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

Independent Spent Fuel Storage Installation (ISFSI) Integration to the Reactor Oversight Process (ROP)

Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission

NMSS
Division of Spent Fuel Management

Agenda

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

- Introduction
- Background
- Overview
- Next Steps

NMSS
Division of Spent Fuel Management

Introduction

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

- The purpose of this presentation is to provide an informative overview of the special topic related to the Independent Spent Fuel Storage Installation (ISFSI) integration into the reactor oversight process (ROP).

- Success for this presentation is to have a good interaction and dialogue about the "*new*" process.

NMSS
Division of Spent Fuel Management

Background

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

- COMSECY-10-007 – Project Plan for Regulatory Program Review to Support Extended Storage and Transportation of Spent Nuclear Fuel

- Assembled a Working Group (WG) to perform a review of the licensing, inspection, and enforcement programs

- Conducted three public meeting with stakeholders to solicit input.

NMSS
Division of Spent Fuel Management

Background

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

- Reactor Oversight Process (ROP) Baseline Inspection Program Enhancement Project – Special Topic ISFSI

- We (NMSS) provided the project team with three recommendations:
  - Include the ISFSI Inspection Activities at Operating Plants into the ROP
  - Develop a significance determination process (SDP)
  - Streamline through Appendix C

NMSS
Division of Spent Fuel Management

Background

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

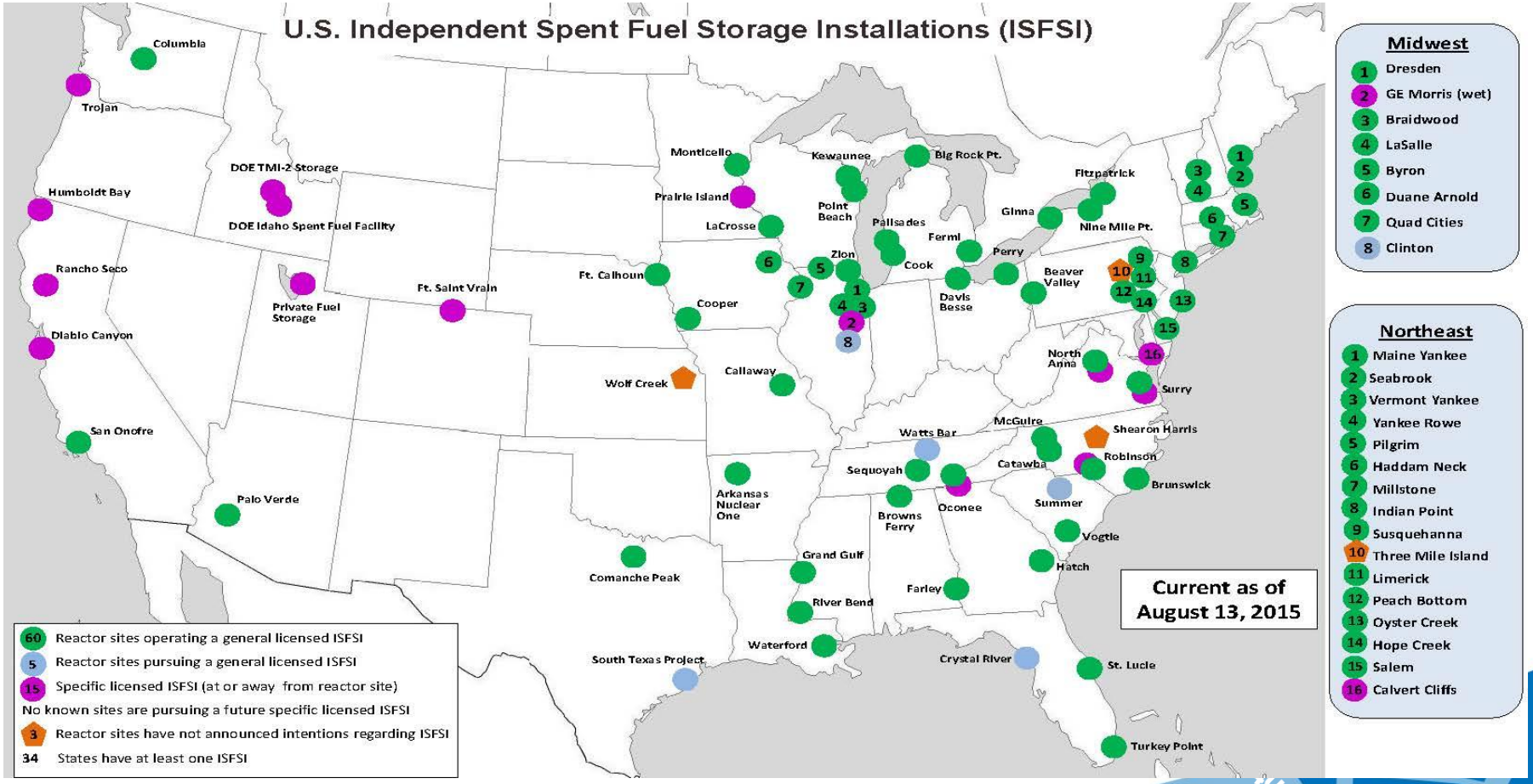
- NRC Inspection Manual Chapters (IMC)s
  - IMC 2690, Inspection Program for Dry Storage of Spent Reactor Fuel at ISFSIs
  - IMC 2515, Appendix C, Special and Infrequently Performed Inspections

