T7: Enhancements to Fuel Cycle and Independent Spent Fuel Storage Installation Oversight Programs

ISFSI Inspection Program Enhancement Initiative Overview

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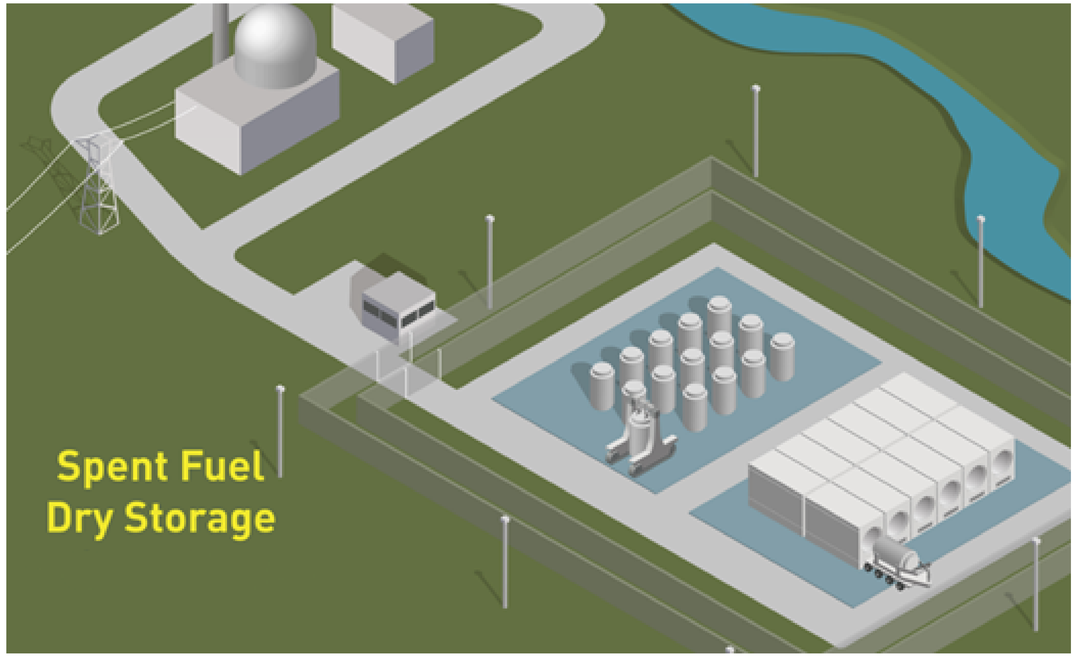
Background

- Internal feedback to provide a more risk-informed independent spent fuel storage installation (ISFSI) inspection program

- The Nuclear Energy Institute submitted one recommendation in their letter on Reactor Oversight Process enhancements (September 19, 2018) regarding ISFSI inspection

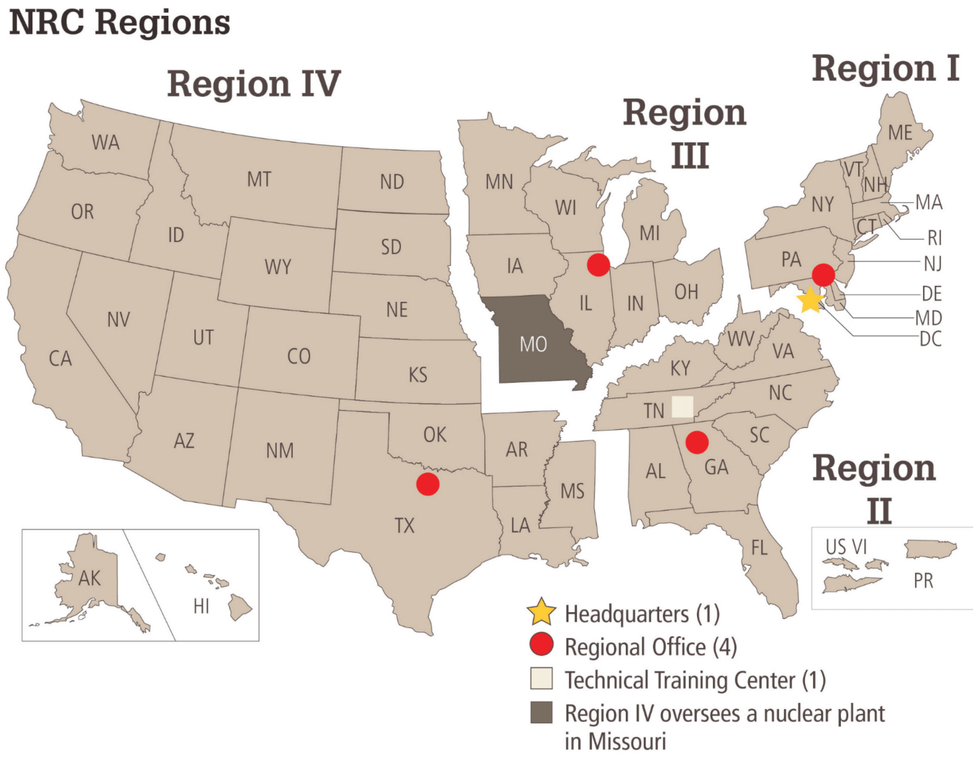
- Initiated a proactive review to enhance the ISFSI inspection program in June 2019



