
INSPECTION PROCEDURE 60856

REVIEW OF 10 CFR 72.212(b) EVALUATIONS

Effective Date: 01/01/2021

PROGRAM APPLICABILITY: 2690

60856-01 INSPECTION OBJECTIVE

Title 10 of the Code of Federal Regulations (10 CFR) 72.210, “General license issued,” grants a general license for the storage of spent fuel in an independent spent fuel storage installation (ISFSI) at power reactor sites to any person authorized to possess or operate nuclear power reactors under 10 CFR Part 50. Section 72.210 gives the conditions for this general license and 72.212(b) delineates requirements that the general licensee shall meet. This inspection procedure (IP) provides guidance for determining whether a general licensee has met these requirements before operating its ISFSI.

60856-02 INSPECTION REQUIREMENTS

The following are the minimum inspection requirements to be performed during each inspection. The requirements were established following the development of a risk-informed performance-based inspection program and the establishment of five safety focus areas. The five safety focus areas include: occupational exposure, public exposure, fuel damage, confinement, and impact to plant operations. Successful implementation of this inspection procedure will include a review of licensee activities in each safety focus area. Inspection Manual Chapter (IMC) 2691, “Technical Basis for the Independent Spent Fuel Storage Installation Inspection Program,” provides a description of the ISFSI inspection program technical basis.

If significant or multiple performance deficiencies are identified, then the inspector shall perform additional inspection activities to determine the breadth of performance deficiencies and their reasons. The additional inspection activities shall be approved by regional management. The basis for the added inspection activity shall be communicated to the licensee and documented in a publicly available record, such as the inspection report. IMC 2690, “Inspection Program for Storage of Spent Reactor Fuel and Reactor Related Greater than Class C Waste at Independent Spent Fuel Storage Installations and for 10 CFR Part 71 Transportation Packagings,” provides guidance on when to consider performance-based inspection activity.

02.01 Review of Licensee Evaluations. [72.212(b)(5)]¹

Determine whether:

- a. The licensee performed written evaluations which established that the conditions set

¹ Numbers in brackets refer to the applicable Section of 10 CFR Part 72, Subpart K.

forth in the Certificate of Compliance (CoC) have been met.

- b. The licensee performed written evaluations which established that the requirements of 10 CFR 72.104, "Criteria for radioactive materials in effluents and direct radiation from an ISFSI or MRS," and 10 CFR 72.106, "Controlled area of an ISFSI or MRS," regarding effluents and direct radiation from an ISFSI have been met.

02.02 Review of Site Characteristics Against Safety Analysis Report (SAR) and Safety Evaluation Report (SER) [72.212(b)(6)]

Verify that the licensee reviewed the SAR referenced in the DSS CoC and associated U.S. Nuclear Regulatory Commission (NRC) SER and determined that the DSS design bases used in these reports are enveloped by the reactor site parameters. Ensure the licensee has documented this review as required by 10 CFR 72.212(b)(5).

02.03 Review of ISFSI Activities for Determination of No Adverse Impact on Site Operations or Technical Specifications (TS). [72.212(b)(8)]

Determine if the licensee evaluated whether activities related to storage of spent fuel under the general license involved a change in the facility TS or required a license amendment for the facility in accordance with 10 CFR 50.59(c). Ensure the licensee has documented this review as required by 10 CFR 72.212(b)(5).

02.04 Review of Programs Impacted by ISFSI Operation. [72.212(b)(10)]

Verify that the licensee reviewed the following programs to determine if their effectiveness is decreased. If so, determine whether the necessary changes were made and if necessary, approvals (internal or external) were sought and obtained.

- a. Emergency plan;
- b. Quality assurance program (QAP);
- c. Radiation protection program; and
- d. Training program.

02.05 ISFSI Procedures. [72.212(b)(13)]

Verify that activities related to storage of spent fuel under the general license will be performed only in accordance with licensee written procedures.

02.06 Review of 10 CFR 72.48 Evaluations.

Verify when selected changes, tests, or experiments were made, that evaluations were performed in accordance with 10 CFR 72.48, "Changes, tests, and experiments". If the licensee is switching cask systems, this should include 10 CFR 72.48 evaluations associated with the changes to the 10 CFR 72.212 evaluations in accordance with 10 CFR 72.212(b)(7).

