



**Global Nuclear Fuel**

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**Scott P. Murray**  
Manager, Facility Licensing

3901 Castle Hayne Road  
P.O. Box 780  
Wilmington, NC 28402  
USA

T (910) 819-5950  
Scott.murray@ge.com

M180107

May 10, 2018

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

Attn: Document Control Desk

Subject: NRC License SNM-1097 – License Amendment Request

References: 1) SNM-1097, Docket 70-1113  
2) Letter S.P. Murray (GNF-A) to T. Naquin (NRC), “GNF-A SNM 1097 Proposed License Amendment Request”, 2/26/18  
3) Telecom, GNF-A/NRC Staff, 3/16/18

Dear Sir or Madam:

The Global Nuclear Fuel – Americas L.L.C. (GNF-A) facility in Wilmington, North Carolina hereby provides a license amendment request for Chapter 5 “Nuclear Criticality Safety” and minor administrative updates to five other Chapters of our approved SNM license renewal application (Reference 1).

The requested changes to Chapter 5 have been internally reviewed and documented as changes to license commitments requiring prior NRC approval in accordance with SNM 1097 Section 1.3.1.2 and 10 CFR 70.72. The minor administrative updates to Chapters 2, 4, 9, 10 and 11 have been internally reviewed and documented as changes to license commitments that do not require prior NRC approval in accordance with SNM 1097 Section 1.3.1.2 and 10 CFR 70.72

A description and reason for the change in each Chapter is provided in Attachment 1 to this letter to aid in the NRC Staff review.

Attachments 2 through 7 provide updates to Chapter 2, “Organization and Administration”, Chapter 4 “Radiation Safety”, Chapter 5 “Nuclear Criticality Safety”, Chapter 9 “Environmental Protection”, Chapter 10, “Decommissioning” and Chapter 11, “Management Measures”. The revised sections are identified with a vertical line in the right hand margin on each revised page.

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

Sincerely,

  
Scott P. Murray, Manager  
Facility Licensing

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US NRC  
May 10, 2018  
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Attachments: 1) SNM-1097 Change Table Summary  
2) SNM-1097 Chapter 2  
3) SNM-1097 Chapter 4  
4) SNM-1097 Chapter 5  
5) SNM-1097 Chapter 9  
6) SNM-1097 Chapter 10  
7) SNM -1097 Chapter 11

cc: RK Johnson, USNRC NMSS  
TD Naquin, USNRC NMSS  
T. Vukovinsky, USNRC RII  
SPM 18-031

Attachment 1

<b>SNM-1097 License Application Chapter Change Table</b>		
<b>Section</b>	<b>Description of Change</b>	<b>Reason for Change</b>
Chapter 2 -ORGANIZATION AND ADMINISTRATION		
Section 2.2.1.1 Organization and Administration	Second paragraph, first sentence added "or equivalent" to the GNF-A Facility Manager.	Administrative Update
Figure 2.1 GNF-A Organization Chart	Separated EHS Functions on Chart	Administrative Update
Chapter 4 - RADIATION SAFETY		
Section 4.5.1 Surveys	Last sentence, last paragraph deleted "or personal clothing"	Clarification
Chapter 5 – NUCLEAR CRITICALITY SAFETY		
Chapter 5 Section 5.1.1, Criticality Safety Design Philosophy	<p>First sentence changed "The Double Contingency Principle as identified" to "The Process analysis as discussed in section 4.1.2 and the Double-contingency principle as identified "</p> <p>Changed "(1998) is the fundamental technical basis" to "(2014) are fundamental bases"</p> <p>Added bullet points:</p> <ul style="list-style-type: none"> <li>• "Before a new operation with fissionable material is begun, or before an existing operation is changed, it shall be determined that the entire process will be subcritical under both normal and credible abnormal conditions."</li> <li>• "Process designs should incorporate sufficient factors of safety to require at least two unlikely, independent, and concurrent changes in process conditions before a criticality accident is possible."</li> </ul> <p>Second paragraph deleted "an inadvertent" and added "or process condition changes"</p>	<p>Administrative Update</p> <p>Administrative Update</p> <p>Administrative Update</p> <p>Align with updates to ANSI/ANS 8.1</p> <p>Administrative Update</p>

