DOCKET NO.: 70-3103

LICENSE NO.: SNM–2010

LICENSEE: Louisiana Energy Services, LLC
National Enrichment Facility
Lea County, New Mexico

SUBJECT: SAFETY EVALUATION REPORT FOR APPROVAL OF LOUISIANA ENERGY SERVICES EXCEPTION REQUEST FOR EXCEPTION TO LICENSE CONDITION 10.f OF MATERIALS LICENSE SNM-2010 (TAC NO. L33168)

1.0 PROPOSED CHANGES

On August 3, 2011, Louisiana Energy Services (LES) transmitted a Request for an Exception to License Condition (LC) 10.f of Materials License SNM–2010 (LES, 2011a) to seek a one-time exception from the QL–1G requirements of eight sections of the Quality Assurance Program Description (QAPD) for the Cylinder Receipt and Dispatch Building (CRDB) foundation because they were not met by LES during construction. The August 3, 2011, request additionally provided proposed technical justification and alternatives for LC 10.f. The licensee proposed these alternatives as a method for ensuring that the CRDB foundation would perform its intended items relied on for safety (IROFS) function even though LC 10.f was not fully complied with. These sections are:

- Material Traceability Requirements
  - QAPD Section 21.7 "Control of Purchased Materials, Equipment, and Services"
  - QAPD Section 21.8 "Identification and Control of Materials, Parts, and Components"
  - QAPD Section 21.13 "Handling, Storage, and Shipping"
  - QAPD Section 21.17 "Quality Assurance Records"

- Quality Control (QC) Inspection Requirements
  - QAPD Section 21.4 "Procurement Document Control"
  - QAPD Section 21.5 "Instructions, Procedures, and Drawings"
  - QAPD Section 21.10 "Inspection"
  - QAPD Section 21.18 "Audits"

Supplements to this request for an exception to LC 10.f of Materials License SNM–2010 were submitted on October 14, 2011 (LES, 2011b); November 22, 2011 (LES, 2011c); February 17, 2012 (LES, 2012a); and April 25, 2012 (LES, 2012b). Additionally, a site visit was conducted by the staff on March 12–13, 2012, to further discuss the technical and quality aspects of the exception request.

2.0 BACKGROUND

By letter dated August 3, 2011 (LES, 2011a), LES submitted document LES–11–00100–NRC, "Request for Exception to License Condition 10.f of Materials License SNM–2010." The document requested an exception to certain sections of the LES QAPD for the CRDB foundation. The primary function of the CRDB structure is to protect uranium hexafluoride transport (48Y and 30B) cylinders during inspection, storage, and weighing processes. The CRDB reinforced concrete foundation supports the CRDB superstructure (steel building). The CRDB superstructure has been designated as an IROFS because a building collapse due to postulated natural phenomena events (seismic, tornado, high wind, roof snow load, roof ponding, and site flooding) could cause a chemical release that exceeds the performance requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) 70.61.

License Amendment Request (LAR) 08-07 (NEF–08–00095–NRC) proposed changing the Separation Building Module (SBM) 1001 structure to QL-2 because the structure was not essential to IROFS, yet could affect IROFS. A similar LAR was planned to propose applying QL–2 requirements to the CRDB superstructure. Based on the U.S. Nuclear Regulatory Commission (NRC) requests for additional information (RAI) on the SBM–1001 LAR, a revised LAR–08–07 (NEF–08–00269–NRC) was submitted and approved by the NRC, which created the QL–1G program and new IROFS27e for the SBM–1001 structure. The planned QL–2 LAR for the CRDB was never submitted. Instead, LAR 09-07 (NEF–09–00059–NRC) was submitted and approved by the NRC, which proposed changing the applicable IROFS for the CRDB superstructure from IROFS27c to IROFS27e requiring a QL–1G quality level.

Construction of the CRDB foundation proceeded during submittal of the above-mentioned LARs, with LES procuring QL–3 (commercial) materials and performing independent field inspections of the contractor-performed CRDB construction activities to verify that the critical attributes of design were installed as designed and specified. Given that the CRDB foundation construction activities were performed outside of the requirements of the QL–1G program, LES submitted this exception request to seek a one-time exception from eight requirements of the QL–1G QAPD because they were not met by LES during construction.

