



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET SW SUITE 23T85
ATLANTA, GEORGIA 30303-8931

[REDACTED]

February 9, 2005

EA-04-207
EA-03-178

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

SUBJECT: RESPONSE TO DISPUTED NOTICE OF VIOLATION

REFERENCE: NUCLEAR FUEL SERVICES - NRC INSPECTION REPORT
NO. 70-143/2004-03

Dear Mr. Schutt:

Thank you for your response of June 11, 2004, to our inspection report issued on May 17, 2004, concerning activities conducted at your facility. In your response, you denied a Severity Level IV violation concerning the failure to perform a detailed criticality safety analysis for a temporary operation that involved changes to existing equipment. This denial was based on your belief that you followed allowed internal change processes to control the processing of waste solutions containing [REDACTED] material and had in place appropriate controls in the processing facility such that a safe mass could not be exceeded. You stated you had in place controls which limited the amount of [REDACTED] material [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]
[REDACTED]. You also quoted the License Renewal Safety Evaluation Report dated July 2, 1999, which stated,

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

You concluded that you had defined and formally established controls adequate to assure nuclear criticality safety and that a detailed analysis would not be required. Finally, you engaged a consultant, who agreed that a detailed nuclear criticality safety evaluation was not required for the [REDACTED] operation.

After careful consideration of the bases for your denial of the violation, we have concluded, for the reasons presented in the enclosure to this letter, that the violation occurred as stated in the inspection report. Although the staff disagreed with your position on several points, of particular note is that some nuclear criticality safety controls for which you took credit were not considered by the staff to have been adequate for maintaining less than a safe mass thereby negating the premise on which you concluded no detailed criticality safety evaluation was required.

We noted your response adequately described immediate corrective actions and the date when full compliance was achieved. However, corrective steps that will be taken to avoid further violations were not described in your response. Therefore in accordance with 10 CFR 2.201(a), you are required to submit to this office within 30 days of the date of this letter a written statement describing those corrective steps. 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, D.C. 20555, with a copy to the Regional Administrator, Region II, within 30 days of the date of this letter. Your response will be considered sensitive information and will not be made available for public inspection in the NRC Public Document Room or in the NRC's document system (ADAMS).

Sincerely,

/RA/

Douglas M. Collins, Director
Division of Fuel Facility Inspection

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

Enclosure: (See page 3)

[REDACTED]



Enclosure: Evaluation and Conclusion

cc w/encl:
 B. Marie Moore
 Vice President
 Safety and Regulatory Management
 Nuclear Fuel Services, Inc.
 P. O. Box 337, MS 123
 Erwin, TN 37650

Distribution w/encl:

D. Ayres, RII
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EVALUATION AND CONCLUSION

In January, 2003, a violation (VIO) was identified during a routine NRC inspection. This violation was issued in Inspection Report No. 70-143/2004-03. Nuclear Fuel Services contested the violation by letter of June 11, 2004, stating that a detailed nuclear criticality safety evaluation for waste processing operations involving [REDACTED] material was not required. The NRC's evaluation and conclusion regarding the licensee's arguments are as follows:

Restatement of Violation

Safety Condition S-1 of Special Nuclear Materials (SNM) License No. SNM-124 authorizes the use of licensed materials in accordance with the statements, representations, and conditions in the license application and supplements.

Section 4.1.2 of the License Application, Responsibilities for Nuclear Safety, states that each proposed change to existing equipment or addition of new equipment used in the processing or storage of licensed material, and any procedure changes resulting there from, will receive a nuclear safety review. Section 4.1.2 further states that all changes, modifications, or additions will receive a detailed criticality safety analysis as outlined in Section 4.3, unless the following criteria are met: less than a safe mass, as defined in Section 4.2.1.3, exists and there is no possibility of double batching material.

Contrary to the above, from September 9, 2002, through January 12, 2003, operations which involved more than a safe mass of licensed material where double batching was possible were performed under temporary procedures which involved changes to existing equipment, without performing a detailed criticality safety analysis.

Summary of Licensee's Response to Violation

The licensee's response to the violation makes the following key points:

- Prior to start of the [REDACTED] operations, the operation and procedures were reviewed and approved by Nuclear Criticality Safety (NCS) and Safety and Safeguards Review Council (SSCR) personnel using the Nuclear Fuel Services (NFS) Internally Authorized Change (IAC) process. Formal controls were provided to limit the quantity of SNM in the processing facility such that a safe mass could not be exceeded. Based on the numerous nuclear criticality safety (NCS) controls, overchecks, [REDACTED], [REDACTED], NFS did not consider double batching the safe mass to be credible.

