

---

## INSPECTION PROCEDURE 60854

---

### PREOPERATIONAL TESTING OF AN INDEPENDENT SPENT FUEL STORAGE INSTALLATION

Effective Date: May 27, 2025

PROGRAM APPLICABILITY: IMC 2690

#### 60854-01 INSPECTION OBJECTIVE

Determine by direct observation and independent evaluation whether the following are conducted in accordance with licensing and regulatory requirements:

- 01.01 The licensee has developed, implemented, and evaluated preoperational testing activities to safely load spent fuel from the spent fuel pool (SFP) into a dry storage system (DSS) and to transfer the loaded DSS to the independent spent fuel storage installation (ISFSI).
- 01.02 The licensee has developed, implemented, and evaluated preoperational testing activities in order to safely retrieve spent fuel from an ISFSI and transfer it to either the SFP or a separate cask or canister.
- 01.03 The licensee has made changes to appropriate plant programs and procedures to support safe operation of the ISFSI.

#### 60854-02 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 and reasons for the performance deficiencies. 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 ISFSI Operational Procedures

Verify, by document review, the licensee procedures' acceptance criteria for DSS loading and unloading activities meet regulatory requirements and site-specific license or Certificate of Compliance (CoC) conditions.

## 02.02 Observation of Preoperational Testing Activities

Verify, by direct observation, that preoperational loading and unloading activities are completed in accordance with regulatory requirements and site-specific license or CoC conditions.

## 02.03 Review of Licensee Programs

Determine by review of all applicable licensee programs listed in Section 03.03 of this procedure, that responsibilities for specific activities relating to the ISFSI have been defined and the licensee has integrated responsibilities for these activities into the appropriate plant programs.

## 02.04 Evaluation of Licensee Oversight and Corrective Actions

Evaluate the effectiveness of the licensee's corrective actions and oversight of ISFSI activities (including contractor oversight, if applicable), by reviewing ISFSI quality assurance audits or surveillances, corrective actions documents, and records associated with the dispositioning of nonconforming conditions. Determine how audits or surveillances are managed and reviewed in the organization and how any related nonconformances/issues are resolved. Evaluate licensee oversight activities performed in the field during preoperational loading and unloading activities. Evaluate the licensee's proposed corrective actions and the timeliness for those corrective actions for any deficiencies identified during preoperational testing.

# 60854-03 INSPECTION GUIDANCE

## 03.01 General Guidance

The inspectors should refer to the risk prioritization table in IMC 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.

For the purposes of this procedure, the term "licensee" may refer to a specific license holder (Title 10 of the *Code of Federal Regulations* (10 CFR) 72.16) or a reactor licensee using a general license (10 CFR 72.210).

The licensee shall provide reasonable assurance that spent fuel can be handled, stored, and retrieved without undue risk to the health and safety of the public. Additionally, activities (e.g., lifting of heavy loads, movement of spent fuel, or DSS transfer to the ISFSI pad) may have a direct impact on reactor safety-related or risk-significant structures, systems, and components (SSCs). Therefore, activities potentially affecting safety-related or risk-significant SSCs should also be assessed.

Requirements and commitments related to preoperational testing may be found in the various licensing basis documents such as the final safety analysis report (FSAR), safety evaluation report (SER), CoC, or the site-specific license and associated TS for the DSS being used. Additional requirements and commitments may also be located in evaluations required by 10 CFR 72.212(b) for general licensed ISFSIs, and in any 10 CFR 50.59 and 10 CFR 72.48 evaluations for both general and specific licensed ISFSIs.

Requirements and commitments shall be captured in licensee programs and procedures. If this inspection procedure (IP) is being performed in coordination with IP 60856, the inspectors should verify that assumptions, inputs, limitations, administrative requirements, surveillance requirements, and limiting conditions of operations identified in IP 60856 are transferred into quantitative or qualitative acceptance criteria documented in licensee procedures.

If the licensee intends to use a different model or type of DSS, for which a preoperational test program has not been completed, then applicable portions of IP 60856 and this procedure should be performed.

If the inspector has questions or concerns that require additional technical or regulatory support, additional guidance can be found in IMC 2690 for obtaining additional support from headquarters.