60856-03 INSPECTION GUIDANCE

03.01 General Guidance.

The inspectors should refer to the risk prioritization table in Manual Chapter 2690, Appendix D. A majority of the inspectors' focus should include review of Priority Level 1 items. The totality of items selected for inspection should also address the five safety focus areas described in IMC 2691, Section 04.05.

- a. If assistance is needed, the inspector may need to refer questions on ISFSI activities potentially affecting safety-related reactor systems, structures or components (SSCs) to the cognizant regional branch. Specific ISFSI-related technical questions may need to be referred to the cognizant Division of Fuel Management (DFM) project manager (PM).
- b. Review of cask storage supporting pads and area engineering evaluations required by 10 CFR 72.212b(5)(ii) are performed in IP 60853, "On-Site Fabrication of Components and Construction of an Independent Spent Fuel Storage Installation".
- c. If the licensee intends to use a different model or type of dry storage system (DSS), for which a preoperational testing program has not been completed, then applicable portions of IP 60854, "Preoperational Testing of an Independent Spent Fuel Storage Installation" and this procedure may be revisited.

03.02 Specific Guidance.

- a. Inspection Requirement 02.01. This requirement impacts all five safety focus areas.
 1. In evaluating CoC conditions:
 - (a) The inspectors should review the CoC for the DSS to be used by the licensee and identify any conditions that should be considered in the licensee's evaluations. The Conditions section of the CoC may additionally refer to an attached TS, Approved Contents, Design Features, or similar document. This attachment will likely contain regulatory requirements such as site-specific parameters and analyses that the user must verify. It may also contain requirements for additional procedures, heavy load considerations, training and preoperational testing, and for the "first cask in place." The TS Functional and Operational Limits and Approved Contents sections may also contain surveillance requirements, restrictions on the characteristics of the spent fuel (or other contents) that may be loaded in the DSS, and other physical parameters that must be observed.
 - (b) The inspectors should review the licensee's evaluations to verify that the conditions identified in Section 03.02.a.1.(a) above were considered. The inspectors should perform independent technical review of the evaluations to assess whether the applicable CoC conditions were met. The inspectors should also determine whether the licensee's analyses used the appropriate DSS FSAR conditions and assumptions to ensure that the licensee has adequately demonstrated compliance with all applicable

conditions of the CoC.

CoC and reactor facility differences will present a variety of site-specific evaluations. An example of site-specific evaluations includes lifting and transport operations of the DSS while outside of the Part 50 facility. While lifts within the licensee's 10 CFR Part 50 facility may be covered by the reactor facility's control of heavy loads program reviewed in Section 02.03 of this IP, lifting and transport operations outside the Part 50 facility may need to be reviewed purely on their impact on the DSS. Inspectors should review the licensee's evaluations associated with lifting and transport operations to verify that they meet CoC requirements and are bounded by the licensee's accident analysis contained within the FSAR.

- (c) While performing this review, the inspectors should verify that applicable CoC conditions have been incorporated into procedures (operational or programmatic, as applicable). This should be documented by the procedure review in 02.05 of this IP.
2. In evaluating the 10 CFR 72.104, "Criteria for radioactive materials in effluents and direct radiation from and ISFSI or MRS," and 10 CFR 72.106, "Controlled Area of an ISFSI or MRS,":
- (a) The inspectors should verify the licensee has assessed the ISFSI's impact on the annual dose-equivalent exposure for normal operations and anticipated occurrences to a real individual who is beyond the controlled area in accordance with 10 CFR 72.104. The inspectors should verify that the licensee has appropriately identified the real individual beyond the controlled area that will receive the largest dose associated with the ISFSI. Specifically, it should be verified if conservative distances from the ISFSI and occupancy factors are utilized as inputs to the evaluation in accordance with NUREG-2215, "Standard Review Plan for Spent Fuel Dry Storage Systems and Facilities," Chapter 10B. The inspectors should verify that assumptions used in the evaluation are bounding of planned operations at the site including fuel assembly characteristics, type of DSS loaded, and number of DSSs. Additionally, inspectors should evaluate the addition of other uranium fuel cycle operations in accordance with 10 CFR 72.104(a)(3).
 - (b) The inspectors should verify the licensee has assessed the ISFSI design basis accident radiological impact on any individual located on or beyond the nearest controlled area boundary in accordance with 10 CFR 72.106. The inspectors should evaluate the licensee's abnormal operating and accident event in the FSAR and determine if there are any credible increases in either direct radiation exposure or radiological effluents due to these events. Any increase in radiation exposure or radiological effluents against the dose requirements of 10 CFR 72.106 at the controlled area boundary should be evaluated. Also, whether the introduction of the DSS has created a new accident at the facility and needs be evaluated by 10 CFR 50.59 should be evaluated. For sealed DSSs, increases in direct radiation exposure or radiological effluents are normally not credible due to abnormal operating and accident events.

