UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA ST., N.W., SUITE 3100
ATLANTA, GEORGIA 30303

JAN 4 1980

Report Nos. 50-518/79-27, 50-519/79-27, 50-520/79-27, and 50-521/79-27

Licensee: Tennessee Valley Authority
500A Chestnut Street Tower II
Chattanooga, Tennessee 37401

Facility Name: Hartsville Nuclear Plant

Docket Nos. 50-518, 50-519, 50-520 and 50-521

License No. CPPR-150, CPPR-151, CPPR-152, and CPPR-153

Inspection at Hartsville site near Hartsville, Tennessee

Inspector: W. B. Swan — 12/27/79 Date Signed

Accompanying Personnel: F. S. Cantrell (October 31, 1979)
A. R. Herdt (October 31, 1979)

Approved by: F. S. Cantrell, Section Chief, RC&ES Branch — 1/2/80 Date Signed

SUMMARY

Inspection on September 24 through November 27, 1979

Areas Inspected

This routine, unannounced inspection involved 322 inspector-hours onsite in the areas of structural concrete; A-1 reactor pressure vessel receipt; A-1 RPV pedestal installation; outstanding items; activation of NRC resident inspector office onsite; and independent inspection items.

Results

Of the areas inspected, no items of noncompliance or deviations were identified.

DETAILS

1. Persons Contacted

Licensee Employees

*R. T. Hathcote, Site Project Manager
*W. R. Brown, Construction Engineer, STRIDE
*W. T. Quinn, Construction Engineer, BOP
*L. H. Jackson, Assistant Construction Engineer, STRIDE, P.E.
E. H. Peoples, Assistant Construction Engineer, BOP QC
*H. S. Sheppard, Assistant Construction Engineer, STRIDE, QC
A. Gonsalves, QA Unit Supervisor
G. Debbage, QA Audit Supervisor
*J. W. Davenport, Materials Engineering Supervisor, STRIDE
B. E. Huffaker, Materials Engineering Supervisor, BOP
W. W. Davis, Materials Engineer, STRIDE
*W. K. Andars, QA, OEDC
G. England, Document Control Supervisor, Night Shift
R. C. Nixon, Document Control Supervisor, Day Shift
J. T. Dorman, Assistant Construction Engineer, Second Shift
*L. H. Wilson, General Construction Superintendent, recently transferred to Knoxville
*B. F. Painter, New General Construction Superintendent
R. Howard, Iron Worker Superintendent, STRIDE and BOP
J. B. Carrol, Assistant General Construction Superintendent, STRIDE
T. E. Kittrell, Carpenter Superintendent, STRIDE
H. K. McLean, Geologist
S. P. Stagnolia, Supervisor, Welding QC, STRIDE
J. R. Inger, Supervisor, Mechanical QC, STRIDE
F. E. Laurent, Mechanical Project Engineer, STRIDE
H. F. Bates, Civil Project Engineer, STRIDE
W. W. Diel, Engineer, Civil Project Engineering
K. L. Ramsey, QA Auditor, Outstanding Items

Other licensee employees contacted included 13 technicians, 2 operators, 5 security force members, and 9 office personnel.

Other Organizations

The Hartford Steam Boiler Inspection and Insurance Company

R. John Hanson, Regional Manager, Special Inspection Services
R. C. Schlamp, Unit Leader of Authorized Inspectors
C. D. Thompson, Authorized Nuclear Inspector
R. J. Hanson, Inspection Specialist

*Attended exit interview

2. Exit Interviews

Monthly inspection scope and findings were summarized on October 31, 1979, with those persons indicated in Paragraph 1 above by asterisk(*); and on November 27, 1979, with R. T. Hathcote only. Weekly resident inspectors findings were summarized as follows - noted by double asterisks(*).

September 27, 1979	with R. T. Hathcote
October 03, 1979	with W. R. Brown
October 12, 1979	with L. H. Jackson
October 19, 1979	with L. H. Jackson
November 9, 1979	with R. T. Hathcote

The resident inspector also attended exit interviews for inspections by specialists, ASME survey team and for conformance on RPV pedestal repairs on September 27, September 28, October 19, and October 31, 1979.

