

**ENCLOSURE 1**  
**Description of Proposed Changes (LAR-19-06)**

# **1 Introduction**

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URENCO USA (UUSA) is proposing a Materials License Amendment to Materials License SNM-2010 which would provide exemption from requirements of 10 CFR 70.24, Criticality Accident Requirements. UUSA proposes that this exemption be authorized for circumstances in which the facility Criticality Accident Alarm System (CAAS) or associated equipment is disabled, provided the equipment is returned to service within a specified period of time or compensatory measures, as described in the UUSA Integrated Safety Analysis (ISA) Summary, that achieve an equivalent safety function are in place.

## **1.1 Regulations**

10 CFR 70.17(a), Specific Exemptions, states the Commission may, upon application of any interested person or upon its own initiative, grant such exemptions from the requirements of the regulations in this part as it determines are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest.

10 CFR 70.24(a), Criticality Accident Requirements, states that each licensee authorized to possess special nuclear material (SNM) in a quantity exceeding 700 grams of contained uranium-235, 520 grams of uranium-233, or 450 grams of plutonium, shall maintain in each area in which such licensed SNM is handled, used, or stored, a monitoring system meeting the requirements of either paragraph (a)(1) or (a)(2), as appropriate, and using gamma- or neutron-sensitive radiation detectors which will energize clearly audible alarm signals if accidental criticality occurs.

Paragraph (a)(1) of 70.24 requires that the monitoring system shall be capable of detecting a criticality that produces an absorbed dose in soft tissue of 20 rads of combined neutron and gamma radiation at an unshielded distance of 2 meters from the reacting material within one minute. Coverage of all areas shall be provided by two detectors.

10 CFR 70.50(b) requires that each licensee shall notify the NRC within 24 hours after the discovery of any event in which equipment is disabled or fails to function as designed when:

- i. The equipment is required by regulation or licensee condition to prevent releases exceeding regulatory limits, to prevent exposures to radiation and radioactive materials exceeding regulatory limits, or to mitigate the consequences of an accident;
- ii. The equipment is required to be available and operable when it is disabled or fails to function; and
- iii. No redundant equipment is available and operable to perform the required safety function.

## 2 Background

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The CAAS is provided to detect and alarm if a criticality event occurs in an area which a uranium quantity at or above the 10 CFR 70.24 limits are used, stored, or handled. In the unlikely event of a criticality accident, the CAAS is equipped with its own specific audible alarm system to alert personnel if a specific area is to be evacuated.

The CAAS at UUSA is designed, installed, and maintained in accordance with American National Standards Institute/American Nuclear Society ANSI/ANS-8.3, Criticality Accident Alarm System, as modified by Regulatory Guide 3.71, Nuclear Criticality Safety Standards for Fuels and Material Facilities.

On September 14, 2018 UUSA reported Event Notification 53604 to the NRC. This event described the CAAS being temporarily disabled during planned corrective maintenance on September 15, 2018. The planned outage was reported to the NRC in accordance with 10 CFR 70.50(b)(2) for an event in which equipment is disabled or fails to function when the equipment is required by regulation (10 CFR 70.24) or license condition to prevent exposures to radiation or to mitigate consequences of an accident; when the equipment is required to be available and operable when it is disabled or fails to function and; no redundant equipment is available and operable to perform the required safety function.

Compensatory measures that achieve an equivalent required safety function of the disabled CAAS system were established prior to the corrective maintenance outage in accordance with the UUSA ISA Summary. The ISA Summary, Section 3.1.5, states "Anytime CAAS coverage is lost and not restored within a specified number of hours (determined on a process-by-process basis), operations will be rendered safe (by shutdown and quarantine) as appropriate. Onsite guidance will be utilized based on process-specific considerations that consider applicable risk trade-off of the duration of reliance on compensatory measures versus the risk associated with process upset in shutdown. Following the occurrence of a credible event or whenever the CAAS is not functional, compensatory measures such as evacuation, limiting access and restricting SNM movement, will be implemented until CAAS coverage is verified operational. Radiation surveys will be conducted prior to re-entry to confirm conditions in the area".