[REDACTED]

Enclosure

[REDACTED]

- Even if double batching had occurred, the resultant mass would still be less than the safe mass because of the limited amount of material available in the processing facility [REDACTED].

The licensee's response also referenced guidance for interpreting the subject license requirement discussed in the NRC Safety Evaluation Report (SER) concerning the SNM-124 license renewal in 1999 that stated,

[REDACTED]

Thus, the licensee also states, by defining and formally establishing controls adequate to assure nuclear criticality safety, a detailed analysis of criticality conditions would not be required. If NCS controls to assure less than a safe mass and to prevent double batching are specified, documented and approved by a recognized process, a detailed NCS analysis would also not be required.

The licensee concluded that although there existed on the NFS plant site [REDACTED] greater than a safe mass, NFS had established nuclear criticality safety controls, a priori, to assure that less than a safe mass would exist in the processing facility and to prevent double batching the safe mass during the subject operations.

NRC Evaluation of Licensee's Response

SNM-124, Section 4.1.2, states the following:

"All changes, modifications, or additions will receive a detailed criticality safety analysis, as outlined in Section 4.3, unless the following criteria are met: less than a safe mass, as defined in Section 4.2.1.3, exists and there is no possibility of double batching."

The license requirement specified in the SER concerning the SNM-124 License renewal in 1999 applies to the Section 4.2.1 criteria that changes in process conditions need to be determined to be below a safe mass and with no possibility of double batching. The exception that no analysis needs to be performed is based on a known and clearly defined and established basis that the criteria specified in Section 4.2.1 for the process conditions and controls are met. Controls used to maintain process conditions below a safe mass must be determined based on known or highly conservative assumptions or have been previously evaluated to clearly

[REDACTED]

[REDACTED]

demonstrate the adequacy of the controls to meet the Section 4.2.1 criteria. These controls also need to be formally established and shown to be adequate with a clear and well established justification that double batching is not possible and that the safe mass limit will not be exceeded. A detailed criticality safety evaluation needs to be performed for changes in process or process controls that have not been clearly demonstrated to be adequate to meet the Section 4.2.1 criteria.

[REDACTED]

[REDACTED] Control robustness, which reflects the number, type, and combination of controls required to adequately prevent changes in process conditions, depends on the actual process design and required safety margin.

The NRC staff review of the licensee's safety basis documentation found that the NCS controls in place to prevent double batching to produce more than a safe mass were not sufficiently robust to adequately prevent credible changes in process conditions that could lead to a criticality accident. The NRC staff review further found that the administrative process controls NFS relied upon [REDACTED] were either not included in the Letter of Authorization (LOA) (procedure used by the operators), or were fundamentally flawed by the susceptibility to common mode failure [REDACTED]. The NRC staff found that the licensee's safety basis documentation did not adequately address how the process design or additional NCS requirements precluded a single operator from making the transfer.

The NRC review determined that the licensee's requirements [REDACTED] were susceptible to common mode failure due to the accuracy of the batch sheet. Since the batch sheet was made up based on prior sample results and the prior samples were required to meet the dual independent sampling requirement, the NRC staff determined that the batch sheets and the dual sampling requirement were not independent controls. In addition, the NRC staff found that the licensee's [REDACTED] process allowed the same two people to verify these numbers [REDACTED]. The NRC staff concluded that if a mistake was made on the first operation, it was likely that the mistake would be repeated on the second one. Thus, while the controls may have been formally established, they were not adequate to ensure that the Section 4.2.1 criteria would be met.

Overall, the main concern for criticality safety for this operation was preventing more than a safe mass from getting in [REDACTED]. Solutions pumped [REDACTED] had a concentration limit that was not to be exceeded, but administrative controls on concentration of solutions did not work and solution above the limit was [REDACTED] on at least one

[REDACTED]

[REDACTED]

occasion. Thus, the method for preventing too much material from being sent [REDACTED] [REDACTED] was administratively limiting the amount of uranium allowed in the [REDACTED] to a safe mass. Since controls for limiting the amount of ^{235}U were not considered adequate for preventing a criticality accident, and double batching greater than a safe mass was possible, the criteria specified in Section 4.1.2 was not met and a detailed analysis was required.

NRC Conclusion

The licensee's response did not provide any new information. The NRC staff concluded that the points addressed by the licensee do not provide sufficient justification for retraction of the violation because more than a safe mass was available for this temporary operation and the possibility of double batching existed. Therefore, a detailed criticality safety analysis was required as the criteria for precluding a detailed analysis as specified in license SNM-124, Section 4.1.2, were not met. For the above reasons, the NRC staff concludes that the violation occurred as stated.

[REDACTED]