
INSPECTION PROCEDURE 60854

PREOPERATIONAL TESTING OF AN ISFSI

PROGRAM APPLICABILITY: 2690 and 2515

SALP FUNCTIONAL AREA: Other Special Areas for Operation (OTHER)

60854-01 INSPECTION OBJECTIVE

For the purposes of this procedure, the term "licensee" may refer to a 10 CFR Part 72 site-specific license holder or a reactor licensee using a 10 CFR Part 72 general license.

01.01 To determine by direct observation and independent evaluation whether the licensee has developed, implemented, and evaluated preoperational testing activities to safely load spent fuel from the spent fuel pool into a dry cask storage system (DCSS) and to transfer the loaded DCSS to the Independent Spent Fuel Storage Installation (ISFSI). These activities should be accomplished in accordance with the commitments and requirements contained in the Safety Analysis Report (SAR), NRC's Safety Evaluation Report (SER), Certificate of Compliance (C of C) for the DCSS design being used under a general license or the license and technical specifications for an ISFSI operated under a site-specific license, as well as the licensee's Quality Assurance (QA) program, and 10 CFR Part 72.

01.02 To determine, by direct observation and independent evaluation, whether the licensee has developed, implemented, and evaluated a preoperational test program in order to safely retrieve spent fuel from an ISFSI and transfer it to either the spent fuel pool or a separate cask or canister in accordance with the requirements listed in section 01.01.

01.03 To determine whether the licensee has fulfilled all test acceptance criteria and that all identified deficiencies are resolved before receipt of fuel at the ISFSI.

01.04 Independently assess, at the completion of the preoperational testing program, the licensee's readiness to load spent fuel into the ISFSI or retrieve spent fuel from the ISFSI.

60854-02 INSPECTION REQUIREMENTS

02.01 Before any on-site activity, review the SAR, SER, C of C, and, if applicable, the site-specific license and technical specifications for the DCSS being used. If a general license is used, review the written evaluations required by 10 CFR 72.212(b).

02.02 Verify that the preoperational test procedures for DCSS loading, unloading, and transfer activities and their acceptance criteria meet the commitments and requirements specified in the DCSS SAR, SER, C of C, or, if applicable, the site-specific license or technical specifications, as well as the licensee's QA program, and 10 CFR Part 72.

02.03 Verify that preoperational test procedures, for the activities listed below, have been prepared, reviewed, and initially approved in accordance with the licensee's administrative programs. Determine if the licensee has completed a verification and validation of the procedures. If the licensee has used multiple procedures, then verify that sufficient overlap has been maintained to ensure all required critical activities will be performed.

- a. For transferring spent fuel from the spent fuel pool to the ISFSI:
 1. Moving the empty cask or canister into the spent fuel pool area.
 2. Placing the cask or canister in the spent fuel pool.
 3. Transporting of fuel from spent fuel pool into the cask or canister.
 4. Documenting the parameters and characteristics of spent fuel placed in the cask or canister per the license or C of C.
 5. Lifting the cask or canister from the spent fuel pool.
 6. Sealing the cask or canister.
 7. Evacuating water from the cask or canister and vacuum drying.
 8. Gas backfilling the cask or canister and decontaminating.
 9. Transferring the loaded cask or canister to the transport vehicle.
 10. Transporting the cask or canister to the ISFSI.
 11. Placing the cask or canister in the ISFSI.

- b. For retrieving spent fuel from a loaded DCSS in the ISFSI and returning it to the spent fuel pool:
 1. Retrieving of the cask or canister from the ISFSI.
 2. Transporting the cask or canister from the ISFSI to the reactor or fuel building.
 3. Sampling the cover gas for indications of fuel damage such as radioactivity or air leakage, and directing operator response if the sample indicates fuel damage.
 4. Venting of the cover gas and backfilling of the cask or canister with water.
 5. Unsealing the cask or canister for access.
 6. Transferring the cask or canister to the spent fuel pool.
 7. Transporting the fuel from the cask or canister to the spent fuel pool.
 8. Removing the cask or canister from the spent fuel pool and decontaminating.
 9. Storing or disposing of the cask or canister.

- c. For inspection guidance on retrieving spent fuel from a loaded DCSS in the ISFSI and performing a dry transfer to a different DCSS component, contact Spent Fuel Project Office (NMSS/SFPO) for assistance.