- b. Inspection Requirement 02.02. This requirement impacts all five safety focus areas.

The licensee's evaluation that reactor site parameters are bounded by the DSS design bases used in the DSS FSAR and associated NRC SER should be reviewed. The inspectors should verify that the evaluation of the reactor site parameters includes, at a minimum, earthquake intensity and tornado-generated missiles. Site specific environmental conditions and parameters are listed in the reactor site's Updated Safety Analysis Report (UFSAR). Additional site parameters that may need to be considered include: normal ambient temperatures, extreme ambient temperatures, working area ambient temperatures, flood height, wind, water velocity and duration, fires, explosions, cask tipover events, salinity levels, lightning, pad icing, burial under debris, aircraft hazards, and design basis events that could block DSS air inlets and outlets.

The inspectors should verify that the transfer route and the storage pad area do not contain fire or explosion hazards beyond those analyzed in the SAR or that an adequate site-specific evaluation has been performed. Example areas of concern may include: transformers, hydrogen or fuel tanks, temporary generators, cranes, personnel lifts, or vehicles.

The inspectors should verify that when areas identified where reactor site parameters are not bounded by the DSS design the change is processed through the licensee's 10 CFR 72.48 process in accordance with 10 CFR 72.212(b)(7). The inspectors should also review the associated 10 CFR 72.48 evaluation in accordance with Section 02.06 of this IP.

- c. Inspection Requirement 02.03. This requirement impacts all five safety focus areas.

1. The inspectors should review the licensee's evaluation of the ISFSI's impact on the reactor facility and identify any required license amendments or changes to the reactor TS.
2. The inspectors should verify that any 10 CFR 50.59 evaluations as a result of this review have been performed in accordance with the licensee's administrative requirements and 10 CFR 50.59.

Regulatory Guide 1.187, "Guidance for Implementation of 10 CFR 50.59, Changes, Tests, and Experiments," Revision 1 states Revision 1 of NEI 96-07, "Guidelines for 10 CFR 50.59 Evaluations," as acceptable for complying with the NRC regulations in 10 CFR 50.59.

3. The inspectors should verify DSS lifting operations in the vicinity of 10 CFR Part 50 SSCs are performed in accordance with the site's control of heavy loads program. The inspectors should review the licensee's FSAR and associated Phase 1 and Phase 2 (if applicable) NUREG-0612, "Control of Heavy Loads," responses, and determine if the licensee is either utilizing a single-failure-proof crane for DSS lifts or has analyzed the effects of a heavy loads drop.
 - (a) If lifts are performed in accordance with a load drop analysis, it should be verified that dropping a storage or fuel transfer cask inside the fuel handling or reactor building will not challenge any 10 CFR Part 50 SSCs,

non-safety risk-important equipment, or damage fuel. Additionally, it should be verified that the offsite dose consequence associated with the drop of a storage or transfer cask are evaluated.

The inspectors should review the licensee's analysis to ensure inputs and assumptions are bounding of lifts expected to be performed. Examples may include: DSS load path, DSS lift height, DSS lift weights, DSS material properties, SSC material properties, soluble boron concentrations, impact limiter material properties, building ventilation, and DSS configuration. The inspectors should also review the assumptions used by the licensee in any cask drop analysis and ensure that these assumptions are consistent with the DSS FSAR.