### 03.02 Specific Guidance

#### a. Review of ISFSI Operational Procedures

This requirement impacts all five safety focus areas. If possible, the inspectors should review the licensee procedures and acceptance criteria for DSS loading and unloading activities before conducting the on-site inspection.

##### 1. Conduct of Operations and Maintenance

If the inspector observes difficulty in procedure use and adherence during the performance of important-to-safety activities, the inspector should assess the following procedure quality attributes. Responsibilities should be clearly defined. Procedures should identify if they are for reference use or continuous use. Instructions should be provided in the event that licensee personnel cannot perform the steps as written and stop-work criteria and contingency plans should be established to place the DSS in a safe configuration. Procedures should include guidance on contingency plans for placing the DSS in a safe configuration during an emergency or abnormal condition.

Hold points, inspection points, and critical tasks, especially those related to technical specifications (TSs) should be clearly identified. Procedures should also state whom to notify if an abnormal or emergency condition arises and what criteria must be met to resume activity. Alternatively, the licensee's corrective action program may be referenced for those actions.

A licensee may use the preoperational test program to validate through trial use the proposed operating procedures. Consequently, the procedures may not have received a final approval. In that case, the inspectors should ensure that the licensee

has performed an initial review, which may include the plant operations review committee (or similar entity), and that performance of these “draft” procedures is included under the overall ISFSI preoperational testing process. Regardless, the inspectors should verify that procedures used that may have an effect on 10 CFR Part 50 SSCs during the preoperational testing process are approved for use through the licensee’s quality assurance processes.

If the licensee utilizes the preoperational testing program as a means of validating “draft” operating procedures during performance of the dry run, inspectors should avoid consulting on the “draft” documents but should review the documents as part of evaluating the licensee’s performance of dry runs. However, the inspectors shall inform the licensee of any deficiencies in the “draft” procedures such that a hazardous condition may exist, or equipment damage could occur. In the case that the licensee uses “draft” procedures for dry runs, the inspectors should re-review the operating procedures after the licensee has approved the procedures, focusing on any procedural changes from the “draft” procedures.

## 2. Loading Procedures

Licensee procedures should be verified to contain appropriate acceptance criteria to ensure loading operations can be completed in accordance with TS and FSAR requirements. As an example, TS requirements may include soluble boron concentration, time-to-boil, pressure testing parameters, dryness levels, backfill gas purity, and helium backfill limits.

At all times, it should be ensured that the canister and fuel remain within an approved analyzed condition as it relates to thermal and pressure limitations. This may include such limitations as ambient temperature surrounding the canister or cask, heat transfer media inside the canister (air, nitrogen, water, helium, etc.), pressure of the canister, annular cooling water system operating fluid temperatures, the time-to-boil duration, shielding placed on the canister and cask, and building geometry surrounding the DSS.

The inspectors should verify that welding operations utilize a welding procedure specification, which is demonstrated as acceptable in accordance with a procedure qualification report. By review of records, the inspectors should ensure the welding procedure specification contains the appropriate essential and non-essential variables and the welders are trained in accordance with the governing code specified in the CoC or specific license, typically the American Society of Mechanical Engineers (ASME) Boiler & Pressure Vessel Code (BPV) Section IX.

The inspectors should verify non-destructive examination (NDE) activities including visual examination, liquid dye penetrant examination, and helium mass spectrometer leak detection are required to be performed by a qualified NDE inspector in accordance with qualified procedures. By review of records, the inspectors should also ensure that NDE procedures contain the appropriate process for performing the evaluations and the procedure is qualified in accordance with the governing code, typically, ASME Boiler and Pressure Vessel (BPV) Section III, Section V, or American National Standards Institute (ANSI) N14.5, “Radioactive Materials - Leakage Tests on Packages for Shipment.”

The inspectors should ensure non-destructive testing technicians are qualified in accordance with the governing code, typically Society for Non-Destructive Testing SNT-TC-1A, "Personnel Qualification and Certification in Nondestructive Testing."

The inspectors should ensure procedures have appropriate quantitative acceptance criteria for ensuring the maximum deposition of a layer of filler material is less than the critical flaw size, as applicable. The inspectors should ensure the appropriate NDE, typically liquid dye penetrant examination, is performed, as applicable. The inspectors should also ensure the weld construction is in accordance with the applicable design of the weld joint found in licensing drawings or the FSAR.

