

21G-17-0059  
GOV-01-55-04  
ACF-17-0064  
February 17, 2017

Mr. Kevin M. Ramsey, Senior Project Manager  
U. S. Nuclear Regulatory Commission  
Fuel Manufacturing Branch  
Division of Fuel Cycle Safety, Safeguards, and Environmental Review  
Office of Nuclear Material Safety and Safeguards  
Two White Flint North, 11555 Rockville Pike  
Rockville, MD 20852-2738

- References:
- 1) Letter from NRC to Richard J. Freudenberger, dated December 5, 2016, Second Request For Supplemental Information Concerning Response To Generic Letter 2015-01
  - 2) Letter from Richard J. Freudenberger, dated January 16, 2017, Proposed Extension of Due Date for Responding to NRC Second Request for Supplemental Information Concerning the NFS Response to Generic Letter 2015-01

**Subject: Screening Methodology Used by NFS for Seismic Analysis of Internal Components and Items Relied On For Safety (IROFS)**

Enclosed, as requested, is the screening methodology being used by NFS to evaluate the performance of internal components and IROFS under a code-evaluated earthquake. NFS proposes weekly telephone calls between NFS and NRC reviewers to communicate progress on resolution of the second request for supplemental information concerning the NFS response to Generic Letter 2015-01. NFS proposes bi-weekly calls at the management level and in-person discussions as mutually agreed.

If you or the reviewers assigned to NFS have any questions or require additional information, please contact me at (423) 743-1705, or Mr. Nicholas Brown, Nuclear Criticality Safety Unit Manager, at (423) 735-5519. Please reference our unique document identification number (21G-17-0059) in any correspondence concerning this letter.

Sincerely,

**NUCLEAR FUEL SERVICES, INC.**



Richard J. Freudenberger  
Safety and Safeguards Director

NWB/pj  
Enclosure: NFS Seismic Screening/Analysis Methodology

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Enclosure

**NFS Seismic Screening/Analysis Methodology**

(3 pages to follow)

### NFS Seismic Screening/Analysis Methodology

The following discussion outlines the approach that will be taken to complete the seismic analysis of applicable internal components, complete the necessary safety analysis, and respond to the NRC RAI questions.

- 1) The important categories of internal components identified to have the potential to be adversely affected during a seismic initiating event include:
  - process enclosures (glove-boxes), (preliminary analysis complete with no failures identified)
  - process columns, (preliminary calculations are complete, need input from Seismic Analyst)
  - process reaction vessels, (preliminary analysis complete with no failures identified)
  - process storage racks and rockets, (preliminary analysis complete with no failures identified)
  - reagent or utility tanks used within the Material Access Area (MAA) (preliminary analysis complete with no failures identified), and
  - process/gas piping (need input from Seismic Analyst).

Internal components listed above will be evaluated by NFS using the seismic loads associated with a 2% probability of exceedance in 50 years to determine if new accident sequences that result in high consequences are identified. A list of equipment that passes the code check will be generated. The equipment that passes the code check will not be analyzed further since the initiating event does not lead to a new accident sequence with high consequences.

<b>Accident Sequence</b>	<b>Initiating Events/Enabling Events (IE/EE)</b>	<b>Comment</b>
Seismic-1 Equipment Passes Seismic Qualification	IE = -3	No further analysis needed since the initiating event did not lead to a new accident sequence resulting in a high consequence.

In addition to the above review for new accident sequences, currently credited IROFS will also be reviewed to determine if they would be degraded or failed as a result of seismic loads associated with a 2% probability of exceedance in 50 years.

- 2) A list of high consequence components that do not pass the code check will also be generated. The internal components analyzed that do not pass the code check will either be modified to satisfy the applicable building code or will be further analyzed through the ISA

process to identify IROFS and/or other barriers that will be credited to satisfy the 10 CFR 70.61 performance criteria.

- 3) The internal components analyzed that do not pass the code check and are not modified to satisfy the applicable building code will be further analyzed using the documented NFS ISA methodology including review of IROFS credited to ensure that there is not a common mode failure. The return period of the code-evaluated earthquake is 1 in 2,475 years. According to NFS's documented ISA methodology, an initiating event frequency index of (-3) would normally be credited for this event.

However, for internal components that are unable to withstand (i.e., remain functional) the seismic loads associated with the code-evaluated earthquake, the maximum loads that they are able to withstand will be calculated and utilized in the safety analysis. These maximum loads will be associated with a seismic event with a return period more frequent than 1 in 2,475 years. Such an event may be credited with a lower initiating event frequency index (e.g., (-2) instead of (-3)).

<b>Accident Sequence</b>	<b>Initiating Events/Enabling Events (IE/EE)</b>	<b>Comment</b>
Seismic-3 Equipment Fails Seismic Qualification	IE = -3 or less credit as applicable	Will be analyzed according to ISA process and additional items/IROFS will be credited as necessary to satisfy the 10 CFR 70.61 performance criteria

Internal components that could result in accident sequences with intermediate chemical or radiological consequences that are demonstrated to survive the applicable seismic loads which correspond to a seismic event with a return period of 1 in 1,000 years satisfy the performance requirements for a failure frequency index of (-3) and will not undergo further analysis. Internal components that could result in intermediate chemical or radiological consequences that do not survive the seismic loading corresponding to a seismic event with a return period of 1 in 1,000 years will be analyzed according to the NFS ISA methodology considering lower initiating frequencies based on the corresponding loads as discussed above. Either additional protections will be credited or the components will be modified to withstand the seismic event loading with a 1 in 1,000 years return period.

**Management Measures:**

New IROFS identified during this analysis will be incorporated into the current configuration management system and will be subjected to the same management measures that apply to

currently designated IROFS. Components associated with licensed activities are currently included in the configuration management program.

**Time Needed:**

The additional time needed to respond to the RAI questions is based on the time needed for the Seismic Analyst to complete the additional component walk-downs and subsequent loading analyses, if necessary, and incorporate those conclusions into our RAI response. NCS, ISA, and the Seismic analyses are being performed in parallel where applicable to ensure the April delivery date is maintained.

**Interim Risk:**

Based on the initial seismic analysis of the structures, the NCS and ISA analyses previously submitted, and the equipment analyses that have been completed to date, the workers, the public, or the environment will not be impacted while the additional analyses are completed.

**Satisfaction of the RAI:**

The analyses described above will be documented and incorporated into the response to the RAI questions.