EHS&L Document

SNM-1227 - Chapter 7
Fire Safety

Nature of Changes

Item	Paragraph	Description	Justification
1.	Entire Document	Changed AREVA Inc. to Framatome Inc.	Company Name Change
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
List Below any Documents, including Forms & Operator Aids which must be issued concurrently with this document revision:			

This document contains a total of 10 pages excluding the signature page.

DOCUMENT REVIEW/APPROVAL/DELETION CHECKLIST

All new and/or revised procedures shall be approved by the change author, cognizant manager(s) of areas affected by the changes, and by applicable manager(s) of any function that approved the previous revision of the document unless responsibility for such approval has been transferred to another organization. Also, the procedure shall be approved by manager(s) of functional organizations that provide technical reviews with the exception of the Training Department. Finally, Document Control shall verify that the required approvals have been properly obtained and that any documents that must be issued concurrently are ready to be issued.

Document Reviews			Document Approvals	
Purpose/Function of Review	Specify Reviewer(s) (Optional except for change author)	(Check all that apply)	Title of Approver	(Check all that Apply)
Document Control (Automatic)		☒	Document Control (Automatic)	☒
Change Author	CD Manning	☒	Author	☒
Independent Technical Review		☐		
Operability Review(s)			Mgr, Richland Operations[1]	☐
Conversion		☐	Mgr, Uranium Conversion & Recovery Operations[1]	☐
Recovery		☐		
Ceramics		☐	Mgr, Ceramic Operations[1]	☐
Rods		☐	Mgr, Rods & Bundles[1]	☐
Bundles		☐		
Components		☐	Mgr, Component Fabrication[1]	☐
Maintenance Review		☐	Mgr, Maintenance[1]	☐
Lab Review		☐	Mgr, Production Support[1]	☐
Transportation		☐	Mgr, Ops Strategy & Supply Chain	☐
EHS&L Review(s)			Mgr, EHS&L[2]	☒
Criticality		☐	Mgr, Nuclear Safety[2]	☐
Radiation Protection		☐		
Safety		☐	Mgr, Safety[2]	☐
Security/Emergency Prep.		☐	Mgr, Security & Emergency Preparedness[2]	☐
Fire Safety	SD Wright	☒		
MC&A		☐	Mgr, Licensing & Compliance[2]	☐
Transportation		☐		
Environmental		☐		
Mechanics Richland Review		☐	Mgr, Mechanics Richland	☐
Mechanics Lynchburg Review		☐		
Thermal-Hydraulics Richland Review		☐	Mgr, Thermal-Hydraulics Richland	☐
Thermal-Mechanics Richland Review		☐	Mgr, Materials & Therm-Mechs	☐
Project & Reliability Review		☐	Mgr, Project & Reliability Eng.	☐
Quality Review		☐	Mgr, Richland Site Quality	☐
Purchasing Review		☐	Mgr, PP&CPC	☐
Others:		☐	Mgr, Richland Site/Other	☐
Document Control		☐	Richland Records Management	☐
Training & Employee Dev.: [3]		☐	Training & Employee Dev.	☐

[1]Note: If approvals include 2 or more product center managers, the Operations manager can be substituted for the applicable product center managers.

[2]Note: If approvals include 2 or more EHS&L functional managers, the EHS&L manager can be substituted for the applicable EHS&L functional managers.

[3]Note: Training department review is required for all procedures that require or affect a Learning Plan and if additional training materials or curriculum must be revised before issuing procedure.

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EHS&L CHANGE IMPACT EVALUATION FORM

The scope and content of this document have been determined by EHS&L to not impact the safety disciplines checked below. Future revisions do not require review by those EHS&L component(s) unless the scope changes such that a previously excluded safety discipline may be impacted.

