

LES-17-00002-NRC

JAN 09 2017

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

Louisiana Energy Services, LLC
NRC Docket No. 70-3103

Subject: License Amendment Request 17-01, Revision to Safety Analysis Report Chapter 5

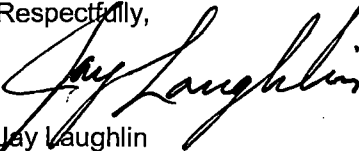
References: 1) LES-12-00074 LAR 12-04 Revision to License Condition 30 of LES Materials License SNM-2010 (Dated May 24, 2012)
2) IN-12-00072-NRC License Amendment Request 12-04 Revision to License Condition 30 of Louisiana Energy Services Materials License SNM-2010 (TAC L34150) Dated June 8, 2012
3) LES-14-00119-NRC dated October 23, 2014
4) LES-13-00087-NRC dated July 10, 2013

In accordance with 10 CFR 70.34 Louisiana Energy Services, LLC (dba UUSA) herewith requests an amendment to revise section 5.1.2 and table 5.1-2 of the UUSA Safety Analysis Report (SAR). Reference 1 revised License Condition 30 to allow UUSA to institute a change process for the SAR. Reference 2 approves the revision to License Condition 30 in Reference 1. Following NRC Inspection documented in Inspection Report 2016-005, UUSA submits this License Amendment Request in accordance with License Condition 30 and in order to restore compliance for the sections revised in the SAR per phone discussion with NRC dated 12/22/16.

Enclosure 1 provides a detailed description and analysis for the proposed change, the basis for the change, and safety significance of the proposed change.

UUSA requests this amendment to be approved by the end of January 2017 to support plant operations in the Liquid Effluent Collection Tank System. UUSA appreciates the efforts of the NRC staff in supporting the review and approval of this important amendment in a timely manner. Should there be any questions concerning this submittal, please contact Salem Thyne, UUSA Licensing and Performance Assessment Manager, at (575) 394-5252.

Respectfully,



Jay Laughlin
Chief Nuclear Officer and Head of Operations

Enclosures: 1) LAR 17-01, License Amendment for Revision to SAR Chapter 5
2) SAR Markup from CC-RW-2012-0001 for Rev 34
3) SAR Markup from CC-RW-2013-0003 for Rev 41b

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ENCLOSURE 1

LAR 17-01, License Amendment for Revision to SAR Chapter 5

Background

During the NCS and Operational Safety Inspection conducted on the week of October 24th, the NRC exited with an Un-Resolved Item (URI) on the change process used for the Configuration Change which modified IROFS55a/b from mass control to enrichment control. Changes made to the SAR section 5.1.2 and table 5.1-2 were determined by the NRC to decrease the level of effectiveness. As such, the change was not compliant with License Condition 30 which requires prior approval from the NRC for any changes to "specific sections of the SAR Chapters 3 and 5 that would result in modifying the current values for criticality-based analysis in a less conservative direction... Specific Chapter 5 sections include 5.0, 5.1.1 through 5.1.5, 5.2.1.2 through 5.1.2.1.7, and Tables 5.1-1 and 5.1-2."

Proposed Change

The proposed change revises SAR Section 5.1.2 and Table 5.1-2 to allow for enrichment control of IROFS55a/b. The proposed IROFS55a/b administratively limits the uranium enrichment level to ≤ 1 wt. % U-235 in a non-safe-by-design tank to ensure sub-criticality using bookkeeping procedures and by performing independent sampling and measurements. The change restricts the non-safe-by-design tanks to only non-fissile material. UUSA requests to move forward with the changes as reflected in SAR Revisions 34 under CC-RW-2012-0001 and 41b under CC-RW-2013-0003. These Configuration Change packages were reviewed by the NRC as part of References 3 and 4.

Configuration Change package CC-RW-2012-0001 revision 1 is a comprehensive configuration change that modifies the initially designed Liquid Effluent Collection and Treatment System. The as built design no longer treats the effluent; instead it transfers it to totes for off-site disposal, the new disposal system will be called the Liquid Effluent Collection and Transfer System (LECTS). The proposed change is to SAR table 5.1-2, Safety Criteria for Buildings/Systems/Components; additional line items for tank control are being added to the table. These items include safe-by-design parameters for tank volume, diameter and slab thickness; these parameters for the original equipment have been previously included in the ISA Summary. The new design requires different equipment and ISA Summary table 3.7-14 Liquid Effluent Collection and Treatment System "Criticality Assessment of Passive Safe-By-Design Components" is being updated to reflect the change. The process for determining safe-by-design values has not been altered or changed. The Slab Tanks used in the new Liquid Effluent Collection and Transfer System (LECTS) use safe-by-design slab thickness as a control mechanism. Safe-by-design parameters are used to control criticality in many process components. Accident identifier LOSS OF SAFE-BY-DESIGN ATTRIBUTE in the ISA Summary is the accident sequence that addresses the use of such parameters.

