**NRC INSPECTION MANUAL** NMSS/DFM

INSPECTION PROCEDURE 60859

INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI)   
LICENSE RENEWAL INSPECTION

Effective Date: September 11, 2024

PROGRAM APPLICABILITY: IMC 2690

# 60859-01 INSPECTION OBJECTIVES

* 1. To verify the independent spent fuel storage installation (ISFSI) license renewal program, including any supporting activities, are planned or implemented consistent with the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR), Part 72, “Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste,” as provided in a renewed license of a specific ISFSI or a renewed Certificate of Compliance (CoC) for specific and general licensees, respectively.

01.02 To verify the licensee has adequate programs planned or in place to implement aging management for the structures systems or components (SSCs) that require an aging management review, such that these SSCs will be adequately maintained consistent with the Part 72 requirements, the staff’s existing safety evaluation report, and the licensee’s license renewal program.

01.03 To verify the license conditions added as part of the renewed license of a specific ISFSI or a renewed CoC, regulatory commitments, aging management programs (AMPs), time limited aging analyses (TLAAs), and license renewal activities are implemented and/or completed, and to verify that age-related degradation is identified and adequately managed or corrected, as applicable.

# 60859‑02 DEFINITIONS

02.01 Aging Management Activity (AMA). The AMA is an application of either the AMP and/or TLAAs to provide reasonable assurance that the intended functions for SSCs of ISFSIs and dry storage systems (DSSs) are maintained during the period of extended operation. For example, an activity identified because of scoping and/or screening in which the licensee incorporated the activity into a TLAA or AMP.

02.02 Aging Management Program (AMP). Means a program for addressing aging effects that may include prevention, mitigation, condition monitoring, and performance monitoring.

02.03 Baseline Inspection. The first inspection of an AMP to assess the condition of SSCs to either: (1) confirm that the results of pre-application inspections conducted at other sites are bounding of the subject site, or (2) verify the adequacy of the AMPs and the conclusions of the TLAAs when pre-application inspections were not performed. The baseline inspection may also be referred to as the lead canister inspection.

02.04 Design Bases. As defined in 10 CFR 72.3, in part, means information that identifies the specific functions to be performed by an SSC of a facility or of a spent fuel storage cask and the specific values or ranges of values chosen for controlling parameters as reference bounds for design. These values may be (1) restraints, derived from generally accepted “state-of-the-art” practices for achieving functional goals, or (2) requirements, derived from analysis (based on calculation, experiments, or both) of the effects of a postulated event under which SSCs must meet their functional goals. For instances, a large portion of the design bases information is generally captured in the most recent final safety analysis report (FSAR) as required by 10 CFR 72.70 and 10 CFR 72.248.

02.05 Period of Extended Operation (PEO). The PEO is the 40-year period commencing immediately after the expiration of an applicant’s or CoC holder’s initial 20-year license. For a renewed license of a specific ISFSI or a renewed CoC, a subsequent PEO (40 year period) may commence immediately after the expiration of the original license.

02.06 Pre-application Inspection. An inspection performed at the discretion of the licensee or CoC holder before submittal of the renewal application to provide operating experience to support the aging management review, proposed AMP activities, or evaluation of TLAAs.

02.07 Time Limited Aging Analyses. As defined in 10 CFR 72.3, means those licensee or certificate holder calculations and analyses that: (1) Involve SSCs important to safety within scope of the license renewal, as delineated in subpart F of 10 CFR Part 72, or within the scope of the spent fuel storage certificate renewal, as delineated in subpart L of 10 CFR Part 72, respectively; (2) Consider the effects of aging; (3) Involve time limited assumptions defined by the current operating term, for example, 40 years; (4) Were determined to be relevant by the licensee or certificate holder in making a safety determination: (5) Involve conclusions or provide the basis for conclusions related to the capability of SSCs to perform their intended safety functions; and (6) Are contained or incorporated by reference in the design bases.