Sealing and NDE, including leak testing operations are frequently performed by vendor procedures. The inspectors should ensure the licensee has reviewed and accepted vendor procedures in accordance with its Quality Assurance (QA) program. The inspectors should also ensure vendor activities have appropriate QA oversight in accordance with 10 CFR 72.154, "Control of purchased material, equipment, and services."

### 3. Spent Fuel Pool Unloading Procedures

Particular attention should be paid to unloading procedures in a spent fuel pool for venting and sampling loaded DSSs, recognizing and responding to damaged fuel, and refilling the loaded cask or canister with water, or reflooding. Problem areas can include radiation exposure when sampling the container or steam flashing and pressure control difficulties while reflooding. Guidance for operator actions and radiological controls in response to potentially damaged fuel should be included. At a minimum, the unloading procedure should contain steps to identify the presence of fuel damage in excess of that assumed by the procedure and direct initial operator response to this event.

#### b. Observation of Preoperational Testing Activities

This requirement impacts all five safety focus areas. Inspectors should observe all preoperational activities required by the license or CoC; however, due to schedule constraints this may not be feasible. The inspectors should then prioritize their observations in accordance with the priority levels listed in IMC 2690, Appendix D. Those activities having a greater potential safety impact warrant a higher level of attention by the inspectors.

An example of preoperational requirements is provided below. The list of activities should be viewed as typical, but not all inclusive.

#### 1. For transferring spent fuel from the SFP to the ISFSI:

- (a) moving the empty cask or canister into the SFP area
- (b) placing the cask or canister in the SFP
- (c) verification of selected fuel and movement of fuel from SFP into the cask or canister

- (d) documenting the parameters and characteristics of spent fuel placed in the cask or canister per the license or CoC
  - (e) lifting the cask or canister from the SFP
  - (f) sealing the cask or canister
  - (g) evacuating water from the cask or canister and vacuum drying
  - (h) gas backfilling the cask or canister and decontaminating
  - (i) transferring the loaded cask or canister to the transport vehicle
  - (j) transporting the cask or canister to the ISFSI
  - (k) placing the cask or canister in the ISFSI
2. For retrieving spent fuel from a loaded DSS in the ISFSI and returning it to the SFP:
- (a) retrieving of the cask or canister from the ISFSI
  - (b) transporting the cask or canister from the ISFSI to the reactor or fuel building
  - (c) sampling the cover gas for indications of fuel damage such as radioactivity or air in leakage and directing operator response if the sample indicates fuel damage
  - (d) venting of the cover gas and reflooding the cask or canister with water
  - (e) unsealing the cask or canister
  - (f) transferring the cask or canister to the SFP
  - (g) transporting the fuel from the cask or canister to the SFP
  - (h) removing the cask or canister from the SFP and decontaminating
  - (i) storing or disposing of the cask or canister

While it is preferable for the dry run to replicate the actual evolution, the use of mockups and overlapping procedures is acceptable. The dry run should accomplish the following overall goals:

- Demonstrate the functionality of all equipment.
- Test and refine the procedures used for loading and unloading activities.
- Train and rehearse licensee personnel before actual movement of spent fuel.

If the licensee omits specific activities and takes credit for the completion of preoperational activities either by a different fleet facility or a CoC holder or vendor, the inspectors should review the licensee's justification that the site-specific omission meets the requirements for preoperational testing. If there is any uncertainty in this

determination, the inspectors should consult with DFM. These omissions should be rare, and the justification provided by the licensee should be comprehensive.

It is acceptable that certain preoperational testing activities may be performed in a different location than where the actual loading and unloading activities will occur. However, the licensee should evaluate any variations or differences to ensure the intent of the preoperational testing program is met. Specific activities where this may be appropriate may include welding, non-destructive evaluations, dewatering, drying, and backfilling activities. Activities that test the movement of heavy loads or are dependent upon SSCs that are fixed in position should be performed in their actual location.

Preoperational testing of cask or canister movements should simulate the maximum expected weight and dimensions of DSS components, as closely as possible. SSC and ancillary equipment used during the actual loading and unloading activities should be used during preoperational testing.