02.04 Verify, through interviews and reviews of selected records, that licensee personnel conducting 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.
- b. A pre-job briefing has been performed for all affected staff.
- c. Hold and inspection points are clearly identified.
- d. Stop-work criteria and contingency plans are established to place the DCSS in a safe configuration. Determine if the licensee has established guidelines for how long a cask or canister may remain suspended in mid-air from a crane and has identified any required compensatory measures.
- e. Oversight and command and control responsibilities have been clearly established. This includes notification requirements.

f. Specific radiological hazards are identified and controls are implemented.

02.05 Verify that equipment used during preoperational test activities has been tested and/or evaluated for its impact on plant structures, systems and components (SSCs) before performance of the preoperational tests.

02.06 Evaluate the effectiveness of the licensee's management oversight and Quality Assurance assessments of preoperational testing activities.

02.07 Evaluate the effectiveness of the licensee's plans and preparations for controlling radiological activities, by reviewing documents and interviewing individuals. Evaluate the effectiveness of radiological controls and monitoring during preoperational testing. Evaluate the effectiveness of security controls during preoperational testing.

02.08 If the procedures used by the licensee during the dry run have not received final approval yet, then re-perform the reviews described in section 02.03 after the licensee has issued the procedures for use.

02.09 By direct observation and evaluation of selected activities, such as those listed in section 02.03.a, independently assess whether the licensee has adequately demonstrated its readiness to safely transfer spent fuel from the spent fuel pool to the ISFSI.

02.10 By direct observation and evaluation of selected activities, such as those listed in section 02.03.b, independently assess whether the licensee has adequately demonstrated its readiness to safely retrieve spent fuel from the ISFSI and transfer it either to the spent fuel pool or to another DCSS component.

60854-03 INSPECTION GUIDANCE

General Guidance

Requirements and commitments related to preoperational testing may be found in the various licensing basis documents (SAR, SER, C of C, or, if applicable, the site-specific license and technical specifications, as well as the licensee's QA program and 10 CFR Part 72). In the event that preoperational test methods and/or acceptance criteria do not coincide with those specified in these documents, the inspectors are encouraged to contact NMSS/SFPO in order to obtain technical assistance. The inspector should directly observe any dry runs required by the site-specific license or C of C. 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:

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

If the licensee intends to use a different model or type of DCSS, for which a preoperational test program has not been completed, then applicable portions of IP 60855 and this procedure may be revisited.

Specific Guidance

03.01 SARs and SERs describing commitments regarding preoperational testing, have been written for each type of approved DCSS. DCSS designs vary widely and care must be taken to review the correct documentation. Copies may be obtained from the Division of Reactor Safety or NMSS/SFPO. In some cases, requirements and commitments for preoperational testing may be located in Section 9 of the SAR. While the SER can document or clarify commitments made by the licensee or vendor, it does not serve as an independent basis for enforcement actions.

03.02 If possible, review the licensee's approved preoperational test procedures for DCSS loading, unloading, and transfer activities before conducting the on-site inspection. Although test criteria are discussed in the DCSS SAR, SER, C of C, and, if applicable, the site-specific license and technical specifications, there may be differences between the licensee's test procedure and the test criteria because of different interpretations of construction Code requirements. Such issues should be brought to the attention of the NRR PM and NMSS/SFPO as soon as they are identified, for timely resolution.

03.03 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 before the inspector's review. In that case, the inspector should ensure that the licensee has performed an initial review, which may include the plant operations review committee (PORC); and that performance of these "draft" procedures is subsumed under the overall ISFSI preoperational testing process. However, this overall process and associated documents should have been reviewed and approved by the licensee's administrative processes. The list of activities contained in section 02.03 should be viewed as typical, but not all inclusive. Further not all tasks are equally significant. For example, activities that affect containment boundaries, seal integrity, or long-term heat removal capabilities have greater potential safety impact and warrant a higher level of attention by the inspector.

