



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

Report Nos. 50-553/79-18 and 50-554/79-17

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

Facility: Phipps Bend Nuclear Plant Units 1 and 2

License Nos. CPPR-162 and CPPR-163

Inspection at Phipps Bend Site near Kingsport, Tennessee

Inspector: R. W. Wright
R. W. Wright

1/16/80
Date Signed

Approved by: F. S. Cantrell
F. S. Cantrell, Section Chief, RC&ES Branch

1/16/80
Date Signed

SUMMARY

Inspection on December 11-14, 1979

Areas Inspected

This routine unannounced inspection involved 29 inspector-hours onsite in the areas of licensee action on previous inspection findings, construction status; concrete cylinder testing; basemat rebar fabrication - Unit 2; cadwelding - Unit 2; the handling of IEB's and LII's.

Results

Of the seven areas inspected, no items of noncompliance or deviations were identified in six areas; one item of noncompliance was found in one area. (Deficiency - 554/79-17-06 - Failure to follow procedures - cadweld allowable accumulative void limit exceeded - paragraph 6b.)

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DETAILS

1. Persons Contacted

Licensee Employees

- *W. P. Kelleghan, Project Manager
- *G. W. Wadewitz, Construction Engineer
- *J. C. Cofield, Assistant Construction Engineer, Project Engineering
- *T. V. Abbatiello, Assistant Construction Engineer, QC
- *W. T. Lindemann, Supervisor, Technical Services
- *H. B. McCracken, Mechanical Engineer, TSU
- *D. E. Hitchcock, Site QA Unit Supervisor
- G. V. Hogg, Materials & Civil QC Unit Supervisor
- **J. J. Ritts, Licensing Engineer, ENDES

Other licensee employees contacted included construction craftsmen, technicians, QC inspectors, and office personnel.

*Attended exit interview

**Participated in exit interview by telephone

2. Exit Interview

The inspection scope and findings were summarized on December 14, 1979 with those persons indicated in Paragraph 1 above. Deficiency 554/79-17-06, "Failure to follow procedure - cadweld allowable accumulative void limit exceeded" was discussed and the licensee acknowledged the finding. This deficiency is discussed in paragraph 6b.

3. Licensee Action on Previous Inspection Findings

(Closed) Deficiency 553/79-16-01; 554/79-15-01: Improper curing and testing of concrete cylinders. RII received TVA's letter of response dated December 17, 1979, on the subject matter. The licensee immediately covered the dry test cylinders in the curing room with wet burlap to bring the curing room in full compliance with ASTM C-31. The faulty nozzles in the curing room have been replaced and the temperature - humidity readings are now recorded by an automatic 24-hour recording device. The compressive test machine has been adjusted to accommodate different strengths of test cylinders varying with curing ages. The RII inspector examined the subject curing room and witnessed testing of various concrete cylinders to ascertain that the cylinder loading rate of 20-50 psi/sec (ASTM C-39) was being maintained.

This item is closed.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Independent Inspection Effort

The inspector conducted a general inspection of construction status and work activities underway in the containment, auxiliary and fuel building areas of both units, the intake pumping station, the cooling tower and spray pond areas.

The RII inspector witnessed the compressive strength testing of concrete cylinders 1606B, 1607B, 1313E, 1604B, 1543D, and 1307E at the site laboratory. All testing was observed being accomplished in accordance with procedure QCI-C-209. The cylinder compressive strengths obtained were found to be within the limits established by Construction Specification G-2, Table 4-1.

Within the above areas of independent inspection no deviations of items of noncompliance were identified.

6. Containment (Structural Concrete I) - Observation of Work and Work Activities - Unit 2

- a. The RII inspector observed the partial fabrication of the upper rebar mat for Unit 2 being constructed in accordance with TVA drawing Nos. S005, S006, S009, and S010. Inspector investigation into a Unit 2 circumferential (hoop) cadweld Splice E-18-HC-0120 found cut out and lying on the bottom of the base mat verified that its removal was done in accordance with approved procedures and authorized by a qualified QC inspector.

No items of deviation or noncompliance were identified.

- b. The RII inspector examined shop completed cadwelds utilizing No.18 rebar cadwelded in B1892J sleeves which were inturn welded to Unit 2 weirwall plates. The inspector found one calweld splice out of 406 he inspected which had been QC accepted that exceeded the void limit (low filler metal) of 3.0 square inches allowed by procedure QCI-C-401. Cadweld AB-18-VB-0029 was calculated to have an accumulative void area of 3.66 square inches. Upon notification of this deficiency TVA's Civil QC inspector immediately placed a QCIR hold tag on the subject calweld. This item was identified as deficiency item 554/79-17-06, Failure to follow procedures-cadweld allowable accumulative void limit exceeded.

7. Status of NRC Inspection and Enforcement Bulletins

- a. (Open) IEB 79-14: Seismic analyses for as-built safety-related piping systems. TVA's response dated September 7, 1979 states, "at Phipps Bend, no safety-related piping has been installed". Procedure are being prepared and they will assure that final verification will be provided to a degree equivalent to that identified by the subject bulletin.

This item remains open pending further evaluation by RII.

- b. (Open) IEB 79-15: Deep draft pump deficiencies. TVA submitted an initial response dated September 10, 1979 and a final response on the matter dated October 25, 1979. Attachments provided identify the type of pumps, the manufacturer, the model number, the capacity of the pump, the plant application and the overall dimensions of the pumps. The subject pumps have not undergone preoperational testing yet. Only receipt inspection and periodic maintenance checks have been made on those pumps received to date and no deficiencies have been found.

This bulletin remains open until IE-HQ's completes its evaluation.

