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INSPECTION PROCEDURE 60853

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ON-SITE FABRICATION OF COMPONENTS  
AND CONSTRUCTION OF AN ISFSI

PROGRAM APPLICABILITY: 2690 and 2515

SALP FUNCTIONAL AREA: Plant Support (PLTSUP)

## 60853-01 INSPECTION OBJECTIVES

For the purposes of this procedure, three different entities will be referred to: "licensee" - a 10 CFR Part 72 site-specific license holder or a reactor licensee using a 10 CFR Part 72 general license; "vendor" - an independent organization that holds the Certificate of Compliance (C of C) for a particular dry cask storage system (DCSS) design and who may be authorized by the C of C to approve changes to the cask's design; and "fabricator" - an organization that is physically building the DCSS components and receives oversight from either the "vendor" or "licensee".

01.01 To determine whether DCSS components which are fabricated on-site, for use in an Independent Spent Fuel Storage Installation (ISFSI), are fabricated in accordance with the design commitments and requirements specified in the vendor's Safety Analysis Report (SAR), NRC's Safety Evaluation Report (SER), the C of C, 10 CFR Part 72 and, if applicable, the site-specific license and technical specifications.

01.02 To determine whether on-site construction activities for the ISFSI have been conducted in accordance with the licensee's NRC-approved Quality Assurance (QA) program.

## 60853-02 INSPECTION REQUIREMENTS

02.01 Before conducting any on-site inspection, review the SAR, SER, C of C, and, if applicable, the site-specific license and technical specifications for the DCSS being used.

02.02 Verify, by review of selected records, whether the licensee has performed and documented its 10 CFR 50.59 analyses for those plant systems, structures, and components (SSCs) that will be affected by the construction, fabrication, preoperational testing, and operation of an ISFSI, and verify that all issues have been acceptably resolved.

02.03 If on-site fabrication or construction activities are being performed by vendor or fabricator personnel, then verify, by direct observation and interviews

with selected personnel, that the licensee's QA program requirements are being implemented.

02.04 Determine whether ISFSI-related activities conducted by licensee, vendor, or fabricator personnel have been audited by the licensee's QA staff.

02.05 Verify, by review of selected records, that corrective actions for identified deficiencies have been implemented in a timely manner and dispositioned in accordance with the licensee's QA program.

02.06 Verify, by direct observation or review of selected records, that materials, components, and equipment received by the licensee meet the procurement document specifications. Verify, by review of selected records, that the specifications contained in the procurement documents conform to the design commitments and requirements contained in the SAR, SER, C of C, and, if applicable, the site-specific license and technical specifications.

02.07 Fabrication of DCSS Components

- a. Determine, by reviewing selected drawings and fabrication procedures, whether the construction specifications conform with the commitments and requirements contained in the SAR, SER, C of C, and, if applicable, the site-specific license and technical specifications.
- b. Verify, by review of records for design changes and modifications, that all changes, from the design specified in the SAR, have been reviewed, documented, and approved by the licensee, in accordance with 10 CFR 72.48. If the vendor is authorized by the C of C to approve design changes, then verify the vendor has also approved any changes as well.
- c. Verify, by the review of selected records and interviews with selected personnel, that persons performing quality related functions are properly trained and certified to perform their duties.
- d. Determine, by interviews with selected personnel, whether the individuals constructing the component, and their foreman and/or supervisor are familiar with the specified design, fabrication techniques, testing requirements, and QA controls.
- e. Verify, by direct observation and review of records, that personnel are constructing the ISFSI and its components in accordance with the approved design specifications defined in the SAR, SER, C of C and, if applicable, the site-specific license and technical specifications.
- f. Determine, by direct observation, whether supervision and Quality Control (QC) staff are present at the work site and are providing appropriate oversight during fabrication activities.

02.08 Construction of the ISFSI Site

- a. Review the concrete pad's design specifications contained in the cask SAR, SER, C of C, and, if applicable, the site-specific license and technical specifications, and appropriate construction codes and standards.
- b. Determine, through direct observation, whether the location of the ISFSI could be compromised or impacted by subsequent dismantling of any plant structures (e.g. cooling towers).
- c. Verify, through review of selected records, that the licensee has designed and constructed the storage pad to withstand the static load of stored casks per 10 CFR 72.212(b)(2)(ii); and that the licensee has analyzed the reactor site parameters, including earthquakes and tornado missiles, to determine that these parameters are enveloped by the ISFSI's design basis described in the SAR and SER per 10 CFR 72.212(b)(3). Verify that the licensee has ensured that the soil characteristics of the ISFSI site envelope those of the reactor site.