<b>SNM-1097 License Application Chapter Change Table</b>		
<b>Section</b>	<b>Description of Change</b>	<b>Reason for Change</b>
Continued: Section 5.1.1, Criticality Safety Design Philosophy	Third paragraph "The established" to "Established"  b) deleted "an inadvertent"  e) deleted "IROFS" added "parameter"	Administrative Update  Administrative Update  Administrative Update
Section 5.1.2.1 Changes to Facility	First paragraph added "criticality safety" and removed "chemical hazards"  Third paragraph added "ISA documents are updated per section 11.2"	Clarification  Clarification
Section 5.1.4.1, Posting of Limits and Controls	Updated second paragraph to refer to internal procedures	Administrative Update
Section 5.3.1 General Configuration Management	First sentence changed "2005" to "2014"	Administrative Update
Section 5.3.2.1, Training and Qualification of NCS Staff	Removed "The most effective training is on the job facility specific training, which", added "CSE qualifications" and changed "senior" NCS management to "NCS management" in last sentence of second paragraph	Clarification
Section 5.3.2.2, Auditing, Assessing and Upgrading the NCS Program	Fourth paragraph, second sentence changed "reported in writing" to "documented and provided" and changed "who disseminates the report to line are" to "and facility"  Second paragraph, last sentence changed "Results in the form of corrective action requests" to "Findings requiring corrective action"	Clarification  Content not applicable to NCS
Section 5.3.2.4, Modifications to Operating and Maintenance Procedures	Second sentence, second paragraph changed "concerned" personnel to "affected" personnel	Clarification
5.3.2.5 Criticality Accident Alarm System (CAAS) Design and Performance Requirements	Second sentence changed "2003" to "(R2012)"	Administrative Update
Section 5.3.2.7, NCS Records Retention	Moved to first paragraph of Section 5.4.5.5	Administrative Update
Section 5.4.1, Control Practices	First paragraph First sentence, added "limits and controls" and deleted "effective"	Administrative Update

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<b>Section</b>	<b>Description of Change</b>	<b>Reason for Change</b>
Continued: Section 5.4.1, Control Practices	<p>Second sentence deleted “Prior to use in any enriched uranium process, nuclear criticality safety controls are verified against criticality safety analysis criteria. The ISA program described in Chapter 3 implement performance based management of process requirements and specifications that are important to nuclear criticality safety.”</p> <p>and added “The Area Manager, with NCS support, implements the limits and controls documented in the CSA.”</p>	Clarification that the Area Manager is responsible for establishing controls necessary for the CSA
Section 5.4.1.1, Verification Program	<p>First paragraph, third sentence changed “Criticality safety function personnel observe or monitor the performance of initial functional tests and conduct pre-operational audits to verify that the controls function as intended and the installed configuration agrees with the criticality safety analysis.” To “Criticality safety function personnel conduct pre-operational audits (e.g., field verification of design features, functional test review), as needed, to verify that the installed configuration agrees with the criticality safety analysis. “</p> <p>Second paragraph, first sentence deleted ”subsequent and changed “or verification” to “or other verification means”</p>	<p>Clarification to provide a better description of the verification program</p> <p>Clarification</p>
Section 5.4.1.2., Maintenance Program	<p>Changed first sentence from “The purpose of the maintenance program is to assure that the effectiveness of IROFS designated for a specific process are maintained at the original level of intent and functionality.” to “The purpose of planned and scheduled maintenance of safety controls is to assure that systems are kept in a condition of readiness to perform the planned and designed functions when required.”</p> <p>Second sentence added “calibration”</p>	<p>Clarification of maintenance program</p> <p>Administrative update</p>

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<b>SNM-1097 License Application Chapter Change Table</b>		
<b>Section</b>	<b>Description of Change</b>	<b>Reason for Change</b>
Section 5.4.2, Means of Control	Changed "simple administrative controls" to "administrative controls" in the fourth sentence	Administrative update
Section 5.4.2.1, Passive Engineered Controls	<p>First sentence deleted "without any required human action" from first sentence.</p> <p>Added second sentence "Beyond appropriate installation, a passive engineered control requires no human action to perform its safety function"</p>	<p>Clarification</p> <p>Clarification of a passive engineered control</p>
Section 5.4.2.2, Active Engineered Controls	<p>First sentence deleted "without any required human action" from first sentence.</p> <p>Added second sentence "Beyond appropriate installation, an active engineered control requires no human action to perform its safety function" in second sentence</p> <p>Last sentence changed "controls are designed to be fail-safe (i.e., meaning failure of the control results in a safe condition)." to "controls that are designed to be fail-safe (i.e., meaning failure of the control results in a safe condition) are preferred"</p>	<p>Clarification of an active engineered control</p> <p>Clarification of an active engineered control</p> <p>Clarification of an active engineered control</p>
Section 5.4.2.3, Administrative Controls	<p>Deleted first sentence "Either an augmented administrative control or a simple administrative control as defined herein:"</p> <p>Second bullet changed "Simple Administrative Controls" to "Administrative Controls"</p> <p>First sentence, last paragraph changed "is" to "should be"</p>	<p>Administrative Update</p> <p>Administrative Update</p> <p>Administrative Update</p>
Section 5.4.3, Specific Parameter Limits	First sentence changed "safe geometry values of Table 5.1 below are specifically licensed for use" to "favorable geometry values of Table 5.1 contain dimensions for sphere, cylinder, and slab which may be used for applicable operations"	Clarification of safe geometry values

