

# NRC INSPECTION MANUAL

SFPO/NMSS

## MANUAL CHAPTER 2690

### INSPECTION PROGRAM FOR DRY STORAGE OF SPENT REACTOR FUEL AT INDEPENDENT SPENT FUEL STORAGE INSTALLATIONS

#### 2690-01 PURPOSE

To define the inspection program requirements for the dry storage of spent reactor fuel and other radioactive materials associated with spent fuel storage at an independent spent fuel storage installation (ISFSI). This inspection manual chapter (IMC) covers all activities related to dry storage ISFSIs, including: operations, maintenance, surveillance testing, preoperational testing, design control, fabrication, and construction. Guidance on scheduling inspections is contained in Appendices A and B. The Fort St Vrain Modular Vault Dry Storage system is an ISFSI and is within the scope of this IMC. The guidance contained in Appendix B of this IMC may also be used for the inspection of a monitored retrievable storage (MRS) facility and an away from reactor (AFR) site ISFSI.

#### 2690-02 OBJECTIVES

- 02.01 To establish the general policy and responsibilities for the inspection of ISFSIs.
- 02.02 To define the program for inspecting ISFSIs and related activities.
- 02.03 To provide a framework to achieve a uniform level of inspection.

#### 2690-03 DEFINITIONS

03.01 ISFSI. An independent spent fuel storage installation (ISFSI) is a facility designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with the spent fuel (10 CFR 72.3). The term ISFSI refers to the facility authorized for storage of spent nuclear fuel under Part 72 and includes the storage pad, the storage containers, and any support facilities. However, if the ISFSI is located at a reactor site, it does not include any structures, facilities, or services that are part of the 10 CFR Part 50 license, unless they are identified as being shared jointly. Additional background information on ISFSIs may be found in Reference 07.01.

03.02 DCSS. Dry cask storage system (DCSS) is the term used to describe the physical system, either a cask or a canister in its shielding overpack, that holds the spent fuel and is a component of the ISFSI. An ISFSI may contain several different DCSS designs.

03.03 MRS. A monitored retrievable storage (MRS) installation is a complex designed, constructed, and operated by the Department of Energy under the *Nuclear Waste Policy Act of 1987* (NWPA) for the receipt, transfer, handling, packaging, possession, safeguarding, and storage of spent nuclear fuel and solidified high-level radioactive waste resulting from civilian nuclear activities (10 CFR 72.3).

03.04 For this inspection program, four different entities will be discussed.

- a. Licensee. An organization that is operating an ISFSI for the storage of spent fuel and other radioactive materials associated with spent fuel under a Part 72 license. The licensee is ultimately responsible for ensuring that the ISFSI is designed, fabricated, constructed, and operated in accordance with the requirements contained in Part 72 and the site-specific license or the general license CoC. The licensee may also fabricate DCSS components or construct ISFSI structures, such as the storage pad.
- b. Vendor. An organization, typically independent from the licensee, that is responsible for the design of a particular DCSS and ensuring that design commitments contained in the safety analysis report (SAR) are met during the fabrication of the DCSS. For a general license ISFSI, the vendor is also typically the CoC holder for the DCSS. For a site-specific license ISFSI, there is no CoC, and the SAR contains the relevant information on the design and fabrication of the specific DCSS being used. Regardless of the type of license, the vendor is also responsible for ensuring that the DCSS is designed and fabricated in accordance with the applicable requirements.
- c. CoC Holder. A vendor that has obtained Nuclear Regulatory Commission (NRC) approval for a specific DCSS under Part 72, Subpart L. The issuance of a CoC to the vendor authorizes the use of the DCSS in an ISFSI under the general license.
- d. Fabricator. An organization that is physically building the DCSS components and receives design oversight from either the vendor, licensee, or both. The fabricator is responsible for manufacturing the DCSS in accordance with the vendor's requirements and drawings.

03.05 There are two types of licenses governed by Part 72 - a general license or a site-specific license (10 CFR 72.6).

- a. General License. Any person issued a license under 10 CFR Part 50 to possess or operate nuclear power reactors is also issued a general license under Part 72, Subpart K, to store spent fuel at an ISFSI located at that power reactor site. This general license authorizes the use of a DCSS that has been previously approved under Part 72, Subpart L.
- b. Site-Specific License. Any person or entity may submit an application under Part 72 for a site-specific ISFSI license. The application should contain detailed

information on the ISFSI's site characteristics and the particular DCSS to be used. Under a site-specific license any DCSS design can be used at any location. While a site-specific Part 72 license is independent from a co-located Part 50 reactor license, some structures, systems, and programs—that are part of the licensing basis for the reactor license—may be shared.

