70-1157

Westinghouse Electric Corporation

Commercial Nuclear Fuel Division

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NRC-96-057

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U.S. Nuclear Regulatory Commission
ATTN: Mr. Charles Gaskin, Acting Section Leader
Licensing Section 1, Licensing Branch
Division of Fuel Cycle Safety and Safeguards, NMSS
Washington, D.C., 20555-0001

Dear Mr. Gaskin:

Subject: Response to Request for More Information

Attached please find the response to Question #7 concerning our Safety License Condition S-2 of Material License SNM-1107, application dated September 29, 1995.

If you have any questions, please contact me at (803) 776-2610 (Ext. 3282), or Norman Kent (Ext. 3552).

Sincerely,

WESTINGHOUSE ELECTRIC CORPORATION

W. L. Goodwin, Manager
Regulatory Affairs

Enclosure



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RESPONSE FOR REQUEST FOR INFORMATION
FOLLOW-UP SUBMITTAL

7. The CSEs provide numerous parametric/sensitivity calculations to show the effect on $k_{eff}$, from changes in parameter limits from normal to off-normal quantities. However, there are no analyses that demonstrate that the physical margin of safety is sufficient to show the likelihood of changing parameters to these off-normal quantities. Provide analyses to show the margin of safety is sufficient.

The following is an explanation of the approach and terminology used by the Nuclear Criticality Safety function at Westinghouse in the development of the CSE.

Each CSE is, in effect, a combination of a safety analysis and a safety evaluation. The safety analysis consists of the sensitivity calculations which determine the delayed critical thresholds and margins of subcriticality for different controlled parameter configurations. The safety evaluation is that engineering assessment which evaluates the strength of the margin of safety for the system based on the safety analysis results and the proposed/actual system of controls for providing double contingency protection.

During the development of the CSE, NCS engineers identify the controlled parameters, and, together with the area system experts, determine the <u>normal</u> operating conditions, the <u>expected</u> process upsets, the <u>credible</u> process upsets, and, finally, the upsets that are <u>not credible</u>.

The <u>normal</u> operating conditions and <u>expected</u> process upsets together are analyzed to ensure that the neutron multiplication factor ($k_{eff}$) for the configuration does not exceed 0.95. The events which are <u>not credible</u> are identified as bounding assumptions for the CSE. These events generally are not analyzed, and neither are controls established to prevent their occurrence. This leaves only the <u>credible</u> process upsets to consider in determining whether or not the margin of safety for the system is adequate.

The <u>credible</u> process upsets are those upset events which, singularly or collectively, could lead to a contingency were not controls in place to prevent, detect, and mitigate. The safety evaluation is that engineering judgment which concludes that the controls in place are sufficient to prevent the credible upsets from occurring, or detect their occurrence and mitigate before a contingency occurs, thereby satisfying the double contingency principle. This margin of safety is contained in Section 5 of the CSE, and it is graphically depicted in the fault tree, found in Section 6.

Sensitivity studies are performed varying the controlled parameters to identify configurations that would produce calculated $k_{eff}$'s at 0.90, 0.95, and delayed critical. The changes in parameter limits from normal to off-normal quantities (changes required to drive a system to delayed critical) are described in terms of actual events that must happen in order for the parameter change to occur. These parameter changes are evaluated in terms of such things as the size of increase (e.g., double the volume, or 1% increase in volume?, ten-fold increase in

concentration or density, or very slight increase?, 5 foot increase in water level or ¼ inch?), the time involved to reach off-normal quantities given the system fill-frequencies and flow rates (minutes?, hours?, multiple shifts?, days?), and changes in other system parameters needed to produce off-normal controlled parameter values (e.g., sustained and significant increase in pressure or temperature). The criticality safety practitioner then determines whether or not the controls provide sufficient protection. This, then, is the evaluated margin of safety.

We believe our more recent CSEs, (e.g., ADU Conversion, Pelleting), contain clearer presentations of the margins of safety for the different systems considered. However, in the case of our earliest CSEs (UNH Bulk Storage Tanks, Safe Geometry Dissolvers, ADU Bulk Powder Blending), emphasis perhaps was given to the analysis aspect rather than the evaluation aspect, and the margins of safety were not clearly spelled out. They were, however, implicitly included in the text and the fault tree. A clearer presentation of the margins of safety will be included in future revisions to these CSEs. In fact, we are currently preparing a revision to the UNH Bulk Storage Tank CSE, and our responses to your questions #3 and #4 were taken directly from drafts of this work. Also, the response to question #6 was developed to provide clearer understanding of the strength of the margin of safety for the favorable geometry bullet tank, which is an often-used passive engineered control.