U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

ISFSI Inspection Program Enhancement Initiative Overview

Jeremy Tapp
Office of Nuclear Materials Safety and Safeguards
Division of Fuel Management
March 9, 2020

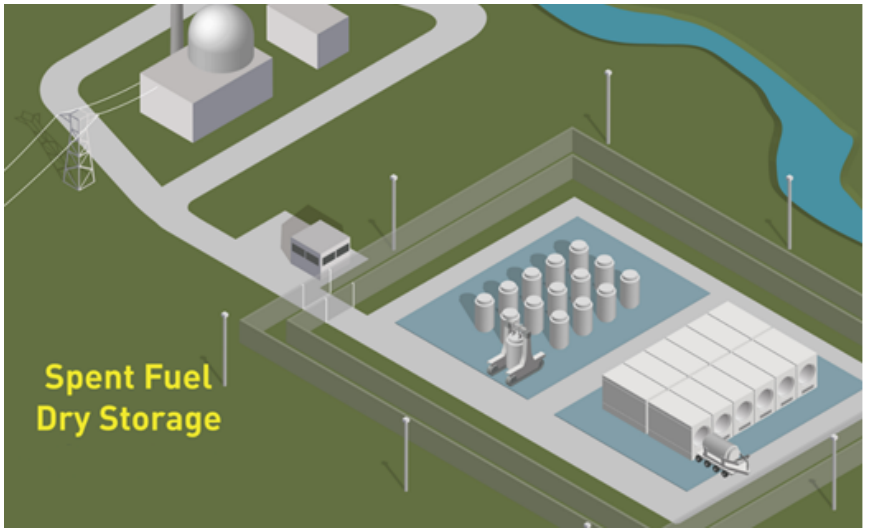
U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

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

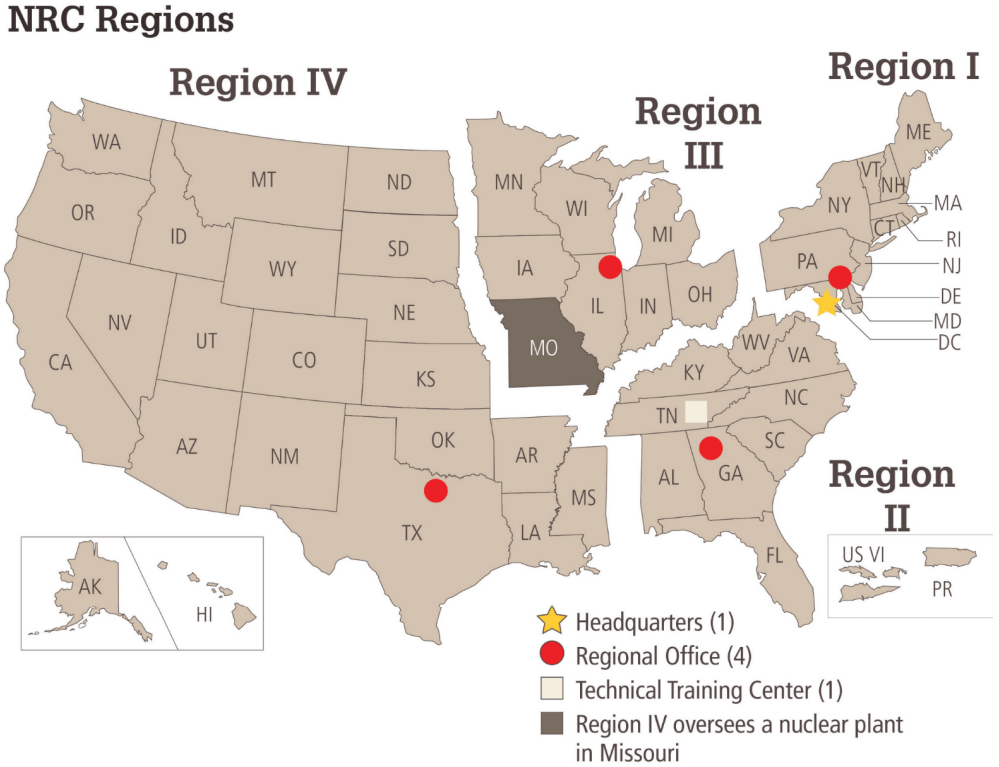
- Initiated a proactive review to enhance the ISFSI inspection program in June 2019



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.

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

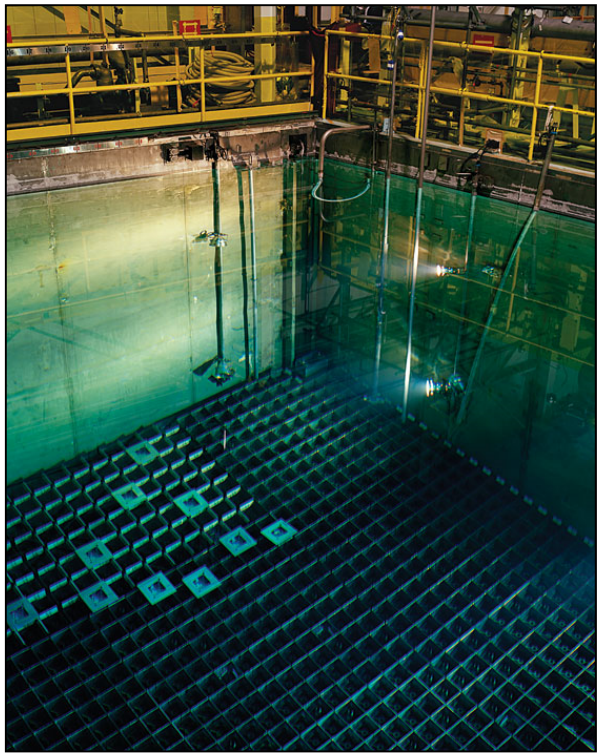
ISFSI Enhancement Scope

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

- Not in scope of review:
  - Transportation
  - Vendor Inspections
  - Aging Management
  - Security

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Focus Areas of ISFSI Program



The working group identified five safety focus areas:

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

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Areas Reviewed for Potential Enhancement

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

Methodology

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- 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

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- 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

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

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

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

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

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

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

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Inspection Effort (cont.)

- Preoperational and initial loading inspections
  - Based revised risk-informed inspection procedures and taking 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

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- 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

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- 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

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- 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 upon final decision
  - New technical basis document
  - Revisions to Inspection Manual Chapters and inspection procedures
- Implementation planned for start of calendar year 2021