UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

Report Nos.: 50-269/91-23, 50-270/91-23, and 50-287/91-23

Licensee: Duke Power Company
422 South Church Street
Charlotte, NC 28242

Docket Nos.: 50-269, 50-270, and 50-287

License Nos.: DPR-38, DPR-47, and DPR-55

Facility Name: Oconee 1, 2, and 3

Inspection Conducted: August 27-29, and September 4-6, 1991

Inspector: _____ 10/1/91
J. J. Lenahan Date Signed

Approved by: _____ 10/1/91
J. J. Blake, Chief Date Signed
Materials and Processes Section
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope:

This routine, unannounced inspection was conducted in the areas of the reactor building tendon surveillance program, the snubber surveillance program, construction of additional units in the Independent Spent Fuel Storage Installation (ISFSI), and followup on licensee action on a previous inspection finding.

Results:

In the areas inspected, violations or deviations were not identified.

A potential weakness and unresolved item was identified in the licensee's corrective action program paragraph 4, in that nonconformances handled as technical concerns do not appear to be formally documented in accordance with the licensee's corrective action program. Construction of the ISFSI was satisfactory, with the possible exception of the unresolved item concerning the concrete density requirements specified in the license.

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REPORT DETAILS

1. Persons Contacted

Licensee Employees

W. Adam, Civil Engineer, CMD South
*H. Barron, Station Manager
**T. Curtis, Compliance Manager
***W. Foster, Maintenance Manager
R. Kelly, Construction Superintendent, ISFSI
F. Linsley, Maintenance Engineer
*T. McClure, QA Engineer
***B. Millsap, Maintenance Engineering Manager
***R. Morgan, Site QA Director
*S. Perry, Compliance

Other licensee employees contacted during this inspection included craftsmen, engineers, and technicians.

NRC Resident Inspectors

***P. Harmon, Senior Resident Inspector
***B. Desai, Resident Inspector
*K. Poertner, Resident Inspector

*Attended exit interviews, August 29 and September 6, 1991
**Attended exit interview, August 29, 1991
***Attended exit interview, September 6, 1991

2. Inspection of Horizontal Storage Modules for Dry Storage of Spent Nuclear Fuel (60848)

The inspector examined QA/QC controls and observed placement of concrete for Phase II of the horizontal storage module (HSM) construction. The HSM is a reinforced concrete structure for dry storage of spent nuclear fuel. Phase II is construction of an additional 20 modules, in addition to the 20 modules constructed under Phase I. The HSM is classified as QA condition II, which although is not a category I structure, is still considered important to safety. The requirements for construction of the HSM are contained in the Technical Specification for Special Nuclear Materials license number SNM-2503, the licensee's Final Safety Analysis Report and the license application, Docket No. 72-04.

a. Review of Quality Assurance Implementing Controls

Quality Control/Quality Assurance implementing controls for the HSM construction examined by the inspector include the following procedure and drawings:

(1) Specification No. OS-160-S, Specification for the Procurement of Concrete for QA Condition II Structures

(2) Quality Control Procedure CS-1, Inspection of QA Condition Concrete.

(3) Drawing No. 0-39.12.01, Horizontal Storage Modules Concrete - Plans

(4) Drawing No. 0-39.12.02, Horizontal Storage Modules Concrete - Sections

(5) Drawing No. 0-39.12.03, Horizontal Storage Modules Concrete Sections

(6) Drawing No. 0-39.13.01, Horizontal Storage Modules - Reinforcing - Plans

(7) Drawing No. 0-39.13.02, Horizontal Storage Modules - Reinforcing - Sections

(8) Drawing No. 0-39.13.03, Horizontal Storage Modules - Reinforcing - Plans and Section

(9) Variation Notices OC-5269, 5643, and 5646.

