UNITED STATES
ATOMIC ENERGY COMMISSION
DIRECTORATE OF REGULATORY OPERATIONS
REGION II - SUITE 818
230 PEACHTREE STREET, NORTHWEST
ATLANTA, GEORGIA 30303

TELEPHONE: (404) 526-4503

In Reply Refer To:
RO:II:VLB
50-390/74-6
50-391/74-6

DEC 13 1974

Tennessee Valley Authority
ATTN: Mr. J. E. Watson
Manager of Power
818 Power Building
Chattanooga, Tennessee 37401

Gentlemen:

This refers to the inspection conducted by Messrs. V. L. Brownlee and W. B. Swan of this office on November 19-22, 1974, of activities authorized by AEC Construction Permit Nos. CPPR-91 and CPPR-92 for the Watts Bar Nuclear Plant Units 1 and 2 facilities, and to the discussion of our findings held by Messrs. Brownlee and Swan with Mr. Killian at the conclusion of the inspection.

Areas examined during the inspection and our findings are discussed in the enclosed inspection report. Within these areas, the inspection consisted of selective examination of procedures and representative records, interviews with personnel, and observations by the inspector.

New unresolved items are identified in Section III of the summary of the enclosed report.

During the inspection, it was found that certain activities under your license appear to be in violation of Appendix B to 10 CFR 50 of the AEC Regulations, "Quality Assurance Criteria for Nuclear Power Plants." The violations and references to the pertinent requirements are identified in Section I of the summary of the enclosed report.

This notice is sent to you pursuant to the provisions of Section 2.201 of the AEC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations. Section 2.201 requires you to submit to this office, within 20 days of your receipt of this notice, a written statement or explanation in reply including: (1) corrective steps which have been taken by you, and the results achieved; (2) corrective steps which will be taken to avoid further violations; and (3) the date when full compliance will be achieved.

In accordance with Section 2.790 of the AEC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and the enclosed inspection report will be placed in the AEC's Public Document Room. If this report contains any information that you believe to be proprietary, it is necessary that you submit a written application to this office requesting that such information be withheld from public disclosure. If no proprietary information is identified, a written statement to that effect should be submitted. If an application is submitted, it must fully identify the bases for which information is claimed to be proprietary. The application should be prepared so that information sought to be withheld is incorporated in a separate paper and referenced in the application since the application will be placed in the Public Document Room. Your application, or written statement, should be submitted to us within 20 days. If we are not contacted as specified, the enclosed report and this letter may then be placed in the Public Document Room.

Should you have any questions concerning this letter, we will be glad to discuss them with you.

Very truly yours,

Norman C. Moseley
Director

Enclosure:
RO Inspection Report Nos.
50-390/74-6 and 50-391/74-6

Letter to Tennessee Valley Authority from N. C. Moseley
dated DEC 13 1974 and RO Rpt. Nos. 50-390/74-6
and 50-391/74-6

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RO Inspection Report Nos. 50-390/74-6 and 50-391/74-6

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

Facility Name: Watts Bar Nuclear Plant Units 1 and 2
Docket Nos.: 50-390 and 50-391
License Nos.: CPPR-91 and CPPR-92
Category: A2/A2

Location: Spring City, Tennessee

Type of License: W PWR, 1160 Mwe

Type of Inspection: Routine, Unannounced

Dates of Inspection: November 19-22, 1974

Dates of Previous Inspection: October 8-9, 1974
October 23-25, 1974

Principal Inspector: V. L. Brownlee, Reactor Inspector
Facilities Section, Facilities Construction Branch

Accompanying Inspectors: W. B. Swan, Reactor Inspector
Engineering Section, Facilities Construction Branch

Other Accompanying Personnel: None

Principal Inspector: V.L. Brownlee 12/2/74
V. L. Brownlee, Reactor Inspector, Facilities Section, Facilities Construction Branch — Date

Reviewed by: J.C. Bryant 12/12/74
J. C. Bryant, Senior Inspector, Facilities Section Facilities Construction Branch — Date

SUMMARY OF FINDINGS

I. Enforcement Action

A. Violations

Certain items appear to be in violation of 10 CFR 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants," as indicated below. This apparent violation is considered to be of Category II severity.

