



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
230 PEACHTREE STREET, N.W. SUITE 818
ATLANTA, GEORGIA 30303
JAN 4 1977

In Reply Refer To:
IE:II:VLB
50-390/76-11
50-391/76-11

Tennessee Valley Authority
ATTN: Mr. Godwin Williams, Jr.
Manager of Power
830 Power Building
Chattanooga, Tennessee 37401

Gentlemen:

This refers to the inspection conducted by Mr. V. L. Brownlee of this office on November 16-19, 1976, of activities authorized by NRC 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 with Mr. J. C. 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.

We have examined actions you have taken with regard to previously reported unresolved items. These are identified in Section IV of the summary of the enclosed report.

New unresolved items resulted from this inspection and are identified in Section III of the summary of the enclosed. These items will be examined on subsequent inspections.

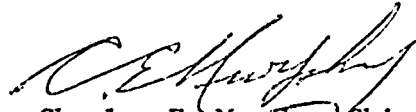
During the inspection, it was found that certain activities under your license appear to be in noncompliance with NRC requirements. These items and references to pertinent requirements are listed in Section I of the summary of the enclosed report.

This notice is sent to you pursuant to the provisions of Section 2.201 of the NRC'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 noncompliance; and (3) the date when full compliance will be achieved.

In accordance with Section 2.790 of the NRC'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 NRC'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,



Charles E. Murphy, Chief
 Reactor Construction and Engineering
 Support Branch

Enclosure:
 IE Inspection Report Nos.
 50-390/76-11 and 50-391/76-11

cc: J. E. Gilleland
 Assistant Manager of Power
 831 Power Building
 Chattanooga, Tennessee 37401

Mr. J. C. Killian, Project Manager
 Watts Bar Nuclear Plant
 P O. Box 2000
 Spring City, Tennessee 37381



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
230 PEACHTREE STREET, N.W. SUITE 818
ATLANTA, GEORGIA 30303

IE Inspection Report Nos. 50-390/76-11 and 50-391/76-11

Licensee: Tennessee Valley Authority
830 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, Construction

Dates of Inspection: November 16-19, 1976

Dates of Previous Inspection: October 12-15, 1976

Principal Inspector: V. L. Brownlee, Reactor Inspector
Projects Section
Reactor Construction and Engineering Support Branch

Accompanying Inspectors: W. B. Swan, Reactor Inspector
Engineering Support Section No. 1
Reactor Construction and Engineering Support Branch

E. J. Vallish, Reactor Inspector
Engineering Support Section No. 1
Reactor Construction and Engineering Support Branch

F. U. Bower, Reactor Inspector
Engineering Support Section No. 1
Reactor Construction and Engineering Support Branch

Principal Inspector: *V. L. Brownlee*

V. L. Brownlee, Reactor Inspector
Projects Section
Reactor Construction and Engineering Support
Branch

12/25/76
Date

Reviewed by: *J. C. Bryant*

J. C. Bryant, Chief
Projects Section
Reactor Construction and Engineering Support Branch

12/25/76
Date

SUMMARY OF FINDINGS.

I. Enforcement Items

A. Infraction

76-11-A1(II) Failure to Report

Title 10, Code of Federal Regulations Part 50.55(e) requires that the holder of a permit for the construction of a nuclear power plant notify the commission of each deficiency found in design and construction, which were it to remain uncorrected, could have affected adversely the safety of operations of the nuclear power plant at any time throughout the expected lifetime of the plant.

Contrary to these requirements, TVA failed to perform an adequate review and evaluation for determining reportability to NRC and thus failed to notify NRC of Nonconformance Report No. 554, pertaining to sporadic operation of relays on shutdown board logic panels and Condition Adverse To Quality And Corrective Action Report No. E3, pertaining to false detent occurrences on two position selector switches. (Details I, paragraph 4)

II. Licensee Action on Previously Identified Enforcement Items

None

III. New Unresolved Items

76-11/1 Quality Control Procedure 3.5 (Units 1 and 2)

Paragraph 6.4.7 of Table 6.4 of the subject procedure does not provide a clear and concise definition of the cable color coding scheme. TVA agreed to look into this matter and correct as required. (Details III, paragraph 4)

76-11/2 Quality Control Procedure 1.12 (Units 1 and 2)

Table I of the subject procedure did include the conductor crimper tool certification frequency. TVA agreed to correct this matter. (Details III, paragraph 5)