Specific compensatory actions taken by UUSA included (1) limiting access to only essential personnel inside the Controlled Access Area (CAA) during the maintenance activities; (2) use of temporary criticality detection equipment for personnel inside the CAA; (3) evacuation of non-essential personnel from the areas of concern and then Immediate Evacuation Zone (IEZ) before removing the equipment from service; (4) limiting access into the facility; (5) restricting Special Nuclear Material (SNM) movement until CAAS coverage was verified; and (6) radiation surveys conducted prior to re-entry to confirm acceptable conditions in the area. No abnormal radiation readings were observed following this outage. NRC Integrated Inspection Report 70-3101/2018-005 (ADAMS Accession Number ML19024A094), dated January 24, 2019, concluded that "actions taken by the licensee were consistent with NRC regulations and license basis requirements, including the requirements to report the issue to the NRC" and "the licensee took adequate and conservative compensatory measures to mitigate the safety impact of the CAAS outage and no violations of NRC requirements were identified".

## 3 Proposed Changes

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UUSA requests NRC approval of a permanent exemption from requirements of 10 CFR 70.24, Criticality Accident Requirements. Should the criticality accident alarm system or associated equipment be out of service for more than four hours, UUSA will employ compensatory measures in accordance with the UUSA Integrated Safety Analysis (ISA) Summary, Section 3.1.5. Compensatory measures that achieve an equivalent safety function shall remain effective until the CAAS has been restored to service.

### **3.1 Modification to the UUSA Materials License**

UUSA proposes an addition of License condition 34 to Materials License SNM-2010 to state the following:

*34. In the event that the criticality accident alarm system or associated equipment is out of service, the licensee is exempt from requirements of 10 CFR 70.24 provided that within four hours of the equipment being disabled:*

- 1. The equipment is returned to service, or;*
- 2. Compensatory measures that achieve an equivalent safety function are employed and remain effective until the CAAS has been restored to service.*

This exemption request is based on the determination by NRC personnel that documented operating experience employing compensatory measures outlined in the UUSA ISA Summary have been successfully implemented during work evolutions related to Event Notification 53604. Subsequent Inspection Report 70-3101/2018-005 findings provide reasonable assurance that the proposed exemption criterion will be properly applied.

The requested exemption is authorized by 10 CFR 70.17(a) "Specific exemptions" which provides for exemptions that are authorized by law and will not endanger life or property, or the common defense and security and are otherwise in the public interest. This submittal demonstrates the requested exemption meets each of these requirements.

### **3.2 Impact on License Basis Documents**

Review of UUSA license basis documents has determined that no change to the UUSA Safety Analysis Report (SAR), Integrated Safety Analysis (ISA) Summary, or Emergency Plan would be necessary to implement the proposed changes in this request.

The SAR, Revision 45, Section 5.3, states "Except where specifically exempted in the UUSA Materials License, SNM-2010, areas where Special Nuclear Material (SNM) is handled, used, or stored in amount at or above the 10 CFR 70.24 (CFR, 2003d) mass limits are provided with CAAS coverage".

The ISA Summary, Revision 30, Section 3.1.5, states “Except where specifically exempted in the UUSA Materials License, SNM-2010, areas where Special Nuclear Material (SNM) is handled, used, or stored in amounts at or above the 10 CFR 70.24 (CFR, 2003d) mass limits are provided with CAAS coverage.”

The Emergency Plan, Revision 26b, Section 2.1.1, states “Except where specifically exempted in the UUSA Materials License, SNM-2010, a Criticality Accident Alarm System (CAAS) is provided to detect and alarm if a criticality event occurs in an area where uranium at or above the 10 CFR 70.24 limits is used, stored, or handled, except as exempted in the cascade halls.”

Therefore, if the proposed change in this LAR is implemented as new license condition 34, the current License basis documents contain language that would encompass the new exemption, i.e. “Except where specifically exempted in the UUSA Materials License”, without additional changes to license documents.

## **4 Technical Basis**

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### **4.1 Existing Precedence**

Similar processes to this submittal have previously been approved by the NRC and are actively used by for other fuel cycle facilities for criticality accident alarm systems.

