

Safety Readiness Review

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On behalf of the ESH&Q and ESS project

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- US department of energy (DOE) regulatory framework for accelerator safety program
- Swedish regulatory framework
- Safety Readiness Review (SRR) as part of the ESS safety program
- Safety Assessment Report (SAR)
- Operational Limits and Conditions (OLC)

US department of energy (DOE) regulatory framework for accelerator safety program

DOE regulatory framework for accelerator safety program



- Order, Guide, Technical Standard
 - DOE O 420.2C, approved in 2011, *Safety of Accelerator Facilities*
 - DOE G 420.2-1, approved in 2014, *Accelerator Facility Safety Implementation Guide for DOE O 420.2C*
 - DOE-STD-6004-2016, approved in 2016, *Clearance and Release of Personal Property from Accelerator Facilities*
- Great “Community of Practice”
- DOE Accelerator Safety Workshop – both European Spallation Source (ESS) and Swedish Radiation Safety Authority (SSM) participate since 2015

Minimum Program Requirements (at DOE labs)



- **Accelerator Safety Envelope (ASE)**
 - A top level document for risk management of accelerator operations. It defines limits that are objective, measurable, and directly linked to safety of the facility.
- **Safety Assessment Document (SAD)**
 - A compilation of facility hazard identification and risk analysis, including description of engineering controls or administrative measures to eliminate or mitigate hazards from operation
- **Accelerator Readiness Review (ARR)**
 - A process to verify facility readiness for safe operations. It includes readiness verification for hardware, personnel and procedures associated with the operations.
- **Clear Roles and Responsibilities**
- **Unreviewed Safety Issue (USI)**
- **Contractor Assurance System (CAS)**

Swedish regulatory framework

Swedish regulatory framework



- Swedish Work Environment Authority
 - Statute Book, contains a number of provisions with various designations
 - No requirement for Safety Readiness Review
- Swedish Radiation Safety Authority (SSM)
 - Mandated from the Swedish government within the areas of nuclear safety, radiation protection and nuclear non-proliferation
 - European Spallation Source is NOT dealt with as a nuclear facility and is regulated within the special conditions for ESS (influenced by nuclear facilities)
 - No requirement for Safety Readiness Review



A decision at ESS

- At the European Spallation Source, we are adopting a “DOE” approach and will conduct an SRR before each step of commissioning and start of routine operations.
- SSM will not use SRR as part of their process to issue a permit to commission/operate the European Spallation Source
- SSM deems SRR as very positive and agrees to observe at (some) reviews
- Swedish work environment authority will not participate in ESS SRR

Safety Readiness Review (SRR)

Safety Readiness Review (SRR)

Objective/Scope



- The purpose of this Safety Readiness Review (SRR) is to verify ESS's readiness to safely commission/operate the facility.
- The SRR considers a process by which hardware, personnel and procedures associated with commissioning/operations are verified.
- SRR is not a method for achieving readiness, but for verifying it.

Safety Readiness Review (SRR)

The main objective of SRR is to verify that:

- An acceptable Safety Analysis Report has been properly developed in accordance to ESS and SSM safety requirements and has been reviewed and approved in accordance with the ESS internal guidelines.
- An adequate Operational Limits and Conditions (OLC) has been developed, is supported by the SAR, and approved in accordance with ESS internal requirements.
- An appropriate commissioning plan has been developed.
- Procedures necessary for the safety operation have been developed, reviewed and approved and an appropriate process for the development, review and approval of new/revised procedures is in place.
- Procedures to deal with emergency situations have been developed, reviewed and approved for use.
- Records important for operational activities are controlled.
- Equipment and systems important to safety meet criteria established in the Safety Analysis Report (SAR) and have been appropriately tested.
- Personnel training and qualification programs relevant to safe operation have been established.
- Staffing requirements specified in the OLC are met.



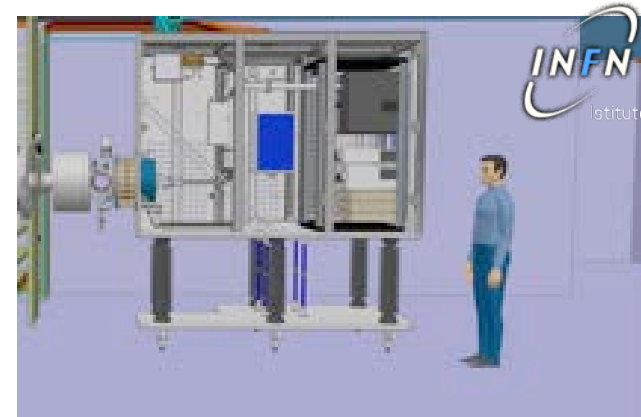
Prerequisite Documentation for ESS SRR

- Safety Assessment Report (SAR)
- Operational Limits and Conditions (OLC)
 - referred to as ASE in DOE terms
- Safety Configuration Management Program
- Commissioning Plan



Near term schedule

SRR 1 IS-LEBT commissioning date TBC



SRR 2 RFQ-MEBT-DTL commissioning date TBC



Safety Assessment Report (SAR)

Safety Assessment Document (SAD)

- SAD provides a description of the facility and analysis of associated hazards such that necessary controls and risks are clearly understood.
- Scope encompass entire facility, including auxiliary support facilities and activities.
- Analysis focus on accelerator specific hazards.
- Standard industrial and laboratory hazards need not be addressed in detail if adequately addressed by the facility's safety programs.

Operational Limits and Conditions (OLC)

Operational Limits and Conditions (OLC)



- OLC is the top level document for risk management of accelerator operations.
- OLC identifies limits that be objective, measurable, and directly linked to safety of the facility.
- Identifying and tracking the “critical few” makes it possible to focus on the issues that are important to safety.
- The Safety Assessment Document (SAD) provides the basis for OLC.
- In the US, approval of OLC by DOE is mandatory
- At ESS, OLC will be approved by organization’s high management.
- OLC then will become a part of an application to SSM, which is approved as a whole.

Conclusions

- ESS is adopting a DOE approach for accelerator facilities and will conduct a safety readiness review before each step of beam commissioning and routine operations.
- SRR is a new process for ESS and for Swedish authorities. The authorities see the SRR process as a very positive part of a management system and will participate in some of the reviews.
- ESS will hold its first SRR in the beginning of next year.
- The detailed plan is under development.
- Additional several SRRs will be conducted until we reach the routine operations.



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Thank you!