



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
101 MARIETTA STREET, N.W.  
ATLANTA, GEORGIA 30323

Report Nos.: 50-390/91-14 and 50-391/91-14

Licensee: Tennessee Valley Authority  
6N11 B Missionary Place  
1101 Market Street  
Chattanooga, TN 37402-2801

Docket Nos.: 50-390 and 50-391 Licensee Nos.: CPPR-91 and CPPR-92

Facility Name: Watts Bar 1 and 2

Inspection Conducted: June 22 - July 19, 1991

Inspectors: *G. A. Walton* *Aug 21, 1991*  
G. A. Walton, Senior Resident Inspector  
Construction Date Signed

B. Crowley, Resident Inspector, Watts Bar  
H. Livermore, Senior Project Inspector, Watts Bar  
A. R. Long, Project Engineer, Watts Bar

Consultants: M. I. Good, COMEX Corporation (Paragraph 3.a)  
W. S. Marini, Pegasus, Inc. (Paragraphs 4.b through 4.p)  
P. L. Reagan, COMEX Corporation (Paragraphs 3.a, 3.b, 3.c, 4.a)

Approved by: *K. P. Barr* *Aug 21 1991*  
K. P. Barr, Section Chief  
TVA Projects  
Division of Reactor Projects Date Signed

SUMMARY

Scope:

This routine resident inspection consisted of a review of the construction restart status, several historical issues, and previous inspection items.

Results:

The areas inspected were found acceptable.

## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*R. Bashambu, Materials Project Manager
- \*R. Bellamy, Project Manager
- \*W. Byrd, Senior Project Manager
- \*S. Crowe, QC Manager
- \*J. Cruise, Compliance Licensing
- \*L. Dolan, Compliance Licensing
- \*W. Elliott, Engineering Manager, Nuclear Engineering
- \*J. Garrity, Site Vice President, Watts Bar
- \*R. Gibbs, Plant Program Manager
  - J. Hamilton, Nuclear Quality Assurance - Corporate
  - L. Jackson, Operations Manager
  - R. Johnson, Modifications Manager
- \*N. Kazanas, Vice President, Nuclear Operations
  - F. Koontz, Manager, Operations Engineering
- \*F. Laurent, Special Projects Manager
- \*R. Lewis, Project Manager, QA Records
- \*C. Lyke, Engineering Specialist
- \*L. Martin, Site Quality Manager
- \*G. Mauldin, Design Manager
- \*R. McIntosh, Project Management
- \*D. Nauman, Senior Vice President, Nuclear Power
- \*C. Nelson, Maintenance Support Superintendent
- \*D. Nunn, Vice President, Nuclear Projects
- \*P. Pace, Compliance Licensing Supervisor
- \*G. Pannell, Site Licensing Manager
- \*M. Purcell, Manager BOPS Systems
  - R. Purcell, Plant Program Manager
- \*D. Rader, Modifications Training Manager
- \*J. Scalice, Plant Manager
  - H. Weber, Engineering and Modifications Manager
- \*P. Wilson, Special Projects Manager

Other licensee employees contacted included engineers, technicians, nuclear power supervisors, and construction supervisors.

\*Attended exit interview

Acronyms used throughout this report are listed in the last paragraph of this report.

### 2. Construction Restart Status

Listed below is a summary, based on information provided by the licensee, of their progress on management objectives for restart of construction.

## a. Historical Problems Understood and Not Repeated

Licensee review was completed June 24, 1991, and ten items will require further evaluation and resolution prior to restart. The schedule and assignments for completion of these items was developed and distributed. Three items were completed and the goal for completing actions for the remaining items was August 30, 1991.

## b. Simplified Workplans and Related Procedures

Workplan writing was in progress. There were two General Construction Instructions scheduled to be revised or closed by mid-July.

## c. Backlog Reduction

As of July 11, 1991, there were 952 open SCARs, FIRs, and PERs, which represented a net decrease of five CAQs since June 6, 1991. Of the open CAQs, 282 were "blue dotted" or workplan ready.

The Manager of Engineering and Modifications was reviewing each CAQ for restart closure. Justifications for deferral until after restart had been accepted for 24 CAQs.

The status of Employee Concern Corrective Action Tracking Documents as of July 11, 1991, was as follows:

	<u>Total</u>	<u>Submitted For Closure</u>	<u>In Work</u>	<u>Post Restart**</u>
Engineering	106	16	8	82
Modifications	56	13	2	41
Plant	42	6	0	36
QA	17	4	0	13
Total	<u>221</u>	<u>39</u>	<u>10</u>	<u>172</u>

\*\*Modification field work or major engineering analysis required.

