



NUCLEAR FUEL SERVICES, INC.  
a subsidiary of The Babcock & Wilcox Company

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**CERTIFIED MAIL  
RETURN RECEIPT REQUESTED**

21G-10-0199  
GOV-01-55-04  
ACF-10-0285

October 28, 2010

U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, DC 20555

**Subject: 30-Day Written Notification of Event (NRC Event No. 46284)**

Reference: Docket No. 70-143: SNM License 124

Gentlemen:

On September 28, 2010, at approximately 1250 hours (EST), Nuclear Fuel Services, Inc. (NFS) made a telephone notification to the NRC Operations Center of an event for which 10CFR70, Appendix A, paragraph (b)(1) requires a 24-hour notification. This letter provides the 30-day written notification of that event.

If you or your staff have any questions, require additional information, or wish to discuss this matter further, please contact me or Mr. Randy Shackelford, Nuclear Safety and Licensing Manager, at (423) 743-2504. Please reference our unique document identification number (21G-10-0199) in any correspondence concerning this letter.

Sincerely,

NUCLEAR FUEL SERVICES, INC.

Mark P. Elliott, Director  
Quality, Safety, and Safeguards

WRS/smd

Attachment: 30 –Day Notification of Reportable Event

nuclear fuel services, inc., a subsidiary of The Babcock & Wilcox Company

IET2

cc:    Regional Administrator  
      U.S. Nuclear Regulatory Commission, Region II  
      245 Peachtree Center Avenue NE, Suite 1200  
      Atlanta, GA 30303-1257

Mr. John Pelchat  
Project Inspector  
U.S. Nuclear Regulatory Commission, Region II  
245 Peachtree Center Avenue NE, Suite 1200  
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Mr. Kevin Ramsey, Senior Project Manager  
Division of Fuel Cycle Safety and Safeguards  
Office of Nuclear Material Safety and Safeguards  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Mr. Galen Smith  
Senior Resident Inspector  
U. S. Nuclear Regulatory Commission

M.P. Elliott to U.S. NRC  
October 28, 2010

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**Attachment**

***30-Day Notification of Reportable Event***

(3 pages to follow)

**30-Day Notification of Reportable Event**

**1. The date, time, and exact location of the event**

The issue was discovered on September 27, 2010, at approximately 1341 hours (EST). The report of the event was made on September 28, 2010, at approximately 1250 hours (EST). The location of the event is the Nuclear Fuel Services, Inc. (NFS) site (Building 333 Centrifuge Area), located in the town of Erwin, Unicoi County, Tennessee.

**2. Radiological or chemical hazards involved, including isotopes, quantities, and chemical and physical form of any material released**

There are no radiological or chemical hazards associated with the event. There were no materials released.

**3. Actual or potential health and safety consequences to the workers, the public, and the environment, including relevant chemical and radiation data for actual personnel exposures to radiation or radioactive materials or hazardous chemicals produced from licensed materials (e.g., level of radiation exposure, concentration of chemicals, and duration of exposure)**

There were no actual or potential health and safety consequences to the workers, the public, or the environment associated with the event. There were also no personnel exposures to radiation, radioactive materials, or hazardous chemicals produced from licensed materials associated with the event.

**4. The sequence of occurrences leading to the event, including degradation or failure of structures, systems, equipment, components, and activities of personnel relied on to prevent potential accidents or mitigate their consequences**

During the unloading of centrifuges in the Building 333 U-Aluminum centrifuge area on September 27, 2010, a crusty buildup of material (~1/8" thick) was observed on the inside of the centrifuge "jacket" that contains the centrifuge bowl. The buildup was also observed on the underside of the centrifuge lid (i.e., "cake pan"). Although some dusting or spattering had been previously observed, this level of material buildup was unusual and had not been previously observed.

The system has overflow drains on the bottom that are designed to prevent the accumulation of liquid within the centrifuge "jacket". There is also a requirement to inspect the "jacket" when solution is observed draining from the overflow drains.

This was considered an unanalyzed or improperly analyzed condition because the mechanism for buildup of this extent was not considered in the safety analysis (i.e., there was no indication of buildup provided by the overflows). This buildup was also found inside these drains. This material originally appeared loose and would not have been expected to obstruct the drains; however, continued buildup could potentially challenge their functionality.

**5. 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**

The probable cause of the event was identified as operation of the centrifuges at high speeds for an extended period of time with the liquid feed turned off. Typically the centrifuges operate with a liquid feed input, and there is no evidence of this type of buildup under normal operations based on the past four (4) years of experience. Feed would occasionally be turned off due to process disruptions (e.g., clogs), but typically for periods of less than 24 hours, and with rotational speeds reduced. The centrifuges were run dry for two (2) separate periods, with each period extending to just less than 48 hours.

Approximately 7-10 liters of liquid (entrained in the centrifuge bowl) is suspected to have migrated (from the centrifuge bowl) and subsequently vaporized, depositing solids on the centrifuge jacket.

Air entrainment (from the overflow drain traps that were recently modified to remove p-traps) is believed to have aided in drying the liquid, thus forming the hardened scale that was later found in the annular space of the centrifuge jacket. This is further supported since recent operation of the system has resulted in minor buildup without the system being run dry for an extended period of time.

No equipment failed or malfunctioned.

**6. Corrective actions taken or planned to prevent occurrence of similar or identical events in the future and the results of any evaluations or assessments**

The issue was entered into NFS' Problem Identification, Resolution, and Correction System (PIRCS) as Problem Identification No. P26883. An unusual incident evaluation and an engineering evaluation were also performed. Extent of condition reviews were performed as part of the engineering evaluation.

The following corrective actions have been implemented:

- 1) The operating procedure has been changed to limit the amount of time the centrifuges can be operated without feed solution being added to the centrifuges.
- 2) The operating procedure has been changed to provide periodic inspection of the centrifuge jackets (i.e., limit maximum operating time of centrifuges).
- 3) The Nuclear Criticality Safety Evaluation (NCSE) has been revised to address buildup while taking credit for the revised operating parameters.
- 4) A procedure was approved to safely clean up the excessive buildup in the centrifuge jackets.

Note: recent operation of the system has detected minor buildup on one (1) of the centrifuge jackets. This buildup is bounded by the revised NCSE. However, the system is now shutdown and is currently being modified to reinstall water seals on the centrifuge overflows. The ultimate goal is to eliminate the mechanism for buildup and to avoid clean-up operations.

**7. If the event involved an area or equipment with an approved Integrated Safety Analysis, whether the event was identified and evaluated in the Integrated Safety Analysis**

The event was associated with an area having an approved Integrated Safety Analysis (ISA). This event was not specifically identified and evaluated in the ISA.

**8. The extent of exposure of individuals to radiation or radioactive materials**

No individuals were exposed to radiation or radioactive materials as a result of this event.