74-6-A1-(II) Procedures (Unit 1)

The PSAR, Appendix A, paragraph A.2.1, Organization, identifies the Division of Construction as being responsible for the inspection of all fabrication, installation, construction, and erection activities at the site including work by field contractors. Paragraph A.2.5 states that activities affecting quality are prescribed by documented instructions in the form of drawings, specifications, and procedures. Contrary to these requirements, the containment vessel erector had started on-site work and there was no TVA approved procedure for surveillance of field erection of containment vessels and the contractor's quality assurance program. This is an apparent violation of Criterion V of Appendix B. (Details I, paragraph 3.b)

B. Safety Items

None

II. Licensee Action on Previously Identified Enforcement Matters

A. Violations

None

B. Safety Items

None

III. New Unresolved Items

74-6/1 Letter and Analysis Report on Concrete Pour Collapse at Control Building (10 CFR 50.55(e))

On November 5, 1974, the forms collapsed during placement of concrete for a roof slab of the control building. The TVA report is due December 5, 1974. (Details II, paragraph 2)

IV. Status of Previously Reported Unresolved Items

74-4/1 Malfunction of Safety Related Switches (RO Bulletin 74-6)

TVA submitted letters of response dated July 3 and September 18, 1974, identifying their proposed corrective actions and plans. Region II will confirm implementation during subsequent inspections. This item remains open.

74-5/1 Valve Wall Thickness Verification Program

TVA (DED) will submit a valve wall thickness program that meets Region II letters of June 30, 1972, and February 16, 1973. This item remains open.

V. Design Changes

None

VI. Unusual Occurrences

Death of Workman in Hoisting Accident

Just prior to this inspection, a workman had been killed by a steel panel which slipped from its hoisting grapple. The licensee had given telephone notice to DRO-II, had made an accident investigation, and was holding safety meetings on the matter.

VII. Other Significant Findings

A. Project Status

Equipment Delivery Dates: See Details II, paragraph 3, for expected arrival dates of major components of the NSSS.

B. Personnel Changes

The DEC QA staff, Watts Bar Unit, has been expanded to four men. The QC and Records Engineering Unit has been expanded to eight men.

C. Training

During the weeks of November 11 - November 18, 1974, TVA completed QA orientation training sessions which included all on-site supervisory and craft personnel.

VIII. Management Interview

The inspectors met with Mr. J. C. Killian, Project Manager, members of the site staff and QA representatives of DED, Knoxville. The licensee was apprised of the areas inspected and findings. The licensee was informed that the lack of approved documented procedures for the surveillance of CB&I activities by TVA would be considered a violation of Criterion V, Appendix B. The licensee stated that this matter would be resolved as soon as possible. The licensee was informed that the control building concrete pour collapse will be considered an unresolved item until TVA submits their letter and accident analysis report. (Details II, paragraph 2)

No violation was found in the inspection of heavy equipment procurement, receipt, handling and storage. A detailed procedure was under development. The bearing capacity of soils under stored heavy items is to be determined. (Details II, paragraph 3(b) and (d))

The licensee gave assurance that the reactor vessel and head, scheduled to arrive about December 10, 1974, would not be unloaded and stored until the procedure is approved and the soil integrity verified.

DETAILS I

Prepared by: V. L. Brownlee 12/12/74
V. L. Brownlee, Reactor Inspector Date
Facilities Section, Facilities
Construction Branch

Dates of Inspection: November 19-22, 1974

Reviewed by: J. C. Bryant 12/12/74
J. C. Bryant, Senior Inspector Date
Facilities Section, Facilities
Construction Branch

All information in Details I applies equally to Units 1 and 2 except where information is identified with a specific reactor.

1. Individuals Contacted

a. Tennessee Valley Authority (TVA)

J. C. Killian - Project Manager
T. B. Northern - Construction Engineer
J. M. Lamb - Mechanical Engineering Unit Supervisor
L. J. Johnson - Mechanical Engineer
J. A. Morgan - Welding Engineer
R. L. Heatherly - QC and Records Supervisor
A. R. White - General Construction Superintendent
J. H. Perdue - Electrical Engineering Unit Supervisor
T. W. Hayes - Electrical Engineer

b. Contractor Organizations

Chicago Bridge and Iron Company (CB&I)

M. L. Gilmore - Field Foreman

2. Electrical-Implementation of QA Program

Discussions with the TVA on-site electrical engineers, tour of the environmentally controlled and open storage facilities, and examination of the developing QA/QC program and procedures confirm that TVA is implementing an on-site QA program that is consistent with the SAR requirements. TVA's on-site control procedures are not yet finalized; however, considering the early state of construction, TVA's on-site electrical quality control procedure development appears to be at a reasonable stage of development and implementation to control that work in progress.