After a review of the exception request, the NRC staff determined that it did not have sufficient information in order to begin a technical review of the request. By letter dated September 29, 2011 (NRC 2011a), the NRC requested further information, which was provided by LES in document LES–11–00141–NRC, "Revised Request for Exception to License Condition 10.f of Materials License SNM–2010," dated October 14, 2011 (LES, 2011b). The NRC staff review of the revised exception request determined that there was still information missing from the submittal that would prohibit the initiation of a detailed technical review. The NRC, by letter dated November 9, 2011 (NRC, 2011b), sent a second request for supplemental information to LES. By letter dated November 22, 2011 (LES, 2011c), LES provided the requested supplementary information and the NRC accepted the exception request for formal review. The results of the staff's review of the exception request are described below according to the individual QAPD sections from which an exception was requested.

3.0 REGULATORY REQUIREMENTS

Under 10 CFR 70.62, a licensee is required to establish and maintain a safety program, including management measures, that demonstrates compliance with the performance requirements of 10 CFR 70.61. The licensee's management measures are required to ensure

that engineered and administrative controls and control systems that are identified as IROFS are designed, implemented, and maintained, as necessary, to ensure that they are available and reliable to perform their function when needed to comply with the performance requirements of 10 CFR 70.61.

In its application, LES committed to comply with the requirements of Appendix B to 10 CFR Part 50, and, as such, is required to establish a Quality Assurance (QA) program to be applied to the design, fabrication, construction, and testing of structures, systems, and components of a facility. 10 CFR Part 70, Section 70.72(c), identifies changes that may be made to license basis documents without prior NRC review and approval. Changes that do not meet the criteria established in Section 70.72(c) require a license amendment request in accordance with Section 70.34.

4.0 GUIDANCE

NRC staff conducted its safety review in accordance with NUREG–1520, "Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility" (NRC, 2010).

5.0 STAFF REVIEW AND EVALUATION

5.1 Material Traceability Requirements

In this section, the staff reviewed and evaluated the licensee's one-time exception from the QL–1G requirements of four sections of the QAPD for CRDB foundation related to material traceability requirements. These QAPD sections are:

- QAPD Section 21.7 "Control of Purchased Materials, Equipment, and Services"
- QAPD Section 21.8 "Identification and Control of Materials, Parts, and Components"
- QAPD Section 21.13 "Handling, Storage, and Shipping"
- QAPD Section 21.17 "Quality Assurance Records"

5.1.1 QAPD Section 21.7, "Control of Purchased Material, Equipment, and Services"

Section 21.7 of the LES QAPD states, in part, that "LES Engineering shall define critical elements applicable to the components and material furnished for IROFS27e structures."

LES requested an exception to the requirements of Section 21.7 of the QAPD because LES (i) did not identify the critical elements for the procurement process and (ii) as such, these insights were not available to support initial specifications for purchase of the materials.

LES has subsequently identified those critical elements of the CRDB foundation that are necessary to support its IROFS27e safety function. LES has conducted a failure modes and effects analysis for anchorage systems and reinforcing steel and concrete and documented, in Section 3.2 of CALC–C–00183 (UUSA, 2011), in detail the process used with the objective to ensure that all critical characteristics have been identified.

5.1.1.1 Anchor Bolt Assembly

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[redacted]

[redacted]

[redacted]

[redacted]

The staff review of Sections 3.2 and 4.2, Attachment 1, and Attachment 1A of CALC–C–00183 (UUSA, 2011); and Enclosure 2 of LES response to RAIs (LES, 2012a) confirmed that the licensee demonstrated that they used standard methods and procedures and approved work plans {ACI (2001, 2002); EPRI (1999); and Work Plans [Attachment 1 of LES correspondence (LES, 2012a)]} to identify the critical characteristics of installed anchor bolt assemblies and for sampling and collection of test coupons used in this exception request. Thus, the staff finds that the licensee has demonstrated that they have adequately identified anchor bolt critical characteristics and adequately sampled and collected test coupons.