During preoperational testing and dry runs, the inspectors should observe the implementation of radiation protection (RP) and foreign material exclusion (FME) activities and the licensee's readiness to respond to and control actual radiation hazards. It is beneficial if expected radiological conditions are simulated during preoperational testing.

Inspectors may choose to review training records, training curricula, and available training aids. At the completion of preoperational testing, workers should be able to readily discuss their responsibilities and demonstrate an understanding of the critical knowledge and skills required to perform their assigned tasks.

#### c. Review of Licensee Programs

This requirement impacts all five safety focus areas.

Procedures and programs should have been formally reviewed and approved consistent with the licensee's administrative programs.

Supplemental guidance may also be found in the inspection procedures used for evaluating these program areas in the IMC 2515 and 2561 programs.

NOTE: IP 60856 contains guidance for many programmatic reviews associated with 10 CFR 72.212 evaluations which may have been previously reviewed under IP 60856 if the facility is operating under a general license only. The intent of inclusion of these sections in this IP is to ensure that a review of these items is performed for facilities operating under a specific license, as applicable, and should not be re-inspected for a general licensee. Areas of overlap with IP 60856 are delineated with text indicating the overlap.

##### 1. Plant Operations

The inspectors should review how spent fuel pool level is monitored, documented, and communicated to the control room when placing the canister or cask into or removing it from the spent fuel pool. The impact of any movements of the DSS throughout the facility on plant operations should be evaluated. Examples of impacts may include movement of the DSS through containment doors requiring entrance

into a limiting condition of operation, modification of plant rounds, or increased dose rates in areas of the plant. The inspectors should verify that gases and fluids removed from the cask or canister during processing operations are adequately monitored and processed.

## 2. Control of Heavy Loads

### Crane Maintenance

The inspectors should verify the licensee has a preventive maintenance program in place based on vendor recommendations for their type of crane (i.e., single-failure-proof or non-single-failure-proof). The inspectors should also verify, by a review of selected records, the cask handling crane's daily, frequent, and periodic inspection procedures are completed for DSS lifts in accordance with ANSI/ASME B30.2, "Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)," or alternative code, as appropriate. If possible, direct observation of the licensee's daily cask handling crane's inspection should be performed.

### Special Lifting Device Maintenance (if not reviewed in IP 60856 for design only)

The inspectors should verify, by a review of inspection records, design evaluations, and direct observation of inspections, the special lifting devices and slings used for DSS lifts are designed and tested consistent with the applicable standard (typically, ANSI/ANS N14.6, "Standard for Special Lifting Devices for Shipping Containers Weighing 10,000 pounds (4,500 kg) or More for Nuclear Materials," and ASME B30.9, "Slings," respectively). The condition of special lifting devices and slings should be evaluated by performing an independent walkdown of these items.

### Crane Operation

The inspectors should ensure the appropriate personnel are in place for crane movement and the crane operators are qualified and have appropriate training records.

### Control of Heavy Loads Program Compliance (If not reviewed in IP 60856)

The inspectors should verify DSS lifting operations in vicinity of 10 CFR Part 50 SSCs are performed in accordance with the site's control of heavy loads program. The inspectors should also review the licensee's FSAR and associated Phase 1 and Phase 2 (if applicable) NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants," responses, and determine if the licensee is either utilizing a single-failure-proof crane for DSS lifts or has analyzed the effects of postulated heavy load drops.

### Load Drop Evaluation (If not reviewed in IP 60856)

If lifts are performed in accordance with a load drop analysis, it should be verified that dropping a storage or transfer cask inside the fuel handling or reactor building will not challenge any 10 CFR Part 50 SSCs, non-safety-related risk-important equipment, or potentially damage spent fuel. Additionally, the inspectors should verify the offsite dose consequence associated with the drop of a storage or transfer cask are evaluated.



The licensee's analysis should be reviewed 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 review the assumptions used by the licensee in any cask drop analysis and ensure that these assumptions are consistent with the DSS FSAR and incorporated into licensee procedures.

