

# NRC INSPECTION PROCEDURE

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## INSPECTION PROCEDURE 60845

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### OPERATION OF INTER-UNIT FUEL TRANSFER CANISTER AND CASK SYSTEM

PROGRAM APPLICABILITY: **IMC 2515C**

#### 60845-01 INSPECTION OBJECTIVE

This inspection focuses on verifying the licensee's operation of an inter-unit fuel transfer canister cask system. This procedure would be used when a licensee is handling and transferring spent fuel between units at their facility.

#### 60845-02 INSPECTION REQUIREMENTS

The review shall be performed to determine if: (a) The licensee has developed, implemented, and evaluated preoperational testing activities to safely perform an inter-unit fuel transfer.; (b) The licensee has developed and made changes to plant programs and procedures to support operations of an inter-unit fuel transfer canister and cask system; (c) activities are accomplished in accordance with the commitments and requirements contained in the Licensing Report (LR), NRC's Safety Evaluation Report (SER), and the licensee technical specifications (TS); and (d) activities are accomplished in a manner that adhere to As Low As Reasonably Achievable (ALARA) exposure controls practices. This shall be accomplished through direct observation of the dry run and inter-unit fuel transfer activities and by independent evaluation and review of licensee documents.

Requirements and commitments related to preoperational testing and operation of an inter-unit fuel transfer may be found in the licensing basis documents, such as the LR, SER, and TSs. In the event that preoperational test methods and/or acceptance criteria do not coincide with those specified in these documents, the inspector should contact their regional management.

Inspectors should directly observe the preoperational test (dry run) of the inter-unit fuel transfer. While it is preferable for the dry run to replicate the actual evolution, the use of mockups and overlapping procedures are acceptable. The NRC observed dry run should accomplish the following: (a) demonstrate the functionality of all equipment; (b) test and refine the procedures used for the inter-unit fuel transfer; and (c) demonstrate proficiency by licensee personnel prior to inter-fuel transfer operations.

Inspectors should observe the initial operational transfer activities. Subsequent operational transfer operations may be inspected as determined by NRC management.

#### 02.01 Preoperational Test (Dry Run) of Inter-Unit Fuel Transfer

- a. Verify that preoperational procedures for inter-unit fuel transfer activities have been prepared, reviewed, and initially approved in accordance with the licensee's administrative procedures. Procedures should be developed for normal operations and off-normal events as described in the LR, SER, and TS. Verify that no real fuel assemblies will be handled during the test run.
- b. 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:
  1. Personnel have been trained and certified per the licensee's approved training program.
  2. A pre-job brief has been performed for all affected staff.
  3. Oversight and command and control responsibilities have been established in accordance with licensee's procedures.
  4. Specific radiological hazards are identified and controls implemented.
- c. Verify equipment used during preoperational test activities has been tested and evaluated for its impact on plant structures, systems, and components before performance of preoperational tests, such as the control of heavy loads. Verify equipment used during preoperational test activities has met all maintenance criteria required by manufacturer and licensee.
- d. Verify that the licensee has implemented the site radiological protection program for activities such as contamination controls, temporary shielding, distance, surveys (including neutron surveys as required by the TS) associated with the inter-unit fuel transfer.
- e. Evaluate the effectiveness of the licensee's management oversight and quality assurance (QA) assessments of preoperational test activities through observations and review of records.
- f. Verify that licensee has adequately demonstrated its readiness to safely transfer spent fuel from one unit to the other.
- g. Verify whether the licensee is identifying problems that could affect preoperational and operational inter-unit transfer activities in the licensee's corrective action program and verify they are properly addressed for resolution.