# 60859-03 INSPECTION REQUIREMENTS

## 03.01 General Inspection Requirements

This inspection procedure provides specific requirements and guidance for the inspection of ISFSI license renewal programs for specific and general licensees AMAs (e.g., lead canister and pre-application inspections, AMPs and TLAAs) and the implementation of the AMP (i.e., the inspection of the applicable AMP elements). This procedure also verifies that a licensee identifies and adequately manages or corrects age-related degradation, as applicable.

Implementation of AMAs and AMPs should occur under an U.S. Nuclear Regulatory Commission (NRC) approved quality assurance (QA) program. Many attributes of the licensee’s QA program apply to these activities, which may include control of special processes, inspections, test control, control of measuring and test equipment, handling and storage control, corrective action, and records.

The ISFSI license renewal for specific licensees is done under 10 CFR Part 72.42(a), and the renewal of the CoC for the DSSs is done under 10 CFR Part 72.240(c).

## 03.02 Specific Inspection Requirements

1. Verify the licensee adequately identified, evaluated, and incorporated AMAs into applicable processes and procedures. Inspectable AMAs include but are not limited to baseline and pre-application inspections, scoping evaluations contained in the safety evaluation report (SER), and other AMP development activities. These activities may lead to the identification of aging effects requiring management, the identification of TLAAs, and the identification of materials and environments for those SSCs, and associated subcomponents, determined to be within scope and the identification of AMPs for managing the effects of aging (Sections 04.01 and 04.02.a).
2. Verify the licensee adequately incorporated the license conditions and commitments for license renewal into the FSAR supplement as updated and revised (Section 04.02.b).
3. Verify the licensee adequately implemented and/or have plans to implement the ten AMP elements as described in the SER for license renewal or CoC renewal as applicable (Section 04.03).
4. And have assessed any TLAAs

# 60859-04 INSPECTION GUIDANCE

## 04.01 Document Review.

Inspectors should familiarize themselves with the requirements and guidance related to the renewed ISFSI license or renewed CoC in use at the ISFSI, the NRC SER for the renewal, license or CoC conditions, technical specifications (TSs), and FSAR. Note that the entirety of the approved AMP may not be included in the renewed license or CoC. However, a summary of the approved AMP will be included in the FSAR, and there may be additional license or CoC conditions related to specific aspects of the AMP. In addition, the renewal SER may contain the entire approved AMP in an appendix, or it may contain a reference to a renewal document (e.g., application) with the entire final AMP. This may be a useful reference to inspectors for their inspection planning. License renewal requirements and guidance documents that should be reviewed prior to an inspection include:

1. 10 CFR Part 72.42 and 10 CFR 72.240 regulatory requirements
2. NUREG-1927 and NUREG-2214
3. The renewed ISFSI license or renewed CoC for the DSS, which includes but not limited to the license or CoC conditions, commitments, and TSs.
4. The SER for the renewed ISFSI license or renewed CoC for the DSS
5. Appendix A of the SER, if applicable
6. The FSAR supplement as updated and revised.

Additionally, before any on-site activity the inspectors review should include relevant NRC Bulletins, Information Notices, and 10 CFR Part 21 reports issued related to ISFSI activities or specific DSS. The inspectors should also search the Agency Wide Documents Access and Management System (ADAMS) for any ISFSI related documents or reports that are relevant to the inspection including known issues. The ADAMS search should go back to the date the license or CoC renewal or the date of the last license or CoC renewal inspection, if applicable.

## 04.02 Aging Management Activity (AMA).

1. Baseline (Lead Canister) or Pre-Application Inspections. A lead-canister inspection or pre-application inspection for renewal may be performed at various times. Some licensees and/or CoC holders usually performed these inspections before submittal of the renewal application. However, the renewal application may include a commitment to perform an inspection before the beginning of the period of extended operation. There may also be justification for performing the lead-canister inspection during the period of extended operation. Additionally, some of the licensees and/or CoC holders may elect to conduct examinations of the interior of the associated concrete overpack or Horizontal Storage Module for the baseline inspection.