03.06 Away-from-Reactor (AFR). For the purposes of this IMC, an AFR ISFSI is defined as a site-specific licensed ISFSI that is located outside the site boundaries (property lines) for any power reactor licensed under Part 50. The site boundaries for a power reactor are described (pictured) in the associated Part 50 licensee's updated final safety analysis report (UFSAR).

03.07 Integrated Inspection Plan. An integrated inspection plan (IIP) is a document developed by the cognizant region, with input from the Spent Fuel Project Office (SFPO) on technical, regulatory, prior performance, and lessons learned for each new ISFSI site (see Section 05.05). The IIP provides supplemental guidance for planning and scheduling the numerous inspections and any technical reviews that are required before initial loading of spent fuel into the ISFSI. The IIP is intended to ensure that adequate resources are applied so that significant safety issues are resolved before initial loading of spent fuel into the ISFSI.

## 2690-04        RESPONSIBILITIES AND AUTHORITIES

04.01 Director, SFPO, Office of Nuclear Material Safety and Safeguards (NMSS). Directs the activities of the SFPO and is responsible for their implementation. Approves the inspection program and procedures for activities relating to the dry storage of spent reactor fuel and other radioactive materials at ISFSIs.

### 04.02 SFPO, NMSS

- a. Develops and implements the Agency's regulatory, licensing, and inspection programs for the storage of nuclear reactor spent fuel.
- b. Develops and assesses the overall effectiveness of the spent fuel dry storage inspection program.
- c. Develops, modifies, and revises inspection program guidance (NRC IMCs and inspection procedures (IPs)) under SFPO's purview to ensure that ISFSI-related activities are conducted in accordance with appropriate regulations and standards. Incorporates lessons learned into the inspection program for IMCs and IPs under SFPO's purview. Recommends changes to other organizations for IMCs and IPs under their purview.
- d. Serves as a source of technical expertise for questions on DCSS' or ISFSIs (e.g., DCSS design requirements, ISFSI siting criteria, accident analysis, or conditions contained in the site-specific license or CoC).

- e. Manages the assignment, scheduling, and performance of inspections of ISFSI vendors (including CoC holders) and fabricators.
- f. Provides SFPO inspection resources to support region-led inspections of ISFSIs, in accordance with the IIP. Plans, schedules, and coordinates, with the Regional Branch Chief, any inspections of ISFSI vendors, fabricators, and CoC holders, in accordance with the IIP. While resources for ISFSI inspections are budgeted in advance together with NRR, the regions are allowed some flexibility in their actual allocation of ISFSI inspection resources to reflect changes in inspection schedule and scope.
- g. Serves as the focal point for collecting lessons learned from previous IIPs and provides expertise in the development of new IIPs.
- h. Participates with the Regional Branch Chief in the development of an IIP for each new ISFSI site (see Section 05.07).
  - 1. Provides input on technical and regulatory issues, associated with the specific ISFSI and DCSS being used, to the region, for inclusion in the IIP.
  - 2. Based on review of the NRC safety evaluation report (SER), identifies any special inspection resources necessary to resolve technical or regulatory issues for inclusion in the IIP.
  - 3. Based on lessons learned from prior IIPs and licensee, vendor, and fabricator prior performance, identifies any technical, regulatory, performance, or scheduling issues for inclusion in the IIP.
- i. Interfaces, as necessary, with the various Office of Nuclear Reactor Regulation (NRR), project and technical division staffs, regarding the inspection of ISFSI activities at Part 50 reactor sites.

#### **04.03 SFPO Project Manager (SFPO/PM)**

- a. For all assigned ISFSIs, serves as the focal point of contact for technical and regulatory issues that affect the ISFSI. The NRR/PM is the point of contact for ISFSI issues that affect the reactor's structures, systems, and components (SSCs) (see Section 04.09).
- b. For all assigned Part 50 reactor site ISFSIs, serves as the focal point of contact for the NRR/PM where operation of reactor affects the ISFSI's SSCs. Serves as the focal point of contact for the NRR/PM or Regional Branch Chief requests to obtain SFPO resources.
- c. For all assigned Part 50 reactor site ISFSIs, serves as the focal point of contact for all ISFSI issues after site project management responsibilities have been assumed by NMSS.
- d. For all assigned AFR ISFSIs, serves as the focal point of contact for all AFR ISFSI issues.