☐ Criticality ☐ Radiation Protection ☐ Safety/Security ☐ Emergency Preparedness ☐ MC&A ☐ Transportation ☐ Environmental

DOCUMENT VERSION:	EHS&L REVIEW COMPONENT:	EVALUATION DATE:	CHANGE EVALUATOR*: 2ND PARTY APPROVAL*:

The scope and content of this document have been determined by EHS&L to not directly impact the safe handling of licensed materials (enriched uranium). Future revisions to this document do not require the **10CFR 70.72** change evaluation unless the scope of the document changes such that it directly impacts the handling of licensed materials. ☐

DOCUMENT / ECN NO**:	EVALUATION DATE:	CHANGE EVALUATOR:
E10-08-007	1/19/18	SD Wright

Does the change potentially impact Criticality Alarm System (CAS) coverage?	☐ YES ☒ NO

EVALUATION OF NRC PRE-APPROVAL:

IS NRC PRE-APPROVAL (LICENSE AMENDMENT) NEEDED? ➢ Based on "**YES**" answer to any of five questions below. ➢ Based on "**NO**" answer to all five questions below.	☐ YES ☒ NO
1. Does the change create new types of accident sequences that, unless mitigated or prevented, would exceed the performance requirements of **10 CFR 70.61** (create high or intermediate consequence events) and that have not previously been described in Framatome's ISA Summary?	☐ YES ☒ NO
2. Does the change use new processes, technologies, or control systems for which Framatome has no prior experience?	☐ YES ☒ NO
3. Does the change remove, without at least an equivalent replacement of the safety function an item relied on for safety **(IROFS)** that is listed in the ISA Summary?	☐ YES ☒ NO
4. Does the change alter any item relied on for safety, listed in the ISA Summary, that is the sole item preventing or mitigating an accident sequence of high or intermediate consequences?	☐ YES ☒ NO
5. Does the change qualify as a change specifically prohibited by NRC regulation, order or license condition?	☐ YES ☒ NO

Evaluation of Actions Required PRIOR TO OR CONCURRENT with Change Implementation:

6. Modification / Addition to CAS system or system coverage documentation	☐ YES ☒ NO
7. Acquire NRC pre-approval (LICENSE AMENDMENT)	☐ YES ☒ NO
8. Conduct/modify ISA	☐ YES ☒ NO

9. Modify / update the following:	☒ None ☐ Other	☐ ISA Database ☐ Red-Line Drawings/P&ID	☐ NCSA ☐ NCSS	☐ NCSP ☐ PHA	☐ RHA ☐ FHA	☐ ChHA ☐ Procedures

Evaluation of Actions Required SUBSEQUENT TO Change Implementation:

10. Modify / update the following:	☒ None ☐ Other	☐ ISA Database ☐ AS-Built Drawings/P&ID	☐ NCSA ☐ NCSS	☐ NCSP ☐ PHA	☐ RHA ☐ FHA	☐ ChHA ☐ Procedures

Justification Section for "YES" preceding Questions 1 – 8 or other for 9, 10: Being prepared as part of a License Amendment, however pre-approval of the amendment prior to issuing is not required.

(*) Only required if one or more of the boxes to exclude a particular safety discipline review is checked.

(**) If this form exists as a part of a document, the document number is not required.~~23371 (Rev. 001, 01/09/2018)~~

EHS&L CHANGE IMPACT EVALUATION FORM

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IS NRC PRE-APPROVAL (LICENSE AMENDMENT) NEEDED? ➢ Based on "**YES**" answer to any of five questions below. ➢ Based on "**NO**" answer to all five questions below.	☐ YES ☐ NO
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Table of Contents

7.0 **Fire Safety**

The Framatome Inc. (Framatome) fire safety program for the Richland Horn Rapids Road (HRR) facility includes design features, management measures, and operational controls to provide protection against fires and explosions that could affect the safety of licensed materials, thereby creating an increased radiological risk. The potential for, and consequences of, fires and explosions associated with ongoing Richland operations are analyzed in conjunction with the overall site integrated safety analysis as described in Chapter 3, Integrated Safety Analysis (ISA) and ISA Summary. The operational fire hazards analyses provided by the ISA program are complemented by the Richland site general fire safety program. Included in the general fire safety program are general fire safety management measures, facility design requirements, and general fire protection and emergency response measures.