3. Licensee Action on Previous Inspection Findings

(Closed) Unresolved Item 518,519,520,521/79-03-02 - Storage and Control of Drawings. Vendor drawings and manuals have been stored in a separate room. The Plant A vault contains only radiograph records. The Plant B vault contains the QA-QC records. TVA construction drawings have been microfilmed. The Plant A document control room is used for microfilming and reproduction. Plant A and Plant B spreading room drawings have been consolidated in Building #4 opposite the Drawing Control room.

4. Unresolved Items

Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve noncompliance or deviations. New unresolved items and inspector follow up items identified during this inspection are discussed below.

(Open) Unresolved Item (518/79-27-01) Possible Voids in Concrete Behind Fuel Pool Liner in Fuel Building A-1

On September 27, 1979, the licensee reported honeycombing in the outer surface of the concrete in the east and south walls. Excavation disclosed no voiding beyond the outer rebar; however, sonic tests indicate an area of voiding behind the liner plate but could not determine the depth. This must be determined by other methods.

Corrective actions to preclude recurrence include reduction of the height of permissible pour from 20 feet to 10 feet, increased use of pencil vibrators and more intensive use of standard vibrators plus corrective interviews with and retraining of the responsible foreman and the involved workmen and quality control personnel.

(Closed) Inspector Followup Item (518,520/79-27-02) Weld Gauges Not Available to All Welders and Weld Quality Control Personnel

Tools to accurately measure questionable undercut or excessive reinforcement of welds should be readily available. The need was discussed with the site manager on November 9, 1979, and the gauges were procured and distributed.

(Open) Unresolved Item (518,520/79-27-03) Apparent Deficiency in Specification for Checking of Preheat Temperature

In some instances, the preheat temperature range is specified as between 60°F and 125°F with checking by hands-on test. Temperature "temp-stiks" are not available in this range. The resident inspector questioned if a more accurate measurement is required. The licensee is investigating.

(Open) Unresolved Item (518,519,520,521/79-27-04) Excessive Backlog of QCIR's Awaiting Disposition and Closure

QA Unit Audit Report HT-G-79-15, dated November 8, 1979, indicated a large backlog of unresolved matters concerning, in part, adverse impact on quality in both the STRIDE and BOP areas. The study found that the backlog was being reduced by about 100 per month; however, the length of time between writing of QCIR's and their closure is unacceptably long (up to two years). Discussions were held with the project manager, the two construction engineers, and the assistant construction engineers supervising QC in STRIDE and BOP areas. Disruptions attending the curtailment of construction of Plant B and reorganization of personnel into STRIDE and BOP may have diverted attention from concentration on QCIR's. This matter will be held as unresolved pending review of licensee response during the next report period.

5. Licensee Identified 50.55(e) Items

a. Status of Previous Licensee Identified 50.55(e) Items

(Closed) 50.55(e) Items 520-521/78-06-02, 519/78-06-03, 518/79-06-04: H.P. core spray motor control center wiring discrepancies-NCR-HNP-A-013; and HNP-B-006. General Electric provided documentation of corrective actions and the NCR's were closed out October 5, 1979.

(Open) 50.55(e) and Part 21 Item 518,519,520,521/79-03-03: General Electric Design Deficiency - Safety Relief Valve Control System.

TVA's final report on this matter dated August 29, 1979, stated that TVA endorses the design modifications proposed by General Electric to correct the design deficiency. TVA is to implement the modifications and any other measures as approved and directed by NRC-NRR.

(Closed) 50.55(e) Item 518,519,520,521/79-10-02: Factor of safety for actual design of welded anchors-NCR-CEB-79-16; and NCR-CEB-79-17. TVA's Report No. 3 (Final) was received October 26, 1979. Corrective actions for the anchorages at Hartsville have been completed and are accepted as adequate.

(Closed) 50.55(e) Item 518,519,520,521/79-12-05: Reactor pedestal weld cracking NCR HNP-A-050. Corrective welding on A-1 pedestal was completed and TVA's letter of November 16, 1979 (Mills to O'Reilly) detailed the corrective actions and NDE verifications. In a letter dated November 21, 1979, IE-RII released the licensee to install concrete in and around the A-1 pedestal. (See paragraph 7)

Plant B construction has been curtailed, so TVA will not complete weld repairs on the B-1 pedestal in the near future.