04.04 Regional Administrator

- a. Oversees the implementation of the ISFSI inspection program elements that are performed by the regional office.
- b. Ensures, within assigned budget limitations, that the regional office staff includes adequate numbers of inspectors necessary to carry out the inspection program described in this IMC.

04.05 Regional Division Director

- a. Manages the implementation of the ISFSI inspection program as assigned by the Regional Administrator.
- b. Directs the execution of the ISFSI inspection program elements that are performed by his/her division.
- c. Ensures that allocated inspection resources are appropriately scheduled for the routine inspection of the region's ISFSIs, using the regional planning process.
- d. Ensures that necessary reactive inspection resources are applied to deal with events and problems at the Region's ISFSIs, as required.
- e. Approves the IIP prepared for each new ISFSI site in the region (see Section 05.05).
- f. Approves changes to the inspection frequency of inspections listed in Table B-3, as authorized by Appendix B of this IMC.

04.06 Regional Branch Chief

- a. For each assigned ISFSI, manages the planning, scheduling, and performance of inspections of ISFSIs using the inspection resources allocated by the regional planning processes.
- b. For each assigned ISFSI, contacts the SFPO/PM, as necessary, to request SFPO resources in response to any events or problems at his/her assigned ISFSIs.
- c. For each assigned ISFSI, ensures that accountability is maintained over the implementation of the inspection program per the guidance in Sections 05.03 and 05.05.
- d. For each assigned ISFSI, notifies the SFPO/PM of any changes to inspection frequencies for the inspections listed in Tables A-2, B-2, and B-3 of Appendices A and B of this IMC.
- e. For each assigned ISFSI, ensures that inspections of ISFSI activities are documented in accordance with Sections 05.07 and 05.08.

- f. For each assigned new ISFSI, creates an IIP for each new ISFSI site in the region in accordance with Section 05.05.
- g. For each assigned ISFSI, provides feedback and any lessons learned to the applicable SFPO/PM, after the IIP has been completed.

04.07 Regional Liaison for Spent Fuel Storage Issues [Optional]

- a. Provides assistance to Regional Branch Chiefs and inspectors to ensure consistency in inspection planning and oversight of the region's ISFSI activities.
- b. Serves as a regional point of contact for interactions with the SFPO and NRR on ISFSI policy and program issues.

04.08 NRR

- a. Retains oversight of spent fuel at operating and decommissioned reactors, until the fuel has either been safely stored in an ISFSI or transferred offsite.
- b. Provides inspection resources, as requested, to NMSS or the Regions for routine and reactive ISFSI inspection activities performed at Part 50 licensees in accordance with IMCs 2515, "Light-Water Reactor Inspection Program - Operations Phase," and 2561, "Power Reactor Inspection Program - Decommissioning."

04.09 NRR Project Manager (NRR/PM)

- a. Serves as the focal point of contact on issues where the operation of an ISFSI, located at a Part 50 reactor site, affects the reactor's SSCs (e.g., 10 CFR 50.59 issues). Informs the SFPO/PM if any such issues are identified and of any technical and regulatory issues related to a particular ISFSI.
- b. Serves as the point of contact for the SFPO/PM in obtaining NRR resources and support on ISFSI issues, for an ISFSI located at a Part 50 reactor site.
- c. Contacts the assigned SFPO/PM with any requests for SFPO resources and support on issues where the ISFSI is affecting the Part 50 reactor site.
- d. Serves as the point of contact for public and media inquiries on ISFSI issues, for an ISFSI located at a reactor site, and for any AFR ISFSI sites in the region. Contacts the assigned SFPO/PM for additional information or guidance as required.

2690-05 PROGRAM DESCRIPTION

05.01 Inspection Program for ISFSI Activities Where the ISFSI Is Located at a Part 50 Reactor Site. The program for inspecting either a general or site-specific licensed ISFSI, which is located at a reactor site, is described in Appendix A of this IMC.

05.02 Inspection Program for AFR ISFSI Activities. The program for inspecting a site-specific licensed AFR ISFSI is described in Appendix B of this IMC.

05.03 Planning, Scheduling, and Tracking of Inspection Activities. Each region should implement a system for planning, scheduling, and recording of completed inspections of ISFSI activities in accordance with regional requirements.

05.04 SFPO Scheduling of Fabricator Inspections. The scheduling of vendor and fabricator inspections should consider vendor or fabricator performance and recent vendor or fabricator inspections performed for other ISFSI licensees. Additional inspections may be conducted as required. The SFPO will inform any affected regions of the schedule for inspecting vendors or fabricators and any schedule changes, as soon as the need for the change is identified.

