Global Nuclear Fuel
A Joint Venture of GE, Toshiba, & Hitachi

**Global Nuclear Fuel**
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SPM 15-041

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Attn: Document Control Desk
Director, Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Subject: NRC License SNM-1097 – License Amendment Request

References: 1) SNM-1097, Amendment 10, Docket 70-1113

Dear Sir or Madam:

The Global Nuclear Fuel – Americas L.L.C. (GNF-A) facility in Wilmington, North Carolina hereby requests a license amendment to our approved SNM license (Reference 1). The amendment will add an additional exemption for criticality accident monitoring in SNM 1097 application Section 1.3.11.

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Attachment 1 provides the proposed additional section to Chapter 1, Section 1.3.11.3. The additional section is identified with a vertical line in the right hand margin on the page.

Attachment 2 provides the justification and technical basis for the exemption.

Please contact me on (910) 819-5950 if you have any questions or would like to discuss this matter further.

Sincerely,

Scott P. Murray, Manager
Facility Licensing

Commitments: None

Attachments: 1) SNM-1097 Chapter 1, Page 1.18
2) Exemption justification and technical basis

cc: RK Johnson, USNRC NMSS
TD Naquin, USNRC NMSS
M Crespo, USNRC RII

1.3.11 EXEMPTION TO CRITICALITY MONITORING SYSTEM REQUIREMENTS

Authorization that it is not necessary to maintain the criticality accident monitoring system requirements of 10 CFR 70.24 when it is demonstrated that a credible criticality risk does not exist for:

1.3.11.1 A quantity of finished reactor fuel rods equal to or less than 45% of a minimum critical number under conditions in which double batching is credible, or equal to or less than 75% of a minimum critical number under conditions in which double batching is not credible, or

1.3.11.2 The quantity of uranium authorized for delivery to a carrier when fully packaged as for transport according to a valid NRC authorization for such packages without limit on the number of such packages, provided storage locations preclude mechanical damage and flooding, or

1.3.11.3 Individual areas where there is negligible risk of criticality due to the amount or configuration of fissile material.

In these areas, an evaluation has determined the risk of criticality is very low and no credible accident sequence can be identified that result in criticality.

1.3.12 EXEMPTION TO POSTING REQUIREMENTS

Authorization to post areas within the Controlled Access Area in which radioactive materials are processed, used, or stored, with a sign stating “Every container in this area may contain radioactive material” in lieu of the labeling requirements of 10 CFR 20.1904.

1.3.13 EXEMPTION TO EXTREMITY DOSE DETERMINATION REQUIREMENTS

Authorization to use a skin thickness of 38 milligrams/$cm^2$ in the assessment of worker fingertip doses from uranium and for determining compliance to NRC extremity dose limits.

Attachment 2
Exemption Justification and Technical Basis

Under the provisions of 10 CFR 70.17, "Specific Exemptions," the Commission may, upon application, grant exemptions from the requirements of 10 CFR Part 70 when the exemption is authorized by law, will not endanger life or property or the common defense and security, and are otherwise in the interest of the public.

The proposed exemption is authorized by law because the Atomic Energy Act of 1954, as amended, contains no provisions prohibiting a licensee from being exempted from criticality accident alarm system (CAAS) monitoring in a given area in which there is negligible risk of criticality. Granting such an exemption will not endanger life, property or the common defense and security.

Requiring alarms to be installed in areas in which there is negligible risk of criticality has no net safety benefit. Spurious alarms in these areas may actually cause a net overall increase in risk to individuals, such as from the disruption caused by unnecessary evacuation, and thus be counter to safety. As a result, the proposed exemption is in the public interest by reducing unnecessary risk.

The granting of this exemption also meets the criteria for categorical exclusion under 10 CFR 51.22. The categorical exclusion described in 10 CFR 51.22(c)(25) addresses the granting of exemptions from regulatory requirements. Granting this exemption request meets the criteria described in 10 CFR 51.22(c)(25), namely, that there are no significant hazard considerations; no change in the types or amounts of effluents; no increase in public or occupational radiation exposure; no construction impact; no increase in the potential for or consequences of a radiological accident; and the exemption involves surety requirements.

GNF-A Alarm Exemption: Process to Assess Criticality Hazards

SNM-1097 application Chapter 3.0, Integrated Safety Analysis describes internal program commitments to determine potential accident sequences and provides reasonable assurance that adequate controls are in place to prevent and/or mitigate accidents in accordance with the performance requirements of 10 CFR Part 70.61. Items Relied On For Safety (IROFS) are identified for each accident sequence that could fail to meet the performance requirements of 10 CFR 70.61. The ISA systematic analysis identifies facility and external hazards and their potential for initiating accident sequences, the potential accident sequences, their likelihood and consequences, and the IROFS.