Application for Renewal of a Special Nuclear Material License for the Columbia Fuel Fabrication Facility, Materials License SNM-1107, dated March 28th, 2019 (ADAMS Accession Number ML19088A101) includes provisions which allow that:

*“If the CAAS is out-of-service, within one hour the CFFF will suspend movement and processing of fissile material in the coverage area until the process is brought to a safe shutdown condition. Movement of fissile material necessary to establish or maintain a safe shutdown condition may continue. Movement and processing of fissile material will not resume unless the CAAS is returned to service, or continuously attended portable detection instruments, capable of detection and alarm, are provided to monitor the area normally covered by the installed CAAS. These actions will be directed and enforced by the plant emergency response team. The portable detection and alarm devices shall be of a type preapproved for this use by the NCS Function. Once the installed CAAS is returned to service, the monitoring provided by the portable devices may be discontinued. Routine testing, calibration, and/or maintenance of the CAAS for up to four hours is permitted without suspension of fissile material movement or processing.”*

Framatome License renewal document E10-08-01, version 1, Material License SNM-1227 (ADAMS Accession Number ML063110089) includes:

*“Should the nuclear criticality accident alarm system or a portion of the system be out of service for a period of more than four hours, movement of SNM in the affected area will cease until the alarm service has been restored, or until compensatory monitoring, approved by the nuclear criticality safety component, has been implemented.”*

## **5 Safety Significance Determination**

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Industry standards and guidance from the NRC and NRC endorsed sources currently exist that support the approval of this type of exemption. NUREG-1520, Standard Review Plan for Fuel Cycle Facilities License Applications, Revision 2, Section 5.4.3, states that "An applicant that does not meet applicable guidance in this SRP should describe and justify an acceptable alternative to meet the regulations".

Given that the intent of regulatory activities is the protection of people and the environment, UUSA asserts that the proposed compensatory measures listed in Section 3.1.5 of the UUSA ISA Summary justify an acceptable alternative to meet NRC regulations, as no added risk to people or the environment would result from the proposed license amendment.

NUREG-1520 goes on to state in Section 5.4.3.1.1, Use of Industry Standards, that "RG 3.71, "Nuclear Criticality Safety Standards for Fuels and Material Facilities," endorses American National Standards Institute (ANSI)/American Nuclear Society (ANS)-8 national standards, with some exceptions and qualifications. The NRC endorsement of these standards means that they provide methods and practices generally acceptable to the NRC staff for the prevention and mitigation of criticality accidents".

In consideration of the NRC Regulatory Guide 3.71 endorsement of ANSI/ANS-8.3, Criticality Accident Alarm System, which is also included in the UUSA ISA Summary Code of Record, it is apparent that methods and practices described in ANSI/ANS-8.3-1997 would be acceptable to the NRC for mitigation of criticality accidents. ANSI/ANS-8.3-1997, paragraph 6.5, states "when test reveal inadequate performance, corrective action shall be taken without unnecessary delay. If portable instrument use is required, the criteria of 4.4.2 shall be met". Paragraph 4.4.2 states "portable instruments may be used in special situations to augment an installed criticality accident alarm system. Examples of such situations include alarm system maintenance or testing, evacuation drills, activities in areas not normally occupied by personnel, or other special operations. Where portable instruments are used to meet the intent of this standard, the usage shall be evaluated to determine appropriate criteria of this standard".

The purpose of an alarm system, as stated in ANSI/ANS-8.3-1997, paragraph 4.1.3, is to "reduce risk to personnel". UUSA finds that where ANSI/ANS-8.3-1997 provides allowances for portable instruments to augment the criticality accident alarm system to reduce risk to personnel, compensatory measures that achieve an equivalent safety purpose, i.e. reducing risk to personnel, should be considered an acceptable alternative to meet regulations.

## **6 Environmental Considerations**

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UUSA proposes that there are no significant environmental impacts associated with the changes proposed in this LAR. The proposed changes do not meet the criteria in 10 CFR 51.60(b)(2) since they do 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.

## 7 Conclusion

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This License Amendment Request proposes an addition to Materials License SNM-2010, which would exempt UUSA from requirements of 10 CFR 70.24, Criticality Accident Requirements. In an event which the facility CAAS or associated equipment is disabled, UUSA has proposed an exemption provided the allotted period of time to return the system to service has not been exceeded or compensatory measures that achieve an equivalent safety function are in place. Compensatory measures that achieve an equivalent safety function shall remain effective until the CAAS has been restored to service.

UUSA requests approval for implementation of the described activities in this submittal. This request is supported by (1) UUSA operating experience achieved through successful implementation of compensatory measures, as determined by the NRC, (2) Industry standards and guides endorsed by the NRC which detail activities similar to those in this LAR, and (3) precedence set by other fuel cycle facility licensees performing similar functions as those described in this request.