5.1.1.1.1 Anchor Bolt Critical Characteristic: Material Failure (Tensile or Shear) of the Anchor Component

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

The staff review of Sections 4.2.1, 4.2.2, 4.2.4, Attachment 1, and Attachment 1B of CALC–C–00183 (UUSA, 2011), and responses to associated RAIs (LES, 2012b) confirmed that the licensee demonstrated that the properties of the installed anchor bolts have been adequately determined by using standard methods and procedures. The staff found that the installed anchor bolts meet or exceed the minimum design strength requirements. Thus, the staff finds that the licensee has demonstrated that they have adequately assessed the anchor bolt critical characteristic 1 necessary for adequate performance of the CRDB foundation.

5.1.1.1.2 Anchor Bolt Critical Characteristic: Anchor Bolt Component Omitted, Misplaced, or Not Accounting to Design Spacing/Configuration

[redacted]

[redacted]

The staff review of Attachment 1, Attachment 1A, Attachment 4 pages 76 through 306, and Attachment 4 pages 357 through 407 of CALC–C–00183 (UUSA, 2011); interview of the inspectors during an NRC staff site visit; and conduct of site inspection of the installed columns confirmed that the anchor bolts have been installed properly in the foundations. Thus, the staff finds that the licensee has demonstrated that they have adequately assessed the anchor bolt characteristic 2 necessary for adequate performance of the CRDB foundation.

5.1.1.1.3 Anchor Bolt Critical Characteristic: Failure of Anchor Bolt or Nut Threads Due to Insufficient Thread Engagement

[redacted]

The staff review of Attachment 1, Attachments 1B and 1C, and Section 4.2.4 of CALC–C–00183 (UUSA, 2011) and the conduct of an NRC staff site inspection of the installed columns confirmed that the threads of these nuts fully comply with the critical design requirements for these nuts.

Thus, the staff finds that the licensee has demonstrated that they have adequately assessed the anchor bolt critical characteristic 3 necessary for adequate performance of the CRDB foundation.

5.1.1.1.4 Anchor Bolt Critical Characteristic: Tension or Shear Failure Due to Insufficient Cross-Sectional Area of Anchor Bolts

[redacted]

The staff review of Section 4.2.3 of CALC–C–00183 (UUSA, 2011) demonstrated the adequacy of the dimensional characteristics for all anchor bolts. Thus, the staff finds that the licensee has demonstrated that they have adequately assessed the anchor bolt critical characteristic 4 necessary for adequate performance of the CRDB foundation.

5.1.1.2 Reinforcing Steel

[redacted]

[redacted]

The staff review of Section 3.2 and Attachment 2 of CALC–C–00183 (UUSA, 2011) confirmed that the licensee demonstrated that they used standard method and procedure [ACI (2001, 2002)] to identify the critical characteristics of installed CRDB foundation reinforcing bars. Thus, the staff finds that the licensee has demonstrated that they have adequately identified reinforcing steel critical characteristics.

5.1.1.2.1 Reinforcing Steel Critical Characteristic: Tensile Failure of Reinforcing Bar

[redacted]

The staff review of Attachments 1, 2, 2B, and 2C of CALC–C–00183 (UUSA, 2011) confirmed that the licensee demonstrated that they used standard methods and procedures [EPRI (1999), ASTM A370-09] for sampling and testing reinforcing steel test coupons. The staff found that the installed reinforcing steel meets or exceeds the minimum design strength requirements. Thus, the staff finds that the licensee has demonstrated that they have adequately assessed the reinforcing steel characteristic 1 necessary for adequate performance of the CRDB foundation.

5.1.1.2.2 Reinforcing Steel Critical Characteristic: Rebar Omitted, Misplaced, or Not Installed According to Design Spacing/Configuration

[redacted]

The staff review of Attachment 2, pages 357 through 407 of Attachment 4, Attachment 2A, and Attachment 2C of CALC–C–00183 (UUSA, 2011) and interview of the inspectors during the NRC staff site visit confirmed that the CDRB foundation reinforcing bars have been installed properly. Thus, the staff finds that the licensee has demonstrated that they have adequately assessed the CRDB foundation reinforcing steel critical characteristic 2 necessary for adequate performance of the CRDB foundation.