Additionally an enrichment control parameter was added to table 5.1-2 to control tanks to less than or equal to 1%wt U-235. The enrichment control parameter will restrict tanks to only non-fissile material.

Configuration Change package CC-RW-2013-0003 revision 0 is a change that modifies the method for controlling IROFS55a/b. This change introduces enrichment control. The proposed change is to SAR section 5.1.2 to remove specific reference to mass control for tanks in the CRDB and instead allows for any of the control mechanisms in table 5.1-2, Safety Criteria for Buildings/Systems/Components, to be used. Additionally Table 5.1-2, Safety Criteria for Buildings/Systems/Components has an editorial correction to the enrichment parameter control mechanism safety criteria; the less than sign (<) is being changed to an equal to or less than sign (\leq); this error was made during the LBD change process, the original approved change was equal to or less than (\leq) sign.

The proposed change reflects how tanks are controlled in the CRDB specifically the Liquid Effluent Collection and Transfer System (LECTS). Slab tanks located in the CRDB are not controlled with a mass limit; the control mechanism is a safe-by-design attribute.

Currently the Bulk Storage Tanks (BSTs) located in the CRDB are mass controlled for criticality. The proposed change includes a revision to the IROFS, from a mass control to an enrichment control. The mass control was based on a Nuclear Criticality Analysis (NCS-CSA-0020) that assigned a critical mass to varying enrichments; from 0.711wt% ^{235}U to 6wt% ^{235}U . The mass safety criteria was determined by using a double batching limit (45% of the calculated critical mass) and then converting that into grams of ^{235}U . The enrichment control mechanism uses the same Nuclear Criticality Analysis. The analysis determined that for non-fissile material, a critical mass could not be calculated; therefore a criticality is not credible when the tank is being controlled to 1wt% ^{235}U .

Basis for Change

This change greatly simplifies the bookkeeping process for non-safe-by-design tanks as sampling is only required prior to transferring from a safe-by-design tank to a non-safe-by-design tank rather than for all tank transfers. This will allow UUSA to more effectively and safely implement criticality controls on liquid tank transfers.

Safety Significance

There is no safety significance associated with this change. The proposed change puts the system in a more conservative state with regards to criticality safety. The system is now non-fissile operation at 1wt% or less enrichment. Furthermore this is supported by statements made in NUREG-1520, "there is no credible event leading to a criticality for an enrichment of 1wt% or less enrichment."

Environmental Considerations

There are no significant environmental impacts associated with the change proposed in this License Amendment Request. The proposed change does not meet the criteria specified in 10CFR51.60 (b)(2) since it does not involve a significant expansion of the site, a significant change in the types of effluents, a significant increase in the amounts of effluents, a significant increase in individual or cumulative occupational radiation exposure, or a significant increase in the potential for or consequences from radiological accidents. Consequently, a separate supplement to the Environmental Report is not being submitted.

Technical Analysis

During the exit meeting for the subject URI, the NRC dispositioned the failure to submit a LAR for this change as a SL IV under NRC Enforcement Policy section 6.2.d. License Condition 30 evaluations are equivalent to 10 CFR 70.72.

Conclusion

UUSA is requesting NRC review and approval of the SAR changes made to section 5.1.2 and Table 5.1-2 in accordance with License Condition 30. This approval would bring the use of IROFS55a/b under enrichment control into compliance and restore operations in that section of the facility.