Internal procedure CP-27-114, Integrated Safety Analysis, describes how and under what conditions an Integrated Safety Analysis (ISA) is conducted. It also describes events that initiate ISA Team re-evaluations, and how the analysis results are reported and used. The purpose of this procedure is also to present the technical approach for performing a review of the existing ISA for the Global Nuclear Fuel-Americas (GNF-A) facilities that are licensed under SNM-1097. The program establishes the basis for process safety of NRC licensed activities inside the Controlled Access Area (CAA) at GNF-A Wilmington and establishes the ISA program as described in Chapter 3 of the SNM-1097 License.

Internal procedure WI-16-106-02, Configuration Management Program - Nuclear Manufacturing Operations describes the configuration management program for the nuclear fuel manufacturing and hazardous support operations within the GEH/GNF-A Wilmington, NC, site’s Controlled Access Area (CAA).

The configuration management system evaluates, implements, and tracks each change to the site, structures, processes, systems, equipment, components, computer programs, and activities of personnel. The program is designed to ensure that configuration management and documentation, including Integrated Safety Analysis (ISA), is updated for additions or modifications to processes, equipment, or facilities governed by NRC License SNM-1097.

The overall process therefore to assess risk of criticality is in accord with SNM-1097 License ISA program commitments and implementing ISA and configuration management procedures. Each candidate area for which a CAAS exemption is warranted [deemed prudent], a documented criticality safety analysis "CAAS needs evaluation" is performed and reviewed in accordance with internal procedures to assure that no credible process upset may lead to a criticality accident. While the requirement for CAAS coverage over a given area in 10 CFR 70.24(a) is based solely on mass, in areas in which there is negligible risk of criticality, requiring alarms to be installed may actually increase overall risk and thus be counterproductive to safety. The GNF-A ISA program shall demonstrate no credible accident sequences can be identified that could result in criticality, and there is no benefit from requiring CAAS coverage in the affected area.

GNF-A CAAS Exemption: Technical Basis Examples

HF Neutralization and Waste Treatment Facility Area

The dilute HF acid neutralization process at the HF Neutralization Facility cannot support an uncontrolled nuclear chain reaction. The overall likelihood of a criticality accident in the HF Neutralization Facility is not credible due to the following process design, characteristics and controls:

- All upstream credible conditions that may result in uranium levels of concern being carried over into the dilute HF acid storage tank in the HF Recovery building have IROFS applied to assure this scenario is highly unlikely.

- The dilute HF acid storage tank is first recirculated, sampled, and confirmed < 3 ppm uranium prior to transfer into the HF transfer truck. The transfer truck is then physically hauled to the HF Neutralization Facility for HF acid neutralization. The HF Recovery building is physically decoupled from the HF Neutralization Facility.

- The dilute HF acid is treated with calcium hydroxide (lime slurry) and converted into calcium fluoride CaF2. The uranium concentration in the CaF2 solids precipitate or in the decanted water is trace levels, nominally less than 1 ppm such that a criticality accident is not credible.

- There can be no uncontrolled transfer or accumulation of fissionable material in the HF Neutralization Facility. No physical or chemical means of concentrating uranium from the resulting CaF2 solids or the decanted water exists.

The residual fissile material in former lagoons in this area cannot support an uncontrolled nuclear chain reaction. The overall likelihood of a criticality accident in former lagoons is not credible due to the very low concentration of fissile material that remains in the soil. These former lagoons have been remediated (emptied), are no longer in service, and are physically decoupled from all processes such that no fissile material can be added.

Aeration Basin and Process Lagoon Area

The radioactive (rad) waste effluent to the Aeration Basin, pH Adjustment Tank and Process Lagoon Area (separate area from the Waste Treatment Facility previously described) cannot support an uncontrolled nuclear chain reaction. The overall likelihood of a criticality accident in the Aeration Basin, pH Adjustment Tank and Process Lagoon Area is not credible due to the following process design, characteristics and controls:

- All upstream credible conditions that may result in uranium levels of concern being carried over to the pH Adjustment Tank have IROFS applied to assure this scenario is highly unlikely. Uranium concentration in waste streams entering the rad waste system is limited to a few grams per liter by first filtering those streams that may contain some uranium. Chemical treatment and subsequent filtration reduce the uranium concentration in the rad waste effluent to less than 5 ppm.

- Environmental control (daily composite sample analysis) ensures the uranium concentration in the rad waste effluent remains below 5 ppm.

- Rad waste entering into the pH Adjustment Tank is mixed with a large volume of non-rad liquid waste which further reduces the uranium concentration before entering the Process Lagoons.

- The pH Adjustment Tank is cleaned annually and samples are analyzed for metal contents. Historical data indicates very low uranium concentration and relatively large amounts of thermal neutron absorbers such as iron and calcium.

- Sludge in the Process Lagoons is sampled annually for metal contents. Historical data indicates very low uranium concentration in sludge which contains relatively large amounts of thermal neutron absorbers such as iron and calcium.

- There can be no uncontrolled transfer to or accumulation of fissionable material in the pH Adjustment Tank or the Process Lagoons. No physical or chemical means of concentrating uranium in the sludge solids exists.