ISFSI Enhancement Working Group

A working group of NRC regional ISFSI inspectors and NRC Headquarters staff was formed to evaluate and enhance the NRC's existing ISFSI inspection program by developing a clearer, more risk-informed, comprehensive, and consistent approach to ISFSI inspections across the four regions that focuses on those areas most important to safety

- Working Group Charter, Agencywide Documents Access and Management System (ADAMS) Accession No. ML19155A273



Nuclear Power Plants

- Each regional office oversees the plants in its region—except for the Callaway plant in Missouri, which Region IV oversees.

Materials Licensees

- Region I oversees licensees and Federal facilities located geographically in Region I and Region II.

ISFSI Enhancement Scope

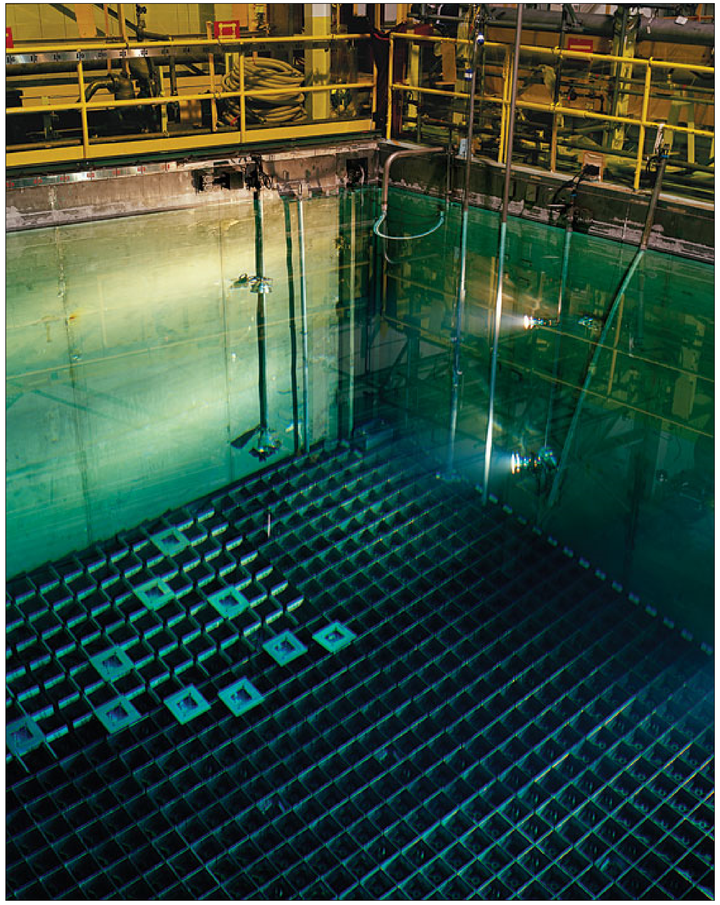
- Oversight of ISFSI operations:
  - Onsite component construction
  - Dry runs
  - Loading
  - Monitoring

- Not in scope of review:
  - Transportation
  - Vendor inspections
  - Aging management
  - Security

Focus Areas of ISFSI Program

The working group identified five safety focus areas:

- Occupational dose
- Public dose/exposure
- Fuel damage
- Confinement/canister integrity
- Impact to plant operation



Areas Reviewed for Potential Enhancement

- Application of risk insights (methodology)
  - Frequency of inspections
  - Level of effort
- Qualification and training

Methodology

- Holistic approach to develop a more risk-informed, performance-based ISFSI program that takes into account information from—
  - Probabilistic models
    - ISFSI pilot probabilistic risk assessment—NUREG-1864
    - Materials systems risk analysis—NUREG/CR-6642
  - Operating experience
  - Subject matter expertise

- Evaluated all ISFSI inspection procedures and ranked the risk of each inspection activity according to the five safety focus areas
  - Risk prioritization tool to help inspectors identify and focus inspections on the most risk-significant items

Key Considerations

- A comprehensive and objective review to develop a more risk informed inspection program to focus on those areas most important to safety
- Increase in inspection for risk-significant activities and decrease in other activities
- Greater flexibility to perform inspections during more risk significant ISFSI operations
- Recommendations considered varied stakeholder feedback

Working Group Recommendations

Inspection Frequencies

- Informed by operating experience, subject matter expertise, and risk insights, which included the fixed radiographic installation and irradiator facility inspection frequencies
  - Proposed Program
    - Routine inspections—triennial cycle
    - Extended loading campaign—quarterly until complete
    - All other inspection frequencies—as needed
  - Current Program
    - Routine inspections—every 2 years, not to exceed 3 years
    - All other inspection frequencies—as needed

Working Group Recommendations

Formal qualification and training specific for ISFSI inspectors

- Applicable to regional or resident inspectors
- Cross-qualification program developed for reactor inspectors already fully qualified as a resident or regional engineering inspector
- Partial qualification table developed for those resident or regional engineering inspectors who only perform routine loading inspections
- No recommendation on who performs inspection

Working Group Recommendations

Inspection Effort

- Routine inspections
  - Level of effort assessed by performing line-by-line review of hours needed for the risk-significant inspection activities
    - Welding, heavy loads, fuel loading activities
  - Proposed program
    - 96 hours every triennial cycle for routine loading inspections
    - 96 hours every quarter during extended loading campaign
    - 24 hours every triennial cycle (includes Away From Reactor ISFSIs) for routine monitoring inspections
  - Current program
    - 132 hours every 2 years, not to exceed 3 years, for routine loading inspections
    - 24 hours every 2 years, not to exceed 3 years (includes Away From Reactor ISFSIs) for routine monitoring inspections

Working Group Recommendations

Inspection Effort (cont.)

- Preoperational and initial loading inspections
  - Based on revised risk-informed inspection procedures and taking into account actual resource expenditures
  - Proposed program
    - Preoperational inspection (Inspection Procedure (IP) 60854)—200 hours
    - Review of 10 CFR 72.212 evaluations (IP 60856)—160 hours
  - Current program
    - Preoperational inspection (IP 60854)—120 hours
    - Review of 10 CFR 72.212 evaluations (IP 60856)—120 hours
- No change to ISFSI construction inspection (IP 60853)—120 hours

Additional Areas for Consideration

The working group also recommended the following:

- Assess and provide recommendations for enhancement in the areas of inspection readiness for—
  - Transportation of spent nuclear fuel
  - Consolidated interim storage facilities

- Review possible efficiency gains and overall improvement related to the creation of a Center of Expertise for ISFSI oversight activities

- Develop a routine assessment of the ISFSI inspection program

Recommendation Development

- Issued a memorandum with the working group's initial assessment and recommendations on October 2, 2019 (ADAMS Accession No. ML19277G895)
  - Includes two enclosures (ADAMS Accession Nos. ML19277G878 and ML19277G879) with recommendations
- Solicited internal and external feedback on the initial recommendations
  - Includes public meetings that provided an opportunity for feedback from stakeholders in various geographic areas
- Updated the working group's recommendations to incorporate feedback (ADAMS Accession No. ML20045D870)

Status and Next Steps

- The NRC will make a final decision and issue a tasking memorandum to the regions with the final recommendations report

- Program documents will be updated, as needed, based up final decision
  - New technical basis document
  - Revisions to Inspection Manual Chapters and inspection procedures

- Implementation planned for start of calendar year 2021