- NRC Inspection Procedures
  - ISFSI Construction
  - Preoperational Testing
  - Operations
  - Security

NMSS
Division of Spent Fuel Management

Background

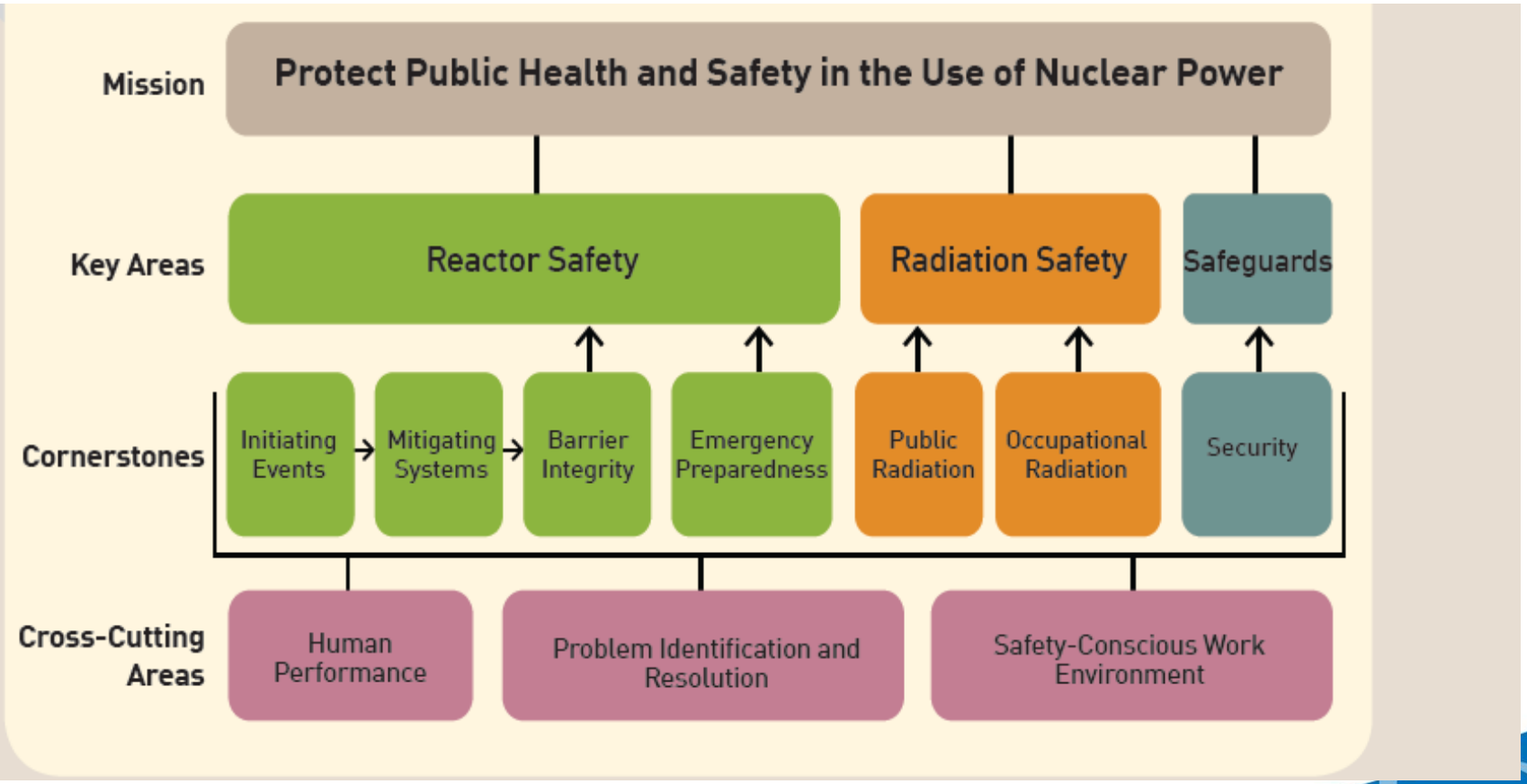
U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment



