UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30303

Report Nos.: 50-518/78-14, 50-519/78-14, 50-520/78-14 and 50-521/78-14

Docket Nos.: 50-518, 50-519, 50-520 and 50-52.

License Nos.: CPPR-150, CPPR-151, CPPR-152 and CPPR-153

Categories: A2, A2, A2 and A2

Licensee: Tennessee Valley Authority
830 Power Building
Chattanooga, Tennessee 37401

Facility Name: Hartsville Nuclear Plants A and B

Inspection at: Hartsville, Tennessee

Inspection Conducted: October 31 - November 3, 1978

Inspectors: W. B. Swan
W. P. Ang
M. J. Gouge

Reviewed by: R M Compton for 11/30/78
J. C. Bryant, Chief Date
Engineering Support Section No. 1
Reactor Construction and Engineering
Support Branch

Inspection Summary

Inspection on October 31 - November 3, 1978 (Report Nos. 50-518/78-14, 50-519/78-14, 50-520/78-14 and 50-521/78-14)
Areas Inspected: Containment spray ponds; concrete; foundations in power block area; Unit A-1 containment and related structural documents; QCIR program implementation; QA audits and project status. This inspection involved 59 inspector-hours on site by three NRC inspectors.
Results: No deviations or noncompliances were identified.

DETAILS I

Prepared by: R. M. Compton for 11/29/78
W. B. Swan, Civil Engineer Date
Engineering Support Section No. 1
Reactor Construction and Engineering
Support Branch

Dates of Inspection: October 31 - November 3, 1978

Reviewed by: R. M. Compton for 11/29/78
J. C. Bryant, Chief Date
Engineering Support Section No. 1
Reactor Construction and Engineering
Support Branch

1. Persons Contacted

a. Tennessee Valley Authority (TVA)

*R. T. Hathcote, Project Manager
W. T. Quinn, Construction Engineer, Plant B
*R. E. Young, Assistant Construction Engineer, Plant B
*H. S. Sheppard, Assistant Construction Engineer, Plant B
*L. H. Jackson, Assistant Construction Engineer, Plant A
*J. W. Davenport, Supervisor, Materials and Civil QC, Plant A
*W. W. Davis, Materials Engineer, Plant A
*B. F. Huffaker, Supervisor, Materials and Civil QC, Plant B
S. P. Stagnolia, Supervisor, Welding QC, Plant B
G. T. England, Supervisor, Document Control, Plant A
G. A. Gonzalves, Supervisor, Site QA Unit
W. R. Brown, Construction Engineer, Plant A
*W. O. Brown, Assistant Construction Engineer, Plant A
*W. K. Anders, OEDC-QA

*Denotes those present at the exit interview.

b. Contractor Organization

The Hartford Steam Boiler Inspection and Insurance Company (Hartford)

R. C. Schlamp, Authorized ASME Code Inspector

2. Licensee Actions on Previous Inspection Findings

No previous inspection findings were examined.

3. Unresolved Items

No new unresolved items were identified.

4. Independent Inspection Efforts

a. A tour was made of the central project area, work progress in pertinent areas was noted and estimates were obtained of the timing of pending work increments which could affect NRC's inspection schedules.

b. Housekeeping in construction areas was inspected. The areas were found to be clean, clear and protected from construction hazards both to personnel and nuclear safety-related items.

c. The license provided a copy of revision 26 to the index of civil quality control instructions. This showed that no revision had been issued since the inspector's previous visit in September 1978. For reference during this inspection, the licensee provided a copy of QCIC C-208, Rev. 4, "Concrete Compressure Strength, Slump Air Content and Unit Weight".

d. A completed placement in basement of Unit A-2 was inspected.

In observance of work and conditions and in review of documents obtained, no noncompliance with requirements was identified.

5. Follow-Up on Licensee Identified Problem in Recorded Moisture Content for Tests of Compacted Soil between Spray Ponds

By telephone on October 13, 1978, the licensee notified RII concerning "Potential CDR-Moisture Content Outside Acceptable Limits for Spray Pond Earth Fill". Errors had been made in field calculation of moisture content for compacted Category I earth fill for the spray ponds. Engineering review disclosed the errors and recalculation revealed eight instances where the moisture content fell outside the design stipulated limits of plus or minus two percent of optimum moisture content for the fill soil used. The widest deviation found was plus 3.1 percent on one test near the bottom of the fill. The inspector reviewed the recalculations. In all tests compaction obtained exceeded the acceptance limit.

NCR B-0011 had been prepared and design engineering review was underway to determine if extent and degree of moisture content deviation is of real structural significance. By review of test records, field personnel had been able to determine the elevation at which each sample had been taken, but could not precisely set the coordinates.

