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ATTN: Document Control Desk
Director, Division of Security Operations
Office of Nuclear Security and Incident Response
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Louisiana Energy Services, LLC
NRC Docket Number: 70-3103

Subject: Response to NRC Request for Additional Information on License Amendment Request (LAR) 12-10 Capacity Expansion of UUSA Facility (TAC L34193)

Reference:
1. IN-13-00053-NRC, NRC Correspondence, dated April 25, First Request for Additional Information for License Amendment Request 12-10 Related to the Safety Analysis Report for Capacity Expansion of URENCO USA Facility (TAC L34193)

2. LES-12-00162-NRC, License Amendment Request for Capacity Expansion of URENCO USA Facility (LAR-12-10), dated November 9, 2012

Pursuant to the Ref. 1 Request for Additional Information (RAI) regarding the Ref. 2 License Amendment Request (LAR), Louisiana Energy Services, LLC (dba URENCO USA "UUSA") herewith provides the Enclosure 1 response.

UUSA appreciates the efforts of the NRC staff in supporting the review and approval of this License Amendment Request in a timely manner. Should there be any questions, please contact Timothy Knowles, UUSA Licensing and Performance Assessment Manager, at 575.394.6212.

Respectfully,

Jay Laughlin
Chief Nuclear Officer and Head of Technical Services

Enclosures: 1) Response to Request for Additional Information

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Enclosure 1

Response to Request for Additional Information

NRC Request (A)

1. Describe the significant differences between the design of SBM-1005 (Phase III) and that of currently approved design of SBM-1003 (Phase II). Include a representative sample of analysis and design calculations, as well as design and construction drawing for SBM-1005 (Phase III) that provide a representation of those differences.

UUSA Response to (A) 1

The significant differences between the approved SBM-1003 design and that of the SBM-1005 design include:

a) SBM-1003 has a conventional cascade design. The design of Assay Unit 1005 in SBM-1005 is a re-feed design which provides an option to use natural or depleted materials as feed. In Mode A, natural material is used as feed and in Mode B, depleted material is used as feed. A new accident sequence introduced in this new design is over-enrichment caused by using natural feed when the cascade is set for depleted material in Mode B.

b) New IROFS are required for the Assay Unit 1005 design in SBM-1005. These new IROFS are under development in accordance with the UUSA configuration change process. These new proposed IROFS require NRC approval in either an update to LAR 12-10 or a new LAR submittal. [*future LAR update/submittal*]

c) SBM-1003 structure is designed and built to IROFS27e (structural integrity) with a steel frame and concrete tilt-up panel design. The cascade halls are designed and built to IROFS27e. SBM-1005 is designed as a concrete shear structure with internal steel columns. Both the SBM-1003 and SBM-1005 Material Handling Areas are IROFS27e structures. The cascade halls in SBM-1005 are not designed or built to IROFS27e. [1] [2] [3] [4]

d) The SBM-1003 cascade halls have tilt up concrete panels designed for IROFS27e. SBM-1005 cascade halls have a metal panel exterior. [1] [3] [4]

e) SBM-1003 Process Service Corridor and Link Corridor are three stories, and the SBM-1005 Process Service Corridor and Link Corridor are two stories. The overall building length of SBM-1005 is approximately 8-foot shorter than SBM-1003. [1]

f) SBM-1003 Material Handling Area will contain 3 autoclaves located to the south of the transporter rails. SBM-1005 Material Handling Area will have 5 autoclaves, 2 located to the south and 3 located to the north of the transporter rails. [5]

The purpose of LAR 12-10 is to request enhancement to URENCO USA (UUSA) License Basis Documents (LBDs) to describe the facility out to a proposed SBM-1009 and 10 MSWU. It is understood as the design basis is finalized with each of these facility expansions the LBDs will need to be revised to provide greater detail. Any proposed changes will be processed in accordance with the UUSA configuration control program. NRC review and approval is required prior to any facility being placed into operation.

References – Question (A) 1

[1] EG-DCR-2012-006, Baker Hybrid Design SBM-1005 [CIC]

[2] 444758-1005-C-CAL-001, SBM-1005 UF6 Area Analysis and Steel Frame Design (calculation)
[3] 444758-1005-C-CAL-012, SBM-1005 Concrete Tilt-up Panel Design (calculation)
[4] 444758-1005-C-CAL-013, SBM-1005 Design of Concrete Poured-in-Place Columns (calculation)
[5] 444758-1005-M-GA-001-01, General Arrangement SBM-1005 UF6 Handling Area and Link Corridor First Floor Plan, shows the arrangement of the autoclaves (note: current Rev. 2 shows all 5 autoclaves on the south side of the transporter rails, future Rev. 3 will show 2 autoclaves to the south and 3 autoclaves to the north of the transporter rails).