(Open) 50.55(e) Item 50-519/79-13-01: Use of incorrect concrete mix in Unit B-1 shield building wall - pour B1R-2B.

Three cylinders were tested after 180 days. Two of these exceeded the 4000 psi requirement (4650 and 4200 psi), but the third failed at 3730 psi. Design engineering has stipulated that another cylinder is to be broken at 270 days on or about February 1, 1980, at which time a decision will be made as to the acceptability of the concrete.

(Closed) 50.55(e) and Part 21 Item 518/79-13-02: Faulty welding by Lakeside Bridge and Steel on drywell vent structure NCR HNP-A-308. TVA has completed the repairs and NDE on the buttered edges of the A-1 vent structure as stipulated in their report submitted October 1, 1979. Stainless cladding of the vertical seam welds is proceeding.

(Open) 50.55(e) Items 518,520/79-17-01, Containment Anchor Bolt Chair Weld Deficiencies

The repairs have not been completed on A-1 and work on the A-2 chair welds has been suspended.

(Open) 50.55(e) Item 518,519,520,521/79-19-01: Defective GE SB-12 auxiliary switches in safety-related switchgear (NCR-2-1)

TVA's final report, dated August 16, 1979, stated that ESW switchgear which had been shipped to Hartsville will be reequipped with the replacement SB-12 auxiliary switches to be supplied by GE-SBD. These replacement switches are to be installed by February 29, 1980. Other shipments of switchgear to Hartsville will have the replacement switches installed by GE-SBD before shipment.

NOTE: IE Circular No. 79-17, entitled Contact Problem in SB-12 Switches on General Electric Metalclad Circuit Breakers, has been issued on this matter.

b. New 50.55(e) Items Reported by Licensee

(Open) 50.55(e) Item 518,519,520,521/79-27-05, Rebar Bending Not in Accordance With Specifications NCR HT-C-79-04. The licensee's Report

No. 1 (Interim) transmitted by letter dated November 21, 1979, was received by NRC IE-RII. A final report is due by February 8, 1980.

(Open) 50.55(e) Item 518,519,520,521/79-27-06, Grit Blasting of Fabricated Piping Assemblies (NCR HNP-A-068). The licensee's letter of November 16, 1979, transmitted report No. 1 (Interim) outlined steps taken by Hartsville site management to mitigate grit blasting damage. A final report is to be transmitted to IE-RII by January 31, 1980.

(Closed) 50.55(e) Item 518,519,520,521/79-27-07, Design Deficiency of T-Head Section of Anchor/Darling Gate Valves (NCR-6). The licensee's Report No. 1 (Final) was transmitted by letter dated November 15, 1979. It states that the fourteen valves of this type which had reached Hartsville had been returned to the vendor on November 8, 1979. Anchor/Darling has implemented redesign of the T-Head section of valves supplied to TVA to meet the specific service conditions.

6. Independent Inspection Effort

During this inspection period the following non-programmatic construction activities were inspected, observed or witnessed:

a. A subsection inspection of records by the ASME site implementation survey team was audited and the conference summarizing the team's findings was attended. Three deficiencies identified by the ASME team have been cleared; but the Section III certificates have not been received.

b. Mothballing activities attendent on curtailment of construction of Plant B were observed. These included three major concrete placements totalling 8,132 cubic yards. Preparation for the placements, the placement work, and concrete curing activities were inspected. The mothballing activities also included erection of protective coverings, provisions for drainage, capping pipe ends, and applying coating to bolts and rebar. Mud and debris at bases of outer walls was removed and fill concrete placed.

c. The inspector observed unsuccessful attempts by licensee to achieve acceptable placements of the test fills for filter drain for the spray ponds rock dike using a combination of natural and manufactured sand. The civil QC supervisor stated on November 29 that acceptable filter placements had been achieved using all manufactured sand, but additional tests are underway.