3. Reactor Building Steel Containment Vessels

a. General

Chicago Bridge and Iron Company (CB&I) erection forces have moved on-site and established the work yard area and the administrative and storage facilities. Present work force is small with one qualified production welder on site. Present plans anticipate a thirty to forty man work force by the end of December 1974.

b. Violation (Unit 1)

Contrary to the SAR requirements, as identified in Section I of the Summary of this report, TVA did not have an approved procedure for surveillance of CB&I activities prior to the start of CB&I work. The responsible TVA engineer submitted draft DEC-QCP-4.6, "Surveillance of Field Erection of Containment Vessels and Contractors Quality Assurance Program," on November 6, 1974, for final review and approval. Field forces could not readily identify the anticipated date of final approval. It should be noted that TVA engineers had implemented informal surveillance activities and assigned an NDT and welding surveillance inspector who is reporting daily activities on the daily report form to the welding engineer.

DETAILS II

Prepared By: L. L. Beratan, Jr. 12-6-74
W. B. Swan, Reactor Inspector Date
Engineering Section
Facilities Construction Branch

Dates of Inspection: November 19-22, 1974

Reviewed By: L. L. Beratan 12-6-74
L. L. Beratan, Senior Inspector Date
Engineering Section
Facilities Construction Branch

All information in Details II applies equally to Units 1 and 2 except where identified with a specific reactor.

1. Individuals Contacted

Tennessee Valley Authority (TVA)

J. C. Killian - Project Manager
T. B. Northern - Construction Engineer
L. C. Northard - Supervisor DEC QA Staff, WB Unit
C. E. Thompson - QA Engineer
H. S. Sheppard - Supervisor, Civil (Field) Engineering
J. C. Cofield - Supervisor, Materials Engineering (C&S)
L. S. Cox - Supervisor, Office Engineering
L. J. Johnson - Mechanical Engineer
W. M. Copeland - Mechanical Engineer
J. A. Morgan - Mechanical Engineer
R. L. Heatherly - Supervisor, QA and Records Engineering Unit
J. M. Lamb - Supervisor, Mechanical Engineering Unit
D. Deford - Supervisor, DED QA Engineering
T. Y. Abbatiello - Engineer, QA Engineering
J. C. Hayes - General Equipment Foreman

2. Concrete Pour Collapse at Control Building

On November 6, 1974, TVA notified DRO-II by telephone that a concrete pour which had been placed the previous evening for a section of the roof of the control building had collapsed, injured fourteen workers and had caused some damage to structural steel members below.

A report is to be made by TVA under 10 CFR 50.55(e) after the investigation report has been reviewed by TVA design engineering. This matter will be carried as an unresolved item until the TVA letter is received.

During this inspection the accident site was inspected, failed bar joists and damaged rebar and structural steel members were inspected in the storage yard, the placement drawings which detailed the bar joists were reviewed, and documentation pertaining to the concrete pour and the accident investigation report were reviewed.

The summary report stated the conclusion that the primary cause of the forms collapse of roof slab C8-D11 was a weld failure on the lower chord of the bar joist No. 6, a temporary construction support. Poor workmanship on this weld was pinpointed as being responsible for the failure. Design of the truss (bar joist) was recalculated and determined to be adequate for loads expected during the placement. Full loading had not occurred before collapse. Near failure of similar joists was found to have occurred under previously placed blocks D9 and D10.

Corrective actions had been taken by TVA. The concrete debris had been cleared away. Damaged bar joists and structural steel members had been inspected and most had been removed and segregated. A decision had been made to discontinue use of the bar joists since visual inspection of joists No. 6 through No. 11 showed various degrees of weld failure. Damaged Class I structural members and rebar are being replaced. DED has been requested to provide vendor inspection, to the Inspection and Test Group, for construction materials such as the bar joists.

TVA investigative action had been prompt and the corrective actions taken effective. This matter will be resolved upon receipt of TVA's letter and approved report.

3. Planning for Receipt, Unloading and Storage of Major Components of the Nuclear Steam Supply System

a. General

An inspection was made of the unloading dock area, the six hundred ton crane being assembled, storage areas near the dock and in the spur track yard, and of the transfer road between the dock and spur yard. Test load blocks were available and the procedure for testing the new Manitowoc crane was approved November 21, 1974. This procedure was reviewed and discussions were held with the general equipment foreman concerning erection of the crane and the training

and qualification of operators. A Manitowoc engineer was monitoring and advising on the erection of the crane and its operational checkout. The controls on this new crane were stated to be similar to and positioned the same as the controls on smaller Manitowoc cranes already in use on site in order that operator training will be simplified.