Otherwise verify the licensee has analyzed soil characteristics differences to ensure that the support pad does not unacceptably diminish the DCSS's safety during an earthquake. [General license]

Verify, through review of selected records, that the ISFSI and its storage pad have built in accordance with the design requirements contained in the SAR, SER, and license or technical specifications. [Site-Specific license]

- d. Verify, through interviews with selected workers and supervisors, that individuals are familiar with the design and construction specifications for the ISFSI pad.
- e. Verify, through the review of records, that the pad's subsoil has been compacted or otherwise treated to meet the specifications defined in the SAR, SER, C of C, and, if applicable, the site-specific license and technical specifications.
- f. If pad construction activities are observed, then verify the following through direct observation:
  - 1. Subsoil has been properly treated to meet the requirements specified for the ISFSI pad.
  - 2. The correct size, grade, and spacing of reinforcing steel are installed per the pad's specifications.
  - 3. Restrictions on batch composition and time between mixing and pouring of concrete are met.
  - 4. Concrete is properly placed in adequate forms, consolidated (vibrated), finished, and cured.
  - 5. Slump and air entrainment tests fall within the specified values.
  - 6. The overall dimensions, orientation, and levelness of the pad meet the design specifications.
  - 7. Compressive strength samples are collected, cured, and tested, per specifications, and tests indicate whether the concrete meets the specified minimum design strength.

#### 02.09 Roadway Modifications

- a. Verify, through review of selected records and interviews with licensee personnel, that an analysis of the proposed route (roadway) and any staging areas between the fuel or reactor buildings and the ISFSI site has been evaluated for the maximum expected load and any interferences.
- b. Determine whether the licensee has scheduled or completed any modifications to reinforce the roadway and protect buried conduit, piping, or other equipment.
- c. Determine, by independent observation, whether the roadway path is suitable for the secure movement of a fully loaded spent fuel storage cask (e.g., a cask temporarily halted during transport will not pose a traffic obstruction that hinders plant activities or compromises plant or material security).

### 60853-03 INSPECTION GUIDANCE

03.01 SARs and SERs describing the functions of a particular DCSS' components have been written for each type of certified DCSS. Information on operational commitments for particular a

DCSS may also be found in the C of C and, if applicable, the site-specific license and technical specifications. DCSS designs vary, and care must be taken to review the correct documentation. Copies of documentation may be obtained from the Division of Reactor Safety or from the Spent Fuel Project Office (NMSS/SFPO). 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 Licensees planning to operate an ISFSI, whether under a site-specific or general license, must assess the ISFSI's effects on all aspects of plant operations. This evaluation should be conducted in accordance with 10 CFR 50.59. Inspection guidance for inspecting 10 CFR 50.59 evaluations may be found in IP 37001. Some areas that should be carefully evaluated include heavy loads considerations as they relate to safety-related plant equipment; single-failure-proof cranes and crane capacity; the floor's load rating; upgrading of plant roads; and protection of underground conduit, piping, and equipment near and along the transport route. Assistance in reviewing plant 10 CFR 50.59 evaluations may be obtained from NRR Project Manager.

03.03 It is assumed that the NRC has previously reviewed the licensee's QA program. The inspectors are to verify that the licensee's QA program is being effectively implemented by the vendor or fabricator personnel constructing DCSS components and the ISFSI on site.

03.04 Since fabricators build components for several licensees, they may have been previously inspected by NMSS, NRR, and/or regional staff. Information on inspections of ISFSI vendors and fabricators may be obtained from either the NRR Project Manager for a specific reactor site or NMSS/SFPO. The licensee's QA staff or other licensees' QA staffs may have previously audited fabricator activities. Information regarding audits of specific fabricators may be obtained from the licensee's staff, or through the owners' groups for specific DCSS designs, or from NMSS.

03.05 A system for tracking corrective actions should have been established. Alternatively, the licensee's plant problem identification and corrective action systems may be used. The licensee's QA group should have periodically audited the status of any identified deficiencies. Review of QA audits may be used to satisfy this requirement. Audit findings and nonconformance reports should be dispositioned in a timely manner. Where possible, issues should be resolved before the fabricated components are released to the licensee.