- 76-11/3 IE Circular 76-05, "Hydraulic Shock and Sway Suppressors - Maintenance of Bleed and Lock-Up Velocities on ITT Grinnell Model Nos. - Fig. 200 and Fig. 201, Catalog PH-74-R (Units 1 and 2)

This matter is carried as an unresolved item for purpose of followup. (Details I, paragraph 6.a)

- 76-11/4 Modification - General Warning Alarm System in the Solid State Protection System (Units 1 and 2)

TVA was requested to evaluate the system and, if required, modify the system to assure performance in accordance with the design requirements. TVA agreed to review this matter and take corrective action as requested. (Details I, paragraph 6.b)

- 76-11/5 Nonconformance Report No. 554, "Relays - Shutdown Board Logic Panels" and Condition Adverse to Quality Report No. E3, "Two Position Selector Switch Operator - Square D Company 9001-DS11FB" (Units 1 and 2)

TVA was requested to evaluate these reports relative to their reportability to the NRC. TVA agreed to review this matter. (Details I, paragraph 4)

IV. Status of Previously Reported Unresolved Items

- 75-5/1 Valve Wall Thickness Verification Program (Units 1 and 2)

This item is resolved based on TVA's letter, July 9, 1976, to NRR and NRC's letter, September 22, 1976, to TVA. This item is closed. (Details I, paragraph 5.a)

- 76-2/1 Instrumentation Procedures (Units 1 and 2)

WBNP QCP 3.1 has been revised (Rev. 3) to include instrumentation. This item is closed. (Details III, paragraph 6)

- 76-6/1 GE HFA Relays - Cracked Coil Spools (10 CFR 50.55(e)) (Units 1 and 2)

TVA's final report was submitted on November 5, 1976. The report was reviewed by IE:II and found to be acceptable. This item is closed. (Details I, paragraph 5.b)

76-7/2 Status of CB&I Welding Supervisor Qualifications
(Units 1 and 2)

76-8/1 IE Circular 76-01, "Crane Hoist Control - Circuit
Modification" (Units 1 and 2)

TVA's letter of response was submitted on October 29,
1976. This item is closed. (Details I, paragraph 5.c)

76-8/2 IE Circular 76-02, "Relay Failures - Westinghouse
BF(ac) and BFA(dc) Relays" (Units 1 and 2)

TVA's letter of November 22, 1976 informs the NRC that
the subject type relays are not used in Class IE Circuits.
This item is closed.

76-9/1 Westinghouse Accident Analysis (10 CFR 50.55(e))
(Units 1 and 2)

76-9/2 Breakdown in Vendor QA Program (Bristol Steel and
Iron Works - Documentation) (10 CFR 50.55(e)) (Units
1 and 2)

76-10/1 Intake Channel - Unfavorable Gravel Conditions
(10 CFR 50.55(e)) (Units 1 and 2)

76-10/2 Refueling and Primary Storage Water Tank Piping
Tunnels - Seismic Criteria (10 CFR 50.55(e))
(Units 1 and 2)

76-10/3 Weld Repair Requirements - Inconsistencies Between
Contractural and Procedural Requirements

76-10/4 NSSS Supplied Stainless Steel Piping - Pressurizer
Surge Line - (Units 1 and 2)

V. Design Changes

None

VI. Unusual Occurrences

None

VII. Other Significant Findings

None

VIII. Management Interview

The exit interview was held on November 19, 1976, with Mr. J. C. Killian, Project Manager, members of his staff, and QA representatives of EN DES, DEC and OEDC. They were apprised of the findings of this inspection as noted in this report.

DETAILS I

Prepared by:

V. L. Brownlee
V. L. Brownlee, Reactor Inspector
Projects Section
Reactor Construction and Engineering
Support Branch

12/14/76
Date

Dates of Inspection: November 16-19, 1976

Reviewed by:

J. C. Bryant
J. C. Bryant, Chief
Projects Section
Reactor Construction and Engineering
Support Branch

12/15/76
Date

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

1. Individuals Contacted

Tennessee Valley Authority (TVA)

Watts Bar Site

J. C. Killian - Project Manager
J. M. Lamb - Mechanical Engineering Unit Supervisor
J. H. Purdue - Electrical Engineering Unit Supervisor
A. W. Rogers - QA Unit Supervisor - DEC
R. L. Moore - QA Engineer, Power
J. S. Colley - QA Engineer - ENDES
J. D. Shanlever - Mechanical Engineer
J. R. Inger - QA Engineer
R. D. Anderson - Electrical Engineer
S. K. Walker - Mechanical Engineer, QCR

2. Scope

Inspection efforts included an overall review of the licensee compliance record, review of construction deficiency reports and resolutions, drawing control, review of nonconformance and conditions adverse to quality reports, previously reported and new unresolved items as identified in Sections III and IV of the Summary to this report, and residual heat removal pump motors.