Responsibilities should be clearly defined. Instructions should be provided if licensee personnel cannot perform the steps as written. Dry runs of cask or canister movements should simulate the maximum expected weight, including water, as closely as possible. Hold and inspection points 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 problem identification and corrective action systems may be referenced for those actions. Particular attention should be paid to procedures for venting and sampling loaded DCSSs, recognizing and responding to damaged fuel, and refilling the loaded cask or canister with water, as problems have been observed in these areas. Problem areas can include radiation exposure when sampling the container, steam flashing and pressure control difficulties when water is being added, filtering or scrubbing the steam/gas mixture being vented from the canister as it is filled with water. Guidance for operator actions and radiological controls in response to damaged fuel should be included. As 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. Supplemental guidance on inspecting procedures can be found in IP 42700.

03.04 Inspectors may choose to review training records, training curricula, and available training aids to support staff interviews. Workers should be readily able to discuss their responsibilities and demonstrate an understanding of the critical knowledge and skills required to perform their assigned tasks. Supplemental guidance on inspecting training can be found in IP 41500. For a site-specific license, additional requirements are contained in 10 CFR 72.192 and the cask C of C.

Pre-job briefings should be thorough and discuss hold and inspection points, expected radiological hazards and controls, and worker actions if an unexpected response is encountered during preoperational testing. Continuance of testing during shift turnovers should be addressed. Delineation of responsibilities should be clear to all licensee staff performing preoperational test activities.

03.05 Operation of an ISFSI, whether under a site-specific or general license, requires a licensee to assess the ISFSI's effects on all aspects of plant operations. This evaluation is performed under 10 CFR 50.59. Inspection of these safety evaluations may be done through a review of selected 10 CFR 50.59 and 72.48 analyses. Inspection guidance for inspecting 10 CFR 50.59 evaluations may be found in IP 37001.

Special attention should be paid to testing and inspecting cranes and rigging and lifting equipment, to verify that they can support the anticipated loads, without compromising the licensing basis margins of safety and are compatible with the DCSS components. This should also include reviews of heavy load paths, crane single failure issues, and maximum DCSS weight versus crane capacity

limits. Any impact on transient radiation sources (such as high integrity containers (HIC) in the load path) should be evaluated by the licensee. See the references for supplemental information.

The inspectors should directly observe that sufficient space in the spent fuel pool and in laydown areas has been prepared and set aside to conduct both preoperational testing and the operational transfer and transport of DCSS components. Reinforcement of the roadway from the fuel or reactor buildings to the ISFSI site should also be considered.

03.06 Inspectors should review QA audit and surveillance plans and interview auditors to assess QA's plans for evaluating the preoperational testing. Hold points should be clearly marked in preoperational test procedures. Completed audits and surveillances should be reviewed after the testing to assess their depth and thoroughness. Inspectors may supplement these activities with reviews of completed audits of ISFSI construction and fabrication activities.

Corrective actions for identified deficiencies should be completed in a timely manner and dispositioned in accordance with the licensee's programs. Corrective actions should be resolved before the preoperational testing program is completed.

03.07 If the review of the implementation of the radiation protection (RP) program was done under IP 60855, then no additional inspection of RP planning need be performed. Otherwise, RP planning should be reviewed. Additional guidance on inspecting RP planing and preparation can be found in IP 60855, sections 02.03, 03.02.d, and 03.03. During preoperational testing and dry runs the inspector should observe the implementation of RP activities and the licensee's readiness to deal with actual radiation hazards.

03.08 The intent of this section is not to re-perform procedure reviews accomplished by section 02.03, unless the licensee used the preoperational testing program as a means of validating "draft" operating procedures during performance of the dry run. In that case, the inspector should review the operating procedures after the licensee has incorporated any comments and improvements and approved the procedures for use. See also the guidance of section 03.03.

03.09 No specific guidance.

03.10 No specific guidance.

60854-04 INSPECTION RESOURCES

To prepare for these inspections each inspector should spend approximately 16 hours for in-office review. Inspection activities will require approximately 40 hours, each, by three inspectors. Documentation is estimated at to require 16 hours per inspector. Performance of this procedure may be used as credit for applicable portions of the MC 2515 core program (plant operations, maintenance, engineering, and plant support). It is expected that regional inspection personnel will perform this procedure, with assistance from NMSS and NRR staff, as requested.

60854-05 REFERENCES

ANSI/N14.6-1993, "For Radioactive Materials - Special Lifting Devices for Shipping Containers Weighing 10,000 Pounds (4500 kg) or More."

NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants," July 1980. Licensee implementation of this NUREG may vary and specific commitments to this guidance are covered by responses to NRC Generic Letters 80-113 and 85-11.

END