05.05 IIP. For a new ISFSI site being constructed, the applicable Regional Branch Chief, with input and assistance from the SFPO, should develop an IIP in accordance with the guidance listed below. The cognizant Regional Division Director should approve the IIP and the SFPO will concur in it. The IIP should be forwarded to the NRR/PM for information and for use in planning and scheduling any requested Headquarters inspections or technical reviews. The Region should inform the SFPO/PM and NRR/PM if any changes are subsequently made to the IIP, as soon as the need for the change is identified.

- a. The IIP should be developed as early as possible with a goal of issuance 12 to 24 months before the licensee or applicant intends to begin storage of spent fuel in the ISFSI.
- b. For activities directly relating to the ISFSI (e.g., design, construction, fabrication, preoperational testing, and operations), the IIP should include a list of the IPs to be used, the number of inspections required to complete a specific IP, estimated inspection resources, a principle inspector, and any requests for NRR or SFPO technical assistance or inspection resources.
- c. For activities that support operation of the ISFSI (e.g., the licensee's or applicant's programs for quality assurance, security, emergency preparedness, or radiation protection), the IIP should contain information similar to that specified in paragraph b. above. SFPO should provide input on the scope of these reviews. Each support program being reviewed should be listed as a specific element in the IIP.
- d. The IIP should indicate licensee milestones, planned inspection dates, and any linkages between the two (e.g., the relationship between dates for inspecting the ISFSI support pad and the licensee's planned pad construction and concrete placement schedule).
- e. Based on the SAR, SER, previous inspections, vendor or fabricator prior performance, and lessons learned from previous IIPs, the SFPO should identify to the region any technical, regulatory, or performance issues that should be included as specific elements in the IIP. This may include inspections of vendors or fabricators.

- f. For an AFR ISFSI, the SFPO and the region should jointly determine which NRC Inspection Manual IPs, or sections of IPs, are appropriate to inspect the licensee's or applicant's implementation of those programs that support operation of the ISFSI (see list of typical programs in Section B of Appendix B).
- g. The following guidance should be used in scheduling inspections of licensee or applicant activities:
  - Inspection of the quality assurance program should be completed before design activities are finished. If possible, inspections should be completed before design activities are begun.
  - Inspection of design activities should be performed during the design process and should be completed before construction or fabrication activities begin, if possible.
  - Inspection of design activities should include a review of any design changes or modifications made by the licensee or CoC holder and the associated safety evaluations completed in accordance with 10 CFR 72.48 or the CoC (see also Section 05.09).
  - Inspection of a general licensee's 10 CFR 72.212(b) evaluations should be completed before the preoperational testing begins. However, review of the 72.212(b) evaluations of the ISFSI support pad should be performed before the support pad is completed. Refer to IP 60856, "Review of 10 CFR 72.212(b) Evaluations."
  - Initial inspection of ISFSI operating procedures (i.e., loading, unloading, abnormal, and emergency) should be performed before the preoperational testing occurs. A final inspection, if required, of the licensee's approved procedures should be completed before the licensee begins to store spent fuel in the ISFSI. Note: Some licensees may use the dry run (part of the preoperational testing) as a method of validating these procedures before approving them for use.
- h. After the IIP has been completed, the Regional Branch Chief should provide an assessment of the IIP and any lessons learned to the SFPO/PM for use in developing future IIPs.

**05.06 Reporting Procedures.** Results of inspections conducted by the regional offices shall be documented in accordance with regional requirements. Results of inspections conducted by headquarters shall be documented as described below in 05.07. Inspection reports or inspector notes shall contain the relevant Part 72 docket number and, for site-specific licensees, the license number. Inspections of Part 72 activities that are combined with inspection reports of Part 50 activities, for ISFSIs located at reactor sites, shall also include the relevant Part 72 docket number and, for site-specific licenses, the Part 72 license number.

**05.07 Methods of Documenting Inspection Results for Headquarters-Led Inspections.** Inspection results shall be documented in inspector notes or in narrative report format depending on inspection outcome. When using inspector notes, NRC Form 591 shall be used to document the result of the inspection with respect to enforcement status. At SFPO

discretion, narrative reports may be used outside of the situations described below in 05.07(b).

