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Westinghouse Electric Company LLC Columbia Fuel Site 5801 Bluff Road Hopkins, South Carolina 29061-9121 USA

Director, Office of Nuclear Material Safety and Safeguards U. S. Nuclear Regulatory Commission Washington, DC 20555 ATTN: Document Control Desk Direct tel: 803-647-2045 Direct fax: 803-695-3964 e-mail: couturgf@westinghouse.com Your ref: Our ref: LTR-RAC-12-45 May 17, 2012

#### SUBJECT: WESTINGHOUSE REPORTED EVENT # 47861 30 DAY FOLLOW-UP REPORT

The following information is being provided by Westinghouse Electric Company LLC (Westinghouse) in accordance with 10CFR70.50(c)(2). A summary of the initial notification report, Event Report #47861, pertaining to the Columbia Fuel Fabrication Facility (CFFF) is attached and provides the applicable information required by 10CFR70.50(c)(1). Additional background and consequence information pertaining to this event as well as the information required in accordance with 10CFR70.50(c)(2) is provided herein.

Please know that Westinghouse remains deeply committed to continuous compliance with all governing regulations and license commitments. If you have any questions regarding this report, please contact me at (803) 647-2045.

Sincerely,

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Gerard F. Couture, Manager Licensing & Regulatory Programs Westinghouse Columbia Fuel Fabrication Facility Docket No. 70-1151, License No. SNM-1107

Attachment

cc:

U. S. Nuclear Regulatory Commission, Region II Attn. Ms. Mary Thomas Atlanta Federal Center 245 Peachtree Center Ave., NE, Suite 1200 Atlanta, Georgia 30303-1257

> U. S. Nuclear Regulatory Commission Attn: Christopher Ryder, Project Manager Mail Stop: EBB 2C40M One White Flint North 11555 Rockville Pike Rockville, Maryland 20852-2738

## Facility

Westinghouse Electric Company LLC, Commercial Fuel Fabrication Facility, Columbia SC, Low enriched ( $\leq 5.0$  wt.% U-235) fuel fabricator for commercial light water reactors. License: SNM-1107.

Time and Date of Event April 23, 2012, 10:00 p.m.

Event Title: Contaminated Individual Medical Treatment at medical facility. Notification is made based on 10CFR §70.50 Reporting requirements.

(b) *Twenty-four hour report.* Each licensee shall notify the NRC within 24 hours after the discovery of any of the following events involving licensed material: (3) an event that requires unplanned medical treatment at a medical facility of an individual with spreadable radioactive contamination on the individual's clothing or body.

Westinghouse Environmental Health and Safety (EH&S) staff responded to an operator who was exposed to dilute Nitric acid (30%) on the left forearm and left foot. Employee was cleaning scrubber piping in the conversion area of the plant when exposed to the nitric acid solution containing uranium. The employee was treated within the onsite medical facility where decontamination was performed. Medical, emergency response and health physics procedures were followed. Upon completion of the decontamination efforts, the smearable alpha reading were  $< 50 \text{ dpm}/100 \text{ cm}^2$  and alpha direct reading on forearm was 818 dpm/100 cm<sup>2</sup>, on foot direct alpha reading was 280 dpm/100  $\rm cm^2$ . Medical staff recommended transfer to the hospital for further treatment. Westinghouse followed contaminated injury protocols and had the employee transported to the hospital emergency room via ambulance. A Westinghouse health physics (HP) technician accompanied the employee to the hospital. Surveys were conducted of the ambulance and all results were below established limits. Material Safety Data Sheets for the Nitric Acid and Uranium were provided to the hospital in accordance with procedures. Hospital report describes injury as "irritation noted over the left forearm as well as over the left anterior part of the foot and dorsal part of the foot......some mild orange discoloration noted to these areas." Employee was monitored for a period of time, given treatment for pain, and then released from the hospital.

### **Immediate Actions**

Initial investigation into the event is ongoing. This event has been entered into the Facility Corrective Action Process Issue # 12-115-001. Local county authorities and state authorities are aware of this event.

### **Additional Background and Consequence Information**

Westinghouse EH&S contacted the Radiation Emergency Assistance Center/Training Site (REAC/TS), on May 1, 2012, to gather information as to the severity of the incident involving nitric acid burn/uranyl nitrate exposure. EH&S representative spoke to Doran Christensen, MD. Albert Wiley, MD, Stephan Sugerman, CHP, and Mark Jenkins, PhD. EH&S provided a synopsis of the situation and presented the contamination data provided by the Columbia plant Radiation Safety Officer. They explained that the contamination levels were low and there is no radiological health hazard. Dr. Christensen cited a reference on the REACTS website, The Medical Aspects of Radiation Incidents, Section 5, pages 24 through 28, see Appendix 1. This section discusses methods to rapidly assess internal dose, in this instance, through a wound or inhalation. Mr. Sugarman and Dr. Jenkins stated at the enrichment involved the primary health concern was due to the chemical toxicity and there are no discernable radiological concerns at the contamination levels presented. Dr. Christensen went on to state the kidney would be the organ of concern if the uranium was to be absorbed into the body. However, even if all the contamination were to be absorbed into the body, there should not be any toxic effects. To verify the amount of uranium absorbed urine samples were collected and Westinghouse is awaiting results of that laboratory analysis to finalize dose information. That report will be made available for NRC inspection. To verify that the kidneys were not affected, Dr. Christensen recommended a urine function test and a kidney function test be performed. At this time, followup testing for kidney function are in progress and those results will also be made available for NRC inspection.