3. Overall Review of QA Program Implementation

a. Review of Inspection Efforts and Enforcement Matters

The inspector performed a thorough review of the QA manual and docket files to include the following: inspections relative to QA programs and site; enforcement correspondence and responses; and the construction deficiency report file.

The review findings indicate that TVA has developed and is executing a QA program consistent with the SAR commitments relative to construction quality assurance, enforcement and reporting of deficiencies, except as noted in paragraph 4 below.

b. Drawing Control

WBNP-QCP 1.1, "Print Room Procedure," R1, implements OEDC-QAP-60, "Document Control." The procedure specifies the methods to be used by the print room for the control, issue, and distribution of documents.

A selective examination was made of on-site drawings to determine if drawings being utilized by construction forces were of the latest revision. Thirty-eight drawings were selected from working stick files located in the containment, auxiliary building and control room areas. The drawings were compared with the print room files. All drawings were of the latest revision. The inspector then reviewed TVA Audit Report DEC QA WB-G-76-06, "Document Control." The DEC QA audit was performed on October 7-17, 1976. Within the areas examined, no items of noncompliance were identified.

4. Control of Nonconforming Material and Conditions Adverse to Quality and Corrective Action Reports

WBNP-QCP 1.2, Revision 1, and WBNP-QCP 1.4, Revision 0, describe the site control mechanisms for control of the subject matter.

The inspector reviewed the Nonconformance Reports generated during the period July 2 through November 9, 1976. The complete file of Conditions Adverse to Quality and Corrective Action Reports was reviewed.

Discussions with site and EN DES personnel and review of the site reports identified the following two items for which TVA was requested to perform an evaluation for reportability in accordance with the requirements of 10 CFR 50.55(e):

- a. Nonconformance Report No. 554, dated October 27, 1976.
- b. Condition Adverse to Quality Report (CAQR) No. E3 dated October 26, 1976.

On November 19, 1976, TVA was asked if these items had been evaluated by TVA for reportability to the NRC. The reply was that these matters had not been evaluated for reportability. TVA agreed to perform the evaluation as requested. The items were entered into the evaluation cycle on November 22, 1976. TVA reported to IE:II on December 2, 1976 that the items were being identified as reportable and a Construction Deficiency Report would be filed.

TVA was informed that this matter, "Failure to Report," would be considered as an item of noncompliance, infraction category. The inspector informed TVA Engineers that he considered the problem to be one where the WBNP QCP's 1.2 and 1.4 do not provide clear, definitive descriptions and report forms to assure that site originated NCR's and CAQRA's are initiated, evaluated and interfaced with the EN DES program for evaluation of reportability to NRC. Additionally, the inspector informed the TVA Engineers that he would perform a thorough overall review of how TVA originates, documents, interfaces, evaluates and reports Construction Deficiency Reports to NRC. TVA construction and EN DES Engineers agreed to evaluate the TVA overall program and take corrective actions as required.

5. Previously Reported Unresolved Items

- a. 75-5/1 Valve Wall Thickness Verification Program (Units 1 and 2)

TVA's letter of July 9, 1976, Mr. J. E. Gilleland to Mr. B. C. Rusche, NRR, requested approval to modify TVA's valve wall thickness program to delete the requirement for reviewing and maintaining valve wall thickness documentation. NRR's letter to TVA dated September 22, 1976 agreed to delete this requirement. Review of TVA internal correspondence by D. R. Patterson, November 4, 1976, relative to subject matter indicates that adequate internal information has been disseminated to the responsible personnel. IE:II has no further questions regarding this matter.

- b. 76-6/1 GE HFA Relays Cracked Coil Spools (10 CFR 50.55(e))
(Units 1 and 2)

TVA's corrective actions identified in the Final Report, November 5, 1976 appear to be clear and straight forward.

Responsible site personnel are knowledgeable of the problems and understand the corrective actions. IE:II has no further questions regarding this matter.

- c. 76-8/1 IE Circular 76-01, "Crane Hoist Control - Circuit Modification" (Units 1 and 2)

TVA's letter of October 29, 1976, informs NRC that they do not plan to make modifications to the subject crane hoist controls.