## 02.02 Operation of Inter-Unit Fuel Transfer

- a. Verify that operational procedures for inter-unit fuel transfer activities have been prepared, reviewed, and approved in accordance with the licensee's administrative procedures prior to use. Procedures should be developed for normal operations and off-normal events as described in the LR, SER, and TS. Determine if licensee has completed a verification and validation of the procedures.
- b. 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:
  1. Personnel have been trained and certified per the licensee's approved training program.
  2. A pre-job brief has been performed for all affected staff.
  3. Oversight and command and control responsibilities have been established in accordance with licensee's procedures.
  4. Specific radiological hazards are identified and controls implemented.
- c. Verify that spent fuel assemblies being transferred and the configuration of spent fuel assemblies in the shielded transfer canister (STC) and receiving spent fuel pool meet the requirements specified in the LR, SER, TSs, and licensee procedures.
- d. Verify equipment used during operational activities has met all maintenance criteria required by the manufacturer and licensee. Verify pre-inspections of the STC and transfer cask (HI-TRAC) have been performed.
- e. Verify that the licensee has implemented the site radiological protection program for activities such as contamination controls, temporary shielding, distance, and surveys (neutron) associated with the inter-unit fuel transfer.
- f. Evaluate the effectiveness of the licensee's management oversight and QA assessments of preoperational test activities through observations and review of records.
- g. Verify that the licensee has properly transferred spent fuel from one unit to the other in accordance with regulatory requirements, commitments, and licensee's procedures.
- h. Verify whether the licensee is identifying problems that could affect operational inter-unit transfer activities in the licensee's corrective action program and verify they are properly addressed for resolution.

- a. Inspection Requirement 02.01(a) and 02.02(a). Review and assess the adequacy the licensee's procedures. Determine if licensee has completed a verification and validation of the procedures during the dry run. Procedures, including those provided by contractors, should be prepared, reviewed, and approved in accordance with the licensee's administrative programs prior to initial loading. During subsequent inspections review changes made to procedures to verify that changes did not reduce the effectiveness of the program and continue to fulfill the commitments and requirements specified in the LR, SER, and TS. Ensure changes were approved consistent with the licensee's administrative programs (50.59 process), including reviews required by the plant operations review committee (or similar entity), if applicable. Procedures should include normal, abnormal, and emergency conditions, such as shielded transfer canister (STC) transfer cask (HI-TRAC) preparation, setup, inspection, fuel loading, HI-TRAC/STC movement, STC fuel unloading, and maintenance and off-normal events (crane operation, water inventory control, transporter breakdown, and cask drop)
- b. Inspection Requirement 02.01(b) and 02.02(b). Review the licensee's preparation for transfer operations such as ALARA plans, radiological postings, pre-job briefs, training, security and safeguards, survey equipment, equipment staging, lifting equipment, and suitability of the transfer path. Confirm that any personnel assigned to participate in fuel transfer operations have been trained. Through interviews, confirm their knowledge of the safety significant aspects of their job assignments. Ensure changes made to procedures have been properly incorporated into retraining and pre-job briefs.
- c. Inspection Requirement 02.02(c). Review the licensee's fuel loading plan and confirm that the fuel loading plan meets requirements for configuration of fuel assemblies in the STC. Verify by direct observation and review of records that each fuel assembly transferred meets the conditions for the STC and are appropriately stored in the approved regions within the receiving unit's spent fuel pool.
- d. Inspection Requirement 02.01 (c) and 02.02 (d). Assess the licensee's heavy lifting equipment and processes. Refer to NUREG-0612 and ANSI/N14.6-1993 for additional guidance. Determine whether the licensee has evaluated the impact of lifting of heavy loads (STC and HI-TRAC) within the facility. Review the testing and maintenance performed by the licensee on cranes and rigging and lifting equipment. Verify all equipment can support the anticipated loads, without compromising the licensing basis margins of safety and are compatible with the STC and HI-TRAC components. Reviews should include heavy load paths, crane single failure issues, and crane maximum weight capacity limits. Verify the licensee has, prior to operations, performed pre-inspections of the STC and HI-TRAC. Inspectors should observe or review documents associated with STC and HI-TRAC leak testing and seal integrity, installation of Metamic Surveillance Coupons, HI-TRAC Centering Assembly orientation, and HI-TRAC Bottom Missile

Shield. Also, review the functionality and performance of ancillary equipment utilized during the inter-unit transfer.