The inspectors should review the results of the baseline or pre-application inspections or observe if possible, the baseline inspection during the on-site inspection. The results of this inspection may become part of the justification for license renewal. Typically, the licensee may elect to conduct a repeat inspection at a 20-year interval as a license condition for renewal.

1. Final Safety Analysis Report Supplement. The FSAR supplement as updated and revised describes the AMP and TLAAs approved by the NRC in the SER for license renewal. The inspectors should verify that the FSAR supplement description matches the AMP and/or TLAA the licensee plans to implement and that the changes to AMPs, TLAAs, and other license renewal activities incorporated as a part of the FSAR supplement are in accordance with 10 CFR 72.48.

## 04.03 Aging Management Program Inspection.

The inspectors should verify and assess the adequacy and effectiveness of the implementation and/or completion of the AMP described in the regulatory commitments, FSAR supplement program descriptions, and license conditions. The AMP is generally itemized by ten elements. NUREG-1927, “Standard Review Plan for Renewal of Specific Licenses and Certificates of Compliance for Dry Storage of Spent Nuclear Fuel,” and NUREG-2214, “Managing Aging Processes in Storage (MAPS) Report,” provide additional guidance related to the ten AMP elements.

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| --- | --- |
| Scope of the Program | Acceptance Review |
| Preventative Actions | Corrective Actions |
| Parameters Monitored or Inspected | Confirmation Process |
| Detection of Aging Effects | Administrative Controls |
| Monitoring and Trending | Operating Experience |

The inspectors should be aware that the AMP may be modified through information gained from the implementation of the AMP and from lessons learned from other sites and research programs.

1. Review of Scope. The scoping process should identify the SSCs of the ISFSI or DSS that should be reviewed for aging effects. The scoping evaluation should be based on a process and methodology for including SSCs in the renewal scope. The implementation of the process and methodology is inspectable. NUREG/CR-6407, “Classification of Transportation Packaging and Dry Spent Fuel Storage System Components According to Importance to Safety,” contains guidance describing SSCs that may be included within the scope of license renewal.

This AMP element should contain the specific SSCs addressed during the licensing review and captured in the NRC SER. The inspectors should verify that the licensee processes or procedures identify and define the SSCs and applicable subcomponents that were part of the renewal scope. For the SSCs that are in scope of the license renewal, the inspectors should also determine that their design safety function is or supports the following design bases functions such as criticality, shielding, confinement, heat transfer, structural integrity, and retrievability. The evaluation of these activities confirms the licensee’s initial assessment and continued adequacy are relative to the requirements of the AMP’s prevention, mitigation, condition, and/or performance monitoring programs.

1. Review of Preventive Actions. This element of an AMP should contain actions that will be used to prevent or mitigate aging effects and potential degradation rates of aging for SSCs. Not all licensees’ AMPs will contain this section. If applicable, the inspectors should verify that there are processes or procedures for performance of preventive actions. The inspectors should verify that any preventative measures described in the AMP are still effective in preventing any aging effects. The inspectors should also evaluate whether the licensee performs the preventative actions at the right frequency identified in AMP, as applicable.
2. Review of Parameters Monitored or Inspected. This element of the AMP should list the specific parameters monitored or inspected in the AMP and describes how these parameters can identify potential degradation prior to the loss of the SSC’s intended function(s). For example, the parameters may identify signs of deterioration, including corrosion, cracking, or sulfate and chloride concentrations, which could be linked to aging effects on SSCs. The inspectors should verify that the processes or procedures involve the monitoring or inspecting of parameters incorporated into the AMP. The inspectors should verify that the parameters monitored and/or inspected correctly capture the anticipated effects of aging on the intended functions of the SSC and whether those parameters seem appropriate relative to changing nature of an aging system or environmental conditions over the licensing period.
3. Review of Detection of Aging Effects. This element of the AMP describes how the licensee would detect aging effects prior to the loss of the SSC’s intended function(s). It includes inspection and monitoring details, methods and techniques, frequency, sample size, data collection, and timing of inspections. The inspectors should verify the following:
   1. For each of the SSCs in scope, verify that the specific types of inspections to be performed are clearly stated in the processes or procedures.
   2. Verify that the processes or procedures include performance of inspections or examinations at the specified intervals, information on the location and extent of inspection of the SSCs, and number of SSCs inspected (sample size).
   3. If the AMP includes inspection of a limited sample size, verify that the licensee has a documented approach to select the most susceptible SSCs, and the most susceptible locations on those SSCs, for inspection.
   4. If the AMP requires altering the sample size of some inspections based on aging effects observed, verify that the processes or procedures ensure that the sample size is expanded when said aging effects are observed.
   5. Verify that the processes or procedures include provisions to ensure that any locations of identified aging effects are monitored during further inspections.
   6. If the AMP includes inspections of opportunity, verify that the processes or procedures take advantage of opportunities to access usually inaccessible areas to check for aging effects.