A field check by the inspector verified that the subject crane hoist controls are not provided by the same supplier.

IE:II has no further questions regarding this matter.

6. New Unresolved Items

- a. IE Circular 76-05, "Hydraulic Shock and Sway Suppressors - Maintenance of Bleed and Lock-up Velocities on ITT Grinnell's Model Nos. - Fig. 200 and Fig. 201, Catalog PH-77-R

NRC letter of October 8, 1976, transmitted this circular to TVA. This item is identified for purpose of followup.

- b. General Warning Alarm System (GWAS) - Generic Problem (Units 1 and 2)

The inspector requested that TVA evaluate a generic problem in the GWAS in the solid state protection system. TVA was provided the NRC general information relating to this matter. TVA agreed to investigate.

7. Residual Heat Removal Pump Motors - NYLOK Lower Bearing Lock-Nut

TVA Field Engineer confirmed through Westinghouse that the motors supplied for the Watts Bar project were not ones manufactured during the period 1970-1972. IE:II has no further questions regarding this matter.

DETAILS II

Prepared by:

W. B. Swan, P.E.
W. B. Swan, Reactor Inspector
Engineering Support Section No. 1
Reactor Construction and Engineering
Support Branch

12/27/76
Date

Dates of Inspection: November 16-19, 1976

Reviewed by:

T. E. Conlon
T. E. Conlon, Chief
Engineering Support Section No. 1
Reactor Construction and Engineering
Support Branch

12/27/76
Date

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

1. Individuals Contacted

Tennessee Valley Authority (TVA)

J. C. Killian - Project Manager
A. R. White - General Construction Superintendent
A. W. Rogers - Supervisor, Site QA Unit, DEC QA Staff
J. D. Shanlever - Mechanical Engineer, Mechanical Components
J. M. Lamb - Supervisor, Mechanical Engineering Unit
H. S. Sheppard - Supervisor, Civil Engineering Unit

2. Scope of Inspection

The principal effort of the inspection was directed toward observation of work, QC procedures and related records for installing major supports for NSSS equipment. Progress of concrete work was inspected in the reactor building, the diesel generator building, auxiliary building and intake pumping station. Excavation and backfill operations on the intake channel for the intake pumping station were observed. Records for recent concrete and earth placements were reviewed.

3. Intake Channel Over Excavation (76-10/1)

Exploratory drilling was found to have been completed for the lower end of the channel behind the dike. Excavation in this area is held in abeyance pending decision as to the extra excavation needed and redesign of the river end of the channel.

The inspectors made a followon visual inspection of the excavation and backfilling in the rest of the channel. The compaction test records for backfilled earth and rock were reviewed. No items of noncompliance were found in the work or records.

A contract had not been let for proposed barge operator removal of the dike and underwater excavation, riprapping and placement of the effluent diffuser nearby.

Acceptance criteria for the channel work are set out on drawings 10N215RI, General Construction Procedure G-9 "For Rolled Earth Backfill For Dams and Power Plants;" and WBNP procedures QCP-2.1-RO "Backfill Placement Inspection and Documentation," and OCP-2.6-RO "Crushed Stone Backfill Placement and Inspection."

This unresolved 10 CFR 50.55(E) item is left open pending receipt of redesigns.

4. Containment (Steel Structures and Supports) - Observation of Work and Work Activities

A follow on inspection of the installation work and associated activities for supports of major NSSS equipment was made. Review of the controlling acceptance criteria and documents had been made and reported on previous inspections. The support systems inspected were:

Reactor Vessel Supports, Units 1 and 2
Reactor Coolant Pump Supports, Units 1 and 2
Steam Generator Supports, Units 1 and 2
Pressurizer Supports, Units 1 and 2

a. Work Status At Time of Inspection:

- (1) RV Supports, Unit 1: The large support sections provided by Bristol were being positioned by millwrights and the upper bulkhead sections were being given fit verification.
- (2) RV Supports, Unit 2: Installation of Bristol supplied support hardware was held up by concrete operations on the reactor cavity and shield wall.
- (3) R. C. Pump Supports, Units 1 and 2: There was no installation work being performed on nonembedded support parts. Embedments had been inspected during previous visits to the site.