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

#### Crane Design (If not reviewed in IP 60856)

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). If friction is used to mitigate seismic reaction forces for the crane support system, the inspectors should verify that the licensee has evaluated use of friction in accordance with 10 CFR 50.59 to determine if a license amendment is required prior to using the crane to support ISFSI activities. For example, a licensee (Monticello) used friction but it was specifically approved by the NRC through a license amendment request. The inspectors should also 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, the inspectors should verify 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 including meeting the provisions of NUREG-0554 in addition to the specified design codes 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.

#### Crane Testing (If not reviewed in IP 60856)

The inspectors should verify that the crane is tested in accordance with the facilities control of heavy loads program, typically following ASME B30.2. Specifically, 100 percent and 125 percent load testing of the crane should be performed in accordance with ASME B30.2 requirements.

#### Building Super Structure (If not reviewed in IP 60856)

The inspectors should verify, by document review and as necessary in field walkdown, 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. At a minimum, the licensee should have utilized appropriate load combinations and **allowable stresses** from the FSAR code of record. Examples of previously identified deficiencies can be found in NRC IN 2019-09.

#### Lay Down Area Structure (If not reviewed in IP 60856)

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 over onsite. Areas may include the spent fuel pool, spent fuel pool shelf, cask washdown and processing areas, building rail bay, and heavy haul path. At a minimum, the licensee should have utilized appropriate load combinations and allowable stresses 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. The inspectors should also verify 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.

#### Transfer Path Structure (If not reviewed in IP 60856)

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. An example would include potential impacts on building containment or ventilation during movement out of buildings. The inspectors should examine any interferences from overhead lines or nearby structures. Contact with overhead power lines may impact the safety of licensee personnel, the reactor plant and endanger the cask and cask transporter.

#### Cask Transporters and Transfer Facilities (If not reviewed in IP 60856)

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 elsewhere, lifting and transport operations outside the Part 50 facility may need to be reviewed purely on their impact on the DSS. The 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 accident analyses contained within the DSS FSAR.

### 3. Radiation Protection

Requirements for radiation protection program activities may be found in 10 CFR 72.104, 72.106, 72.126, and 72.212, in addition to 10 CFR Part 20.

The inspectors should verify that the licensee has implemented the site radiation protection program for activities related to dry storage. Special consideration should include contamination controls; postings; the use of temporary or movable shielding; minimizing workers time near the DSS; pre-job briefings; continuous coverage by radiation protection (RP) personnel; and special considerations for neutron surveys and dosimetry.

The inspectors should verify that the licensee has adequately addressed the change in the neutron energy spectrum that will be encountered in the vicinity of the DSS after the water has been drained from the cask and has provided workers with personal dosimeters, which include alarming dosimeters that compensate for the

higher neutron energy. The inspectors should also verify that appropriate survey meters are being used.

The inspectors should review how potential noble fission gas releases during canister processing will be detected and evaluated.

#### 4. Emergency Preparedness

If not performed in IP 60856, the inspectors should verify that any ISFSI-specific requirements have been adequately addressed in the emergency plan (EP). The inspectors should also verify that changes have been incorporated into the EP implementing procedures and that personnel have been trained regarding these changes.

The inspectors should verify that changes have not decreased the plan's effectiveness. If any changes decreased the plan's effectiveness, NRC approval of the changes should have been 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 an alternative to the method described in Appendix 1 to NUREG-0654/FEMA-REP-1 and NUMARC/NESP-007 for developing EALs as required by Section IV.B of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4).

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

#### 5. Maintenance and Surveillance

The inspectors should review the license or CoC for site-specific maintenance and surveillance requirements that apply to the ISFSI and ensure the licensee's maintenance and surveillance program meets these requirements. An example of activities for a standard DSS may include monitoring DSS temperatures, calibrating instruments, inspecting DSS ventilation openings for obstructions, performing shielding effectiveness tests, inspecting internals of DSSs, evaluation of slope stability of nearby geography, evaluation of the height of shielding berms, or monitoring and evaluating the structural condition of the DSS(s) and ISFSI pad(s).

#### 6. Fire Protection

The fire protection program should consider the impact of transient combustible loading on the DSS (e.g., equipment used for DSS transfer activities or delivery of materials on-site that pose a fire and/or explosion hazard).