d. Erection of the gantry crane to be used for setting the A-1 reactor pressure vessel in the reactor building was monitored. Final plumbing and inspection of the assembly prior to load testing was underway at the end of this report period.

e. In the A-1 auxiliary building pipe galleries at the (-) 32 foot elevation, periodic observations have been made of the installation of

hangers, structural supports and piping for the essential service water, high and low pressure core spray, dirty radioactive waste, reactor core isolation, normal waste, condensate, fuel pool cooling and cleaning, suppression pool cleanups, core spray service water, instrument air, hot water distribution and service air systems. In the A-2 auxiliary building only the dirty radioactive waste system was started. The work on these systems had not progressed to where control document quality requirements could be checked against performance.

f. At the southwest corner of the B-2 spray pond earth fill area, the inspector followed foundation preparation involving the placement of 838 cubic yards of fill concrete in erosion rock cavities as directed by TVA geologists. Continuous QC and geologist coverage was provided by the licensee.

In the areas covered by independent inspection, no items of noncompliance or deviations were identified.

7. Reactor Pressure Vessel Pedestal

Problems on welds on the A-1 RPV pedestal were reported to NRC on June 6, 1979, by the licensee. Corrective actions have been tracked under 50.55(e) Item 518,519,520,521/79-12-05. During corrective work, the licensee encountered extensive copper contamination in the seam welds in addition to the weld preparation repair inclusions first revealed after a Lakeside weld repair cracked during welding of a horizontal seam. Numerous weld repairs included multiple repairs in some areas.

During IE-II inspection 518/79-24 on October 16-19, 1979, two cracks opened in multiple repair areas. Among concerns raised by the findings of this report and a previous report by an NRC metallurgist was a concern that multiple repairs might be causing embrittlement or other granular changes in the welds which could lead to cracking in the pedestal after the RPV is set.

Telephone discussions were held between RII RC&ES supervision, J. C. Killiam of TVA's Knoxville office, the site manager and his staff, the resident inspector and representatives of C. F. Braun and General Electric.

By Confirmation of Action letter dated October 25, 1979, the director of NRC Region II confirmed an understanding that TVA would not place concrete in or around the pedestal pending concurrence by IE-II.

On October 31, 1979, a conference was held in Administration Building #3 at the Hartsville site. In attendance for NRC were two section chiefs, Herdt and Cantrell from NRC Region II and the resident inspector. TVA representatives included the site manager and his staff, QA personnel, TVA engineering from Knoxville EMDES and Division of Power in Chattanooga, C. F. Braun's site representative with a structural engineer and a metallurgical engineer, and General Electric.

By letter dated November 2, 1979, TVA submitted their response summarizing their actions and their responses to items set forth in the NRC letter of October 25, 1979.

By telecon on November 19, 1979, followed by a Confirmation of Concurrence letter dated November 21, 1979, NRC agreed to resumption of concrete placement in and around the pedestal, predicated on review of submitted documentation and completion of repairs.

On Wednesday, November 21, 1979, placement of concrete was completed in the annular shell of the pedestal. On November 28, 1979, the basemat inside the vessel was placed. The basemat outside the steel pedestal cannot be placed until cadweld sleeves are attached at the seam welds.

8. Containment (Structural Concrete II) - Observation of Work and Work Activities on Containment Shield Walls of Units A-1 and A-2, and on Other Structures

Placement A1R-2R (Partial), 152 cubic yards was inspected through the stage of preparation check off, placement and curing.

On Unit A-2 Containment the inspector inspected completed placement A2R-2A. No item of concern was noted. Placement A2R-2B was made on November 5, 1979 taking 488 cubic yards. Preplacement activities and signoffs had not been inspected. Curing activities and joint preparation for the next placement were observed on the day following the placement. Curing activities were also observed intermittently until November 19, 1979. The placement was kept covered and wet.

Supplementally placement AIT-ST3-1121W on radwaste building placement AOW-2113 was observed from placement through curing.

Placement of concrete in the annular space between the inner and outer steel walls of the A-1 RPV pedestal was inspected. In the Plant B, placements inspected included a concrete placement in the B-1 turbine building (1,308 cubic years); in the B-2 fuel building basement (852 cubic yards); and in the B-2 reactor building basement where placement B2R-1c and -1d (5,972 cubic yards) was the largest single placement in TVA construction history. Preparation for these placements, the placement work, and concrete curing activities were inspected.

