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February 24, 2009

Ms. Mary T. Adams, Senior Project Manager
Fuel Manufacturing Branch
Division of Fuel Cycle Safety
and Safeguards NMSS
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Subject: Response to Renewal of Materials License SNM-1097 Requests for Additional Information (TAC L32629) Dated January 15, 2009 and February 9, 2009

References:
1) SNM-1097, Docket 70-1113
2) Letter, S.P. Murray to NRC Document Control Desk, 4/2/07, License Renewal Application for Global Nuclear Fuel – Americas LLC
3) E-mail M.T. Adams to S.P. Murray, 1/15/09, GNF-A RAI Follow-up Questions (Rad & Fire) for License Renewal (TAC L32629)
4) E-mail M.T. Adams to S.P. Murray, 2/9/09, GNF-A RAI Follow-up Questions (Crit) for License Renewal (TAC L32629)
5) Telecon between NRC NMSS staff and GNF-A – S. P. Murray, 2/18/09

Dear Ms. Adams:

The Global Nuclear Fuel – Americas L.L.C. (GNF-A) facility in Wilmington, North Carolina hereby submits the requested information in support of our SNM License Renewal Application. This information, along with revisions to the renewal application is being provided in response to your January 15, 2009 and February 9, 2009 e-mails (References 3 and 4) and as we discussed by phone on February 18, 2009. (Reference 5). Attachment 1 provides our response to each RAI and Attachments 2 through 4 provide the revised License Renewal Application pages.

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

Sincerely,

S.P. Murray, Manager
GEH Licensing and Liabilities

Attachments 1-4
cc: SPM-09-008
MN Baker, USNRC NMSS

Radiation Protection Related RAI

RAI 4.7

Consistent with 10 CFR 19.12, 20.1101, 70.22(a)(6) and 70.23(a)(2); Regulatory Guides 8.10 and 8.29; and NUREG-1520, provide the following additional information regarding the nuclear safety program:

1. *Demonstrate that the periodic review of training material by management is conducted on a time frame at least equivalent to the 3-year review specified in the guidance.*
2. *Demonstrate that the frequency of retraining is appropriate for the amount and type of SNM at the facility consistent with the 1- to 3-year time frame specified in Regulatory Guide 8.29 and the SRP.*
3. *In the application, clarify that the meaning of the term "periodic" in section 11.4.7 of the license application is consistent with the 1- to 3-year time frame in the guidance.*
4. *In the RAI response, demonstrate that plant workers will be tested on their radiation protection understanding on a periodic basis equivalent with the once-per-year timeframe specified in Regulatory Guide 8.10.*
5. *Clarify whether the procedure review table provided in section 11.5.1 "Operating Procedures" on page 11.14, applies to the training program? (Note: If this section can be shown to be applicable to training, this RAI would be satisfied.)*

GNF-A Response

As described in Chapter 11, Section 11.5.2, licensed material activities are conducted in accordance with management control programs described in administrative and general plant policies approved and issued by cognizant management at a level appropriate to the scope of the practice. These practices are reviewed for updating at least every 2 years (26 months).

Included in this review is the nuclear safety training program procedure.

RAI 4.9

Consistent with the requirements in 10 CFR 20.1101(a), 20.1703, 70.22(a)(8), and 70.23(a)(4); Regulatory Guide 8.15; and NUREG-1520, provide the following additional information regarding the respiratory protection program:

1. *State in the application the individual or function responsible for oversight of the respiratory protection program.*
2. *Indicate which individual or function is responsible for conducting the evaluation to determine when respiratory protection should be used, and demonstrate that they are appropriately qualified.*
3. *Describe the criteria that are used to determine the need for respiratory protection.*
4. *Describe how the criteria are incorporated into procedures.*
5. *In section 4.10.3 state the individual or function responsible for ensuring proper respiratory protection equipment maintenance.*
6. *Consider adding the commitment to have the respiratory protection program be conducted in accordance with regulatory guide 8.15.*

GNF-A Response

Chapter 2, Section 2.2.1.6 “Radiation Safety Function” designated responsibilities is revised by adding a bullet as follows:

- Oversight of the respiratory protection program

The first sentence of Chapter 4, Section 4.10 is revised as follows:

> The respiratory protection program shall be conducted in accordance with the applicable portions of 10 CFR 20, including written procedures for air sampling sufficient to identify the potential hazard, proper equipment selection, maintenance and testing, dose estimation; and surveys or bioassays, as necessary, to evaluate actual intakes.