When the employee returned to work on April 24th, he reported to HP where additional surveys were conducted. HP staff found additional contamination on his other forearm that was evidently missed the previous evening. It was also fixed (8,000 DPM/100 cm2) with no removable. It was cleaned and taken down to 2,000 fixed. Employee was restricted from entering the Contamination Controlled Area CA until the contamination was below limits. Westinghouse health physics staff continued to monitor the affected employee and on 5/4/12 he was no longer restricted and allowed to return to normal duties.

### 10CFR70.50 (c)(2) Information:

(2) Written report. Each licensee that makes a report required by paragraph (a) or (b) of this section, or by § 70.74 and Appendix A of this part, if applicable, shall submit a written follow-up report within 30 days of the initial report. Written reports prepared pursuant to other regulations may be submitted to fulfill this requirement if the report contains all the necessary information, and the appropriate distribution is made. These written reports must be sent to the NRC's Document Control Desk, using an appropriate method listed in § 70.5(a), with a copy to the appropriate NRC regional office listed in appendix D to part 20 of this chapter. The reports must include the following:

(i) Complete applicable information required by 70.50(c)(1);

This information has been provided above.

### LTR-RAC-12-45 Attachment 1

# (ii) The probable cause of the event, including all factors that contributed to the event and the manufacturer and model number (if applicable) of any equipment that failed or malfunctioned;

A causal analysis was performed for this event. Process adequacy issues and a human factors issue were identified as contributing causes of the event. First, the current cleaning method did not prevent the potential for splashes or dripping of nitric acid near or on the worker performing the task. The process was therefore inadequate for the task. Second, there was no requirement or specified timing for taking a rest break while performing task wearing the Personnel Protective Equipment (PPE) specified (acid suit). This contributed to the employee who had been working for a significant period of the shift in an acid suit, choosing to reduce PPE to stay cool while performing the task. Third, the procedures applicable to the task lacked clarity. Multiple procedures and a training module discuss the PPE for handling nitric acid while performing various tasks. These procedures (see matrix below) did not clearly and consistently require the use of acid boots and taped acid gloves for the task.

# (iii) Corrective actions taken or planned to prevent occurrence of similar or identical events in the future and the results of any evaluations or assessments;

### Corrective Actions:

- Commitment established to update the procedures to require rest breaks for work conducted in acid suits.
- Commitment established to revise the applicable procedures and training packages for clarity and consistency pertaining to the use of this PPE.
- Commitment to evaluate the type of acid boots in use to identify if better fitting boots can be procured for use by the operators.
- These commitments are being tracked to completion by management in the corrective action system.

### Longer term additional action:

- Engineering has been assigned an action to implement the use of tools that can eliminate the potential for splashing or dripping of acid during this activity or to design a system for cleaning piping to reduce the potential for worker exposure.
- Completion of this action is being tracked by management in the corrective action system.

## (iv) For licensees subject to Subpart H of this part, whether the event was identified and evaluated in the Integrated Safety Analysis.

The Columbia Fuel Fabrication Facility is subject to Subpart H and the report dealt with a routine activity that is analyzed in the hazards analysis process conducted for the Integrated Safety Analysis.

PPE	COP-810080	COP-	COP-	COP-814532	COP-816003	TRN-091
	(Wet	811101	811121	(General	(Acid	(Chemical
	Decontamination	(Calciner	(Clearing	Safety	Washing	Àwareness
	Operation)	Off-Gas	Blockages	Requirements	Conversion	& Personal
		Scrubber)	in the	-	Line Process	Protective
			Calciner	Conversion)	Vessels and	Equipment).
			Off-Gas		Associated	slides 12
			System)		Piping)	and 34-37
Body	Chemical	Acid Suit	Acid Suit	Acid Suit or	Acid Suit	Acid Suit
	Resistant Suit			Protective		(Implies
				Apron		that Hood
						Should Be
						Used)
Hands	Chemical	Chemical	Chemical	Acid	Chemical	Chemical
	<b>Resistant Gloves</b>	Resistant	Resistant	Resistant	Resistant	Resistant
		Gloves	Gloves	Gloves	Gloves	Gloves
Taped	Does Not	Does Not	Does Not	Yes if	Does Not	Yes
	Specify	Specify	Specify	Submerging	Specify	
				Hands in		
				Acid		
Feet	Does Not	Does Not	Does Not	Rubber Shoe	Does Not	Acid
	Specify	Specify	Specify	Covers or	Specify	Resistant
				Acid		Boots
				Resistant		
Respiratory	Fresh Air	N/A	Full Face	Supplied Air	Air Line	Does Not
		1011	Respirator	or SCBA	Respirator	Specify
Face	N/A	Full Face	N/A	Full Face	Face Shield if	Does Not
		Shield		Shield if No	No	Specify
				Respiratory	Respiratory	1 5
				PPE	PPE	
Eyes	N/A	Goggles	N/A	Full Face	Face Shield if	Does Not
				Shield if No	NO	Specify
				Respiratory	Respiratory	
					Chemical	
					Goggles	
					Recommended	
					with Face	
					Shield	

Summary of Procedure PPE Requirements