The matter will be pursued when the licensee's written report is received.

6. Lakes, Dams and Canals (Spray Ponds) - Observance of Work and Work Activities - Units A-1, A-2, B-1 and B-2

Compaction of earth fill for the spray ponds was suspended pending a design decision on moisture content under NCR B-0011. The inspector was able to observe blasting in A-2 spray pond excavation, forming for fill concrete in spray ponds A-1 and B-2 excavations, and grouting of rock formations bordering A-1 spray pond. Completed fill concrete in the inlet-outlet area excavated for pond B-1 was inspected.

Acceptance criteria for work on the spray ponds are set out in PSAR section 2.5, paragraph IV of PSAR section 2.5A and by notes and dimensions on the construction drawings.

Quality control implementation for the operations observed is through QCI's C-109, "Drilling and Grouting Inspection", C-110, "Blasting Inspection and Monitoring", and C-201, "Concrete Placement".

In the operations observed, no noncompliance was identified.

7. Foundations - Observation of Work and Work Activities-Units A-1, A-2, B-1 and B-2

A follow on inspection was made of primary foundations for Category I structures in the power block area. In the A-1, A-2 and B-1 areas, it was found that fill concrete had been placed over the foundation rock and that Category 1 base slabs in the containment basemat and for peripheral structures were also in place. The licensee's October 1978 construction progress report for Plant B indicated that placement of fill concrete for the bases of the reactor building, auxiliary building and fuel building areas for Unit B-2 had been completed.

The inspector was told that in the power block areas an intermediate foundation fill will be placed under the control buildings and diesel generator buildings. This fill will be made using compacted crushed rock.

Requirements for foundation rock treatment were outlined in PSAR section 2.5. These were supplemented by letter reports by TVA geologists and geologic consultants, devolving into TVA procedure SOP-2, "Foundation Evaluation and Treatment". In turn, implementation of construction and quality control requirements were by:

TVA Construction Specification No. N6C-875, "Earth and Rock Foundations and Fills"

TVA General Construction Specification No. G-26, "Pressure Grouting of Rock Foundations with Portland Cement"

TVA General Construction Specification No. G-2, "Plain and Reinforced Concrete"

TVA Quality Control Instruction C-201, "Concrete Placement"

The basic foundation treatment in the power block areas was found during this inspection to have been performed in adequate compliance with the requirements of these documents.

8. Containment (Structural Concrete I) - Observation of Work and Work Activities - Unit A-2 Basemat and Unit B-2 Basemat

Placement A2R-1A, consisting of 1938 cubic yards of concrete, had been made on October 2, 1978, as the lower layer of the basemat of Unit A-2. A second placement is expected to be made in January 1979 on top of the first. Preparation of the top surface of the first layer for joining with the second was inspected and found to have been adequately done. To judge the adequacy of quality control, a visual inspection was made of the completed placement and a records review was made as described in the following paragraph. Forming and rebar placement in preparation for the placement had been inspected in late September 1978, and described in Report 50-518/78-8. Preparations for a 7 foot thick placement north of and adjacent to the A-2 basemat were inspected. Forms and rebar placement were completed and cleanup was in final stages. The outer edge of the placement was the excavated rock wall.

The inspector observed installation of embedments for the final basemat placement in the auxiliary building east of the A-2 basemat.

Acceptance criteria for concrete work were incorporated in Specification 300-01, "Concrete, TVA STRIDE." Implementation and quality control have been through QCI C-201, "Concrete, Concrete Placement" and its Appendix, TVA General Construction Specification G-2, "Plain and Reinforced Concrete". The inspector inspected forming and placement of rebar for the initial placement of concrete in the basemat of containment of Unit B-2.

In the work observed, completed placement inspected and pertinent records reviewed, no deviation from or noncompliance with the requirements of these documents was identified.

9. Containment (Structural Concrete I) - Review of Quality Records - Basemat of Unit A-2

Quality records are required by quality control instructions C-201, C-202, C-203, C-204, C-205, C-206, C-207, C-208 and C-209. The inspector sampled these records for placement A2R-1A for which 1988 cubic yards were mixed, 1938 C.Y. were placed and 50 C.Y. rejected. The design mix used was 300.75 BFW-P, revised January 5, 1977, using 3/4 inch maximum aggregate and requiring 3000 psi compressive strength at 90 days. The records for 28 day cylinder tests were reviewed. Cylinders cast from concrete mixed in batch plant No. 1 were numbered from 1233 to 1239; those from batch plant No. 2 concrete ere numbered 10137 through 10147. The design mix indicates that at 28 days, the compressive strength should fall between 1910 psi and 2790 psi. Test results for plant No. 1 cylinders fell between 2405 and 3572 p[illegible] averaged 2323 psi. Those from plant No. 2 concrete averaged 2140 psi but the first two achieved only 1768 psi. An NCR was written to require 90 day break test results review and proper engineering evaluation.