- a. Each IMC 2690 inspection procedure has a corresponding inspector notes form that shall be used for inspection planning and for documenting inspection results. SFPO maintains the files for these forms. Inspector notes do not have to be typed, but should be legible and should contain: (1) sufficient detail to describe the inspection that was conducted, including observations; (2) the compliance status of topics examined during the inspection; (3) the status of follow-up items involving prior enforcement or reported licensee or vendor events; (4) any additional information related to violation findings, and completed or anticipated corrective actions to any identified violations, documented on the NRC Form 591; and (5) sufficient detail for management and other inspectors to evaluate the licensee's or vendor's overall status with respect to implementation of their quality assurance program. A different inspector should be able to use the inspector notes in preparing for a subsequent inspection, and to determine whether corrective actions have been taken.
- b. A narrative report is required for reactive inspections and for findings which may involve an enforcement conference or escalated enforcement. For escalated cases, the narrative report should only address the areas in which safety concerns and violations are identified and all other areas shall be covered in the inspector notes. Inspector notes must document routine inspection activities that are not covered in the narrative report. All inspection documentation shall be filed in the licensee or vendor docket file.

**05.08 Methods of Transmitting Inspection Results.** Region-based inspection reports shall be transmitted to licensees in accordance with regional instructions. For headquarters-led inspections, results shall be reported to the licensee or vendor by issuing the following: 1) an NRC Form 591 (in accordance with the guidance in this IP and the Enforcement Manual), or 2) issuance of a narrative report for those situations described in 05.07(b).

Inspector notes (used for headquarters-led inspections) shall be reviewed and signed by the Transportation and Storage Safety and Inspection Section (TSSI) Section Chief and a copy provided to the NRC docket room for placement in the licensee or vendor docket file.

- a. NRC Form 591, "Safety Inspection," shall be used: (1) to document clear inspections and inspections resulting in Severity Level IV violations (that are neither willful nor repetitive) that can be corrected while the inspector is present, or that the licensee or vendor is able to correct easily; and (2) to document non-cited violations (NCVs), as discussed in the Enforcement Manual, Section 4.3. When the NRC Form 591 is used to document the results of an inspection, the inspector must ensure that for each cited and non-cited violation, the form includes a brief statement of the circumstances, including the date(s) of the violation or NCV and the facts necessary to demonstrate that a requirement was not met, and reference to the regulation or license condition that was violated. The inspector shall also document on the form (as well as in inspector notes) the corrective actions that the licensee or vendor has taken or plans to take to address each

violation identified. The following are examples of how to document citations on an NRC Form 591:

1. Design calculation did not receive required independent review. [10 CFR 72.146(b)]
2. Purchased material was not obtained from an approved vendor. [10 CFR 72.154(a)]

The inspector must also ensure that the findings are documented in the inspector notes in sufficient detail for the reader to determine what requirement was violated, how it was violated, who violated the requirement, and when it was violated. If the licensee or vendor provides corrective action for the violations, this information should also be included in the inspector notes. In addition, for NCVs, the inspector notes shall document why the violation was not cited and the corrective action taken or planned. The inspector will present NRC Form 591 to the licensee or vendor at the conclusion of the exit interview, or, on rare occasions where consultation with management is necessary, the inspector may mail NRC Form 591 from the office.

05.09 Authority to Approve Changes to the ISFSI or DCSS. Effective with a rule change that became effective April 5, 2001, licensees, vendors and CoC holders are all authorized by the provisions of 10 CFR 72.48 to make changes to the ISFSI or DCSS described in the SAR, to approve changes to procedures described in the SAR, or to perform tests or experiments not described in the SAR without prior NRC approval.

#### 2690-06 DEFINITIONS OF INSPECTION FREQUENCIES FOR APPENDIX A AND B

06.01 Triennially (TA). The inspection effort should be performed approximately every 3 years so that the interval between inspections is no less than 30 months and no more than 42 months.

06.02 Biennially (BA). The inspection effort should be performed approximately every 2 years so that the interval between inspections is no less than 20 months and no more than 28 months.

06.03 When Required (W). The inspection effort should be performed when the activity or event occurs at the facility as specified in Appendices A, B, or the guidance section of specific inspection procedures.

#### 2690-07 REFERENCES

07.01 NUREG-1571, "Information Handbook on Spent Fuel Storage Installations," December 1996

07.02 NUREG-1536, "Standard Review Plan for Dry Cask Storage System," February 1997

END

Appendices:

- A. "Inspection Program Guidance for Reactor Site ISFSIs"
- B. "Inspection Program Guidance for Away From Reactor Site ISFSIs"