

[REDACTED]

June 10, 2005

EA 05-115

Mr. Kerry Schutt, President  
and General Manager  
Nuclear Fuel Services, Inc.  
P.O. Box 337, MS 123  
Erwin, TN 37650

SUBJECT: REVISED NOTICE OF VIOLATION FOR INSPECTION REPORT  
70-143/2004-207

Dear Mr. Schutt:

This letter refers to your correspondence dated March 10, 2005, in reply to our Inspection Report and Notice of Violation (Notice) dated February 11, 2005. The violation identified in the Notice concerned the failure to ensure that the introduction of more reactive materials [REDACTED] would not result in a k-effective ( $k_{eff}$ ) exceeding 0.95. Specifically, the Notice was issued because Nuclear Fuel Services, Inc. (NFS) did not consider optimal placement of the more reactive material.

The basis for NRC's position will be articulated in the following discussion by addressing NFS's refutation of the violation as discussed above.

Violation B in the Notice, Violation 2004-207-05, stated that "Scenario 4.1.7 failed to ensure that the introduction of the more reactive materials [REDACTED] would not result in a k-effective exceeding 0.95. Specifically, [REDACTED] analysis did not consider optimal placement of the more reactive material." On December 17, 2004, the licensee transferred materials to a storage area without using a particular transfer device as required by the Standard Operating Procedure (SOP). This device was designed to prevent a more reactive/incorrect material type from being transferred to the storage area. In the unlikely event that a more reactive/incorrect material type was added to the process, the particular

[REDACTED]

[REDACTED]

device prevented this material from being transferred to the storage area. The inspector reviewed the input file referenced by the nuclear criticality safety evaluation (NCSE) [REDACTED] which included the more reactive material in the storage area and independently verified the  $k_{\text{eff}}$  reported [REDACTED]. The inspector modified the input file to relocate the more reactive material [REDACTED] and observed that the calculated  $k_{\text{eff}}$  exceeded 0.95. The inspector determined that placing the more reactive material [REDACTED] which the inspector concluded was the [REDACTED], produced a more reactive configuration than the base case considered in the NCSE. The inspector discussed this issue with the licensee's nuclear criticality safety (NCS) engineer and determined that the calculation referenced in [REDACTED] did not support the licensee's position that introduction of a single batch of more reactive material [REDACTED] would be less than 0.95. In a letter to the NRC dated January 7, 2005, the licensee provided additional analysis and calculations with more realistic modeling assumptions (e.g., offset reflection) and demonstrated the resulting  $k_{\text{eff}}$  would be less than 0.95. Based on our review of your analysis and the fact that reflection controls were already in place at the time of the inspection, we have determined that the introduction of more reactive materials [REDACTED] as stated in inspection report 70-143/2004-207 would not exceed  $k_{\text{eff}}$  of 0.95.

SNM-124, Section 4.1.1, states the following:

*"Criticality safety analyses used to demonstrate the safety of process equipment and systems shall show the following:*

- *Normal conditions - the most reactive values as limited by identified controls on system parameters...*
- *Accident conditions - ... In particular, subcriticality shall be evaluated, for each designated safety control, one at a time, assuming that just one control is failed, and all others functional. It shall be assumed that the parameter for the failed control and all uncontrolled nuclear criticality parameters are at their most reactive combination of credible values. Each parameter controlled by a safety control other than the one being evaluated shall be assumed at the most reactive value within its controlled range."*

The NRC staff reviewed [REDACTED] NCSE and found that the licensee's upset model representing [REDACTED] had evaluated the failure of more than one designated safety control at the same time without assuming that the parameter for the failed control and all other uncontrolled nuclear criticality parameters were at their most reactive values.

In addition, the NRC staff concluded that the reflection parameter was not assumed at the most reactive value within its controlled range as stated in SNM-124, Section 4.1. As stated in Inspection Report 70-143/2004-207, the most reactive value for the failed parameter was determined [REDACTED]. Since

K. Schutt

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controls for limiting the location of the more reactive type of materials [REDACTED] did not exist, and reflection was not assumed at the most reactive value within its controlled range, the staff determined Scenario 4.1.7 did not demonstrate the safety of process systems and equipment.

Based on information provided by the licensee at the time of the inspection, the NRC has determined that the Severity Level IV violation of NRC requirements cited in Inspection Report 70-143/2004-207 occurred. However, based on information provided by NFS on January 7, 2005, we have concluded that we agree with your conclusion that  $k_{eff}$  did not exceed 0.95. However, your original analysis failed to ensure that the parameter for the failed control and all uncontrolled nuclear criticality parameters were at their most reactive combination of credible values. Therefore, the violation is being clarified in the enclosed Notice. The violation was evaluated in accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions" (Enforcement Policy), NUREG-1600. The current Enforcement Policy is included on the NRC's web site at [www.nrc.gov](http://www.nrc.gov); select What We Do, Enforcement, then Enforcement Policy. The violation is being cited in the enclosed Notice of Violation (Notice) as a Severity Level IV violation, and the circumstances surrounding it are described in detail in the subject inspection report. The violation is being cited in the Notice because it was identified as the result of an event. The violation being cited as a Severity Level IV violation is the failure to evaluate a parameter for a control at its most reactive system location.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice of Violation 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.

[REDACTED]

If you have any questions concerning this report, please contact Lawrence Berg, of my staff, at (301) 415-6215.

Sincerely,

*/RA/*

Melanie A. Galloway, Chief  
Technical Support Group  
Division of Fuel Cycle Safety  
and Safeguards, NMSS

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

Enclosure: Notice of Violation

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Sincerely,  
**/RA/**  
Melanie A. Galloway, Chief  
Technical Support Group  
Division of Fuel Cycle Safety  
and Safeguards, NMSS

Docket No. 70-143  
License No. SNM-124  
Enclosure: Notice of Violation

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