- (4) S. G. Supports, Unit 1: Five of the support columns were observed outside the containment: one for loop 1; one for loop 2; and three for loop 4. Sliding base plate and clevis sections were being installed over embedded bolts. Support yokes had been bolted onto the steam generators stored in the yard. Bolting of upper structural restraint yoke sections to embedments was nearing completion.
- (5) S. G. Supports, Unit 2: No installation work was observed. Some support hardware delivered by Bristol was inspected in storage. Floor embedments are already in place and had been previously inspected.
- (6) Pressurizer Supports, Unit 1 and Unit 2: Conditions were found to be unchanged from those reported in Report 50-390/76-10 Details III, paragraph 3. The steel support ring for Unit 1 was in interim storage outside the containment.

5. Containment (Steel Structures and Supports) Review of Quality Records

A follow on review of the quality records for supports supplied by Bristol Steel and Iron Works was made. The TVA-Bristol contract number is 85879. TVA's practice is to have vendors send records of material test reports, chemical and physical test certifications from suppliers and result of shop tests and inspections to the appropriate engineering design section in Knoxville.

A shop release form is signed by a TVA-Inspection and Test Branch representative certifying that required documentation has been furnished. A previous report covers the inspector's review of Bristol documents at TVA-Knoxville. The shop releases and receiving reports for the following items were sample reviewed at the site:

- (a) Release dated 10/13/76 for Unit 1 tie rod bracket and pressurizer support ring and Unit 2 support ring.
- (b) Release dated 10/28/76 for Unit 1 (Div. 1) S. G. Vertical Columns and Brackets
- (c) Release dated 10/28/76 for three (Div. 1) S. G. lower supports, one bumper stop and three (Div. 2) bumper stops and bolts.

The TVA receiving inspection reports for these and other items were reviewed. The storage areas for various items were noted on the

receiving reports. The inspector verified the locations by a field inspection. The record review covered support hardware for the reactor vessels, steam generators, pressurizers and reactor coolant pumps for both Units 1 and 2.

No items of noncompliance were identified during the records review.

6. Independent Inspection Effort

Follow on inspections in the following areas were made:

- a. Recently completed concrete placements in RB1 and RB2. Placement RB2-J9, 10d; 16 cubic yards, was made 11/17/76.
- b. Forming for concrete placements in the diesel generator building.
- c. Forming for concrete placements in the intake pumping station and inspection of curing and cold protection for placement H 19(72 c.y.) made 11/16/76.
- d. Concrete placed 11/16/76 in the auxiliary building. Placements AB-G65, -G75, -G123(a) totaling 108 cubic yards.
- e. Placement of embeds in RV Shield Wall and Crane Wall, RB2.

Quality Control records were reviewed as follows: concrete pour authorization cards for pours RB2-J9, 10d; AB-G65, -G75, -G123(e) and IPS block H 19; compaction test record No. 649 on 11/18/76 by sand cone method; and moisture content test made by Troxler nuclear method on 11/06/76.

As reported in paragraphs 3 and 5 above the inspector observed the placement and compaction of clay backfill and crushed stone backfill in the intake channel and inspected field and storage of NSSS equipment support hardware. Acceptance criteria for the areas of work covered are called out in Regulatory Guides 1.10, 1.55 and 1.94; in TVA general construction procedures G-2 and G-9, and in WBNP procedures:

QCP-202 RO - Concrete Placement and Documentation,

QCP-2.1 RO - Backfill Materials Placement Inspection and Documentation

QCP-2.6 RO - Crushed Stone Backfill Placement Inspection and Documentation.

Calibration records and methods were reviewed for survey equipment being used for verifying proper installations of NSSS equipment and supports.

An oversight omission of procedure details for the removal of large box beams B10 over the reactor pit during the installation of RV in Unit 1 was pointed out and the licensee initiated supplementary planning.

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

DETAILS III

Prepared by:

For: R. W. Wright
F. U. Bower, Reactor Inspector
Engineering Support Section No. 1
Reactor Construction and Engineering
Support Branch

12/3/76
Date

Dates of Inspection: November 16-19, 1976

Reviewed by:

T. E. Conlon
T. E. Conlon, Chief
Engineering Support Section No. 1
Reactor Construction and Engineering
Support Branch

12/3/76
Date

All information in Details III applies equally to both units except where information is identified with a specific reactor.

1. Persons Contacted

Tennessee Valley Authority (TVA)

T. Hayes - Supervisor, Instrument Engineering Unit
J. Purdue - Supervisor, Electrical Engineering Unit
C. Shelby - Group Leader, Reactor Control Instruments
D. Eidson - Assistant Supervisor, Electrical Engineering Unit
D. Faulkner - Instrument Engineer
E. Austin - Electrical Engineer

2. Scope of Inspection

Directed inspection activities for this inspection were principally concerned with a review of the quality assurance implementing procedures (Quality Control Procedures) as they relate to instrumentation components, systems, cables and terminations.