Additional information on cask drop analysis may be found in Section 5.1 "Recommended Guidelines" of NUREG 0612.

- (b) The licensee's crane design should be reviewed to verify it meets operational and structural requirements. The inspectors should verify that the crane is compliant with the design code of reference (typically The Crane Manufacturers Association of America (CMAA) Specification No. 70, "Specifications for Top Running Bridge & Gantry Type Multiple Girder Electric Overhead Traveling Cranes" or Electric Overhead Crane Institute (EOCI) Specification 61). The inspectors should verify that the crane is capable of lifting the heaviest loads expected for DSS operations. If lifts are not performed in accordance with a load drop analysis, it should be verified that the licensee's crane is single-failure-proof in accordance with Section 5, "Guidelines for Control of Heavy Loads," of NUREG-0612. If the crane is single-failure-proof, additional requirements may apply to the crane design and testing including meeting the provisions of NUREG-0554 in addition to the design codes already specified or meeting alternative requirements such as ASME-NOG-1, "Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder)." Examples of previously identified deficiencies can be found in NRC Information Notice (IN) 2019-09.
 - (c) The inspectors should verify that the crane is tested in accordance with the facility's control of heavy loads program, typically following American Society of Mechanical Engineers (ASME) B30.2, "Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)." Specifically, it should be verified that 100% and 125% load testing of the crane has been performed in accordance with ASME B30.2 requirements.
4. The inspectors should verify, by document review and as necessary in field walkdown, that the licensee has evaluated the building superstructure and associated SSCs to transfer static and dynamic loads from the crane through the superstructure to the base mat. It should be verified at a minimum that the licensee has utilized appropriate load combinations and strength code allowables from the FSAR code of record. Examples of previously identified deficiencies can be found in NRC IN 2019-09.

5. The inspectors should verify, by document review and as necessary in field walkdown, that the licensee has evaluated the maximum expected load placed on SSCs, including buried SSCs, by the DSS at each location the DSS is set on or moved through onsite. Areas may include, the spent fuel pool, spent fuel pool shelf, DSS washdown and processing areas, building rail bay, and heavy haul path. It should be verified at a minimum that the licensee has utilized appropriate load combinations and strength code allowables from the FSAR code of record. The inspectors should verify the areas can withstand the heavy loads of the DSS and supporting equipment or that modifications have been designed and implemented to reinforce the area and protect SSCs. It should also be verified that the licensee has verified the seismic stability, including sliding and tipping, of the DSS if required. Examples of previously identified deficiencies can be found in NRC IN 2019-09.
 6. If as part of the specific cask system's operations, the licensee performs a vertical free-standing transfer of a canister containing spent fuel from a transfer cask to a storage cask, the inspectors should verify the seismic stability of the free-standing system if physical seismic restraints are not used. RIS 2015-13 provides guidance on how the seismic stability analysis should be performed. It should be verified that the analysis adequately reflects the actual in-field configuration during canister transfer activities. If the licensee does not follow RIS 2015-13, the inspectors should consult with DFM for additional guidance.
 7. The inspectors should determine, by observation and interviews with licensee personnel, that the proposed roadway and railways are suitable for the secure movement of DSSs and that a DSS temporarily halted during transport will not pose an obstruction that adversely impacts facility operations. Examples could include impacts on security and on building containment or ventilation during movement out of buildings. The inspector should examine any interferences from overhead lines or nearby structures. Contact with overhead power lines may impact the safety of the reactor plant and endanger the cask transporter.
- d. Inspection Requirement.02.04. This requirement impacts all five safety focus areas.
1. The licensee's evaluation of the ISFSI's impact on the reactor emergency plan (EP) should be reviewed.
 - (a) The inspectors should verify that any ISFSI-specific requirements have been adequately addressed in the EP. It should be verified that changes have been incorporated into the EP implementing procedures and that personnel have been trained regarding these changes.
 - (b) The inspectors should verify that changes have not decreased the plan's effectiveness. If any changes decreased the plan's effectiveness, it should be verified that NRC approval of the changes was obtained in accordance with 10 CFR 50.54(q).

