
MANUAL CHAPTER 2690

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

2690-01 PURPOSE

To define the requirements and provide policy guidance for the inspection of activities for which a license or Certificate of Compliance (CoC) has been issued under 10 CFR Part 72, 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 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.

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 is a complex (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). Spent fuel must have aged for a minimum of at least 1 year before it is placed in an ISFSI (10 CFR 72.2(a)(1)). However, the minimum aging period may be longer, depending on the thermal design limitations of the dry cask storage system (DCSS) being used. ISFSIs may be initially licensed for a period up to 20 years. The license may also be renewed for an additional 20 years. 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 is the term used to describe the physical container (cask or canister) holding the spent fuel and is a component of the ISFSI. An ISFSI may contain several DCSS' of different design.

03.03 MRS. A monitored retrievable storage installation is a complex designed, constructed, and operated by the Department of Energy under the *Nuclear Waste Policy Act of 1987* (NWPAA) 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 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 05.07). 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.
- 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 05.07).
- 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 Section 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 05.08 and 05.09.
- f. For each assigned new ISFSI, creates an IIP for each new ISFSI site in the region in accordance with Section 05.07.
- 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, until project management responsibilities for that Part 50 reactor site have been turned over to NMSS.

2690-05 PROGRAM DESCRIPTION

05.01 Safety classification of ISFSI SSCs. Some ISFSI SSCs are classified as important to safety; all others are classified as not important to safety.

- a. Important to Safety includes all SSCs that:
 - 1. Maintain the functions or conditions required to store spent fuel safely (i.e., containment, criticality, shielding, and heat removal);
 - 2. Prevent significant damage to the spent fuel container (i.e., DCSS) during handling and storage; or
 - 3. Provide reasonable assurance that spent fuel can be received, handled, packaged, stored, and retrieved without undue risk to public health and safety.
- b. Not Important to Safety. All other ISFSI SSCs are considered not important to safety. For not-important-to-safety SSCs, the licensee's or applicant's use of generally accepted commercial standards and practices in the design, fabrication, and construction of the SSCs is considered acceptable. Components must conform to the design described in the SAR.

Inspectors, technical reviewers, and supervisors need to carefully review the licensee's design basis documents to determine if the licensee has applied the correct safety classification to a particular SSC before performing an inspection or technical evaluation. Site-specific variations in the ISFSI design may affect the safety classification of the SSC. The SFPO/PM may be contacted for assistance on determining the safety classification of any ISFSI SSCs.

05.02 Impacting Reactor Safety-Related SSCs. Although none of an ISFSI's SSCs are considered safety-related, ISFSI-related activities inside the reactor or fuel handling buildings (e.g., lifting of heavy loads or movement of spent fuel) may have a direct impact on a reactor plant's safety-related SSCs. Therefore, ISFSI-related activities, at reactor sites, that affect the reactor's safety-related SSCs, involve or require 10 CFR 50.59 safety evaluations, or involve changes to the Part 50 technical specifications, should receive additional attention. Questions on ISFSI activities potentially affecting reactor safety-related SSCs should be referred to the NRR/PM.

05.03 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.

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

05.05 Planning, Scheduling, and Tracking of Inspection Activities. Each region should implement a system for planning, scheduling, and recording of completed inspections of ISFSI activities.

- a. For ISFSIs located at a reactor site, the Region should use the Master inspection planning (MIP) system or any replacement system.
- b. For AFR ISFSIs, the region should use the MIP system, any replacement system, or establish a system with the following four attributes.
 1. Planning of inspections.
 2. Scheduling of inspections.
 3. Reviewing previously identified items.
 4. Recording completed inspections.

05.06 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.

05.07 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, the lead 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 02.01 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 05.10).
 - 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.
 - Inspection of procedures supporting operation of the ISFSI should be completed before preoperational testing of the ISFSI is completed.
 - 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.

05.08 Reporting Procedures. Inspection reports of Part 72 activities, performed by either Headquarters or regional inspectors, shall be documented in accordance with IMC 0610. Inspection reports of Part 72 activities shall contain the relevant Part 72 docket number and, for site-specific licensees, the license number. For each report, time shall be charged in RITS for the appropriate IMC 2690 inspection procedure. 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.

05.09 Performance Assessment

- a. For an ISFSI located at an operating Part 50 reactor site, any relevant ISFSI inspection findings should be included in periodic SALP¹ assessments. Relevant inspection findings may be included in the SALP report, at the discretion of the SALP board. NOTE: SALP assessments are not performed for power reactor sites that are permanently shut down nor for AFR ISFSIs.
- b. ISFSI licensee violations of NRC regulations should be addressed using the guidance contained in NRC Enforcement Policy.²

05.10 Authority to Approve Changes to the ISFSI or DCSS

- a. Licensees. Only licensees are 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.
- b. Vendors and CoC Holders. Vendors and CoC holders are not authorized by the provisions of 10 CFR 72.48 to approve changes to the ISFSI or DCSS, to approve changes to procedures described in the SAR, or to perform tests or experiments not described in the SAR without prior NRC approval.

NOTE: Although vendors and CoC holders are not authorized by the provisions of 10 CFR 72.48 to perform these types of activities, an equivalent authority may be granted to the CoC holder if the CoC contains an explicit condition that authorizes such changes.

In that case the CoC holder may:

- (1) make changes in the specific DCSS design described in the SAR;
- (2) make changes to procedures described in the SAR; or
- (3) conduct tests or experiments not described in the SAR;

without prior NRC approval, unless the proposed change, test, or experiment involves a change in the CoC, an unreviewed safety question, a significant increase in occupational exposure, or a significant unreviewed environmental impact.

2690-06 DEFINITIONS OF INSPECTION FREQUENCIES

06.01 Quadrennially (QA). The inspection effort should be performed approximately every 4 years so that the interval between inspections is no less than 40 months and no more than 56 months.

06.02 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.

06.03 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.

¹ NRC Management Directive 8.6, "Systematic Assessment of Licensee Performance (SALP)."

² NUREG 1600, "General Statement of Policy and Procedures for NRC Enforcement Actions."

06.04 SALP Cycle (SC). The inspection effort should be performed every inspection planning cycle (typically 18 to 24 months) so that the interval between inspections is no less or no greater than the inspection planning cycle \pm 4 months.

06.05 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.

07.03 NUREG-1567, "Standard Review Plan for Spent Fuel Storage Facilities," October 1996 [DRAFT].

END

Appendices:

- A. "An Inspection Program for an ISFSI Located at a Reactor Site"
- B. "An Inspection Program for an ISFSI Located Away From Any Reactor Site"