The primary subdivisions of this inspection program included examinations in the following listed areas: (a) Identification; (b) Receipt Inspection, Handling and Storage; (c) Handling and Installation; (d) Inspection and Construction Testing; (e) Wire Separation and Protection; (f) Cable Redundancy and Separation; (g) Cable and Termination Testing After Installation; and (h) Design Changes, Deviations and Unusual Problems.

3. Electrical (Components & Systems) Review of QA Procedures

The activities completed to accomplish the IE inspection program goals included a search of licensing commitments (SAR Sections 8 and 17) to determine the general acceptance criteria applicable to the significant inspection milestones. This was followed by a detailed examination of all those applicable procedures contained in the "Watts Bar Nuclear Plant Quality Control Procedures Manual" (WBNP QCP) and the specific references contained therein to other documents such as Design Criteria (DC) and Field Instructions (FI). These procedures included the following: (a) QCP 3.1 "Handling, Storage, and Maintenance of Permanent Electrical and Instrument Materials;" (b) QCP 3.6 "Electrical and Instrument Equipment Installation, Standard Tests, Inspection and Documentation;" (c) QCP 1.12 "Control and Calibration of Construction Tools, Gages, Instruments, and Measuring Devices;" (d) QCP 1.6 "Receipt Inspection, Storage, Withdrawal and Transfer of Permanent Material;" (e) QCP 3.5 "Installation, Inspection, and Testing of Insulated Control, Signal and Power Cable;" (f) QCP 1.4 "Conditions Adverse to Quality and Corrective Action;" (g) QCP 1.2 "Control of Nonconforming Materials;" (h) QCP 1.16 "Equipment Monitoring Program;" (i) QCP 3.4 "Installation, Inspection and Documentation of Cable Tray System;" (j) QCP 1.10 "Preparation and Control of WBNP QC Procedures;" (k) WB-DC-30-4 "Design Criteria for Separation of Electrical Equipment and Wiring;" and (l) WBFI-E-34 "Field Instruction for Certification of Test Equipment."

Within the areas examined there were no items of noncompliance identified. The unresolved items identified are discussed in the following paragraphs of this section of this report.

4. Quality Control Procedure 3.5 (Ref. 76-11/1)

WBNP QCP 3.5, "Installation, Inspection, and Testing of Insulated Control, Signal and Power Cable," Paragraph 6.4.7 and Table 6.4 has an apparent error in the cable color coding description for safety related cables. The apparent error may be significant when interpreted by the less experienced inspector thereby allowing the possibility of cable routing errors.

This problem was discussed in depth with the responsible staff personnel and it was determined that the problem probably arose during the process of collating and releasing the final document through the misunderstanding of the clerical unit.

The staff has agreed to revise this portion of the subject procedure in a fashion that will provide a better description of the color coding scheme.

This item will remain unresolved until the anticipated action is complete.

5. Quality Control Procedure 1.12 (Ref. 76-11/2)

WBNP QCP 1.12, "Control and Calibration of Construction Tools, Gages, Instruments and Measuring Devices" has not included conductor termination crimper tools in Table I which lists the required frequency of certification for all such devices essential to quality actions. Requirements for periodic certification of these tools is set forth in WBNP QCP 3.5 and a reference therein, WBF1-E-34. The reference does list the frequency of crimper certification but "Field Instructions," although important to quality action, do not form a part of the QC program.

The staff has agreed to revise the subject procedure and add the required notations which will include crimper certification and certification frequency into the program.

This item will remain unresolved until the expected action has been completed.

6. Instrumentation Quality Control Procedures (Ref. 76-2/1)

Based on the results of this inspection and the qualifications contained in this report relating to the examined procedures, it is this inspector's finding that suitable QC procedures exist to control the present activities associated with the instrumentation systems.

This finding includes the understanding that the QC procedure relating to instrument calibration, scaling and loop testing, presently in draft form, will be released in a suitable form and in a timely fashion to include the action described therein. This unresolved item is closed.

7. Nondirected Inspection Activity

- a. A cursory examination of cable tray and conduit installation work in progress at several locations throughout the project revealed the extensive use of untreated lumber for semi-permanent construction scaffolds. The hazards of combustible

materials as experienced at other nuclear construction projects was discussed at the closeout meeting with site management. The licensee stated that the problem had been identified and corrective action had been initiated. Some of the features already initiated included the use of flame retardant plastic and canvass covers and flame retardant paint on all wooden, temporary structures. In addition, the use of flame retardant treated lumber has been initiated for future scaffolds. It is intended that this type of material will eventually be used throughout.