Regulatory Guide 1.101 "Emergency Response Planning and Preparedness for Nuclear Power Reactors," Revision 5 endorsed the guidance in Revision 4 of NEI 99-01 as acceptable to the NRC staff as an alternative to the method described in Appendix 1 to NUREG0654/FEMA

REP-1 and NUMARC/NESP-007 for developing EALs required in Section IV.B of Appendix E to 10 CFR Part 50 and 10 CFR 50.47 (b)(4).

Additional guidance on the evaluations of EP changes can be found in IP 71114 Attachment 04, "Emergency Action Level and Emergency Plan Changes."

2. The licensee's evaluation of the ISFSI impact on the reactor QAP should be reviewed.
 - (a) The inspectors should verify that any ISFSI-specific requirements have been adequately addressed in the QAP. It should be verified that changes have been incorporated into the QAP's implementing procedures and that personnel have been trained regarding these changes.
 - (b) The inspectors should verify that changes have not decreased the QAP's commitments in accordance with 10 CFR 50.54(a)(3). If any changes decreased the QAP's commitments, it should be verified that NRC approval of the changes was obtained.
3. The licensee's evaluation of the ISFSI's impact on the reactor radiation protection program (RPP) should be reviewed.
 - (a) The inspectors should verify that ISFSI-specific requirements have been adequately addressed in the RPP. It should be verified that changes have been incorporated into the program's implementing procedures and that personnel have been trained regarding these changes.
 - (b) The inspectors should verify that changes have not decreased the program's effectiveness.
4. The licensee's evaluation of the ISFSI's impact on the reactor training program should be reviewed.
 - (a) Through interviews with personnel that operate important to safety equipment, the inspectors should verify that ISFSI-specific requirements have been adequately addressed in training. Suggested staff to interview include non-destructive evaluation technicians, crane operators, riggers, fuel handlers and canister processing technicians. If weaknesses are identified, it should be verified that changes have been incorporated into the program's implementing procedures and training documents.
 - (b) A Systematic Approach to Training (SAT) program may be required to be implemented in accordance with the site's Part 50 requirements. The analysis phase of the SAT program should be reviewed. The inspectors should ensure all required positions have been analyzed and should review training documentation and on-the-job demonstration requirements to become qualified. Whether the program contains an evaluation phase to ensure the process is working and improvements are identified and implemented should be determined.

- e. Inspection Requirement 02.05. This requirement impacts all five safety focus areas. 10 CFR 72.150, Instructions, Procedures and Drawings, requires that the licensee prescribe activities affecting quality by documented instructions, procedures, or drawings of a type appropriate to the circumstances. The instructions, procedures, and drawings must include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

Throughout the review of 10 CFR 72.212 evaluations, the inspectors should be cognizant of assumptions, inputs, limitations, administrative requirements, surveillance requirements, and limiting conditions of operation generated by these evaluations and how they are transferred into quantitative or qualitative acceptance criteria documented in licensee procedures.

While formal review of licensee procedures is performed in IP 60854, this procedure should be used in conjunction with IP 60854 to generate a listing of acceptance criteria that should be verified by the NRC inspector for inclusion in licensee procedures.

- f. Inspection Requirement 02.06. This requirement impacts all five safety focus areas. Changes, tests, or experiments performed should be reviewed. Emphasis should be given to evaluations based upon their safety significance and complexity. The inspectors should refer to Manual Chapter 2690, Appendix E for guidance in prioritizing the review of 72.48 evaluations.

Regulatory Guide 3.72, "Guidance for Implementation of 10 CFR 72.48, Changes, Tests, and Experiments," states that Appendix B, "Guidelines for 10 CFR 72.48 Implementation," dated March 5, 2001, to NEI 96-07 provides methods that are acceptable for complying with NRC regulations in 10 CFR 72.48. The inspectors should verify the licensee/certificate holder has appropriately concluded, as applicable, that the change, test, or experiment can be accomplished without obtaining a license or CoC amendment.

Inspectors should refer to IP 60857, "Review of 10 CFR 72.48 Evaluations," as needed for additional guidance for the review of 10 CFR 72.48 evaluations.