03.06 No specific guidance.

03.07 Additional guidance on fabrication of ISFSI components is found in IP 60852.

- a. Examples of design requirements include: material specifications; fabrication techniques such as welding or brazing; dimensions or tolerances; concrete batch composition (aggregate, cement, and slump tests); reinforcing steel (size and spacing); nondestructive testing methods; and performance tests (e.g., hydrostatic or load tests).
- b. Review of design changes may be conducted as specified in IP 60851.
- c. No specific guidance.
- d. No specific guidance.
- e. No specific guidance.
- f. No specific guidance.

03.08 Additional guidance on soil preparation and concrete work may be found in the 4500 and 4600 series of IPs. However, those IPs were based on inspecting safety-related structures. Because the DCSS components and the ISFSI are only important to safety, caution and inspector judgment should be used to ensure that excessive requirements are not imposed. The SAR should be reviewed closely to determine the exact requirements for the pad. For example, a licensee may build a pad to

seismic Category I requirements, to gain additional design margin for certain events or situations. However, the pad is still only classified as important to safety. Questions on pad design requirements should be referred to NMSS/SFPO for technical assistance.

- a. Standards utilized by the SAR may refer to national construction codes. IPs 45051, 45053, and 46053 may be used for supplemental guidance.
- b. Whether future impacts of reactor site dismantling were considered in determining the location of the ISFSI site. For example, would the demolition of tall structures (i.e., offgas stacks or cooling towers) create the possibility that falling material could impact the ISFSI.
- c. Problems, including natural phenomena, that might arise and cause adverse consequences to the DCSS should have been evaluated and determined to be enveloped by the design limits set for the specific DCSS design, as defined in the SAR and SER. Natural phenomena include events such as earthquakes, floods, tornados, wave erosion, and soil liquefaction. 10 CFR 72.212(b)(2)(ii) requires that the licensee perform a written evaluation that establishes that the cask storage pads and areas have been designed to adequately support the static load of the stored casks. 72.212(b)(3) requires that the licensee review the SAR, SER, and C of C to determine whether or not the reactor site parameters, including earthquake intensity and tornado missiles, are enveloped by the cask design basis considered in the SAR, SER, and C of C. These two requirements should be taken together and are inclusive, not exclusive. Consequently, the design basis of the ISFSI should bound the seismic response spectra for the reactor site.

Some storage pads may be classified as important to safety in the SAR. They should then be designed to more stringent criteria. The NRC's regulations do not explicitly require a licensee using the general license provisions to evaluate the cask storage pad and foundation. However, implicit in the regulations are requirements to evaluate reactor site conditions to ensure that they do not unacceptably diminish cask safety. For example, the ability of the cask to withstand a tip-over accident may be predicated upon the seismic response of the pad. While the cask is designed to withstand this type of event, its occurrence should be prevented. Additional guidance may be found in the references.

- d. No specific guidance.
- e. IPs 45053 and 45051 may be used for supplemental guidance.
- f. IPs 46053 and 46051 may be used for supplemental guidance.

### 03.09

- a. Inspectors should determine whether the licensee has adequately reviewed the pathway for moving the DCSS to the ISFSI site and has determined the right-of-way needed for such transport. There should be an examination of any interferences from overhead lines or proximity to other structures. Contact with overhead power lines may impact the safety of the plant as well as the cask transporter. The licensee assessment should consider the effects of weathering and repeated use of the roadway.
- b. The licensee should have determined whether those portions of the roadway that pass over or are adjacent to buried components, such as diesel fuel oil transfer lines, fire mains, service water lines, and electrical conduit, need reinforcement.
- c. Inspectors should also determine whether the licensee has reviewed the traffic and security issue consequences of a transfer-vehicle breakdown on the roadway.

### 60853-04 INSPECTION RESOURCES

To prepare for these inspections each inspector should spend 16 hours for in-office review. Inspection activities are initially estimated, over a 2 month period, to require a total of 120 hours by three individuals. Documentation is estimated at 16 hours per inspector. The inspection resources may vary because of the complexity of the construction activities. Regional inspection staff will primarily conduct this inspection, with assistance from NMSS or NRR staff, as requested.

#### 60853-05 REFERENCES

NRC Information Notice 95-28, "Emplacement of Support Pads for Independent Spent Fuel Dry Storage Installations At Reactor Sites," June 5, 1995

NRC Information Notice 95-29, "Oversight of Design and Fabrication Activities for Metal Components Used in Spent Fuel Dry Storage Systems," June 7, 1995

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