Detailed drawings for rigging, off loading, and storage of the NSSS components were available and were reviewed:

Preliminary Drawing 108 N 1066-1: "Reactor Pressure Vessel and Head Off-Loading Plans and Equipment"
Drawing 108 N10178, Approved 11/15/74: "Test Load Arrangement for Off-Loading NSSS Vessels"
Drawing 108 N10176, Approved 10/24/64: "Reactor Vessel Head Lifting Assembly"
Drawing 108 N10168-2, Rev. 1, Sh. 1&2: "600 Ton Lifting Beam"
Drawing 108 N10160 - RO, Approved 9/11/74: "NSSS Barge Shipment Off-Loading and Storage Area."

b. Pending Procedure

The detailed procedure for removing the Unit 1 RPV and head from the barge was under preparation by the site mechanical engineering section. The licensee stated that telephone notice will be given when the barge arrives. No handling of the cargo will take place before the procedure is approved.

Documents being used for reference included:

Regulatory Guide 1.38: QA Requirements for Packaging, Shipping, Receiving, Storage and Handling of Items for Water Cooled Reactors

Draft of NASI N45.2.15 for Hoisting, Rigging and Transporting Items at Nuclear Power Plants

W "Procedures and Specifications Pertinent to Field Operations Involving W Equipment or Systems"

Section 3: Tanks and Vessels Including Steam Generators and Heat Exchangers

Section 5: Mechanical Equipment

Separate Attachment entitled Long Term Storage Requirements, Rev. 3, June 1, 1971

References included NPS QA-1, Rev. 4. February 10, 1972, "Suggested Material Receiving, Inspection and Storage Practices for Nuclear Power Plant Construction Site"

OEDC-QAP-13.0 RO, 5/28/74, "Handling, Storage, Shipping" which defines, responsibilities of DED, DEC, OEDC, QA, and others

DEC-QCP-6 RO, 1/11/74 "Receipt, Inspection, Storage and Withdrawal of Permanent Material"

Notes and Agenda for Site Conferences on May 22, 1974, and July 30, 1974, with W on large component barge shipments and handling of heavy loads.

c. Expected Arrival Dates of NSSS Components

On November 21, 1974, site personnel were given the following estimated arrival dates for some of the equipment:

Reactor Vessel No. 1, 370 tons - 12/10/74
Reactor Head No. 1, 90 tons - 12/10/74
Reactor Vessel No. 2, 370 tons - January 1975
Reactor Head, No. 2, 90 tons - January 1975
Steam Generators No. 1, 2, 3 and 4, 340 tons each - January 1975
Reactor Internals No. 1, Upper, 70 tons - February 1975
Reactor Internals No. 1, Lower, 170 tons - February 1975
Pressurizer, Unit 1, 118 tons - February 2, 1975

The steam generators for Unit 2 are expected to arrive in July 1975 and the reactor internals for Unit 2 in November 1975.

d. Bearing Capacity of Soil Under Heavy Stored Items

The cribbing designed to support a reactor vessel during storage will impose an average loading of 3800 psi on the soil. Discussions with the civil engineers disclosed that bearing tests had not been taken at the storage spots for the reactor vessels and steam generators. The soil has a fly ash composition and might be expected to flow under sustained high stress. The licensee agreed to make soil tests or provide redesign of supports to provide adequate bearing.

e. Transfer Road Between Dock and Spur Track Storage Yard

At the start of the inspection this construction road appeared to be inadequate to provide ease and safety for transfer of heavy safety critical loads such as the reactor vessel. Note that the reactor vessel and steam generators are to be stored at the unloading

dock. On the second day of the inspection surveying of the road was underway and this was followed by lateral leveling and compaction of the roadbed and regrading to a maximum 5% grade. At the management interview the licensee gave assurance that the road levelness, grade, and load bearing compacity will be verified before each of the transfers of heavy safety critical items such as the reactor vessels, steam generators and reactor internals.

The detailed procedures for removing the heavy items from storage, transporting them and installing them in the containments will be prepared in sequence prior to these operations.

f. Summary

There were no deficiencies or violations noted pertaining to the receipt, handling and storage of large items insofar as the project had advanced at the time of the inspection.

4. Observation of Concrete Work

Forming and other preparations were observed for concrete placements for the third lift of the Unit 1 containment wall for the bolting portion of the base of Unit 2 containment, and for a section of the upper wall extension on the control building. The base slab of the intake pumping station had been placed in October. The slab and follow on work were inspected.

No deficiencies were noted in the preparations, completed work or construction housekeeping.