NMSS Division of Spent Fuel Management

Background

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



NMSS Division of Spent Fuel Management

Overview

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

- We wanted to make it applicable to ISFSIs at operating reactors.

- We modified and/or updated attachment 0609.04, Initial Characterization of Findings, of IMC-0609 and the enforcement policy.

- We created a new appendix to IMC-0609, (Appendix N, ISFSI SDP at Operating Reactors) to determine the significance of the issue using a series of logic questions.

Overview

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

- NUREG-1864, A Pilot Probabilistic Risk Assessment of a Dry Cask Storage System At a Nuclear Power Plant, dated June 2006.

- EPRI Technical Report 1009691, Probabilistic Risk Assessment (PRA) of Bolted Storage Casks: Updated Quantification and Analysis, dated December 2004.

- NUREG-1745, Standard Format and Content for Technical Specification for 10 CFR Part 72 Cask Certificates of Compliance

NMSS
Division of Spent Fuel Management

Overview

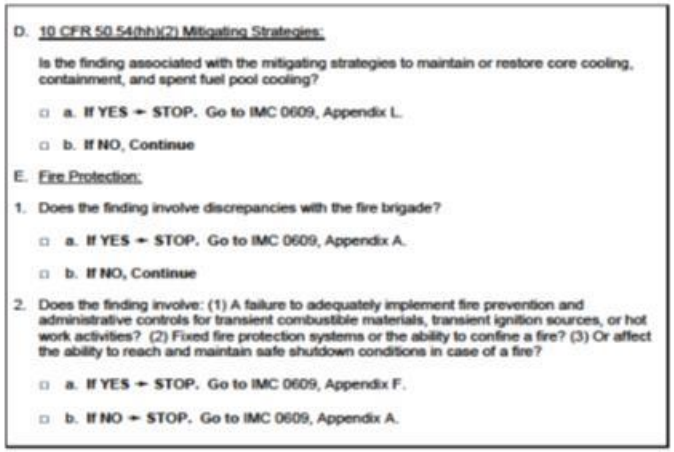
U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Table 2 – IMC-0609.04
Cornerstones Affected By Degraded Condition or Programmatic Weakness

Initiating Events	Mitigating Systems	Barrier Integrity
F. Handling, Transfer, and Storage of DCSS at an operating reactor	D. DCSS Decay Heat Removal System degraded	E. DCSS Shielding/Criticality Degraded
		F. DCSS Confinement Degraded

NMSS
Division of Spent Fuel Management

Overview



D. 10 CFR 50.54(hh)(2) Mitigating Strategies:

Is the finding associated with the mitigating strategies to maintain or restore core cooling, containment, and spent fuel pool cooling?

- a. If YES → STOP. Go to IMC 0609, Appendix L.
- b. If NO, Continue

E. Fire Protection:

1. Does the finding involve discrepancies with the fire brigade?
   - a. If YES → STOP. Go to IMC 0609, Appendix A.
   - b. If NO, Continue
2. Does the finding involve: (1) A failure to adequately implement fire prevention and administrative controls for transient combustible materials, transient ignition sources, or hot work activities? (2) Fixed fire protection systems or the ability to confine a fire? (3) Or affect the ability to reach and maintain safe shutdown conditions in case of a fire?
   - a. If YES → STOP. Go to IMC 0609, Appendix F.
   - b. If NO → STOP. Go to IMC 0609, Appendix A.