2. To ensure that our review is comprehensive, describe the differences (if any) that are anticipated for SBM-1007 (Phase IV) and SBM-1009 (Phase V).

UUSA Response to (A) 2

The design of SBM-1007 and SBM-1009 is intended to be the same as SBM-1005, except without re-feed capability. Both SBM-1007 and SBM-1009 should be located to the west of SBM-1001. However, SBM-1007 and SBM-1009 are future projects that have not been approved for funding. If differences in the design basis do evolve, the license basis will be changed in accordance with the URENCO USA configuration change process, including 10 CFR 70.72, and the safety basis impact evaluated as a result.

NRC Request (B)

1. For calculating radiation doses at the site boundary due to the uranium byproduct cylinder storage pad expansion, provide information to support that the minimum distances from the storage pad to the site boundary required to meet the annual dose limit of 25 millirems (mrems) in 40 CFR Part 190 include considerations for the organ dose. Demonstrate that calculated doses to any member of the public from external and internal exposures do not exceed the limits in 40 CFR Part 190.

UUSA Response to (B) 1

The external and internal exposures to any member of the public have been considered in the Environmental Report, Rev. 21. The MCNP calculated external dose is the effective dose equivalent for external radiation to the whole body, not to any specific tissue or organ. The effective dose equivalent, however, is equal to the dose equivalent per the following:

Dose Equivalent, per 10 CFR 20.1003, is the product of the absorbed dose in tissue, quality factor, and all other necessary modifying factors at the location of interest. The units of dose equivalent are the rem and sievert (Sv).

$H_T = \sum W_R D_{T,R}$ (conservative for no other modifying factors)
H_T = dose equivalent to tissue T (rem)
W_R = energy-dependent weighting/quality factor for radiation type R
$D_{T,R}$ = absorbed dose in tissue T from radiation type R (rad)

Effective Dose Equivalent, per 10 CFR 20.1003, is the sum of the products of the dose equivalent to the organ or tissue (H_T) and the weighting factors (W_T) applicable to each of the body organs or tissues that are irradiated.

$H_E = \sum W_T H_T$
H_E = effective dose equivalent (rem)
W_T = weighting factor to account for radiosenitivity of tissue T
H_T = dose equivalent to tissue T (rem)

Furthermore, for external whole-body dose, $W_T = 1$ (10 CFR 20.1003). Therefore, effective dose equivalent is equal to the dose equivalent.

Tables 4.12-5 through 4.12-7 of the Environmental Report, Rev. 21 (10MSWU 7-23-12) present the internal dose impacts to various organs. These values are based on the initial site evaluation but are expected to be bounding for the 10 MSWU operation due to the conservatisms included in the initial evaluation. Furthermore, the internal doses are small and well below the regulatory limits.

In summary, the calculated dose equivalents are all below the 1 mSv (100 mrem/yr) total effective dose equivalent (TEDE) requirement per 10 CFR 20.1301, and also within the 0.25 mSv (25 mrem/yr) dose equivalent to the whole body and any organ of any member of the public as required by 40 CFR 190.

2. For the dose equivalent contribution from Uranium Hexafluoride(UF6) storage inside each cylinder receipt and dispatch building, explain why the ratio of 157 to 377 mrems (an increase by a factor of 2.4) from "simple scaling" is less than the ratio of 3.7 to 10 MSWU (an increase by a factor of 2.7).

UUSA Response to (B) 2

The dose equivalent contribution from UF6 storage in the CRDB originally reported as 157 mrem, calculated in reference [1], represents 3 MSWU. While this dose equivalent value was scaled to represent 10 MSWU, it was also initially reduced due to unnecessary conservatisms included in the original calculation [1]. Therefore, the ratio observed from scaling the dose equivalent contribution from representing 3 MSWU to 10 MSWU is not a linear relationship.

The unnecessary conservatisms referred to above is due to normalization factors utilized in the MCNP calculation [1] that accounted for the following error types [2]: (1) Monte Carlo sampling (or relative) error; (2a) MCNP method for photon skyshine at large distances; (2b) Neutron dose rate conversion factors, and (3) Uncharacterized source variables or parameters. An evaluation was performed that concluded that inclusion of some of these error types is unwarranted and produces excessive conservatism [3]. Based on this evaluation, it was determined that the only error/uncertainty that needs to be considered is in the MCNP sampling, or relative error (for statistical satisfaction). This resulted in a considerably smaller multiplier/normalization factor, which ultimately lead to significantly lower dose equivalent contribution than those observed in reference [1].

References – Question 2

[1] AREVA 2003, Dose Equivalent Contribution from UF6 Storage Inside the Cylinder Receipt and Dispatch Building (CRDB), Document Identifier 32-2400561-01, Framatome ANP, July 2004.