Fire Related RAI

RAI 1

James Downs (NRC) would like to confirm the following is accurate for the renewal SER.

Hydrogen is used in the licensed process to provide a reducing atmosphere in the sintering furnaces. Although there is a risk associated with its use, safety systems are designed and installed to effectively prevent an accident scenario. Sintering furnaces comply with the edition of NFPA-86C, A Standard for Ovens and Furnaces, @ which was in effect at the time the furnaces were upgraded. Flammable gas detectors are installed where required.

GNF-A Response

The statement is correct with the following change:

Hydrogen is used in the licensed process to provide a reducing atmosphere in the sintering furnaces. Although there is a risk associated with its use, safety systems are designed and installed to effectively prevent an accident scenario. Sintering furnaces comply with the edition of NFPA-86C, A Standard for Ovens and Furnaces, @ which was in effect at the time the furnaces were last upgraded in 1999. Flammable gas detectors are installed where required.

Criticality Related RAI

RAI 5.1

Justify the inclusion of concrete reflectors in the area of applicability (AOA) for low-enriched uranium (LEU) systems. The GEMER validation includes only two benchmark experiments with concrete reflectors for AOA-1. The GEKENO validation report also lists only a few critical experiments with LEU and concrete reflectors.

This information is needed to determine the adequacy of the commitments in the license application regarding selection of benchmark experiments for validation and determination of the AOA.

GNF-A Response

AOA-1 of the GEMER validation report contains a total of seventy-five critical benchmark experiments for low-enriched uranium (LEU) homogeneous systems. Within this set of experiments, thirty-two involve bare (unreflected) systems while the remaining forty-three contain neutron reflectors of various types including water, concrete, Plexiglas, polyethylene and paraffin. Since fissile material handling operations performed under SNM-1097 involve conditions where homogeneous LEU must be analyzed as either unreflected or reflected by a variety of different types of neutron reflectors, both types of systems are included in AOA-1. By inspecting the forty-three homogeneous LEU experiments that contain neutron reflectors, it is seen that only two (LCT45-16 and LCT45-20) utilize concrete as a reflector compared with nineteen water, twelve Plexiglas, five polyethylene and five paraffin reflected experiments.

The reason for the limited number of concrete reflected experiments compared to the other reflector types is the fact that the critical benchmark experiment selection criteria used for AOA-1 involves consideration of many different experimental variables such as H/U-235 ratio, uranium chemical form, uranium physical form, uranium enrichment, presence (or absence of absorbers) and neutron energy spectrum in addition to the type of neutron reflector. Because the critical benchmark experiment selection process considers all of these variables (not just reflector type alone), only a limited number of concrete reflected experiments were available from published accepted sources for homogeneous LEU systems that also met all the other required criteria for inclusion in AOA-1.

RAI 5.2

Section 4.3.1 of the GEMER validation report states that the single-sided lower tolerance limit (SSLTL) method for determining an upper subcritical limit (USL) is used when there are not trends in the calculated critical benchmark results. Explain why the SSLTL method was used to determine the USL for AOA-1 when a trend was found in the data.

This information is needed to determine the adequacy of the commitments in the license application regarding the statistical methods used to determine an upper subcritical limit.

GNF-A Response

This is a typo error. In the previous version of GEMER validation report (rev. 03), AOA-1 was the LEU solution systems for which statistical analyses indicated that no trend in *keff* within the AOA-1 could be identified with simple but statistically significant regression models. Therefore, the SSLTL method was used to determine the USL for AOA-1 in the report (rev.03). However, the current version of validation report defined AOA-1 as the LEU homogeneous systems for which the trend was found in *keff* by statistical analyses. The SSLTB method was actually used to determine the USL for AOA-1. The error has been corrected.

RAI 5.3

The response to RAI 5.10 and 5.11 describes the compensatory measures that may be employed when CWS coverage is lost. Revise the license application to indicate that compensatory measures will be put in place if the CWS is out of service, including for maintenance activities.

