

**ENCLOSURE**

**U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV**

**Docket No.:** 72-20  
**Report No.:** 98-01  
**Licensee:** U. S. Department of Energy  
**Facility:** TMI-2 Independent Spent Fuel Storage Installation  
**Location:** Idaho National Engineering and Environmental Laboratory (INEEL)  
Idaho Fall, Idaho  
**Dates:** June 22-23, 1998  
**Inspector:** C. Johnson, Senior Reactor Inspector, Maintenance Branch  
Division of Reactor Safety  
  
**Approved By:** Dr. Blair Spitzberg, Chief, Nuclear Materials Safety Branch 2  
Division of Nuclear Materials Safety

**ATTACHMENT:** Supplemental Information

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## EXECUTIVE SUMMARY

### TMI-2 Independent Spent Fuel Storage Installation Construction Activities NRC Inspection Report 72-20/98-01

The licensee had developed inspection procedures, specifications, drawings, and an inspection plan to construct and place concrete for the TMI-2 Independent Spent Fuel Storage Installation in accordance with American Concrete Institute and American Standard for Testing Materials Codes and Standards.

#### Maintenance

- Overall, the general location, reinforced steel, and form work were installed as required by the design/installation drawings. However, the inspector did note that the construction joint keyway did not meet the dimensional tolerances as required by the drawings. Discrepancies identified by the inspector during review of the general configuration and spacing requirements of the pad were immediately corrected by the licensee (Section M1.1.b.1).
- Concrete placement activities were being accomplished in accordance with procedures and American Concrete Institution Code requirements. One concrete truck mixer was rejected because the drum had exceeded the allowable number of revolutions (Section M1.1.b.2).
- The inspector did not identify any significant problems with the design mix. The licensee informed the inspector that concrete specimens from each concrete placement would be taken as required by procedure to verify the compressive strength of the concrete (Section M1.1.b.3).
- Soil compaction results were in accordance with specifications (Section M1.1.b.4).

## Report Details

### Summary of Plant Status

During this inspection period, TMI-2 Independent Spent Fuel Storage Installation (ISFSI) was under construction.

The licensee had developed inspection procedures, specifications, drawings, and an inspection plan to construct and place concrete for the TMI-2 ISFSI pad in accordance with American Concrete Institute and American Standard for Testing Materials Codes and Standards.

## II. Maintenance

### **M1 Construction of the TMI-2 Independent Spent Fuel Storage Installation (ISFSI) Pad**

#### **M1.1 Inspection of The ISFSI (Nonsafety-Related)**

##### **a. Inspection Scope (60853)**

The inspector observed construction activities of the nonsafety-related ISFSI pad to determine whether work activities, and inspection performance were being accomplished in accordance with plans, specifications and procedures.

##### **b. Observation and Findings**

#### **b.1 Construction Activities of the ISFSI Pad**

The inspector verified the overall general orientation and layout of the ISFSI pad, the proper placement, spacing and size of reinforced steel, sturdiness of the form work, and the proper location of construction joints were in accordance with the design/installation drawings and engineering change notices. Overall, the general location, reinforced steel, and form work were installed as required by the design/installation drawings for Sections A1, A3, A5, C1, C3, and C5. However, the inspector did note that the construction joint keyway for Sections C5 and A5 did not meet the dimensional tolerances specified in the drawings. The licensee representative and contractor (Newport News Shipbuilding) were informed of this discrepancy and immediately corrected the problem. The inspector did not identify any additional discrepancies.

#### **b.2 Concrete Placement of the ISFSI Pad**

The inspector was informed that Newport News Shipbuilding was the prime contractor and had subcontracted work activities to various contractors. Engineering services were performed by Transnuclear, Inc. The construction of the pad and placement of the concrete were performed by UGAKI and Associates, and the inspection and testing were performed by Lockheed Martin. The concrete was supplied by High Valley, a local concrete contractor.

The inspector observed concrete placement activities for Sections A1, A3, and C1 of the pad. The inspector noted that contractor personnel appeared experienced in the placement of concrete. Contractor personnel used good construction practices in consolidation and placement of concrete.

The inspector observed that the fourth concrete truck mixer had approximately 420 turns (revolutions) indicated on its counter. The American Standard for Testing Materials, Section C4, requires that a truck mixer discharge the concrete within 1 ½ hours, or before the drum has revolved 300 revolutions, whichever comes first. The inspector informed the licensee representative of this discrepancy, and the licensee representative and contractors rejected the truck load of concrete.

