



Planning and Preparation of Inspections for Research Reactors

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Introduction

- This presentation will focus on how to develop an inspection plan and how to prepare for an inspection at a research reactor, including:
 - pre-inspection review of the documents relevant to the inspection topic
 - the constitution of the inspection team
 - the roles and responsibilities of the inspection team members
- For the U.S. NRC – this role is fulfilled by staff in the oversight branch

Inspection Programme

- The regulatory body needs to establish an overall plan for the programme of inspections to be implemented at a facility
- Planned inspections are scheduled in advance according to a structured and pre-arranged inspection programme developed by the regulatory body
- Such inspections could be linked to operator schedules for the performance or completion of certain activities at all stages of the authorization process

Inspection Intervals

In determining the intervals of inspections and the effort to be applied, the regulatory body needs to take into account:

- The relative safety significance of the facility
- The type of facility
- The level of activity at the facility
- The qualified personnel and other resources available to the regulatory body
- The qualified personnel and other resources available to the operator
- The inspection methods and approaches used

Inspection Intervals

Other aspects that need to be considered in determining the intervals of inspection and the level of inspection effort include:

- The performance record of the operator and the facility, including:
 - the number of violations, deficiencies, incidents and problems encountered
 - the number of reactive inspections
- Results of regulatory review and assessment
- Results of previous inspections

U.S. NRC Oversight

The U.S. NRC has an established written inspection and oversight programme for research reactors that it uses based on these factors:

- The programme is conducted by the Research and Test Reactors Oversight Branch (PROB)
- PROB consists of highly qualified inspectors, examiners, and security experts responsible for inspection, operator licensing, and security oversight of the 31 Research and Test Reactors (RTRs) in U.S.
- PROB conducts routine inspections, safeguards inspections, and reactive inspections

NRC Inspection Activities

**Yearly ~65 hours
on average at each
facility**

Safety Inspections:

$< 2 \text{ MW}_{\text{th}}$

- One visit/yr per facility
- Avg. 40 hours/yr per facility

$\geq 2 \text{ MW}_{\text{th}}$

- Two visits/yr per facility
- Avg. 80 hours/yr per facility

Safeguards Inspections:

Cat 2:

- One week visit
- Every 2 years

Cat 3:

- One week visit
- Every 3 years

Non-Routine Inspections:

- Management visits, special and reactive inspections
- Avg. 2-3 per yr
- One week each

Inspection Planning

- Inspection planning needs to be flexible to permit inspectors to respond to particular needs and situations
- The regulatory body establishes a process of periodically evaluating inspection findings, identifying generic issues and making arrangements to enable inspectors from various facilities, locations or projects to meet to exchange views and discuss the findings and issues.

Development of an Inspection Plan

The inspection plan needs to include:

- The inspection objectives and scope
- The requirements and reference documents
- Dates and places where the on-site inspection activities are to be conducted
- Identification of the area, activities, process, and SSCs to be covered by the inspection
- Expected time and duration for inspection activities, including meetings with the licensee management, and inspection team meetings

Inspection Areas

Typical examples on inspection areas and activities are the following:

- Maintenance and testing
- Safety and safety related systems
- Operator license, including safety documentation
- Radiation protection and radioactive waste management
- Management system
- Training programme
- Emergency preparedness

Inspection Procedures

The NRC inspection procedures are designed to confirm that the licensee's programmes and actions are consistent with the regulatory requirements and the licensing basis for the facility, such as:

- *U.S. Code of Federal Regulations*
- Operating license and technical specifications
- Orders
- Confirmatory action letters
- Safety analysis report
- Licensee commitments in security plan, emergency plan, and personnel training and requalification plan

NRC Inspection Programme

Example – Class I Research and Test Reactor Inspection Programme (Chapter 2545)

- Inspection Procedure 69003- Class I Research and Test Reactor Operator Licenses, Requalification, and Medical Activities
- Inspection Procedure 69004- Effluent and Environmental Monitoring
- Inspection Procedure 69005- Experiments
- Inspection Procedure 69006- Organization and Operations and Maintenance Activities
- Inspection Procedure 69007- Review and Audit and Design Change Functions
- Inspection Procedure 69008- Procedures
- Inspection Procedure 69009- Fuel Movement
- Inspection Procedure 69010- Surveillance
- Inspection Procedure 69011- Emergency Preparedness
- Inspection Procedure 69012- Radiation Protection
- Inspection Procedure 86740- Transportation

NRC Inspection Programme

Example –Research and Test Reactor Inspection Programme (continued)

- Inspection Procedure 81401- Plans, Procedures, and Reviews
- Inspection Procedure 81402- Reports of Safeguards Events
- Inspection Procedure 81421- Fixed Site Physical Protection of Special Nuclear Material of Moderate Strategic Significance
- Inspection Procedure 81810- Protection of Safeguards Information
- Inspection Procedure 85102- Material Control and Accounting
- Inspection Procedure 81403- Receipt of New Fuel at Reactor Facilities

Inspection Assignments

- The inspection programme manager within the regulatory body appoint the inspector in charge of implementing the inspection
- The inspection could be conducted by one inspector or more
 - In case of an inspection team, designate a lead inspector who has the appropriate skills and competences needed to achieve the objectives of the inspection
- The inspection team may comprise of inspectors and technical experts supporting and working under the direction of the lead inspector

The Inspection Team

The size and composition of the inspection team depends on:

- Inspection objectives, scope, and estimated duration
- The overall competence needed to achieve inspection objectives

Establishing the Inspection Team

- The licensee has the right to request the replacement of particular team members on reasonable grounds that should be presented to the regulatory body
- Examples of reasonable grounds may be those of conflicting interests (such as an inspection team member was former employee of the licensee) or previous unethical behavior

Duties of Lead Inspector

- Prepare the inspection plan
- Assign roles of the inspection team members
- Brief team members
- Review working documents to ensure adequacy
- Make final decisions for all phases of the inspection
- Represent the inspection team at entry and exit meetings
- Report critical non-conformities to the licensee immediately
- Report any major obstacles encountered during the inspection
- Submit the inspection report

Duties of Inspection Team

- Review the required inspection procedures in advance of the inspection
- Follow the regulatory guidance of inspection
 - Conduct performance based inspections versus a paperwork review
 - Be prepared to explain the regulatory requirements to personnel without prior experience with a formal system of regulations
- Report inspection findings to the lead inspector
- Co-operate and support the lead inspector in drafting the inspection report

Working Together

NRC staff from licensing and oversight communicate often:

- Licensing staff can ask inspectors to look at areas of the facility or documents that are part of a licensing action
- Licensing staff can consult with inspectors about licensee performance
- Inspectors verify that the licensee implements the new license requirements
- License requirements must be clear and enforceable

Working Together

- NRC inspectors and licensing staff hold annual meeting to discuss the performance of all of the licensees
- Special inspection teams can include both licensing staff and inspectors
- Communication between inspectors and licensing staff results in increased safety