- b. Independent inspections were made of the cable storage area, the conduit and tray storage yard, the environmentally controlled warehouse for instruments and electrical equipment and the open stores warehouse. All the aforementioned facilities were constructed and operated as described in the licensing criteria and the inspection is clear.
- c. During the inspection, several items of future interest were noted. These items included the need to sign and date all significant QC documents forming milestones in the QC program. The procedures were not explicit on this point in all cases.

Another item discussed dealt with the problems encountered at other sites associated with safety related cable separation in areas of high cable population. The cable spreading room vertical runs were specifically discussed with reference to the Sequoyah project problems since the spreading room configuration in these two projects are nearly identical.

The specific and somewhat unique requirements associated with safety related redundant instruments and sensor lines, particularly those located in hostile areas, were discussed with the emphasis placed on the need for planning such installations in detail prior to the start of construction.

There was no reference to a special handling procedure for station batteries in any of the documents examined. Licensee representatives were requested to determine the need for such a procedure and prepare any planning document found necessary.

DETAILS IV

Prepared by:

E. J. Vallish

12-3-76

E. J. Vallish, Reactor Inspector
Engineering Support Section No. 1
Reactor Construction and Engineering
Support Branch

Date

Dates of Inspection: November 16-19, 1976

Reviewed by:

T. E. Conlon

12/3/76

T. E. Conlon, Chief
Engineering Support Section No. 1
Reactor Construction and Engineering
Support Branch

Date

1. Persons Contacted

a. Tennessee Valley Authority (TVA)

J. C. Killian - Project Manager
H. C. Richardson - Assistant Construction Engineer
A. W. Rogers - Site QA Supervisor
J. S. Colley - EN DES QA Engineer
S. K. Walker - QC&R Supervisor
R. C. Nixon - QC&R Engineering Unit
D. Kerr - Mechanical Engineer, MEU
J. Ballard - Mechanical Engineer, MEU
J. D. Shanlever - Mechanical Engineer
L. D. Bates - Mechanical Engineer

b. Contractor Organizations

(1) Chicago Bridge and Iron Company (CB&I)

G. E. Rowe - QA Engineer
R. E. Hester - Auditor (Birmingham Office)

(2) Westinghouse Electric Company (W)

A. Hogarth - Site Manager
W. Sudak - Mechanical Engineer

2. Containment Steel Structures - Observation of Work-Unit 1

The containment shell's fifth and sixth ring of steel plates were selected for inspection as a representative steel structure in the containment building. The CB&I drawings 40 R5 and 41 R6 of CB&I Contract No. 72-4333 were reviewed and used to verify location and orientation of the plates in the structure. The containment plates are received and stored within the CB&I storage yard by the CB&I personnel. Erection was progressing on the seventh ring at the time of inspection and it was observed that joint welding and penetration installation was continuing on the fifth and sixth rings and in accordance with drawings referenced above.

The process inspections were being performed by the CB&I and TVA personnel to assure erection in accordance with the design requirements.

3. Containment Steel Structures - Quality Record Review - Unit 1

The FSAR Section 3.8.2 requires the containment structure to conform to ASME Section III - NE, including the Winter of 1971 Addendum. Pertinent quality records were reviewed to confirm that the quality requirements were met. These records were compared to CB&I detailed drawings of erection, R-27 Revision 1 and R-28, Revision 2 of Contract 72-4333, titled, "Record Drawing for Shell Ring No. 5" and "Record Drawing for Shell Ring No. 6." Records included the plate serial numbers, heat numbers, CB&I shop inspection and shop release by a QA inspector; the TVA Inspection and Testing Branch's (I&T) resident inspector's release and certification of compliance with the purchase requirements; the ASME Code Inspector's (AI) certification of compliance; and the site receiving inspection results.

The CB&I QA representative stated that the actual physical and chemical properties of the different heats of steel are on file in the Birmingham, Alabama office and only certifications of conformance are sent to the site. All plate material was required to be ASTM SA-516-70 grade and certifications of conformance were reviewed. The FSAR requires erection within the following tolerances: out-of-round must be less than 1/2 of 1% of the nominal internal diameter except that the ice condenser zone will be within plus or minus two inches on the vertical. Penetrations will be within plus or minus one half inch of the designed location. CB&I is performing surveys of these tolerances in accordance with their procedure DCP-4333/4, titled "Dimensional Control Procedure." TVA is monitoring these tolerances with their own instrumentation as the rings are erected by CB&I. By means of interviews with the responsible inspectors for QA/QC activities, it appeared they were well versed in the requirements and knowledgeable in the skills required to adequately perform their responsibilities.