In addition, the inspectors should verify that processes or procedures are in place to ensure the licensee take advantage of any opportunities to perform inspections on usually inaccessible areas of the ISFSI or DSS to check for aging effects, if required.

1. Review of Monitoring and Trending. This element of the AMP describes how the licensee would collect and evaluate data to determine the extent of the aging effects and the need for corrective or mitigative actions. Trending is the comparison of the current monitoring results with previous monitoring results, to make predictions for the future. Trending is not applicable for one-time new inspections. The inspectors should verify the following:
   1. Verify that the processes or procedures clearly state which parameters will be trended, along with the monitoring methodology and timeline.
   2. Verify that the processes or procedures have methods for comparing results taken at different times to determine changes in conditions of SSCs.
   3. Verify that the processes or procedures require that results of inspections are used to establish rates of degradation to confirm that further inspections will occur prior to a loss of intended function.
   4. Verify that the processes or procedures provide for alteration of inspection frequencies when necessary to ensure the integrity of the SSCs.

Monitoring and trending activities should provide the information required for prediction of the extent of aging and allow for timely corrective or mitigative actions. The AMP should either (1) describe an inspection method that is capable of detecting the effects of aging before the SSC would lose the ability to perform its intended function under design conditions, or (2) demonstrate that the intended function of the SSC will be maintained during the renewal.

1. Review of Acceptance Criteria. This element of the AMP establishes acceptance criteria for the licensee to evaluate when there is a need for corrective actions. The acceptance criteria provide ensure the SSC for the DSS in the period of extended operation continue to maintain their intended design function(s). The inspectors should verify the following:
   1. Verify that the processes or procedures contain acceptance criteria described in the approved AMPs.
   2. Verify that the licensee included a methodology for analyzing the results of the inspection against applicable acceptance criteria.

The inspectors should verify that if the acceptance criterion for an AMP parameter is not met, then the processes or procedures provides adequate guidance to take action on returning the SSC for the DSS back into regulatory compliance, as necessary. These actions can include having an adequate decision regarding continued service of the SSC, repair/replacement of components, and/or recovery of the fuel for repackaging following identification and characterization of service-induced flaws or degraded material conditions.