Issue Date: 06/19/12 8 0609.04
Effective Date: 07/01/12

Table 3 – IMC-0609.04
SDP Appendix Router

F. Independent Spent Fuel Storage Installations:

1. Is the finding associated with the operation of an ISFSI?

   a. IF YES → STOP. Go to IMC 0609, App N.

   b. IF NO STOP. Go to IMC 0609, App A

Overview

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

- Initiating Events (IE)s (Exhibit 1)

  - Handling, Transfer, and Storage of the Dry Cask Storage System (DCSS) – this section considers the three phases that may involve an event that could challenge or challenged a safety function of the DCSS (i.e., structure, system, and component).

  - The safety function areas of the DCSS being as follows: Structural, Criticality, Shielding, and Thermal/Cladding

NMSS
Division of Spent Fuel Management

Overview

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

- Structural – IE that could lead to a structural or confinement failure, such as a failure of one of the redundant seals or crane handling failure that could lead to drops and rupture of the canister.

- Criticality – IE that could lead to inadvertent criticality, such as a failure to maintain pool poison concentration or inadvertently loading the wrong fuel assemblies.

Overview

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

- Shielding – IE that could lead to a shielding failure, such as a failure of temporary shielding, placement of water in the annulus, and failure of equipment used for radiation protection or a crane handling event that challenge dose rate requirements

- Thermal/Cladding – IE that could lead to cladding failure, such as exceeding temperature limits during vacuum drying or vent blockage on the storage pad.

NMSS
Division of Spent Fuel Management

Overview

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

- Mitigating Systems (MS) (Exhibit 2)

  - Safety Protection Systems of the DCSS - For purpose of this subsection, the dry cask storage structures, systems, and components (SSCs), or devices of concern are those that are important to safety, and provide a risk significant or risk relevant mitigating function in response to an initiating event during handling (loading), transfer, and/or storage

  - Focus on the decay heat removal systems if applicable, design type deficiencies, and technical specifications violations

Overview

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

- Safety Protection Systems of the Dry Cask Storage System (DCSS)

Is the finding a deficiency affecting the design or qualification of a dry cask storage structure, system, and component, (SSC) or device used to response to an initiating event, and does the SSC or device maintain its operability or functionality?

a. If YES → Screen as Green.

b. If NO, continue

Does the finding represent a loss of a safety function for the DCSS?

a. If YES → Stop. Go to IMC 0609, Appendix M.

b. If NO, continue.

Does the finding represent an actual loss of function of a SSC, or device greater than its technical specification allowed outage time?

a. If YES → Stop. Go to IMC 0609, Appendix M.

b. If NO, screen as Green.

NMSS Division of Spent Fuel Management

Overview

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

- Barrier Integrity (BI) (Exhibit 3)

  - The barrier integrity screening questions focuses on the DCSS shielding/criticality, fuel cladding, and confinement type findings

NMSS
Division of Spent Fuel Management

Overview

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

- Dry Cask Storage System (DCSS) Confinement:

  - Does the finding only represent a challenge or degradation of the redundant sealing of the confinement boundary?

    If YES → Screen as Green.

    If NO, continue

  - Does the finding involve an actual loss of the confinement barrier (i.e., both seals)?

    If YES → Stop. Go to IMC 0609, Appendix M.

    If NO, screen as Green.

Overview

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

- Use the four part write-up format to document inspection findings from IMC-0612

Before	After
Traditional Enforcement	Significance Determination Process
Severity Level: IV, III, II, I	Color: Green, White, Yellow, Red
1 - Part Write-up	4 – Part Write-up

NMSS Division of Spent Fuel Management

Next Steps

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

- We completed internal comments on the draft SDP (i.e., Appendix N of IMC 0609) May 2015
- We conducted some initial training during the counterpart meetings for Regional and HQ Inspectors
- Changes needed for implementation of the new SDP are the Enforcement Policy and IMC-0612
- Target implementation date based on comment resolution and stakeholder involvement

NMSS Division of Spent Fuel Management

Questions

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

NMSS
Division of Spent Fuel Management