<b>SNM-1097 License Application Chapter Change Table</b>		
<b>Section</b>	<b>Description of Change</b>	<b>Reason for Change</b>
Continued: Section 5.4.3, Specific Parameter Limits	<p>Second sentence, first paragraph added “and the moderating material is not more effective than water”</p> <p>Second paragraph Deleted “or explicit stochastic or deterministic modeling methods” and added last sentence “When not applicable, the Criticality Safety Engineer may use approved validated stochastic or deterministic codes to determine subcritical limits”</p> <p>First sentence, third paragraph changed “are specifically licensed for use at GNF-A” to “may be used for applicable operations at GNF-A. Application of these safe batch values is limited to situations where the neutron reflection present does not exceed that due to full water reflection and the moderating material is not more effective than water.”</p> <p>Added second sentence to third paragraph “Application of these safe batch values is limited to situations where the neutron reflection present does not exceed that due to full water reflection and the moderating material is not more effective than water.”</p> <p>Changed “kgs” to “kg” in formula</p> <p>Deleted bullet point “Where engineered controls prevent over batching, a mass of 75% of the minimum critical mass shall not be exceeded.</p> <p>Changed “Subject to provision for adequate protection against precipitation or other circumstances which may increase concentration, the following safe concentrations are specifically licensed for use at GNF-A:” to “The safe concentration values below may be used for applicable operations at GNF-A subject to provision for adequate protection against precipitation or other circumstances which may increase concentration.” In paragraph under second bullet</p>	<p>Clarification of application of geometry controls</p> <p>Clarification of the dimensional limitations of Table 5.1</p> <p>Administrative Update</p> <p>Clarification of safe batch values</p> <p>Typographical Correction</p> <p>Clarification – No longer used</p> <p>Clarification of safe concentration values</p>

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<b>SNM-1097 License Application Chapter Change Table</b>		
<b>Section</b>	<b>Description of Change</b>	<b>Reason for Change</b>
Table 5.1 Favorable Geometry Values	Change table title from "Safe" to "Favorable"	Clarification
Table 5.2, Safe Batch Values for UO <sub>2</sub> and Water	Changed "Kgs" to "kg" in table	Typographical Correction
Section 5.4.4.1, Geometry	First paragraph, fourth sentence changed "conservatively assuming unlimited water or concrete equivalent reflection, optimal hydrogenous moderation, worst credible heterogeneity, and maximum credible enrichment to be processed." to "conservatively assuming worst credible conditions (e.g., reflection, moderation, heterogeneity, and enrichment) for the material to be processed."	Clarification of favorable geometry control
Section 5.4.4.2, Mass	<p>First paragraph, first sentence changed "Mass control" to "Mass"</p> <p>Third sentence added "along with adequate measurement uncertainty"</p> <p>Second paragraph, first sentence changed "potential" to "worst credible"</p> <p>Deleted last sentence in second paragraph</p>	<p>Administrative Update</p> <p>Clarification of mass control methods</p> <p>Clarification of mass control methods</p> <p>Clarification of mass control methods</p>
Section 5.4.4.3. Moderation	<p>First paragraph, first sentence changed "Moderation" to "Moderator"</p> <p>Added second sentence "Moderator control areas shall be defined in the process evaluation in which moderators are limited and controlled for nuclear criticality"</p> <p>First paragraph, third sentence changed from "When moderation is used in conjunction with other control methods, the area is posted as a 'moderation control area'." to "For areas where moderation is used in conjunction with other control methods, the area is classified as a 'moderation control area (MCA)'"</p>	<p>Administrative Update</p> <p>Clarification of moderation control</p> <p>Clarification of moderation control</p>