b. Observation of Work Activities

The inspector witnessed preplacement preparation and placement operations for placement number ONS-104, Phase II wall sections for modules 14-17, E&W. Preplacement observations included verifying that the forms were tight, level, had the proper dimensions, and that blockouts had been properly installed, that the size, number, and spacing of reinforcing steel complied with drawing requirements, that embedded plates for supporting the HSM rails and doors had been installed, and that the placement had been properly cleared. Observation of placement activities disclosed that concrete placement activities were continuously monitored by QA/QC inspection personnel, and that activities pertaining to concrete delivery time, free fall, flow distance, layer thickness and consolidation met specification requirements. Samples of plastic concrete were tested in accordance with procedure requirements. Test results indicated that concrete slump, air content, and temperature met specification requirements. However, the results of unit weight testing indicated that the concrete had a density of less than the minimum value of 145 pounds

per cubic foot specified in the SNM-2503 Technical Specifications. This problem is discussed under Unresolved Item 72-04/91-17-01, See paragraph 6, below. Following completion of the concrete placement, the inspector observed concrete finishing and preparations for curing. Curing was accomplished by water spray and wet burlap cloth. The inspector witnessed unconfined compression testing of two 28 day old concrete cylinders from placement number ONS-103. The average unconfined compressive strength measures from these two cylinders was 5836 psi, versus the required 28 day minimum strength of 5000 psi. The testing methods, including rate of loading, was satisfactory.

Within the areas inspected, violations or deviation were not identified.

3. Snubber Surveillance Program, Unit 1 (70370)

The inspector examined results of functional testing performed on Unit 1 hydraulic snubbers. These are tested per criteria specified in Technical Specification 4.18, and Duke Procedure number MP/0/A/3018/09, Snubbers - Hydraulic - Functional Testing.

The inspector also examined the results of functional testing performed on Unit 1 mechanical snubbers. The mechanical snubbers were tested at the licensee's Catawba Nuclear Station in accordance with Duke Procedure MP/0/A/3018/59, Snubbers - Mechanical - Functional Testing. The snubbers functional test data examined by the inspector is listed in the table below:

TABLE

UNIT 1 SNUBBER FUNCTIONAL TEST DATA

Hydraulic Snubber	Mechanical Snubbers
1-01A-1-1-0-401A-H40	1-03A-439B-H5143
1-03A-1-0-400B-SR57	1-51-478E-H6080
1-13-0-400A-SC-3	1-01A-4-2-0-400A-R11
1-03A-1-0-437A-SR62	1-53B-0-435B-DE056
1-54B-0-477-H9B	1-51A-0-439C-H86(B)
1-51A-0-479A-H17A	1-03-480A-H6070
1-57-0-481A-H6	1-07A-400B-GC-2611
1-01A-0-550-R12(B)	1-03A-1-0-439A-DE060
1-01A-0-481B-H11B	1-03-0-551-DE002
1-50-0-66A-RCPM-S1	1-07A-400A-DE032(A)
1-01A-0-550-R14	1-03-0-551-DE001

The above testing was performed in August, 1991 during the current Unit 1 refueling outage. All snubbers tested met the functional test acceptance criteria.

Within the area inspected, violations or deviation were not identified.