The status of Modification closure/cancellation of old program workplans was as follows:

<u>Systems Group</u>	<u>Total</u>	<u>Closed/Canceled</u>
1 and 2A	563	46
2B, 2C, and 4	443	43
5 and 6	297	31
Total	<u>1303</u>	<u>120</u>

Through July 11, 1991, all 321 drawing revisions in the drafting backlog had been completed.

Update of category 2 and 3 drawings with greater than one change was completed July 10, 1991. Revision of category 2 and 3 drawings with only one change will continue. The target was a backlog of 450 drawings at September 30, 1991.

The status of ECN to DCN Conversion/Closure was as follows:

<u>System Group</u>	<u>Total</u>	<u>Converted/Closed</u>
1-5	136	98
6	80	0
	<u>216</u>	<u>98</u>

Two-hundred and fifty-one compliance items remain to be closed or stautused prior to restart. Of these, 40 packages have been completed and ten are in concurrence.

d. Process Improvements

Modifications was in process of finalizing the 38 Modification and Addition Instructions to further standardize with other TVA sites and to assure commitments to the NRC have been captured. All 38 have been reviewed. Comment incorporation and commitment verification has been completed on two MAIs. The schedule for completion is early August 1991.

e. Corrective Action Program Improvements

- The Senior Management Review Committee and charter are in place.
- A dedicated root cause analysis coordinator is in place.
- QA monitoring of program, performance of Administrative Control Programs, trending, and SCAR closure verification is ongoing.
- The dedicated Corrective Action Project Manager is in place.

f. Quality Monitoring and Performance

Evaluation of pipeline checklists relative to new procedures and recent process changes was continuing. The evaluation included a review of additional organizational interfaces such as Engineering procurement documents and licensing submittals to determine if additional checklists (or other quality indicators) are needed.

The Engineering and Modifications Manager met with senior/lead quality pipeline managers from the Engineering and Modifications organizations to address ownership, expectations, and the above concepts. The action plan was as follows:

- Complete meetings within Engineering and Modifications week of July 15, 1991 (Materials and Procurement).

- Meet with QA week of July 22, 1991.
- Meet with Engineering Contractor week of July 29, 1991.
- Revise Quality Pipeline User Manual by August 19, 1991.

g. Training

All training modules have been completed and approved. Presentation training for Modifications employees required for restart was completed. Instructors were preparing to provide additional non-restart procedural and programmatic training to Modifications, Facilities, and Operations personnel.

h. Engineering Ahead of Modifications

Engineering was developing a backlog of safe go-forward work for Modifications. A total of 1,720 DCNs have either cleared the pipeline process or have been revised due to the SNR. These DCNs represent potential backlog work for Modifications workplans.

i. Carefully Monitored/Slow Restart

Workplan production began on May 28, 1991. There have been 15 finalized; 24 are in QA review; and 23 others were being written. The target was 500 workplans written by August 30, 1991.

Modification Craft Contract and Quality Control Inspection Contract: The contracts were scheduled for TVA Board approval on August 19, 1991.

3. Historical Problems

a. Adequacy of TACF Control Program

The inspector reviewed documentation related to the control of temporary alterations. SDP AI-2.15, Temporary Alterations, established the requirements for control of TAs to the physical facilities of WBN. TAs were required to be documented on TACFs. The requirements of SDP AI-2.15 applied to all transferred permanent plant equipment.

TAs to permanent plant equipment were necessary to accomplish activities normally carried out at nuclear power plants. Such activities were related to installation, maintenance, operation, surveillance, and testing.

The inspector discussed the adequacy of AI-2.15 implementation with Modifications and Licensing personnel and determined that SCAR WBQ890247SCA identified a programmatic deficiency related to the TACF control program. This was previously documented in NRC report "Watts

Bar Broad-Based Construction Assessment Report No. 50-390/89-200." In paragraph 7.2.2 of that report, the NRC stated "the most significant TVA-identified issue with TACFs was that some temporary modifications were not adequately controlled by the TACF procedure." The TACF program did not provide for a Safety Evaluation prior to TACF implementation, however, TVA plans to conduct a Safety Evaluation of all open TACFs prior to licencing. The construction assessment team also identified that the TACF corrective actions did not appear to include a review or walkdown of closed TACFs to ensure that TACF tracking and closure was adequate.

TVA stated that AI-2.15 was undergoing a comprehensive revision to incorporate the lessons learned from the problems resolved during the processing of SCAR WBQ890247SCA. The Administrative Procedure was planned to be replaced by SSP-12.4, "Temporary Alternations," which was to be issued in about September 1991.

