receipt surveys performed by personnel at United States Enrichment Corporation's Portsmouth Gaseous Diffusion Plant (PGDP) on December 8, 2000, disclosed that three of the thirty cylinders were in excess of NRC and DOT external surface contact limits of 2 millisievert/hour (mSv/h). PGDP reported readings to NRC of 2.3 mSv/h, 2.5 mSv/h, and 2.3 mSv/h. In response to the elevated readings, Westinghouse dispatched personnel to PGDP with calibrated radiation survey instruments on December 12, 2000, to investigate the elevated readings, and perform resurveys along with PGDP personnel of the three cylinders. The instruments used during the initial and resurvey by PGDP was a Geiger-Mueller (G-M) detector referred to as a Teletector, and Westinghouse utilized an ionization detector Model RO-3. According to documentation, survey results were as shown in Table 1.



Table 1 - Survey Results of UF<sub>6</sub> Cylinders

Cylinder Number	Initial Survey		Resurvey	
	Teletector	RO-3	Teletector	RO-3
LU 1348	2.5 mSv/h	0.6 mSv/h	2.0 mSv/h	0.3 mSv/h
LU 1371	2.3mSv/h	0.4 mSv/h	2.5 mSv/h	0.3 mSv/h
LU 1079	2.3mSv/h	0.3 mSv/h	2.0 mSv/h	0.3 mSv/h

Note: PGDP personnel using an ionization detector (Model RO-2) similar to that used by Westinghouse personnel found close agreement in survey results between the ionization detectors (LU 1348 was 0.4 mSv/h, LU 1371 was 0.4, and LU 1079 was 0.4 mSv/h respectively).

Subsequent to the December 12, 2000 surveys at PGDP, the licensee performed a comparative study to evaluate the discrepancy between the RO-3 ionization detector and a G-M detector (similar to the Teletector) know as the Telescan. Based on the comparative results from actual cylinder surveys, the inspector concluded that the difference in contact readings between the Teletector/Telescan and RO-3 (G-M and ionization) may be attributed to geometry, the probe size difference, and the inability to locate the RO-3 probe equidistant to the surface contact as the Teletector probe. The limited study performed by Westinghouse illustrated that when detector probe centers were equidistant, there was little difference in readings between the detectors in the energy range of the material suspected as the major contributor to the cylinder's external radiation levels. Results of the study are shown in Table 2.

Table 2 - Comparative Study Between Detector Types

Cylinder Number	*RO-3 Contact Reading	*Telescan Contact Reading	*Telescan Center Probe Equal RO-3
EURODIF 0040B	50	78	62
EURODIF 0004B	110	150	110
URENCO 20.892-47	100	150	100

**\*Note:** The above readings are in millirem per hour (mR/h)

Consequently, the elevated contact radiation levels may have been missed due to the RO-3 geometry, probe size, and distance to the source of radiation. In response, the licensee submitted a purchase order for two Teletector probes similar to detectors used at PGDP for use during future shipments, and as an interim measure, all cylinders are over checked using the Telescan detector to prevent a recurrence. Based on the technical aspects of this issue, the licensee's corrective actions were prompt and appeared to be adequate for preventing a recurrence. The regulatory significance of this incident was considered minor in that the survey procedures were adequate and

properly followed; instruments were properly calibrated; and personnel performing surveys were trained. The risk and safety significance was considered lessened based on the size (approximately four by two inch area) and location of the elevated readings. The readings were located in an area inaccessible to the whole body, and although unlikely, the potential may have existed such that an individual could make contact with their hands or fingers on the cylinder surface. However, the estimated stay time for incurring an extremity exposure in excess of NRC limits would be approximately 20 hours. The total estimated transit time from the shipper to receiver facility was approximately nine hours. The exceedance of external radiation levels, resulted in the failure to offer for transportation three metal cylinders containing licensed material, such that radiation levels did not exceed 2 mSv/h at any point on the external surface of the package and was considered a violation (VIO 70-1151/2001-01-01) of 10 CFR 71.47(b) and 49 CFR 173.441(b)(1).