1. Review of Corrective Action. This element of the AMP describes the measures the licensee would take when the acceptance criteria are not met. The licensee has the option to reference a corrective action program (CAP) that is consistent with an NRC approved QA program. The inspectors should verify the following:
   1. Verify that the CAP contains such provisions that any deviations from the acceptance criteria require entrance into the CAP.
   2. In some cases, an AMP may include specific corrective actions. In that case, verify that the processes or procedures include those specific corrective actions. Verify that corrective actions follow the requirements of the QA program and procedures and are implemented in a timely fashion.
   3. The corrective action database should be examined for potential aging issues. Considerations should be given to root cause analysis, actions to prevent recurrence, and repair or replacement of the degraded SSC. Discovery of service‑degradation-induced flaws will result in modification of the inspection program schedule. Responses may include, but are not limited to the following: an increase in the number and size of sampling regions (additional examination), an increase in the frequency of examinations (successive examination), temporary placement of stored fuel into wet storage until failed canisters can be repaired or replaced.
2. Review of Confirmation Process. This element of the AMP verifies that preventive actions, if applicable, are reasonable, and that appropriate corrective actions have been completed and are effective. The confirmation process is commensurate with the approved QA program. The inspectors should verify that the licensee controls the AMP with an NRC approved QA program.
3. Review of Administrative Controls. This element of the AMP provides a formal review and approval process for evaluations and changes to the AMP. Generally, the administrative controls are in accordance with the change control processes at the licensee’s facility using an NRC approved QA program. The inspectors should verify the following:
   1. Verify that the processes or procedures are updated when additional specifications or conditions are added to the license or CoC.
   2. Verify that any modifications made to the AMPs have been properly evaluated against and implemented in accordance with the appropriate change control process (e.g., 10 CFR 72.48 or 10 CFR 50.59). Also verify that the AMP modification process is appropriately incorporated into the licensee’s processes or procedures.
   3. Verify that the licensee has processes or procedures in place for timely reporting of any inspection or monitoring results that trigger the 10 CFR 72.75 reporting criteria.
4. Review of Operating Experience. This element of the AMP provides a reference to and allows the licensees to evaluate applicable operating experience in the development of the AMP. The operating experience element also includes provisions to conduct future reviews of operating experience to confirm the effectiveness of AMPs throughout the period of extended operation or identify the need for AMP modifications, as needed. This element supports the determination that the licensee managed aging effects such that SSCs continue to be capable of performing their intended design bases functions. The inspectors should verify the following:
   1. Verify that there is a method to collect and assess operating experience prior to and during the period of extended operation as described in the AMP. If described in the AMPs, ensure that the processes or procedures require that the AMP findings identified as a part of the AMP that the licensee reports the results of the inspections to an operating experience database such as the Aging Management Institute of Nuclear Power Operations Database (AMID) in accordance with that database’s user guidelines or the licensee’s CAP.
   2. The inspectors should verify the accuracy of all data entered in the AMID. The inspectors should review all corrective actions related to age related degradation of the DSS and compare the information to the entries contained in the AMID.
   3. Verify that there are processes or procedures for implementing periodic operating experience assessments (sometimes referred to as “tollgates”) throughout the period of extended operation, as described in the AMPs.

# 60859-05 RESOURCE ESTIMATES

License renewal inspection activities will require approximately 80 to 100 hours for direct inspection and 80 hours for preparation and documentation for an estimated total of 180 hours. The inspection hours for onsite reviews should consist of a team of two to three inspectors, with one of the inspectors acting as a team leader. Additional hours can be allocated as necessary for in‑office inspection preparation prior to the onsite week, and for documentation of the inspection results.

# 60859-06 REFERENCES

10 CFR Part 72, “Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste.”

NUREG-1927, “Standard Review Plan for Renewal of Spent Fuel Dry Cask Storage System Licenses and Certificates of Compliance,” Revision 1, June 2016

NUREG-2214, “Managing Aging Processes in Storage (MAPS) Report,” Revision 0, March 2019

NUREG-2215, “Standard Review Plan for Spent Fuel Dry Storage Systems and Facilities,” Revision 0, April 2020

NUREG/CR-6407, “Classification of Transportation Packaging and Dry Spent Fuel Storage System Components According to Importance to Safety,” January 1996

U.S. Nuclear Regulatory Commission, Regulatory Guide 3.76, “Implementation of Aging Management Requirements for Spent Fuel Storage Renewals,” Revision 0

Nuclear Energy Institute 14-03, “Format, Content and Implementation Guidance for Dry Cask Storage Operations-Based Aging Management,” Revision 2, December 2016

END

Attachment 1 Revision History for IP 60859

| 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 | ML24177A317  09/11/24  CN 24-25 | New Issuance. | Training provided during Counterpart Meeting and will address questions during monthly counterpart meeting |  |