Inspectors also reviewed several examples of TACFs to examine the documentation trail between TACFs, Workplans, Maintenance Requests, ECNs, FCRs and other design base documents. The following TACFs were reviewed:

1-84-57-63	SIS Pump 1B-B Cable Splice
2-86-14-82	Diesel Generator 2AA Control Panel Wiring
1-83-112-31	HVAC Cooling Compressor Wiring
1-84-81-63	Control Room Panel 1-M-6 Cooling Fan
0-83-33-26	Fire Pump 1A-A Switch Cables
1-83-49-92	Source Range N32 Cables
0-83-24-82	Diesel Generator 2A-2A Fuel Oil Pump
1-83-34-70	CCW System Differential Flow Jumpers

The inspector identified that a majority of the TACFs reviewed contained statements in the "Estimated Duration" block such as "until FCR is approved, until drawings are changed, until ECN is complete, until resolved by construction," etc. The ECN, FCR, or Workplan numbers were not always referenced on the TACFs. It was not clear on the TACFs what the "Return To Normal" section meant for TACFs which were made permanent by ECN or FCR. There was no indication in the return to normal section whether the equipment was returned to the previous unaltered condition or left in the same condition due to an approved ECN or FCR. The inspector referred the TACFs to TVA licencing to obtain the ECNs, FCRs, drawings, or work packages that made the TACFs permanent or returned the conditions to normal. The inspector met with plant personnel and resolved a majority of the concerns about referencing of ECNs and FCRs. The licensee had to research the following information:

TACF 1-84-57-63 - The work request that closed the TACF indicated that a splice was done on a Safety-Related cable within a cable tray.

TACF 1-84-81-63 - A copy of the TACF indicated the TACF was still open, however, the temporary condition was verified as being removed from the plant.

TACF 1-83-34-70 - Retrieval and review of the workplan, ECN, or maintenance request that closed the TACF.

IFI 50-390/89-200-38 was closed in IR 50-390/90-200, in part, based on "a commitment that TVA would implement corrective actions. TVA management will need to ensure proper completion of these items."

Action remaining on this issue includes the review of SSP 12.4, "Temporary Alternations," corrective action associated with SCAR WBQ890247SCA, and review of information on the three TACF identified above. This issue is identified as IFI 50-390, 391/91-14-01, Adequacy of TACF Control Program, for further NRC review after corrective actions are completed.

b. Safety Net Review Process

The inspector reviewed documentation related to the adequacy of administrative instructions for the SNR process.

The inspector reviewed WBN Site Quality Organization Monitoring Report, QWB-R-91-0080, which was issued to "evaluate the progress and effectiveness of the personnel, management, and direction involved in the Electrical and IC WP/MR review, and deficiency resolution, WBN." That report stated that, during the course of the SNR, "numerous problems and issues plagued the progress and efficiency of the program." QWB-R-91-0080 also stated that the "SNR identified 100 percent of the workplans and MRs [maintenance requests] in the review had some type of deficiency."

According to QWB-R-91-0080, TVA's Nuclear Construction Management initiated the SNR on December 26, 1990. On February 6, 1991, the SNR team reached a peak staffing of 410 people. On February 7, 1991, the reviews were suspended to "allow reviewers to compile lessons learned. These lessons learned were being incorporated into a site instruction (AI-1.107, Safety Net Review Process)."

QWB-R-91-0080 stated that the "significant deficiencies found during this review were:

- (1) Specific procedure requirements not met
- (2) Drawings or procedures not appropriate
- (3) Data sheets not complete and/or legible
- (4) Instructions inadequate or not followed
- (5) Inspection Reports and data sheets not sufficient
- (6) Inappropriate data on Inspection Reports and data sheets
- (7) 575's not listed and/or attached
- (8) Special requirements not addressed"

QWB-R-91-0080 concluded the following. "The majority of deficiencies identified through this review were administrative and technical. However, there were hardware problems identified in the QE review that were not identified in earlier reviews."

According to QWB-R-91-0080, "One major administrative issue was the inconsistency of addressing blanks and NA's. This is being addressed by a revision to AI-4.1, Processing and Storing Records. In addition, the Nuclear Construction review organization was restructured to provide oversight. Training is planned to familiarize reviewers with AI-1.107."

The inspector found there were employee concerns related to this issue identified as item F2 in file ECP-91-WB-E34. TVA's investigation and findings were documented as ECP-91-WB-E34-F2 and were resolved and closed by TVA on June 28, 1991. In a letter dated June 28, 1991, to the CI, TVA's ECP Site Representative stated the following. "The line evaluation dated June 24, 1991, stated the reviews that were conducted prior to the issuance of AI-1.107 were performed to determine the extent of condition for stop work CAQ 900602SCA. The reviews performed to determine the extent of condition for CAQ 900602SCA [SCAR WBN900602SCA] will be performed again utilizing the criteria established in AI-1.107. The issues was substantiated."