Slump and air content requirements were met for all samples: slump, 1½" for mix placed by bucket and 3" for pumped concrete, air between 4 percent and 7 percent.

The placement authorization sign-offs were verified. Mixing Plant Reports on Form 10247 for QCI 212, Rev. 1, were reviewed.

The records review indicated that procedural requirements had been met and that required quality records had been generated.

In the records review, no noncompliance was identified.

10. Exit Interview

An exit interview was held with Mr. R. T. Hathcote, project manager, and members of his site staff, a site QA unit representative and one from OEDC-QA. The inspector outlined the scope of his inspection in the areas of concrete, soil compaction, spray pond excavation, job status,documents received and project housekeeping.

He stated that in these areas no noncompliance or unresolved item had been identified.

DETAILS II

Prepared by: W. P. Ang 11/21/78
W. P. Ang, Mechanical Engineer Date
Engineering Support Section No. 1
Reactor Construction and Engineering
Support Branch

Dates of Inspection: November 1-3, 1978

Reviewed by: R. M. Compton for J. C. Bryant 11/21/78
J. C. Bryant, Chief Date
Engineering Support Section No. 1
Reactor Construction and Engineering
Support Branch

1. Persons Contacted

a. Tennessee Valley Authority

*R. T. Hathcote, Project Manager
*W. O. Brown, Assistant Construction Engineer Plant A
*J. R. Inger, Mechanical Project Engineer Plant A
R. C. Betch, Civil Project Engineer Plant A
*L. H. Jackson, Assistant Construction Engineer Plant A - QC
D. J. Cowser, Mechanical - QC - Plant A

b. C. F. Braun and Co.

*P. V. Scanlan, Site Representative

*Denotes attendance at the exit interview.

2. Licensee Actions on Previous Inspection Findings

Licensee actions on previous inspection findings were not reviewed during this inspection.

3. Unresolved Items

No unresolved items were identified during this inspection.

4. Independent Inspection Effort

A walk-through inspection of general work practices and housekeeping in Plant A reactor plant construction areas was performed by the inspector.

No items of noncompliance or deviations were identified.

5. Containment (Steel Structures and Supports) - Review of Quality Assurance Implementing Procedures (Units A-1, A-2, B-1 and B-2)

Chapter 17 of the PSAR was reviewed to determine licensee commitments relative to construction and inspection procedure requirements.

C. F. Braun and Co. Specification No. 300-13 establishes the minimum requirements for the design, materials of construction, fabrication, delivering and unloading, field assembling, field erection, inspection and testing of the containment vessels for all four units of Hartsville Nuclear Plant (HNP). Work package Nos. D014-M1 and D009-M1 provide the hold points and inspection signoff spaces for the assembly of the first and second ring of the unit A-1 containment vessel. Similar work packages are still to be prepared for the remaining 13 rings of Unit A-1 and for the entire containment for Units B-1, A-2 and B-2. RISPM M-201 provides receiving inspection and storage requirements for the containment vessel for all four units. Construction Engineering Procedure (CEP) 13.0.2 Rev. 0 provides general storage requirements and CEP 13.0.3 provides warehouse storage inspection requirements. C. F. Braun Specification 300-05-AB details the minimum requirements for the design, fabrication and inspection of the four HNP reactor vessel pedestals. Work packages Nos. D005-C2 and D006-C2 provide the hold points and inspection signoff spaces for the pre-assembly and installation of the reactor vessel pedestal for Unit A-1. Similar work packages are still to be prepared for Units B-1, A-2 and B-2. RISPM C-524 specifies the receiving inspection and storage requirements for the reactor vessel pedestals for all four HNP units. CEP's 13.0.2 and 13.0.3 also provide general storage requirements and warehouse storage inspection requirements.

The above noted specifications and procedures were reviewed and appeared to comply with licensee PSAR commitments. No items of noncompliance or deviations were identified.

6. Containment (Steel Structures and Supports) - Observation of Work and Work Activities (Units A-1 and B-1)

The first ring of the Unit A-1 containment vessel was being assembled in place. The 2nd ring was being pre-assembled a short distance away but out of the reactor plant area. Work performance on both rings was observed and both rings were inspected for conformance to the specifications and procedures noted in paragraph 5. No items of noncompliance or deviations were noted.

The Units A-1 and B-1 reactor vessel pedestals were being preassembled. Work performance was observed and both pedestals were inspected for conformance to the specifications and procedures noted in paragraph 5. No items of noncompliance or deviations were identified.