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<b>SNM-1097 License Application Chapter Change Table</b>		
<b>Section</b>	<b>Description of Change</b>	<b>Reason for Change</b>
Continued: Section 5.4.4.3. Moderation	<p>First paragraph, last sentence deleted “primary design focus and is designated as a the”, changed “posted” to “classified as a”, and added (MRA)”</p> <p>Deleted second paragraph and bullet points deleted and added “Process evaluations for MCA/MRA designated areas shall explicitly identify the limits, controls, and engineered barriers for designated moderator control areas. Material properties, credible moderator present in, introduced to, or accumulated in an MCA/MRA shall be considered. Credible non-uniform distribution of moderators, moderator content measurement, and fire suppression methods shall also be considered.</p>	<p>Clarification of moderation control area postings</p> <p>Clarification</p>
Section 5.4.4.4, Concentration (Density)	Deleted second and third sentence in first paragraph	Administrative update for simplification
Section 5.4.4.5, Neutron Absorber	<p>Changed second paragraph to last sentence in first paragraph “Credit may also be taken for neutron absorber added to fuel, such as gadolinia.”</p> <p>Moved first bullet point to last bullet point and added “For fuel bundles”</p> <p>Added third paragraph and third bullet point</p>	<p>Clarification of neutron absorber control</p> <p>Clarification of neutron absorber control</p> <p>Clarification of neutron absorber control</p>
Section 5.4.4.6, Spacing (or Unit Interaction)	<p>Added “may be” to first sentence</p> <p>Added “or arrays” and deleted “either of the following” from second sentence</p> <p>Deleted “or” in first bullet</p> <p>Deleted “the larger of” in second bullet, added comma and moved remainder of bullet after “or” to a third bullet</p>	<p>Clarification of spacing control</p> <p>Clarification of spacing control</p> <p>Clarification of spacing control</p> <p>Clarification of spacing control</p>

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<b>Section</b>	<b>Description of Change</b>	<b>Reason for Change</b>
Continued: Section 5.4.4.6, Spacing (or Unit Interaction)	Deleted "(e.g. Solid Angle methods" from last paragraph second sentence  Changed 5.3 to 5.4.5.5 in last sentence of last paragraph	Clarification of spacing control  Updated reference
Section 5.4.4.8, Reflection	Added first sentence  Second sentence replaced "Most" with "Generally"  Changed second sentence from "However, subject to approved controls which limit reflection, certain system designs may be analyzed, approved, and operated in situations where the analyzed reflection is less than optimum." to "However, subject to an approved analysis documenting controls or process conditions which limit reflection, certain system designs may be approved and operated in situations where the analyzed reflection is less than optimum."	Clarification of definition for reflection  Administrative Update  Clarification of definition for reflection
Section 5.4.5.1, Keff Limit	Deleted second sentence in first paragraph " including applicable bias and bias uncertainty corrections, for credible process upset (accident) conditions are" and added "(keff) of the system plus three (3) times the standard deviation of the Monte Carlo code must be"  Second paragraph, second sentence changed "accident" to "upset"	Clarification of definition of K effective  Administrative Update
Section 5.4.5.2, Analytical Methods	First sentence added "SCALE/KENO"  Changed "Additional" to " Additionally" and deleted "Monte Carlo codes (e.g., Keno-Va. and MCNP)" or $S_n$ " from second sentence	Provided additional examples of analytical methods  Administrative Update

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Section 5.4.5.3, Validation Techniques	Second paragraph under Minimum Margin of Subcriticality (MMS) added "plus three (3) times the standard deviation for the Monte Carlo code"	Clarification of definition of MMS
	Twelfth bullet added "outlined in the validation report the USL is defined as" and deleted "For all benchmark experiments absolutely critical ( $k_{exp} = 1.0$ )"	Clarification of definition of MMS
	Fifth paragraph changed "accident" to "upset"	Administrative Update
	Seventh paragraph changed "is" to "are"	Grammatical correction
	Thirteenth bullet changed "to" to "in" and "needed" to "included"	Grammatical correction
Section 5.4.5.4, Computer Software & Hardware Configuration Control	Second sentence added "For codes developed or modified at GNF"	Clarification
Section 5.4.5.5, Criticality Safety Analysis (CSA)	First paragraph moved from Section 5.3.2.7	Administrative Update
	Changed "The scope and content of any particular CSA reflects the needs and characteristics of the system being analyzed and includes applicable information requirements as follows:" to "The scope and content of any particular CSA reflects the needs and characteristics of the system being analyzed, as specified in internal procedures, and typically includes the following elements:"	Administrative Update
	Added <ul style="list-style-type: none"> <li>• Process Description</li> <li>• Methodology (e.g., computer code, area of applicability)</li> <li>• Criticality Safety Hazards (i.e., list of credible upset process conditions)</li> <li>• Assumptions, Design Features, Limits / Requirements</li> <li>• Models, Sample input file, and Results</li> </ul>	Administrative Update
	Deleted remainder of section	Administrative Update

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<b><i>Section</i></b>	<b><i>Description of Change</i></b>	<b><i>Reason for Change</i></b>
Chapter 9 – ENVIRONMENTAL		
Figure 9.5c Locations of WT Series Wells Around Waste Treatment Facility (Typical)	Deleted well WT-2	Administrative Update
Chapter 10 - DECOMMISSIONING	Changed date of current Decommissioning Funding Plan	Administrative Update
Chapter 11 – MANAGEMENT MEASURES		
Section 11.3.3 Surveillance/Monitoring	Last Sentence, second paragraph Deleted reference to Table 3.7	Administrative Update