- c. (Closed) IEB 79-23: Potential failure of emergency diesel generator field exciter transformer. The licensee's response dated October 29, 1979, states that their investigations have revealed that neither a direct connection nor a connection through a common ground exists between the excitation power transformer neutral and the generator units at the PBNP. Sustained full-load testing for the diesel generators is required during preoperational testing of the facility. Preoperational test procedures have not been developed for Phipps Bend diesel generators at the time; however, TVA states eventual preoperational testing of Phipps Bend's diesel generators will comply with applicable requirements and regulations. RII has no further questions regarding this matter at this time.

8. Licensee Identified Items (LII)

Prior to the inspection the licensee identified several items which were considered potentially reportable under 10CFR50.55(e). The items are as follows:

- a. (Closed) Item 553-554/79-06-02: Lower than required factor of safety for actual design of welded anchorages. The licensee issued two interim reports dated May 24, 1979, and August 13, 1979, respectively, and a final report on this matter dated October 26, 1979. Progressive cracking of the heat affected zone of welded stud anchors in flexible plate connections has occurred in TVA general research and development tests resulting in lower tensile anchor capacities than assumed in establishing design allowables. TVA initiated a testing program (CEB Report 79-18) to quantify the effect of plate flexibility on stud capability. A review of welded stud attachments for safety-related systems within the balance-of-plant at Phipps Bend was conducted to verify the plant's compliance with CEB Report 79-18. Plate flexibility problems were eliminated in heavy embedments by utilizing knee brace brackets instead of cantilever brackets, thus eliminating high bending moments on the plates. For embedments subject to small loadings/bending moments, cantilever brackets and the test data of CEB Report 79-18 were utilized for modification of the affected embedments. As a result of this review TVA has determined that Phipps Bend anchorages are now adequate. RII has no further questions regarding this matter at this time.

- b. (Open) Item 553/79-15-01, 554/79-14-01: High pressure core spray diesel generator control switchgear wiring discrepancies. Discussions with site licensee personnel and review of TVA's first interim report on this matter dated December 12, 1979 revealed that TVA's investigation of this deficiency is not completed and they have no further information to provide at this time. The licensee anticipates transmitting a final report on the matter on or before February 25, 1980.
- c. (Closed) Item 553/79-18-01, 554/79-17-01: Defective Florida Steel Rebar. On October 17, 1979, TVA notified RII that the Phipps Bend site received an entire heat, C0-0006, (39 tons total) of No. 6 rebar (bought by TVA to meet ASTM A-615, Grade 60) which was rejected and placed in "over, short, or defective status" upon arrival because it was extremely brittle. The licensee submitted a final report on this matter dated November 15, 1979. Five of the six rebar samples of heat C0-0006 tensile tested at Phipps Bend broke well below acceptable limits. The sixth sample of C0-0006 passed the tensile testing giving a ultimate strength of 94,000 psi. Singleton Laboratory analyzed samples of rebar of heat C0-0006 which had broken by brittle failure and found a manganese content of 4.7 percent, an abnormal level which would cause rebar to be extremely brittle. A sample of good rebar from C0-0006 heat was found to contain a normal manganese level of 0.89 percent. Mill certifications provided with the C0-0006 heat from Florida Steel show normal rebar chemistry with a manganese level of 0.77 percent. The high manganese content in part of the heat evidently escaped detection due to the nonhomogeneous of the batch of material and because the sample taken was from a section of the heat which had acceptable properties. TVA has shipped the entire defective heat of rebar back to Florida Steel. Florida Steel has informed TVA they will review melting procedures with melters, discuss the problem and provide training to shearing shop supervisors and crews to alert them to methods of discovering deficient material before shipment. TVA's QEB Charlotte inspection office has increased surveillance of Florida Steel operations and plans an audit of Florida Steel's Charlotte, N. C., office for the first quarter of 1980.
- d. (Open) Item 553/79-18-02, 554/79-17-02: Improper heat treatment of reactor pressure vessel pedestal studs. The licensee issued a final report on this matter dated October 11, 1979. The RII inspectors did not have time to look into this deficiency during this inspection but will pursue this matter at a latter date.
- e. (Closed) Item 553/79-18-03, 554/79-17-03: Design deficient gate valves by Anchor/Darling. The licensee initially reported the subject deficiency to RII on October 9, 1979 and submitted a final report on this matter dated November 15, 1979. Anchor/Darling informed TVA that they had discovered a design deficiency in their 12-inch, 900-pound, flex wedge gate valves. The deficiency involved underdesign of the T-head on the disk or gate. None of the subject valves had been shipped to Phipps Bend. Each of the subject valves of this type made

for TVA before discovery of the deficiency, but not shipped will have reinforcing weld metal added according to approved repair procedures to the T-head section of the disk to give it the required strength. After the deficiency was discovered by Anchor/Darling the pattern for the disk section was altered to add additional strength to the T-head section for subsequent valves of this type produced. Anchor/Darling has reviewed all similar valve designs provided by them for nuclear service and concluded that the subject deficient valves being provided to TVA are the only ones with this design deficiency.

- f. (Open) Item 553/79-18-04, 554/79-17-04: Vortex breaker omitted from condensate header in piping drawings. On December 4, 1979, TVA notified RII that their piping arrangement drawings used for installation did not show a vortex breaker. The A-E plans to revise pertinent drawings to include the subject breaker prior to installation of this piping at Phipps Bend. A written report is due on this matter by January 3, 1980.

- g. (Open) Item 553/79-18-05, 554/79-17-05: Unauthorized bending of reinforcing steel. On December 13, 1977, TVA notified RII that bending of reinforcing steel was done without proper engineering approval. A written report is due January 12, 1980.