7.1 ***Fire Safety Management Measures***

7.1.1 Fire Safety Organization

The manager of the Environmental, Health, Safety and Licensing (EHS&L) function is the senior-level manager vested with the authority and staff to assure that fire safety receives appropriate priority. The EHS&L functional manager reports directly to the Richland Site Manager independently of Operations. Within the EHS&L function, responsibility for fire safety issues rests within the Safety Function. The organizational structure and qualification requirements pertinent to these management positions are set forth in Chapter 2, Organization and Administration.

The Operations Manager is responsible for the day-to-day maintenance of fire safety in the plant production areas, including the provision of trained operators cognizant of fire safety and applicable fire safety-related IROFS.

The Manager of the Plant Projects Function as defined in Chapter 2 is responsible for the engineering and installation of new/modified facilities and equipment and ensuring that these additions/modifications comply with codes, standards and regulations pertinent to fire safety. He manages the plant configuration management program, which assures that plant changes are properly evaluated with respect to fire safety impact and then properly documented as part of the plant safety basis.

The Manager of the Maintenance Function is responsible for the periodic testing and maintenance of installed fire detection and protection systems.

7.1.2 Fire Prevention

7.1.2.1 Employee Training

General awareness training with respect to fire safety is provided to site employees as an element of the annual general employee safety training program.

7.1.2.2 Fire Prevention Procedures

The Richland site maintains procedures for:

- flammable and combustible liquids/solids storage and handling;
- control of hot work, including a permit system for cutting, welding, and grinding outside of designated areas.

7.1.2.3 Inspections

The Richland site maintains a program for periodic fire safety inspections of facilities containing licensed materials.

7.1.2.4 Non-Smoking Policy

The Richland site enforces a non-smoking policy for site facilities, irrespective of radiological or chemical inventories. Smoking on-site is restricted to designated outdoor smoking areas.

7.1.3 Inspection, Testing, and Maintenance of Fire Protection Systems

Preventive maintenance (PM) procedures are established for the inspection, testing, and maintenance of fire protection systems in accordance with applicable state and local (City of Richland) fire codes. These procedures are applied to fire detection and warning systems, fixed fire suppression systems, portable fire extinguishers, and emergency power sources. Records of these activities are maintained within the PM system.

7.1.4 Emergency Response Organization

Framatome maintains an emergency response organization/system commensurate with the potential emergencies at the Richland site and their potential adverse impacts to workers, the public, and the surrounding environment. Commitments to maintain an emergency plan in accordance with 10 CFR 70.22 as well as the procedures to implement the plan are set forth in Chapter 8, Emergency Management. The Emergency Plan outlines the Richland site's overall emergency response program, including but not limited to staffing, training, drills and exercises, response measures, and offsite agency coordination.

7.1.5 Pre-Fire Plan

Framatome maintains a pre-fire (pre-emergency) plan which is provided to, and meets the requirements of, the local fire jurisdiction (City of Richland).

7.2 *Fire Hazards Analysis*

A fire hazards analysis (FHA) is performed for facilities on the Richland site that contain SNM in sufficient quantities and in a form that, if released in a fire, could result in at least an intermediate consequence event as defined in 10 CFR 70.61. FHA's are conducted in general accordance with the NRC's "Guidance on Fire Protection for Fuel Cycle Facilities (August 1992)." The FHAs focus on bounding fire scenarios for discrete fire areas within buildings and address fire loading, consequences of an unmitigated fire (analysis and impacts), and mitigative controls. FHAs are one component of the overall Richland site ISA as described in Chapter 3.

Fire hazards at the operational/process level are analyzed with respect to potential accident sequences, likelihoods, consequences, and resultant risk by the ISA teams. Fire/explosion-

related accident sequences with the potential to create high or intermediate consequences as defined in 10 CFR 70.61 are controlled via the application of items relied on for safety (IROFS) as required to meet the performance requirements of 10 CFR 70.61. IROFS for the Richland site, including those related to fire/explosion hazards, are documented in the Richland site ISA Summary. The need for new and/or modified IROFS related to plant additions and modifications is assessed as part of the plant configuration management program. This and other management programs to assure that IROFS are available and reliable when needed are described in Chapter 11, Management Measures.