- e. Inspection Requirement 02.01(d) and 02.02(e). Assess the licensee's radiological controls in accordance with IP 71124 and its applicable attachments as they apply to inter-unit transfer operations.
- f. Inspection Requirement 02.01(e) and 02.02(f). Evaluate the effectiveness of the licensee's management oversight and QA assessments of inter-unit transfer activities. Review QA audits and observe supervisory involvement and oversight of activities.
- i. Inspection Requirement 02.01(f) and 02.02(g). Verify, by observation, interview of license personnel, and review of records that the licensee performed the dry run and operation<sup>al</sup> inter-unit fuel transfer in accordance with regulatory requirements, commitments, and licensee's procedures. Pre-job briefings should be observed. These briefings should include discussions of planned activities, hold and inspection points, contingency plans, and radiation safety issues. Review contingency plans and verify special equipment and procedures are available to properly mitigate the consequences of off-normal events

Areas to review include:

1. STC and HI-TRAC Preparation and Setup: Instrumentation and gauge calibration, HI-TRAC Jacket Water fill, HI-TRAC/STC Annulus fill, STC fill, and leak check of HI-TRAC Pool Lid and Drain Connection.
2. Placing STC into Spent Fuel Pool (SFP) and Loading: SFP Cooling operation and initial conditions (e.g. temperature and Boron concentration), separation distance for STC and fuel racks, fuel characterization process, fuel loading plan and identification number checks, independent verifications, and use of cell blocking device in the STC, as applicable.
3. Removal of loaded STC from SFP: Fuel loading confirmation surveys of STC, lead shielding installation and removal, connection of instrument trees including proper lineup (e.g., vent path, isolated pressure rise gauges, course pressure gauges on service, relief valve operable), STC lid torque and leak testing, fill and drain down with steam supply, fuel loading confirmation pressure rise test, HI-TRAC lid torque and pressurized leak testing.
4. Movement: Haul path suitability, weather forecast, maximum lift height without redundant fall protection, Vertical Cask Transporter (VCT) lateral support installation, radiological boundaries, security, combustibles, hot-work, and fire watch.

5. Placing STC into SFP and Unloading & Removal of unloaded STC from SFP: HI-TRAC Lid venting and removal, lead shielding installation and removal, instrument tree installation venting and/or cool down of STC, and removal considerations for hydrogen build-up including inert gas purge, STC separation distance for STC and fuel racks, fuel loading plan and identification number checks, and independent verifications.
- j. Inspection Requirement 02.01(g) and 02.02(h). Verify whether the licensee is identifying problems that could affect operational inter-unit transfer activities in the licensee's corrective action program. Review the historical corrective action database to identify trends and to determine whether corrective actions have been effective. Verify that the licensee has entered the problems identified during the inspection in the licensee's corrective action program. Verify that the licensee is identifying issues at an appropriate threshold and entering them in the corrective action program. Verify that problems included in the licensee's corrective action program are properly addressed for resolution. See Inspection Procedure 71152, "Problem Identification and Resolution," for additional guidance.

#### 60845-04 RESOURCE ESTIMATE

04.01 Pre-operational (Dry-Run): It is estimated that direct inspection activities will require approximately 240 – 400 hours. The actual resource requirement may vary, based on site specific activities and the number of inter-fuel transfers observed.

04.02 Operational: It is estimated that direct inspection activities will require approximately 100 – 350 hours. The actual resource requirement may vary, based on site specific activities and the number of inter-fuel transfers observed.

#### 60845-05 COMPLETION STATUS

Inspection of pre-operational (dry run) activities and operational activities will constitute completion of this procedure in the Reactor Program System (RPS).

#### 60845-06 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

10 CFR 50.59, "Changes, tests, and experiments"

NRC Regulatory Guide 1.187, "Guidance for Implementation of 10 CFR 50.59, Changes, Test, and Experiments," Rev. Nov 2000.

NEI 96-07, Revision 1 (Nov 2000), Guidance for 10 CFR 50.59 Implementation.

IMC 2515 Appendix C, "Special and Infrequently Performed Inspections"

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

IP 60855, "Operation of an Independent Spent Fuel Storage Installation"

IP 71124, "Radiation Safety—Public and Occupational"

IP 71152, "Problem Identification and Resolution"

END

Attachment 1 – Revision History for IP 60845

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Training Required and Completion Date	Comment Resolution and Closed Feedback Form Accession Number (Pre-Decisional, Non-Public Information)
	ML11272A053 04/26/12 CN 12-007	Initial Issuance		
NA	ML19086A276 05/16/19 CN 19-015	Periodic review of procedure. Minor grammatical edits. No substantive revision to this procedure was warranted at this time.	None	None