If not reviewed in IP 60856, 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 FSAR or site-specific evaluation. Movement of a DSS through or by vehicle parking lots may expose the DSS to more flammable material than assumed in the FSAR fire hazard analysis, a possibility that should be reflected in the licensee's 10 CFR 72.212(b)(5) evaluation.

## 7. Training

If not reviewed in IP 60856, the inspectors should verify that ISFSI-specific requirements have been adequately addressed in the training program. The inspectors should also verify that changes have been incorporated into the program's implementing procedures and personnel have been trained regarding these changes.

The inspectors should verify through interviews and review of records that licensee personnel conducting the preoperational test activities have a clear understanding of their duties and responsibilities and that:

- (a) Personnel have been trained and certified per the licensee's approved training program. Note: A Systematic Approach to Training (SAT) training program may be required for some sites.
- (b) Pre-job briefs are being performed for all affected staff.
- (c) Oversight and command and control responsibilities have been established in accordance with licensee's procedures.
- (d) Specific radiological hazards are identified, and controls implemented.

The inspectors should verify that changes have not decreased the program's effectiveness. If any changes have decreased the program's effectiveness, it should be verified that the necessary approvals (internal or external) were obtained. Training program changes generally do not require NRC approval.

The inspectors should verify the licensee's Part 72 training program meets the requirements of the license. For general licensees, a Systematic Approach to Training (SAT) program may be required to be implemented in accordance with the site's Part 50 requirements. Site-specific licenses may vary. The inspectors should review the analysis phase of the SAT program and ensure all required positions have been analyzed. The inspectors should review training documentation and the on-the-job demonstration requirements to become qualified. It should also be determined whether the program contains an evaluation phase to ensure that the training process is working, and improvements are identified and implemented.

## 8. Environmental Monitoring

If not reviewed in IP 60856, the inspectors should review the environmental monitoring and, as necessary, effluent monitoring at the facility.

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. It should be verified that the licensee has appropriately identified the real individual beyond the controlled area that will receive the largest dose associated with the ISFSI. Specifically, conservative distances from the ISFSI and occupancy factors should be utilized as inputs to the evaluation in accordance with NUREG-2215, "Standard Review Plan for Spent Fuel Dry Storage Systems and Facilities," Chapter 10A. 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).

The inspectors should verify the licensee has assessed the radiological impact of any ISFSI design basis accident on any individual located on or beyond the nearest controlled area boundary in accordance with 10 CFR 72.106. The licensee's site-specific abnormal operating and design basis accident events should be evaluated as compared to those analyzed in the DSS FSAR and it should be determined if there are any credible increases in either direct radiation exposure or radiological effluents due to these events. The licensee should have evaluated any increase in radiation exposure or radiological effluents against the dose requirements of 10 CFR 72.106 at the controlled area boundary. The inspectors should evaluate whether the introduction of the DSS has created a possibility for an accident of a different type than any previously evaluated at the facility, which should be evaluated in accordance with 10 CFR 50.59. For sealed DSSs, increases in direct radiation exposure or radiological effluents are normally not credible due to abnormal operating or design basis accidents.

#### 9. QA Activities

ISFSI operations are required to be performed under an NRC-approved quality assurance program. A quality assurance program previously approved by the NRC as satisfying the requirements of 10 CFR Part 50, Appendix B, will be accepted as satisfying the 10 CFR Part 72, Subpart G requirements for a QA program.

If not reviewed in IP 60856, the inspectors should verify that any ISFSI-specific requirements have been adequately addressed in the Quality Assurance Program (QAP). Changes should have been incorporated into the QAP's implementing procedures and personnel trained regarding these changes.

If not reviewed in IP 60856, the inspectors should verify that changes have not reduced the commitments in the program description in accordance with 10 CFR 50.54(a)(3). If any change was made that reduced commitments, it should be verified that NRC approval of the changes was obtained.

#### 10. Design Changes

If not reviewed in IP 60856, the inspectors should review changes, tests, or experiments performed to support ISFSI operations. Emphasis should be given to evaluations based upon their safety significance, risk significance, and complexity. The inspectors should refer to IMC 2690, Appendix E, for guidance in prioritizing the review of 10 CFR 72.48 evaluations.