The inspector also observed the concrete testing (i.e., slump and air content) performed by the contractor. The inspector noted that concrete cylinders for compressive strength samples were taken as required by the contractor. Concrete slump tests were observed to be within the design requirements. The inspector observed that air content was within allowable tolerances with the exception of two trucks. Air content was required by specification to be within 4.5 to 7.5 percent, but was 4 percent on the fifth and sixth truck. Discussions with the licensee subsequent to the inspection revealed that several other loads did not meet the air content requirements. The licensee representative informed the inspector that Nonconformance 1000Q-SCI-001 (draft) was written to evaluate this discrepancy. This nonconformance identified that three full loads and a partial load of concrete measuring less than 4.5 percent air were placed in the basemat pad. One full load measuring 4 percent air was placed in Section A1. Two full loads measuring 4 percent were placed in Section C-3. A partial load measuring 3.5 percent air was placed in Section C-5. The inspector was informed by the licensee representative on July 6, 1998, that Nonconformance 1000Q-SCI-001 was in draft and had not been approved by Transnuclear, Inc., the engineering contractor during this discussion.

On July 9, 1998, the licensee representative informed the inspector (telephonically), that Newport News in conjunction with Transnuclear Inc., had dispositioned Nonconformance 1000Q-SCI-001 as USE-AS-IS. The inspector had no further concerns regarding this issue.

The inspector did not identify any additional discrepancies during the observation of these concrete placement activities.

**b.3 Concrete Mix Design**

The inspector reviewed Design Mix 95, CPP 98, Class 45 for the ISFSI pad. The mix design strength of concrete was 4500 PSI. The design mix listed the type of cement, aggregate, air content, water-cement-ratio, and other components of the design mix. The inspector did not identify any significant problems.

b.4 Soil Compaction Test

The inspector reviewed the soil compaction records of the ISFSI pad foundation. The licensee's specification required that the relative compaction of soil be a minimum of 95 percent compaction. The records indicated that all relative compaction test results were above 95 percent. No deficiencies were identified during this review.

c. Conclusion

Overall, the licensee was constructing the ISFSI pad in accordance with procedures, specifications, and drawings. Discrepancies identified by the inspector during review of the general configuration and spacing requirements of the pad were immediately corrected by the licensee. Concrete placement activities were being accomplished in accordance with procedures and American Concrete Institution Code requirements. One concrete truck mixer was rejected because the drum had exceeded the allowable number of revolutions. The licensee dispositioned Nonconformance 1000Q-SCI-001 regarding the deficient air content of concrete as USE-AS-IS. Overall, the concrete design mix appeared reasonable.

**V. Management Meetings**

**X1 Exit Meeting Summary**

The inspector had a brief meeting at the conclusion of the inspection and presented the inspection results to the licensee representative on June 23, 1998. In addition, supplemental telephonic discussions were held on June 29 and July 6, 1998, to discuss the status of the nonconformance of the deficient air content during testing of the concrete. The inspector was informed by the licensee representative on July 9, 1998, that Nonconformance 1000Q-SCI-001 regarding the deficient air content of concrete was dispositioned as USE-AS-IS.

The inspector asked the licensee representative on July 6, 1998, whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

**ATTACHMENT**

**SUPPLEMENTAL INFORMATION**

**PARTIAL LIST OF PERSONS CONTACTED**

**Licensee**

R. Davis, Manager, Quality Assurance  
N. Mackay, Quality Assurance Specialist

**Contractors**

J. Barker, Project Quality Engineer, Lockheed Martin  
J. Carlson, Project Manager, Lockheed Martin  
S. Ellis, Project Manager, Lockheed Martin  
T. Harris, Construction Manager, Lockheed Martin  
S. Hicks, Safety Coordinator, Lockheed Martin  
J. Hitt, Project Quality Assurance Manager, Newport News Shipbuilding  
D. Martin, Quality Assurance Inspector, Lockheed Martin  
J. Morgan, Quality Assurance Engineer, Newport News Shipbuilding  
H. Thompson, Manager, Commercial Nuclear Projects, Newport News Shipbuilding

**INSPECTION PROCEDURES USED**

IP 60853      On-Site Fabrication of Components and Construction of An ISFSI

**DOCUMENTATION REVIEWED**

**Drawings (Transnuclear, Inc)**

219-02-5200, Sheet 1 of 2, Revision 1  
219-02-5200, Sheet 2 of 2, Revision 1

**Procedures/Inspection Plans**

TPR-4951, "Density Testing-Nuclear Method," Revision 0  
TPR-4952, "Field Testing, Ready-Mix Concrete," Revision 0  
NNS No. 1000-Q-Q013-P, "INEEL ISS Facility Project Inspection Plans," Revision D

**Engineering Change Notices**

98-0458  
98-0445  
98-0446

Concrete Mix Design (4500 PSI)

No. 95 CPP 98 Class 45

Nonconformance

1000Q-SCI-001