10 CFR 70.24 requires a CWS be maintained in each area where SNM is handled, used, or stored for facilities authorized to possess greater than a critical mass of SNM. It is recognized that CWS coverage may be lost, but the license application should clearly indicate how the intent of the regulations will continue to be met during such events.

GNF-A Response

Chapter 5, Section 5.3.2.5 is revised by adding an additional paragraph as follows:

> In the event that CWS coverage is lost in an area, compensatory measures such as limiting personnel access, halting special nuclear material movement or installing temporary detection equipment are used as an interim measure until the system is restored.

RAI 5.4

The response to RAI 5.17 contains revised text for Section 5.4.4.3 of the license application that conflicts with previous statements. GNF-A has stated that the moderation safety factor is never less than two. However, the revised text states that it "is never less than two unless justified....." Clarify the response to clearly indicate what an acceptable moderation safety factor is.

This appears to be an unintended change in commitments. However, if the intent is to allow a moderation safety factor less than two, provide justification for reducing the safety margin.

GNF-A Response

Chapter 5, Section 5.4.4.3 third paragraph, last sentence is revised to read as follows:

> The moderation safety factor will normally be three or higher, but never less than two. (Remainder of sentence wording deleted)

Attachment 2

Chapter 2 Page Revisions to
License Renewal Application

The criticality safety function manager shall hold a BS or BA degree in science or engineering, have at least four years experience in assignments involving regulatory activities, and have experience in the understanding, application and direction of nuclear criticality safety programs.

Minimum qualifications for a senior engineer within the criticality safety function are a BS or BA degree in science or engineering with at least three years of nuclear industry experience in criticality safety. A senior engineer shall have experience in the assigned safety function, and has authority and responsibility to conduct activities assigned to the criticality safety function.

Minimum qualifications for an engineer within the criticality safety function are a BS/BA degree in science or engineering. An engineer shall have experience in the assigned safety function, and has authority and responsibility to conduct activities assigned to the criticality safety function, with the exception of independent verification of criticality safety analyses.

2.2.1.6 Radiation Safety Function

The radiation safety function is administratively independent of production responsibilities and has the authority to shutdown potentially unsafe operations. This function must approve restart of an operation they request be shutdown.

Designated responsibilities include:

- Establish the radiation protection and radiation monitoring programs
- Establish the radiation protection design criteria, procedures and training programs to control contamination and exposure to individuals
- Evaluate radiation exposures of employees and visitors, and ensure the maintenance of related records
- Conduct radiation and contamination monitoring and control programs
- Evaluate the integrity and reliability of radiation detection instruments
- Provide radiation safety support for integrated safety analyses and configuration control
- Provide analysis and approval of proposed changes in process conditions and process equipment involving radiological safety

- Provide advice and counsel to Area Managers on matters of radiation safety
- Support emergency response planning and events
- Assess the effectiveness of the radiation safety program through audit programs
- Oversight of the respiratory protection program

The radiation safety function manager shall hold a BS or BA degree in science or engineering, have at least two years experience in assignments that include responsibility for radiation safety, and have experience in the understanding, application and direction of radiation safety programs.

Minimum qualifications for a senior member of the radiation safety function are a BS or BA degree in science or engineering with at least two years of nuclear industry experience in the assigned function. Alternate minimum experience qualification for a senior member of the radiation safety function is professional certification in health physics. A senior member shall have experience in the assigned safety function, and has authority and responsibility to conduct activities assigned to the radiation safety function.

2.2.1.7 Environmental Protection Function

The environmental protection function is administratively independent of production responsibilities and has the authority to shutdown operations with potentially uncontrolled environmental conditions. This function must approve restart of an operation they request be shutdown.

Designated responsibilities include:

- Identify environmental protection requirements from federal, state and local regulations which govern the GNF-A operation
- Establish systems and methods to measure and document adherence to regulatory environmental protection requirements and license conditions
- Provide advice and counsel to Area Managers

Attachment 3

Chapter 4 Page Revisions to License Renewal Application

4.8 SUMMING INTERNAL AND EXTERNAL EXPOSURE

Internal and external exposures determined as described in the preceding sections of this application are summed in accordance with the requirements of 10 CFR 20 for the purposes of limiting occupational doses and recording individual monitoring results.

4.9 ACTION LEVELS FOR RADIATION EXPOSURES

Work activity restrictions will be imposed when an individual's exposure exceeds 80% of the applicable 10 CFR 20 limit.

