



Global Nuclear Fuel

A Joint Venture of GE, Toshiba, & Hitachi

Global Nuclear Fuel – Americas, LLC
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January 5, 2005

Mr. Wilkins Smith, Project Manager
Technical Support Group, Division of Fuel Cycle Safety and Safeguards
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: GNF-A Comments to ISG-10

Reference(s): (1) Federal Register Vol. 69, No. 233, pp. 70475-70480, 12/6/04.
(2) Interim Staff Guidance (ISG) – 10, “Justification for Minimum Margin of Subcriticality for Safety”
(3) "USNRC Material License", SNM-1097, Global Nuclear Fuel - Americas, LLC Docket No. 70-1113.

Dear Sir:

Global Nuclear Fuel - America's, LLC (GNF-A) is submitting the following comments on the proposed draft Interim Staff Guidance, ISG-10, “Justification for Minimum Margin of Subcriticality for Safety”.

GNF-A considers the referenced ISG-10 is unwarranted, overly prescriptive and has the potential to have adverse economic impact on our facility operation without enhancing the protection of the public health and safety. The proposed ISG-10 will not benefit our nuclear fuel fabrication facility for the following reasons:

- GNF-A has previously committed to using validated Monte Carlo criticality safety codes as part of our SNM-1097 license (refer Section 6.1.1, ref. 3). Validated computer analytical methods may be used to evaluate individual unit or multi-unit systems. When these analytical methods are used, it is required that the effective neutron multiplication factors (K_{eff}) for credible process upset (accident) conditions are less than or equal to 0.97 including applicable biases and calculational uncertainties, that is: $K_{eff} + 3 \sigma - \text{bias} \leq 0.97$ (accident conditions). Thus, the established arbitrary margin of safety (MoS) used at GNF-A under credible abnormal (accident) conditions is 0.03. This safety margin related to calculations is in addition to the very large margin of safety provided by the highly conservative assumptions used in evaluating criticality safety.

- GNF-A has successfully and safely applied our $USL \leq 0.97$ for over 25 years. Our internal validation is technically rigorous and justifies the $MoS = 0.03$. It has been routinely reviewed by NRC staff during previous licensing actions and facility inspections and found to be fully acceptable. GNF-A is therefore very opposed to the imposition of any new prescriptive value on $MoS = 0.05$ suggested by ISG-10. As stated above, for any increase on the MoS , substantial retrofit of existing operations would be required, with an enormous associated cost. This cost would not be justified as it will result in little or no improvement to overall safety. A defined $USL \leq 0.97$ is sufficiently subcritical and adequate to protect workers, the public, and the environment.
- Normal operating conditions include maximum credible conditions expected to be encountered when the criticality control systems function properly. Internal procedures require $K_{eff} + 3 \sigma - \text{bias} \leq 0.90$ (normal conditions). Thus, the established arbitrary margin of safety (MoS) used at GNF-A for normal conditions is 0.10. Credible process upsets include anticipated off-normal or credible accident conditions and must be demonstrated to be critically safe in all cases in accordance with Section 6.1.1 of SNM-1097. The sensitivity of key parameters with respect to the effect on K_{eff} is evaluated for each system such that adequate criticality safety controls are defined for the analyzed system.
- The proposed ISG-10 does not appear to acknowledge the inherent conservatism applied by the qualified criticality safety analyst during the derivation of the established subcritical limit(s). For example, a favorable geometry unit is developed conservatively at GNF-A assuming unlimited water or concrete equivalent reflection, optimal hydrogenous moderation, worst credible heterogeneity, and maximum credible enrichment to be processed (ref. Section 6.2.5.1, ref. 3). These conservatisms provide an additional, but unacknowledged, margin of safety beyond the demonstrated 0.03.
- The proposed ISG-10 does not appear to acknowledge previously published NRC guidance. For example, Regulatory Guide 3.71, "Nuclear Criticality Safety Standards for Fuels and Materials Facilities", already acknowledges the ANSI/ANS-8 series national consensus standards "should be followed" to prevent and mitigate nuclear criticality accidents. ANSI/ANS-8.1, Section 4.3 clearly stipulates criteria for acceptable approaches to validation of a calculational method used to establish a subcritical limit, including how one establishes the bias, bias trends, and bias uncertainty, etc. and that the facility prepare a "written report" that:
 - (1) Describes the method with sufficient detail, clarity, and lack of ambiguity to allow independent duplication of results.
 - (2) Identifies experimental data and list parameters derived there from for use in the validation of the method.
 - (3) States the area (or areas) of applicability.

Mr. Wilkins Smith,
ONMSS
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Page 3 of 3

(4) States the bias and the margin of Subcriticality over the area (or areas) of applicability. Give the justification for the adequacy of the margin of Subcriticality.

At GNF-A, experimental critical data or analytical methods, which have been validated (benchmarked) by comparison with experimental critical data in accordance with criteria described in Section 4.3 of ANSI/ANS 8.1 (1998), are used as the basis for validation.

- GNF-A is a production facility that processes stable forms of low-enriched uranium that have been well characterized. GNF-A is not a research institute or national laboratory. Based on the forms and type of material used at our facility, the change is not warranted.
- The NRC draft ISG-10 has downplayed the importance of *spectrum comparison* between defined areas of applicability and critical benchmark dataset. Spectrum comparisons can be used (in addition to other physical parameters) instead of quantitative similarity / sensitivity analysis to justify the bias and associated uncertainty.
- The validation methodology itself is actually independent of the selection of the arbitrary margin of safety (MoS).

Please contact me at (910) 675-5656, or Mr. Lon Paulson, Manager, Nuclear Safety at (910) 675-5460 if you have any questions or would like to discuss this matter further.

Sincerely,

Global Nuclear Fuel – Americas, L.L.C.

Original signature on file

Charles M. Vaughan, Manager
Facility Licensing

LEP/rhf

cc: CMV-05-01