5.1.1.3 Concrete

The staff review of Section 3.2 and Attachment 3 of CALC–C–00183 (UUSA, 2011) demonstrated that LES used standard methods and procedures [ACI (2001, 2002)] to identify the critical characteristics of installed CRDB foundation concrete. Thus, the staff finds that the licensee has demonstrated that they have adequately identified CRDB foundation concrete critical characteristics.

5.1.1.3.1 Concrete Critical Characteristic: Failure of the Concrete Under Design Basis Loads

[redacted]

The staff review of Attachments 3, 3B, and 3D of CALC–C–00183 (UUSA, 2011), Item No. 7 of LES response to RAIs (LES, 2012b), and Archon Engineering (ARC, 2009) demonstrated that the compressive strengths of the casted concrete of all placements has been determined using standard methods and procedures (ASTM, 2010 & ACI, 2002) and they meet or exceed the design strength requirements. Thus, the staff finds that the licensee has demonstrated that they have adequately assessed the CRDB foundation concrete critical characteristic 1 necessary for adequate performance of the CRDB foundation.

5.1.1.3.2 Concrete Critical Characteristic: Concrete Not Placed in Accordance With Design Specifications/Requirements

[redacted]

[redacted]

The staff review of Attachment 3, Attachments 3A and 3C, and Attachment 4 of CALC–C–00183 (UUSA, 2011) and interview of inspectors during the NRC site visit confirmed that the concrete was placed according to design specifications and requirements. Thus, the staff finds that the licensee has demonstrated that they have adequately assessed the CRDB foundation concrete critical characteristic 2 necessary for adequate performance of the CRDB foundation.

5.1.2 QAPD Section 21.8, "Identification and Control of Materials, Parts, and Components"

Section 21.8 of the LES QAPD states, in part, that "The controls necessary to ensure that only correct and accepted items are used or installed will be required and specified in the Project Quality Assurance Plan (PQAP), including requirements for identification of materials, parts and components." LES QAPD Section 21.8 also states, in part, that "The requirements for IROFS27e structures will include provisions for segregated and controlled lay down areas for the IROFS27e structural elements and bolting utilized to connect the structural elements. Storage requirements shall be in accordance with supplies requirements for QL–1 components."

[redacted]

[redacted]

The staff reviews documented in Sections 5.1.1.1.2, 5.1.1.2.2, and 5.1.1.3.1 of this SER and interview of the inspectors during an NRC site visit provide reasonable assurance that the installed anchor bolts, nuts, reinforcing bars, and concrete were procured specifically to meet the design requirements of the CRDB foundation. Thus, the staff finds that the licensee has demonstrated that they have adequately addressed the identification and control requirements for these items necessary for adequate performance of the CRDB foundation.

5.1.3 QAPD Section 21.13, "Handling, Storage, and Shipping"

Section 21.13 of the LES QAPD states, in part, that "Handling, storage, cleaning, packaging, shipping and preservation of items are controlled in accordance with requirements of engineering or work control documents, as applicable, to prevent damage or loss and to minimize deterioration."

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The staff reviews documented in Sections 5.1.1.1.2, 5.1.1.2.2, 5.1.1.3.1, and 5.1.2 of this SER and interview of the inspectors during an NRC staff site visit provide reasonable assurance that the installed anchor bolts, nuts, reinforcing bars, and concrete were not damaged or deteriorated during handling, storage, and shipping. Thus, the staff finds that the licensee has demonstrated that they have adequately addressed the handling, storage, and shipping requirements of these items necessary for adequate performance of the CRDB foundation.

5.1.4 QAPD Section 21.17, "Quality Assurance Records"

Section 21.17 of the LES QAPD refers to QAPD Section 17, which states, in part, that "Applicable LES design specifications, procurement documents, test procedures, operational procedures or other documents and procedures shall specify the records to be generated, supplied or maintained."

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The staff review of Attachments 6 and 6A of LES (2011c) and reviews documented in Sections 5.1.1, 5.1.2, and 5.1.3 provide reasonable assurance that the QA records have eventually been controlled to QL–1G requirements. Thus, the staff finds that the licensee has demonstrated that they have addressed the QA records requirements necessary for adequate performance of the CRDB foundation.