4. Safety Related Components - Control Rod Drive Mechanisms-Observation of Work Activities - Units 1 and 2

This inspection is a follow-on inspection of that reported in IE Reports 50-390/76-7 and 50-391/76-7. Installation of the Control Rod Drive Mechanisms (CRDM) on the reactor vessel closure heads is completed and the items are stored in the same high bay, single purpose, building in which they were assembled. This building is in a relatively remote area away from the mainstream of construction activity. Calrod electric heaters are placed under each closure head. Inspection indicated that the building was tight so as to exclude vermin and access doors kept padlocked for the exclusion of the unauthorized. The head for Unit 1 is identified by nameplate data, Spin WAT - SN 30749, and the head for Unit 2 as Spin WBT-SN 30750. Installation of the CRDM's was completed in accordance with QCP 4.12. Weekly inspections are performed on the stored components in accordance with QCP 4.5

Nonconforming material is processed in accordance with QCP 1.2, "Control of Nonconforming Material." Two NCR's are outstanding on the Unit 2 assembly; these are NCR 428R and NRC 429R. All action on these NCR's is completed, but closing formalities thru the Knoxville office is still in progress.

5. Safety Related Components - Control Rod Drive Mechanisms - Quality Record Review - Units 1 and 2

This inspection is a follow-on inspection of that reported in IE Reports 50-390/76-7 and 50-391/76-7. Requirements for the Control Rod Drive Mechanisms (CRDM) were reviewed in the FSAR paragraphs 4.2 and 5.2. The required scope of inspection was performed in accordance with QCP 4.12 titled "Assembly and Installation of Reactor Pressure Vessel Head and Control Rod Drive Mechanisms." Records of these inspections were reviewed as recorded on QCP 4.12, Appendix 2, titled, "PL-CRDM Installation Check Sheet," and Appendix 3 titled, "MJ-CRDM Installation Check Sheet." Other records of subcomponent assembly were reviewed including welding procedures, welder qualification tests, repair procedures, NDE requirements and results, and specifications of welding equipment and materials. Copies of Attachment 4 of QCP 1.18 were reviewed; these are records of lifting and transporting items during their assembly onto the vessel head. Records of hydraulic pressure testing of the assembled CRDM's were reviewed and found to be in accordance with QCP 4.12. The "Check Lists of Completed Operations" containing certifications of material test reports, check sheets of NDE of the basic materials and the "Field Weld Operation Sheets" were sampled and reviewed for completeness and appropriate certification.

Records of two of the most recent QA audits performed on safety related components were reviewed. It was ascertained that the audits were performed with adequate frequency and scope and that deficiencies identified were documented and dispositioned in a timely manner.

An interview with the one present auditor resulted in the opinion that he was trained and qualified in the work he performed. The audits of this review were DEC Audit WB-M-76-05, Subject "ASME Section III Nuclear Power Plant Components" which included audit subject "Assembly and Installation of Reactor Pressure Vessel Head and Control Rod Drive Mechanisms," and DEC Audit WB-M-76-06, Subject "Documentation of Inspection Tests and Activities Performed on CVCS, RHR and HPFPS Piping, Valves and Other Components."

6. Independent Inspection Effort - Units 1 and 2

Inspection was conducted of the reactor control and instrumentation mechanical aspects including the neutron chambers for start-up, mid-range and power operation and the control rod power and instrumentation detectors. Requirements of these installations were reviewed on TVA drawings 85C41W 727-1, -8 and -9; The Royal Industries publication titled, "Part Length Control Rod Drive Manual - Model 121 J 701," the Westinghouse instruction and operating book titled, "Magnetic Control Rod Drive Mechanisms for Full Length Control Rods Model L-106A," and in interviews with W representatives on the site. Also inspected were the Unit 1 steam generator and primary coolant pump's anchor bolts and preparations for installation of these components in the power block. Drawings N 427 R-9, titled "Reactor Support Embedments," and N412 R4, titled "Steam Generator and Reactor Coolant Pump Vertical Column" were reviewed and used to verify locations and orientation details.

7. Findings

Within the areas examined there were no items of noncompliance indicated and all findings were clear.