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 Implementation" is acceptable for complying with the NRC regulations in 10 CFR 50.59 with clarifications provided within the Regulatory Guide.

Regulatory Guide (RG) 3.72, "Guidance for implementation of 10 CFR 72.48, "Changes, Tests, and Experiments," Revision 1, endorses Nuclear Energy Institute (NEI) document NEI 12-04, "Guidelines for 10 CFR 72.48

Implementation," Revision 2, dated September 2018 with exceptions and clarifications.

The 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.

d. Evaluation of Licensee Oversight and Corrective Actions

This requirement impacts all five safety focus areas. The inspectors should review QA audit and surveillance plans or interview auditors to assess the QA department's plans for evaluating the preoperational testing. Hold points and critical tasks should be clearly marked in preoperational test procedures. In addition to the review of formal audits and surveillances performed, the inspectors should evaluate through in-field observations and/or interviews, the licensee's oversight of preoperational loading and unloading activities. The licensee may accomplish this, for example, through use of task managers, management observations, and peer checking. If contractors are utilized for work activities, the licensee shall assess the effectiveness of the control of quality by contractors and subcontractors at intervals consistent with the importance, complexity, and quantity of the product or service in accordance with 10 CFR 72.154.

Audits and self-assessments should be performed by the licensee on ISFSI operations in accordance with their NRC-approved QAP. Additionally, many licensees perform pre-campaign readiness reviews. The inspectors should review audits and self-assessments and verify that conditions adverse to quality are documented in the licensee's corrective action program. A risk-informed selection of corrective action documents associated with the ISFSI should be reviewed. This review may include a review of corrective action documents of ISFSI support programs, such as the control of heavy loads program. Conditions adverse to quality associated with the ISFSI program should be promptly identified and corrected and for any significant condition adverse to quality identified, the cause of the condition should be determined, and corrective action taken to preclude repetition. The inspectors should verify that conditions adverse to quality are dispositioned in accordance with the licensee's corrective action program (CAP). Deficiencies should be appropriately addressed before the licensee begins loading operations.

#### 60854-04 INSPECTION RESOURCES

The estimated average time to complete the inspection requirements is 200 +/- 30 hours of direct inspection per inspection occurrence.

#### 60854-05 PROCEDURE COMPLETION

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

## 60854-06 REFERENCES

American National Standards Institute (ANSI) N14.5, "Radioactive Materials - Leakage Tests on Packages for Shipment"

American Society of Mechanical Engineers (ASME) Boiler & Pressure Vessel Code (BPV), Section V, "Nondestructive Examinations"

ANSI N14.6, "Standard for Special Lifting Devices for Shipping Containers Weighing 10,000 pounds (4,500 kg) or More for Nuclear Materials"

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

ASME B30.9, "Slings"

ASME BPV Code, Section IX, "Welding, Brazing, and Fusing Qualifications"

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

IMC 2515, "Light-Water Reactor Inspection Program"

IMC 2561, "Decommissioning Power Reactor Inspection Program"

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 60856, "Review of 10 CFR 72.212(b) Evaluations"

IP 60857, "Review of 10 CFR 72.48 Evaluations"

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

NEI 12-04, "Guidelines for 10 CFR 72.48 Implementation," Revision 2

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

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

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

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

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

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

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

RG 1.187, "Guidance for Implementation of 10 CFR 50.59, Changes, Tests, and Experiments," Revision 2

RG 3.72, "Guidance for Implementation of 10 CFR 72.48, Changes, Tests, and Experiments," Revision 1

Society for Non-Destructive Testing SNT-TC-1A, "Personnel Qualification and Certification in Nondestructive Testing"

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 60854

| Commitment Tracking Number | Accession Number<br>Issue Date<br>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                        | ML073100468<br>01/16/08<br>CN 08-003            | 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                        | ML20177A533<br>10/20/20<br>CN 20-052            | Major revision. Revised to update inspection hours. Clarified 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 inspector training session on revised ISFSI inspection program. Due date is 12/31/2020. | ML20177A541   |
|                            | ML25107A143<br>05/27/25<br>CN 25-013            | Revised to incorporate resource estimate ranges and include additional guidance.   | N/A  | N/A   |