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ENCLOSURE 2

SAR Markup from CC-RW-2012-0001 for Rev 34

5.6 Chapter 5 Table

Table 5.1-2 Safety Criteria for Buildings/Systems/Components

Building/System/Component	Control Mechanism	Safety Criteria
Enrichment	Enrichment	5.0 w/o (6 w/o ²³⁵ U used in NCS)
SBM-1001 Centrifuges	Diameter	< 22.4 cm (8.8 in)
SBM-1003 Centrifuges	Diameter	Note 1
Product Cylinders (30B)	Moderation	H < 0.98 kg (2.16 lb)
UF ₆ Piping	Diameter	< 22.4 cm (8.8 in)
Chemical Traps	Diameter	< 22.4 cm (8.8 in)
Product Cold Trap	Diameter	< 22.4 cm (8.8 in)
Contingency Dump System Tails System	Enrichment	1.5 w/o ²³⁵ U (used in NCS)
Tanks (controlled by any one mechanism listed on the right)	Diameter	< 22.4 cm (8.8 in)
	Enrichment	≤ 1.0 w/o ²³⁵ U
	Mass	< 0.73 kg ²³⁵ U < 12.2 kg U (26.9 lb U)
	Slab Thickness	< 10.1 cm (4.0 in)
	Volume	< 19.3 L (5.1 gal)
Feed Cylinders	Enrichment	< 0.72 w/o ²³⁵ U
Uranium Byproduct Cylinders	Enrichment	< 0.72 w/o ²³⁵ U
UF ₆ Pumps	Volume	< 19.3 L (5.1 gal)
Individual Uranic Liquid Containers, e.g., PFPE Oil Bottle, Laboratory Flask, Mop Bucket	Volume	< 19.3 L (5.1 gal)
Vacuum Cleaners Oil Containers	Volume	< 19.3 L (5.1 gal)

Note 1 – Sensitive information – see ETC4156706 Issue 1, "Criticality Safety Assessment of TC21 centrifuge cascade arrangement at 6% Enrichment – fully filled bores", for the outside diameter assumed in the criticality calculation.

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ENCLOSURE 3

SAR Markup from CC-RW-2013-0003 for Rev 41b

5.14.0 The Nuclear Criticality Safety (NCS) Program

assumed that UF_6 comes in contact with water to produce aqueous solutions of UO_2F_2 as described in Section 5.2.1.3.3, Uranium Accumulation and Moderation Assumption. A uniform aqueous solution of UO_2F_2 , and a fixed enrichment are conservatively modeled using MONK 8A and the JEF2.2 library. Criticality analyses were performed to determine the maximum value of a parameter to yield $k_{eff} = 1$. The criticality analyses were then repeated to determine the maximum value of the parameter to yield a $k_{eff} = 0.95$. Table 5.1-1, Safe Values for Uniform Aqueous Solution of Enriched UO_2F_2 , shows both the critical and safe limits for 5.0 % and 6.0 %.

Table 5.1-2, Safety Criteria for Buildings/ Systems/Components, lists the safety criteria of Table 5.1-1, Safe Values for Uniform Aqueous Solutions of Enriched UO_2F_2 , which are used as control parameters to prevent a nuclear criticality event. Although the NEF will be limited to 5.0 % enrichment, as additional conservatism, the values in Table 5.1-2, Safety Criteria for Buildings/Systems/ Components, represent the limits based on 6.0 % enrichment except for the Contingency Dump System equipment and piping on the 2nd floor of the Process Services Area and the Tails Take-off System which are limited to 1.5 % ^{235}U .

The values on Table 5.1-1 are chosen to be critically safe when optimum light water moderation exists and reflection is considered within isolated systems. The conservative modeling techniques provide for more conservative values than provided in ANSI/ANS-8.1. The product cylinders are only safe under conditions of limited moderation and enrichment. In such cases, both design and operating procedures are used to assure that these limits are not exceeded.

All Separation Plant components, which handle enriched UF_6 , other than the Type 30B cylinders and contingency dump chemical traps, are safe by geometry. Centrifuge array criticality is precluded by a probability argument with multiple operational procedure barriers. Total moderator or H/U ratio control as appropriate precludes product cylinder criticality.

In the Cylinder Receipt and Dispatch Building criticality safety for uranium loaded liquids is controlled via one of the mechanisms specified in Table 5.1-2. Individual liquid storage bottles are safe by volume. Interaction in storage arrays is accounted for.

Based on the criticality analyses, the control parameters applied to NEF are as follows:

Enrichment

Enrichment is controlled to limit the percent ^{235}U within any process vessel or container to a maximum of the LES license limit except for the systems and components associated with a cascade dump and in certain LECTS tanks noted below. For added conservatism the systems controlled to the LES license limit in isotope ^{235}U are analyzed at 6%. The enrichment level is further restricted in the Bulk Storage Tanks, Release Tanks, and Totes to 1% ^{235}U .

Assuming a product enrichment of 6% limits the upper bound for the average cascade enrichment to less than 1.5%, the systems and components associated with a cascade dump (Tails Take-off System, Contingency Sump System) are conservatively analyzed at 1.5%