7.3 *Facility Design*

7.3.1 Facility Design Criteria

Richland site facilities and buildings have been designed and built to the applicable national, state, and local building, electrical, and fire codes as required by the City of Richland Fire Marshal and Building Department at their time of construction. In recognition of the fire-induced hazards associated with licensed materials and process chemicals, enhanced emphasis is placed on:

- minimizing combustible materials in the construction of facilities;
- provision and maintenance of effective intra-building fire barriers;
- segregating non-radiological and radiological operations to the extent feasible;
- use of physical layouts, configurations, and materials that promote ease of decontamination;
- provision of HEPA-filtered ventilation systems that maintain flow gradients from areas of lower contamination to areas of higher contamination and that provide effective smoke control in the event of a fire;
- provision of auxiliary electrical power to key plant systems, especially those important in the detection and mitigation of off-normal events, including fires; and
- utilization of non-combustible and segregated and/or remotely located storage facilities for large quantities of radioactive materials.

For planned new facilities and/or new processes at the Richland site meeting the 10 CFR 70.72 criteria for a license amendment, facility/process design shall address the baseline design criteria (BDC) and defense-in-depth requirements of 10 CFR 70.64 as they apply to fire protection.

7.4 *Process Fire Safety*

Process fire safety is appropriately considered in the planning, design, and construction of new facilities and processes. At the operational level, process fire safety as it relates to processes utilizing licensed material is evaluated and assured via the ISA process described in Chapter 3. The ISA evaluates the special fire risks associated with:

- combustibles and flammable process chemicals (solids, liquids, gases), in use and in storage;
- exothermic reactions of uranium oxides;

- high temperature and/or high pressure equipment, including but not limited to the incinerator, sintering furnaces, calciners, and boilers; and
- laboratory operations, including specialty laboratory equipment, hoods, and chemicals.

Process-related fire hazards are controlled with items relied on for safety (IROFS) to the extent necessary to meet the performance requirements of 10 CFR 70.61.

7.5 *Fire Protection and Emergency Response*

7.5.1 Plant Water Supply

Pressurized water for plant usage (process, domestic, sprinklers, hydrants) is supplied to the Richland plant via two mains which enter at opposite sides of the plant. The mains are fed from separate portions of the City of Richland water grid. Fire hydrants are strategically located throughout the plant site in accordance with local fire code requirements.

7.5.2 Fire Detection/Alarm Systems

The Richland site is covered by an electronically-supervised fire alarm system that alarms locally, at the continuously manned Central Guard Station, and at a remote alarm monitoring facility that provides notification to the City of Richland.

The alarm system may be activated via a variety of alarm modules, including:

- smoke detectors
- heat detectors
- manual alarm pull stations
- water flow switches within fire sprinkler lines
- monitor switches from the hydrogen detection systems serving certain H_2-utilizing process systems.

7.5.3 Fire Suppression

Fire suppression relies primarily on the fire alarm system and subsequent truck, hydrant, and hose coverage provided by the City of Richland Fire Department. A limited number of facilities are served by a piped fire sprinkler system, including the onsite combustible waste incinerator.

7.5.4 Portable Fire Extinguishers

Portable fire extinguishers are available across the site to provide incipient fire fighting capability. The following types of extinguishers are in use:

- Dry Chemical
- Class D (Metal X)

7.5.5 Emergency Power Generators

The site maintains a number of fixed-location, emergency power generators to provide auxiliary electrical power to designated equipment and emergency systems, including portions of the fire alarm system. The generators are periodically tested in accordance with an established

preventive maintenance procedure. The fire alarm system in facilities not on emergency backup power is provided with backup electrical power via emergency backup batteries.

7.5.6 Fire Protection System/Equipment Standards

Fire protection systems and equipment on the Richland site are installed, maintained, and tested in accordance with International Building and Fire Codes as adopted/modified within state and local (City of Richland) fire codes.

7.5.7 Emergency Response Support

The Richland site's emergency response capabilities (internally and externally provided) are set forth in the Richland Emergency Plan (see Chapter 8, Emergency Management). Services provided by outside agencies are formalized in written agreements (Memoranda of Understanding) maintained on-file at the Richland site. These include agreements with the City of Richland which provides both firefighting and emergency medical response services. City of Richland emergency response personnel are included as appropriate in site emergency drills and exercises.