[2] AREVA 2003, *Normalization of UF6 MCNP Dose Equivalent Calculation*, Document Identifier 32-2400527-00, Framatome ANP, November 2003.
[3] UUSA 2012, *Radiation Dose Rate Calculation of the Site Boundary due to UBC Storage Pad Expansion*, CALC-S-00141, Rev.1, URENCO USA, August 2012.

NRC Request (C)

1. Table 4.1-2 lists a dose rate of < 0.01 mrem/hr for the plant general area excluding the separations building modules. Provide estimated dose rates in occupied areas close to the expanded uranium byproduct storage pad and describe the considerations given to these dose rates in the assessment of expanded facility operations.

UUSA Response to (C) 1

UUSA is currently awaiting revised analytical data to support calculations to support this response. UUSA received verbal acknowledgement from the NRC Project Manager that the response is expected to be completed no later than July 24, 2013.

NRC Request (D)

1. Provide a drawing showing locations of the soil borings relative to the proposed facility expansion, assess stability of the materials beneath the proposed expansion, and justify that additional geotechnical investigation is not needed to support design of the proposed expansion.

UUSA Response to (D) 1

The attached Geotechnical Report [1] demonstrates that an equivalent number and quality of soil borings were taken for the SBM-1005 location commensurate with those taken for the rest of the current facility. SBM-1007 and SBM-1009 are future projects that have not been approved for funding. If approved, these locations will need further justification for the stability of materials beneath the proposed expansion. This will be accomplished by either requiring further soil borings along with a technical analysis of the results or by a technical justification why the current soil borings are sufficient to bound the stability of materials beneath these proposed facilities.

References – Question (D) 1

[1] Report No. 114489-G-01, Revision 1, Develop Report-Quality Boring Logs & Subsurface Profiles, dated June 29, 2006. Prepared by Nuclear Technology Solutions, LLC, Cherry Hills, NJ for Louisiana Energy Services, National Enrichment Facility.

NRC Request (E)

1. Provide the updated aircraft hazard risk determination report demonstrating that the low-level federal airway passing within 9 km (-6 statute miles) northeast of the facility is not a safety hazard to the entire facility including the proposed expanded portion.

UUSA Response to (E) 1

A Risk Determination was performed as part of the original licensure of the facility, 32-2400569-00/Areva, *Aircraft Hazard Risk Determination*, October 2003. This determination used very broad assumptions in defining the target area. The target area included 3 Separations Building Modules (SBM), the Technical Services Building (TSB) a Cylinder Receipt and Dispatch Building (CRDB) a Centrifuge Assembly Building (CAB) and a Uranium Byproduct Cylinder (UBC) Storage Pad capable of storing more than 23,000 cylinders. A preliminary design drawing was used for scaling and estimating the target area. The original analysis resulted in a target area of approximately 40 acres. Additional margin was added as 50 acres was used for the calculations

The critical facility area for the 10MSWU facility will consist of the UBC Pad, the SBMs and the CRDB. Due to the removal of activities involving uranic material in the Technical Services Building and the SNM-2010, Materials License Condition 27 limiting the Centrifuge Assembly Building possession limit to 50kg of UF^6, these buildings area removed from considerations. The UBC Storage Pad will be 23 acres (Reference 1). The SBM-1001 area is 8,258 m^2 + 3,014 m^2 (UF^6 Handling Area) + 5,036 m^2 (extension) or 4.0 acres (Reference 2). The CRRB-1100 area is 11,045 m^2 or 2.7 acres (Reference 2). The SBM-1003 area is 9,502 m^2 +2,306 m^2 (UF^6 Handling Area) or 2.9 acres (Reference 2). The SBM-1005 area is 7,328 m^2 +2,797m^2 (UF^6 Handling Area) or 2.5 acres (Reference 2). Assuming the design of SBM-1007 and SBM-1009 is similar to SBM-1005 and the 2nd CRDB is half the size of the original, the total target area is therefore (23 + 4.0 + 2.7 + 2.9 + 3(2.5) + 2.7/2) = 41.5 acres. The original margin utilized in the analysis still bounds the target area.

In addition, the original number of flights per year along the airway was conservatively determined to be 14,600 which resulted in a probability of 3.4×10^{-7}. The Risk Determination also determined what the annual number of flights would have to be for the probability to exceed 1.0×10^{-6} and determined the number would have to increase to 42,666 flights. This was done to encompass future increase in air traffic.

Since the target area has not increased beyond the values assumed in the original analysis and since the original analysis considered future increases in air traffic, an update to this calculation based upon current data is unnecessary.

References – Question (E) 1

1. LES-12-00162-NRC, License Amendment Request for Capacity Expansion of URENCO USA Facility LAR-12-10, November 9, 2012.
2. 32-2400504-LES, URENCO USA Building Volumes and Profiles, Revision 3.