The inspector's review of the shipping documentation disclosed an inconsistency with the licensee's mode of transport. The licensee indicated that the shipment was considered an "Exclusive Use Open Transport" mode. However, the Bill of Lading did not indicate mode of transport, nor were the required instructions for an exclusive use shipment included with the shipping paper information. The licensee indicated that the carrier considered all shipments originating from Westinghouse as "Exclusive Use" and therefore, the carrier was providing instructions. The inspector questioned the licensee if periodic audits were performed of the carrier to verify that the instructions were adequate and being provided to drivers. The licensee had not performed audits and in response to the inspector's inquiry, the licensee obtained documentation from the carrier indicating that all drivers and dispatchers were trained to abide by the provisions of the exclusive use definition in 49 CFR 173.403 regardless to whether a shipper provided such instructions. In response to this finding, the licensee took the appropriate actions to ensure that future shipments as exclusive use would be appropriately identified on the Bill of Lading, and specific instructions provided to the driver along with the Bill of Lading. The regulatory and safety significance of this finding was lessened in light of the carrier's training program associated with exclusive use shipments. The inspector verified via training documentation that the driver for the before-mentioned shipment was trained and aware of the exclusive use requirements. The inspector acknowledged the licensee's comments and indicated that the December 7, 2000, shipment did not appear to meet the intent of 10 CFR 71.47(c), and 49 CFR 173.441(c) and was a violation (VIO 70-1151/2001-01-02).

(3) Conclusions

Based on interviews and documentation, the inspector concluded that two violations occurred as follows: the limitations on survey instruments resulted in three containers shipped with contact radiation levels in excess of limits for an exclusive use open transport vehicle; and failure to provide specific instructions for an exclusive use shipment. The licensee's corrective actions were prompt and appeared to be adequate for preventing a recurrence.

b. Followup on Previously Identified Issues (R4.07)

(1) Inspection Scope

The inspector reviewed the actions taken by the licensee to correct a previous issue to verify that the corrective actions were adequate and had been completed.

(2) Observations and Findings

Inspector Followup Item (IFI) 70-1151/2000-04-02: Review the adequacy of corrective actions to ensure accountability was both adequate and timely.

Changes were made to the accountability procedure to include Evacuation Coordinators and the assignment of employees to specific assembly areas based on work unit or department.

(3) Conclusions

Based on the licensee's actions and results from an unannounced accountability drill conducted December 15, 2000, this item is closed in that complete accountability was accomplished within an hour of the starting time.

3. **Exit Interview**

The inspection scope and results were summarized on January 19, 2001, with those persons indicated in the Attachment. Although proprietary documents and processes were occasionally reviewed during this inspection, the proprietary nature of these documents or processes has been deleted from this report. No dissenting comments were received from the licensee.

## ATTACHMENT

### 1. LIST OF PERSONS CONTACTED

\*J. Bush, Manager, Manufacturing  
D. Goldbach, Manager, Environment, Health and Safety  
\*D. Graham, Technician, Environment, Health and Safety  
\*H. Green, Technician, Health Physics Operations  
\*J. Heath, Manager, Integrated Safety Engineering  
\*R. Likes, Engineer, Integrated Safety Engineering  
\*R. Pollard, Manager, Chemical Operations  
R. Monley, Plant Manager  
\*J. Rankar, Engineer, Integrated Safety Engineering  
T. Ross, Manager, Transportation Compliance and Logistics  
\*T. Shannon, Manager, Health Physics Operations  
\*R. Williams, Advisory Engineer, Environment, Health and Safety

Other licensee employees contacted included engineers, technicians, production staff, security, and office personnel.

\*Attended exit meeting on January 19, 2001

### 2. INSPECTION PROCEDURE USED

IP 86740      Transportation

### 3. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

<u>Item Number</u>	<u>Status</u>	<u>Description</u>
70-1151/2000-04-02	Closed	IFI - Review the adequacy of corrective actions to ensure accountability was both timely and complete (Paragraph 2.b).
70-1151/2001-01-01	Closed	VIO - Failure to offer for transportation three metal cylinders containing licensed material such that radiation levels did not exceed 2 mSv/h at any point on the external surface of the package (Paragraph 2.a).
70-1151/2001-01-02	Closed	VIO - Failure to provide specific written instructions to the carrier for an exclusive use shipment (Paragraph 2.a).

4. LIST OF ACRONYMS USED

CFR	Code of Federal Regulation
DOT	Department of Transportation
G-M	Geiger-Mueller
IFI	Inspector Follow up Item
mR/h	Millirem per hour
mSv/h	MilliSievert per hour
NRC	Nuclear Regulatory Commission
PGDP	Portsmouth Gaseous Diffusion Plant
UF <sub>6</sub>	Uranium Hexafluoride
VIO	Violation