7. Exit Interview

The inspector met with licensee representatives identified in paragraph 1 at the conclusion of the inspection. The inspector summarized the scope and findings of the walk-through inspection of Plant A and the inspection of procedures and work activities for the containment vessels and reactor vessel pedestals. The licensee had no comments.

DETAILS III

Prepared by: M. J. Gouge 11/20/78
M. J. Gouge, Principal Inspector Date
Projects Section
Reactor Construction and Engineering
Support Branch

Dates of Inspection: November 1-3, 1978

Reviewed by: A R Herdt 11/20/78
A. R. Herdt, Chief Date
Projects Section
Reactor Construction and Engineering
Support Branch

1. Persons Contacted

Tennessee Valley Authority (TVA)

*R. T. Hathcote, Project Manager
*W. K. Anders, TVA OEDC (QA)
G. A. Gonsalves, Supervisor, Site QA Unit
*A. G. Debbage, Lead Auditor, Site QA Unit
G. T. England, Supervisor, DCU, Plant A
R. Nixon, Supervisor, DCU, Plant B
*B. E. Huffaker, Supervisor, Material and Civil QC Unit, Plant B

*Denotes those present at the exit interview.

2. Licensee Action on Previous Inspection Findings

This area was not inspected.

3. Unresolved Items

No new unresolved items were identified during this inspection.

4. Independent Inspection Effort

The Quality Control Investigation Report (QCIR) program for Plant B was inspected for proper implementation in accordance with TVA Construction Engineering Procedure (CEP) 15.01, "Control of Quality Control Investigation Reports and Nonconformances". The inspector reviewed the master QCIR log and the file of cleared QCIR's maintained by Plant B Document Control Unit. The local log maintained by Plant B Materials and Civil QC Unit Supervisor was compared with the master QCIR log for accuracy. The basic QCIR system as implemented by CEP 15.01 was found to be functioning in an acceptable manner.

Plants A and B are currently utilizing a printout obtained from an automated filing system to indicate the status of cleared and outstanding QCIR's. The printout appears to be a good management device to indicate the status of QCIR's. At present, CEP 15.01 does not contain any reference to the automated printout and discussions were held with site management with regard to a procedure that would interface the use of the QCIR printout with CEP 15.01. Site personnel are currently reviewing the need for a procedure specifying the uses of the automated QCIR printout. Discussions were held with site management in regard to potential interface problems between Plants A and B QCIR systems. CEP 15.01 does not contain any guidance on interfacing the separate QCIR systems for a dual plant site. Site personnel are currently reviewing the QCIR interface problems unique to the two plant Hartsville Project. This will be carried as Inspection Followup Item No. 518/519/520/521/78-14-01 QCIR Interface.

No items of noncompliance or deviations were identified in the above areas inspected.

5. Review of Site QA Unit Audit Reports (Plants A and B)

The following audits performed in 1978 by the site QA unit were reviewed by the inspector:

Audit Number	Title
HT-M-78-01	Control of Welding Materials
HT-M-78-03	Mechanical Embedments
HT-G-78-01	QA Document Review
HA-G-78-01	Field Change Request
HA-E-78-01	Electrical Embedments
HA-E-78-02	Motor Receipt Inspection
HB-E-78-01	Electrical Embedments
HA-E-78-03	Electrical Equipment Receipt, Inspection and Storage
HT-W-78-01	Welding and NDE QCI Documentation
HB-C-78-01	Cadwelding

HB-C-78-02	Structural Concrete Placement
HT-C-78-01	Rebar and Embedments

The above audits were reviewed for content, accuracy, deficiencies found, corrective action and implementation in accordance with the licensee's procedures CEP 18.01 and QAP 18.01. Audits HA-E-78-02, HB-C-78-01, HA-E-78-01 and HT-C-78-01 were issued (signed by site QA supervisor) after a considerable period of time had elapsed since the completion of the actual audit. This period ranged from about five weeks with audit HT-C-78-01 to about four months with audit HA-E-78-02. This delay in issuing the audit report appears to be unreasonably long. Discussions were held with the site QA Unit Supervisor who stated that in most cases the delay was due to problems in scheduling the post audit conference. Site personnel stated these problems are being resolved and that audit reports will be issued without unreasonable delays after the completion of an audit.

No items of noncompliance or deviations were identified in the above areas inspected.

6. Exit Interview

The inspector met with the licensee representatives listed in paragraph 1 at the conclusion of the inspection on November 3, 1978. The licensee was appraised of the scope of the inspection which included QCIR system review (Plant B) and site QA unit audit review (Plants A and B) and the inspector's findings. No items of noncompliance or deviations were disclosed.