4. Reactor Containment Building Tendon Surveillance Program - Unit 1 (61701)

On August 1, 1991, during performance of tendon surveillance activities required by Technical Specification 4.4.2, the internal threads on one of the anchor heads failed, causing the stressing ram to become disengaged from the anchor head. The stressing ram, which is used to tension and detension the tendons, to perform lift off measurements and determine the amount of prestress force in the tendons, had been engaged to three-quarters of the internal threads on the anchor head, when the threads failed. The licensee suspended further tendon surveillance activities pending investigation into the cause of the thread failure. Visual examination of the remaining threads on the anchor head indicated the threads had yielded prior to the current tendon surveillance inspection. The licensee examined anchor heads on other tendons and determined, through visual inspection, that the threads were deformed (therefore the threads were loaded with stresses greater than the yield point). Further testing and examination of the anchor head with the failed threads disclosed that corrosion was not a factor in the thread failure, and that the anchor head material complied with specifications requirement for yield and ultimate strength. Licensee design engineers performed a stress analysis of the threads on the anchor head under application of maximum stresses applied during tendon stressing operations. This analysis disclosed that the actual loads applied to the threads exceeded the anchor head material shear yield stress, which would result in the observed deformation of the threads on the anchor heads. Licensee engineers concluded that the internal thread failures do not affect operability of the tendons. The inspector discussed the licensee's documentation of the problem, and the evaluation of the problem for reportability to NRC. These discussions disclosed that since the tendons were evaluated to be operable, licensee compliance personnel concluded that the problem and potential anchor head design defect was considered as non-reportable. Discussions with maintenance engineers and management personnel disclosed that no formal nonconformance document was generated to document and disposition the problem. The licensee's nonconformance program, written to comply with 10 CFR 50, Appendix B, Criterion XVI, is described in Station Directive (SD), 4.5.5, Problem Investigation Process. This procedure discussed the lower tier program, for example, work request maintenance investigation reports, and the more significant nonconformances which are handled by the Problem Investigation Report (PIR). In lieu of the methods described in SD 4.5.5, licensee maintenance personnel are in the process of preparing a Technical Report to document and disposition the anchor head thread failure problem. The Technical Report is controlled by Maintenance Directive 3.2.12, Technical Support Program. The inspector questioned licensee personnel as to whether the Technical Report prepared in accordance with MD 3.2.12 complies with 10 CFR 50, Appendix B, Criterion XVI. Concerns expressed by the inspector included failure to report the defect to NRC under 10 CFR Part 21, or some other equivalent program, and whether the Technical Report ensured prompt correction of the problem. The handling of this program as a technical concern outside the bounds of the licensee's corrective action program

appears to be a weakness in the program. Pending further review of the licensee's corrective action program, this concern was identified to the licensee as Unresolved Item 269,270,287/91-23-01, Maintenance Corrective Action Program.

Within the area inspected, deviations or violations were not identified.

5. Independent Spent Fuel Storage Installation Surveillance (60847)

The inspector reviewed surveillance procedures which implement the License Number SNM-2503 Technical Specifications (Section 4.2) pertaining to air flow in the modules and temperature measurements. Procedures examined were as follows:

a. PT/0/A/0615/01, Temperature Rise Verification

The purpose of this procedure is to verify that the temperature rise across a newly loaded HSM is not greater than 60° F.

b. OP-2-A/1102/20, Shift Turnover

Enclosure 5.11, SSF/outside NLO Round Sheet, requires operations personnel to inspect the inlet and outlet screen on the HSM on a daily basis to verify that the screen is free of debris or blockage which would permit flow of air into and out of the HSM.

Within the area inspected, violations or deviations were not identified.

6. Action on Previous Inspection Findings

(Open) Unresolved Item 72-04/91-17-01, Density Requirements for HSM Reinforced Concrete. During placement of concrete for the Phase I HSM structure, the licensee cast six inch diameter by 12 inch long cylinders from samples of plastic concrete for testing in accordance with ASTM specifications. The majority of these cylinders were used for unconfined compression testing. However, the licensee had retained some spare test cylinders in the concrete laboratory. Licensee QA personnel measured the volume and weight of these cylinders and calculated concrete densities of the previous placed concrete. These densities ranged from 141 to 149 pounds per cubic foot (pcf). The lower range of density values do not meet the requirements specified in Technical Specification Section 5.5 of license number SNM-2503, which specifies that HSM reinforced concrete shall have a minimum density of 145 pcf. However, this requirement was issued by NRC after the Phase I HSM construction had been completed. The licensee also obtained density data from concrete used for the Phase II HSM construction which is currently in progress. Some of the Phase II concrete also has a density less than 145 pcf. The licensee will request an amendment to the Technical Specifications to reduce the minimum density value for the HSM concrete from 145 to 140 pcf. Pending further evaluation of the safety significance of this problem by NRC, unresolved item 72-04/91-17-01 will remain open.

7. Exit Interview

The inspection scope and results were summarized on August 29 and September 6, 1991, with those persons indicated in paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

Subsequent to completion of the inspection, and after further in office review of the licensee's corrective action program the unresolved item listed below was identified to the licensee via a telephone call on September 12, 1991 to S. Perry of the licensee's compliance staff. Unresolved Item 269,270,287/91-23-01, Maintenance Corrective Action Program.