Inspectors should be aware that performance of a 10 CFR 72.212 evaluation alone does not relieve the licensee from performing a 10 CFR 72.48 evaluation if required as discussed in NRC Regulatory Issue Summary (RIS) 2012-05, "Clarifying the Relationship Between 10 CFR 72.212 and 10 CFR 72.48 Evaluations."

60856-04 INSPECTION RESOURCES

The estimated average time to complete the inspection requirements for a new ISFSI is 160 hours of direct inspection per inspection occurrence.

The estimated average time to complete inspections requirements for a change in ISFSI designs will vary depending on the complexity of the change. Nevertheless, the estimated average time is 120 hours of direct inspection per inspection occurrence.

60856-05 PROCEDURE COMPLETION

Inspection procedure completion is based upon completion of the inspection procedure requirements. The inspection procedure shall be completed in accordance with the inspection procedure frequency requirements specified in IMC 2690 Appendix A.

60856-06 REFERENCES

IMC 2690, "Inspection Program for Storage of Spent Reactor Fuel and Reactor Related Greater than Class C Waste at Independent Spent Fuel Storage Installations and for 10 CFR Part 71 Transportation Packagings"

IMC 2691, "Technical Basis for the Independent Spent Fuel Storage Installation Inspection Program"

IP 60853, "On-Site Fabrication of Components and Construction of an Independent Spent Fuel Storage Installation"

IP 60854, "Preoperational Testing of an Independent Spent Fuel Storage Installation"

IP 60857, "Review of 10 CFR 72.48 Evaluations"

IP 71114 Attachment 04, "Emergency Action Level and Emergency Plan Changes"

Regulatory Guide 1.101, "Emergency Response Planning and Preparedness for Nuclear Power Reactors," Revision 5

Regulatory Guide 1.187 "Guidance for Implementation of 10 CFR 50.59, Changes, Tests, and Experiments," Revision 1

Regulatory Guide 3.72, "Guidance for Implementation of 10 CFR 72.48, Changes, Tests, and Experiments"

NEI 96-07, "Guidelines for 10 CFR 50.59 Implementation," Revision 1

NEI 96-07, Appendix B, "Guidelines for 10 CFR 72.48 Implementation," dated March 5, 2001

NUREG/CR-6407, "Classification of Transportation and Dry Spent Fuel Storage System Components According to Importance to Safety," February 1996

NUREG-2215, "Standard Review Plan for Spent Fuel Dry Storage Systems and Facilities," April 2020

NUREG-0554, "Single-Failure-Proof Cranes for Nuclear Power Plants," May 1979

NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants," July 1980

NRC Information Notice (IN) 2019-09, "Spent Fuel Cask Movement Issues," October 30, 2019

NRC Regulatory Issue Summary (RIS) 2012-05, "Clarifying the Relationship Between 10 CFR 72.212 and 10 CFR 72.48 Evaluations," April 20, 2012

American Society of Mechanical Engineers (ASME)-NOG-1, "Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder)"

American National Standards Institute (ANSI)/ASME B30.2, "Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)"

The Crane Manufacturers Association of America (CMAA), Inc. Specification No. 70, "Specifications for Top Running Bridge & Gantry Type Multiple Girder Electric Overhead Traveling Cranes"

END

Attachment 1: Revision History for IP 60856

| Commitment Tracking Number | Accession Number Issue Date Change Notice | Description of Change | Description of Training Required Completion Date | Comment Resolution and Closed Feedback Form Accession Number (Pre-Decisional, Non-Public Information) |
|----------------------------|---|---|---|---|
| N/A | ML073100636 03/05/08 CN 08-010 | This document has been revised to change SFPO to SFST and some minor editorial changes. No other major changes are proposed by 10/24/2007. | N/A | N/A |
| N/A | ML20178A388 10/20/20 CN 20-052 | Major revision. Revised to update inspection hours. and clarify and enhanced the inspection requirements and guidance as a result of the risk-informed review of the inspection process | Yes. Verbal discussion of changes during inspectors' counterpart meeting. 12/31/2020 | ML20178A366 |