The resident inspector also observed preparations, placement, and curing of concrete in Plant A central services building, the A-1 and A-2 auxiliary buildings and control buildings; in the A-1 walls and the A-2 fuel building floor slab; and in the A-1 radwaste building wall.

Acceptance criteria examined by the inspector were:

a. PSAR, Section 3.8
b. TVA Specification G-2, Plain and Reinforced Concrete
c. C. F. Braun Specification TVA STRIDE
d. Procedures QCI-C-201 to 218, 401, 402, CEP, 9.02, 12.01, 15.01 and 17.01

Preplacement approval was indicated by the properly signed pour card. Placement activities pertaining to delivery time, free fall, flow distance, layer thickness and consolidation conformed to specifications. Activities were continuously monitored by QC personnel.

Samples for temperature, slump, air content, unit weight and cylinder molding were taken in accordance with specifications and procedures. Post placement inspection revealed the pour card was signed and prescribed curing was in progress.

No deviations or noncompliances were identified.

9. Reactor Vessel Installation - Unit A-1 - Observation of Preliminary Work and Work Activities

The reactor vessel, and separately packaged shroud head and separators assembly, arrived by barge at 7:45 p.m. CST on October 25, 1979. On October 26, the packaged assembly (115,000 #Gross) was removed from the barge and temporarily stored just beyond the dock area. Later, it and the RPV head were stored in a storage yard near the main rebar storage yard.

Prior to any unloading, representatives of TVA and General Electric went aboard the barge and checked for shipping damage to the cargo and barge. No damage was reported.

The inspector observed grounding of the barge on a prepared underwater rock pad, installation of the first Lampson Crawler Unit under one end of the RPV, followed by floating, reversal and regrounding of the barge and installation of the second Lampson under the other end of the RPV.

By November 15, 1979, the two Lampsons had been joined by bracing tubes and the 600-ton vessel had been "crawled" onto the road leading from the unloading dock and parked there on the crawlers pending move up near the A-1 containment where preparations for lifting it are near completion. The gantry crane, which is to place it on the pedestal, is scheduled for its load testing on December 3 and 4, 1979. Machine leveling of the top of the pedestal is underway and, weather permitting, the vessel will be placed on the pedestal on the week-end of December 15 and 16, 1979.

Work packages D-028-CR, Add. 3 guided the off-loading of the RPV head.

W.P. D528-C1 controlled unloading of the RPV
W.P. D528-M3RI has controlled work on installation and testing of the Gantry Crane for setting the RPV.
W.P. D-030M4 outlines the steps for initial setting and W.P. D-030M5 the final setting of the RPV.

Receiving Inspection, Storage and Preventive Maintenance procedure Mechanical, M650 Interim, dated 10-24-79, "Reactor Pressure Vessel (NSSS)-QA, ASME Section III" has been used to date to ensure quality control. Processing of the receiving documents is not complete at this time.

During the RII observations of receiving, handling and interim storage of the RPV and its components, no noncompliance or deficiency was identified.

10. Status of Inspection and Enforcement Bulletins

(Closed) Bulletin 79-19. Erroneously designated as 78-19 in NRC Report 518/79-19.

The following bulletins are held open pending evaluations of TVA's responses:

Bulletins 78-12, 12-A, 12-B; 79-02 thru Rev. 2; 79-14 thru Supplement 2; 79-15; 79-23; 79-24; and 79-25.

11. Inspection and Enforcement Circulars

The licensee has received, evaluated and initiated appropriate action on the following circulars:

Circular 79-18, Proper Installation of Target Rock Safety-Relief Valves
Circular 79-19, Loose Locking Devices on Ingersoll-Rand Pump Impellers
Circular 79-20, Failure of GTE Sylvania Relay, Type PM Bulletin 7305, Catalog 5V12-11-AC With a 120V AC Coil
Circular 79-21, Prevention of Unplanned Releases of Radioactivity
Circular 79-22, Stroke Times for Power Operated Relief Valves