4.10 ESPIRATORY PROTECTION PROGRAM

The respiratory protection program shall be conducted in accordance with the applicable portions of 10 CFR 20, including written procedures for air sampling sufficient to identify the potential hazard, proper equipment selection, maintenance and testing, dose estimation; and surveys or bioassays, as necessary, to evaluate actual intakes. Respiratory protection equipment specifically approved by the National Institute for Occupational Safety and Health (NIOSH) is utilized.

4.10.1 QUALIFICATIONS OF RESPIRATOR USERS

Individuals designated to use respiratory protection equipment are evaluated by the medical function and periodically thereafter at a frequency specified by the medical function to determine if the individual is medically fit to use respiratory protection devices. If there are no medical restrictions precluding respirator use, the individual is provided respiratory training and fitting by a qualified instructor. Additional training on the use and limitations of self-contained breathing devices is provided to designated individuals.

An adequate fit is determined for all face-sealing respirators using either a quantitative fit test method or a qualitative method. Qualitative fit testing is acceptable if (1) it is capable of verifying a fit factor of 10 times the assigned protection factor (APF) for facepieces operated in a negative pressure mode or (2) it is capable of verifying a fit factor of $\geq$100 for facepieces operated in a positive pressure mode. Mask fits are re-evaluated annually.

Attachment 4

Chapter 5 Page Revisions to License Renewal Application

5.3.1.3 ISA Summary Revisions

(See Chapter 3)

5.3.1.4 Modifications to Operating and Maintenance Procedures

Procedures that govern the handling of enriched uranium are reviewed and approved by the criticality safety function.

Each Area Manager is responsible for developing and maintaining operating procedures that incorporate limits and controls established by the criticality safety function. Area Managers assure that appropriate area engineers, operators, and other concerned personnel review and understand these procedures through processes such as: postings, training programs, and/or other written, electronic or verbal notifications.

Documentation of the review, approval and operator orientation process is maintained within the configuration management system. Specific details of this system are described in Chapter 11.

5.3.2.5 Criticality Warning Systems (CWS) Design and Performance Requirements

The criticality warning system (CWS) radiation monitoring unit detectors are uniform throughout the facility for the type of radiation detected, The mode of detection, the alarm signal and the system dependability. Also, individual unit detectors are located to assure compliance with appropriate requirements of ANSI/ANS-8.3 (2003). The location and spacing of the detectors are selected, taking into account shielding by massive equipment or materials. Spacing between detectors is reduced where high density building materials such as brick, concrete, or grout-filled cinder block shield a potential accident area from the detector. Low density materials of construction such as wooden stud construction walls, asbestos, plaster, or metal-corrugated panels, doors, non-load walls, and steel office partitions are accounted for with conservative modeling approximations in determining the detector placement.

The criticality accident alarm system initiates immediate evacuation of the facility. Employees are trained in recognizing the evacuation signal. This system, and proper response protocol, is described in the Radiological Contingency and Emergency Plan for GNF-A.

The nuclear criticality alarm system is a safety-significant system and is maintained through routine response checks and scheduled functional tests conducted in accordance with internal procedures. In the event of loss of normal power, emergency power is automatically supplied to the criticality accident alarm system.

In the event that CWS coverage is lost in an area, compensatory measures such as limiting personnel access, halting special nuclear material movement or installing temporary detection equipment are used as an interim measure until the system is restored.

5.3.2.6 Corrective Action Program

A GNF-A internal regulatory compliance tracking system is in place to track planned corrective or preventative actions in regard to procedural, operational, regulatory, or safety related deficiencies. The regulatory & compliance tracking (REGTRACK) is maintained by the Licensing organization and is standardized, site-wide system used by Operations, EHS and Quality organizations.

5.3.2.7 NCS Records Retention

Records of criticality safety analyses are maintained in sufficient detail and form to permit independent review and audit of the method of calculation and results. Such records are retained during the conduct of the activities and for six months following cessation of such activities to which they apply or for a minimum of three years.

A CSA is prepared or updated for each new or significantly modified unit or process system within GNF-A in accordance with established configuration management control practices defined in Chapter 11. Refer to Section 5.4.5.5 of this Chapter to see an example scope and content for a CSA.