5.2 QC Inspection Requirements

In this section, the staff reviewed and evaluated the licensee's one-time exception from the QL–1G requirements of four sections of the QAPD for CRDB foundation related to QC inspection requirements. These QAPD sections are

- QAPD Section 21.4 "Procurement Document Control"
- QAPD Section 21.5 "Instructions, Procedures, and Drawings"
- QAPD Section 21.10 "Inspection"
- QAPD Section 21.18 "Audits"

5.2.1 QAPD Section 21.4, "Procurement Document Control"

Section 21.4 of the LES QAPD states that "LES procurements documents issued for QL–1G items or services shall include[…]. Provisions for establishing witness/inspection hold points beyond which work cannot proceed by the supplier without LES QA Manager authorization. The Procurement Director may also establish hold points including work that cannot proceed without authorization by the Procurement Director."

[redacted]

[redacted]

[redacted]

[redacted]

The NRC staff found that although procurement documents associated with the CRDB foundation were not treated as QL–1G, the review and approval of CRDB procurement requisitions and contract LES–SC–1051 required QA review during initial development as well as in the event of any changes. Requisitions containing technical and quality requirements as input to the contract were required to receive an independent review from a procurement engineer. Measures were also implemented for suppliers to report non-conformances to LES. These measures, while lacking the requirement for LES approval of partial or full work released prior to disposition of nonconformances tied to work stoppages, were supplemented by the contractor's use of internal nonconformance procedures. Records of nonconformance reports provided as part of the exception request submittal demonstrated an attention to detail during inspections and oversight activities that enabled identification of nonconforming conditions. Thus, the staff finds that the exception to the requirements of Section 21.4, "Procurement Document Control," of the LES QAPD is acceptable.

5.2.2 QAPD Section 21.5, "Instructions, Procedures, and Drawings"

Section 21.5 of the LES QAPD states, in part, that "Instructions and procedures, developed in support of QL–1G implementation for IROFS27e shall be of a type appropriate to the circumstances. These documents shall include or reference appropriate quantitative or qualitative acceptance criteria for determining that prescribed activities have been satisfactorily accomplished."

[redacted]

[redacted]

[redacted]

The staff reviews documented in Section 5.1.1 of this SER, Section 3.2 of CALC–C–00183 (UUSA, 2011), and interview of the inspectors during an NRC staff site visit confirmed that the critical characteristics of CRDB foundation components have eventually been identified and subsequently sufficient documentation of inspections, tests, and verifications of CRDB critical characteristics have been provided. Thus, the staff finds that the licensee has demonstrated that they have addressed the instructions, procedures, and drawings development requirements necessary for adequate performance of the CRDB foundation.

5.2.3 QAPD Section 21.10, "Inspection"

Section 21.10 of the LES QAPD requires that "Critical elements of the IROFS27e structures that warrant inspection during construction and installation activities shall be documented in the implementing work plans as QC hold points requiring verification by trained and qualified QC personnel (or approved designee). The inspections performed to verify critical elements for QL–1G IROFS27e structures are treated as QA Level 1 inspection hold points."

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[redacted]

[redacted]

[redacted]

[redacted]
Thus, the staff finds that the exception to the requirements of Section 21.10, "Inspection," of the LES QAPD is acceptable.

5.2.4 QAPD Section 21.18, "Audits"

Section 21.18 of the LES QAPD states that "LES shall be responsible for the auditing requirements of Contractor(s) performing work on IROFS27e structure(s)."

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6.0 CONCLUSIONS

Based on its review and evaluation of the information provided by the licensee in its Exception Request to License Condition 10.f of Materials License SNM-2010, dated August 3, 2011, and the supplements, the staff finds that the licensee has provided adequate technical justification that the CRDB foundation will perform its intended IROFS functions although the process did not fully meet the requirements of QL-1G proposed and approved during the staff's design review process. Based on the staff's technical review, a one-time exception from the QL–1G requirements of eight sections of the QAPD for the CRDB foundation should be approved; these sections include QAPD Sections 21.4, 21.5, 21.7, 21.8, 21.10, 21.13, 21.17, and 21.18. As such, License Condition 10.f should be modified by the addition of the following text:

> Exception to license condition 10.f is granted for the Cylinder Receipt and Dispatch Building superstructure foundation/footers, as amended by correspondence dated October 14, 2011.

7.0 REFERENCES

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