For reference, SCAR WBN900602SCA was related to Stop Work Order WBN 90-01. Among the listed corrective actions in SCAR WBN900602SCA were the following.

- o Complete quality checklist with attachments according to SNR requirements (ref. AI-1.107)
- o Evaluate deficiencies from earlier self assessments and SNR
- o Rewrite work control procedure AI-8.6, Modification Workplans
- o Train engineering and craft personnel in AIs, and other procedures

Since TVA substantiated the CI's concern, the inspector questioned what corrective action was taken to ensure adequate resolution of this concern. TVA stated that SCAR WBN900602SCA corrective action item 3 contained the corrective action for this ECP item. Corrective Action item 3 was "evaluate deficiencies from earlier self assessments and Safety Net Review, (AI-1.107), determine corrective action, complete corrective action or document condition per corrective action program for all old workplans and maintenance requests (scheduled completion by January 1992)."

A related aspect of this concern was that during early 1991, SNR personnel were working to guidance provided in memoranda rather than in appropriate administrative procedures. For example, in a memorandum dated January 17, 1991, from the TVA Site Vice President



regarding procedural compliance and late entries, it was stated (in part) that individuals "must comply with the procedure as written." That memorandum also described a process for making late entries in logs, data sheets, and other work records. The memorandum ended with a request to "incorporate the above practices into your performance or management of activities for which you are responsible." IC 91-208 incorporated the practices described in the January 17, 1991, memorandum into AI-4.1, Processing and Storing Records, Revision 20, IC-91-208, April 8, 1991.

The inspector found that AI-4.1, section 3.4.1.N, contained adequate instructions for correcting or updating records during preparation. Also, AI-4.1, section 3.4.1.E, contained instructions for marking steps "N/A" and required all "N/A's" to be initialled and dated. Additionally, the inspector found that NP STD-2.9, "Records Management," Revision 0, April 1, 1991, paragraph 3.7, contained adequate guidance for correcting records.

The ongoing SNR review process was examined by NRC during the special team inspection conducted July 8 - 19, 1991, documented in NRC Inspection Report number 50-390/91-13.

TVA's corrective actions included revising AI-1.107 (Safety Net Review Process, Revision 1, July 10, 1991) and reviewing the extent of condition for SCAR WBN900602SCA. Completion of TVA's corrective action for the SNR process (reference SCAR WBN900602SCA) will be tracked as IFI 50-390, 391/91-14-03, Adequacy of Administrative Instructions for the SNR Process, pending NRC review of the procedure revision.

c. Records Review

During this inspection period, the inspector noted several recent examples of apparent nonconformances in preparation of records. AI-4.1, paragraph 3.4.1.E, required that "all steps or blanks on documents are appropriately addressed such that each completed package is clear, concise and the work/action performed is easily understood. This may include marking steps, areas and sections NA, NONE, or NOT REQUIRED while performing and documenting instructions and forms." The inspector identified that neither effective nor expiration dates were provided for AI-1.107, Revision 1, approval date June 25, 1991. AI-3.1, Administering Site Procedures/Instructions, provided for automatic imposition of an effective date if not specified. No signature date was provided for the Manager, Nuclear Construction. It was not clear why approximately sixteen additional signature blocks were blank.

TVA stated that it reviewed additional SDP AIs and no other missing dates were found. TVA stated that it considers this to be a minor administrative error not requiring a corrective action document (e.g., a Problem Evaluation Report) to be generated, since the next revision of AI-4.1 will correct this deficiency.

Another example of blanks in procedures and apparently missing N/As was found in SCAR WBQ890247SCA, Revision 1, February 27, 1991. Approximately 15 of 20 information blocks were vacant. The SCAR was not clear, concise and easily understood without additional research. This SCAR was prepared in accordance with the applicable procedures in effect at the time (i.e., AI-2.8.15, Corrective Action, WBN, and SDP AI-4.1).

Additionally, NP STD-2.9, Records Management, Revision 0, approval date April 1, 1991, had no effective date and there was no Nuclear Assurance, Licensing, and Fuels (Sponsor) signature.

The inspector identified these examples of apparently inadequate conformance with AI-4.1 to TVA Licensing personnel. TVA agreed to evaluate the inspector's concern and either explain why this was an acceptable practice or take appropriate corrective action. The NRC will track TVA's response to this matter as IFI 50-390, 391/91-14-02, Nonconformance in Preparation of Records.

4. Action on Previous Inspection Items (92701)

- a. (Open) VIO 50-390/87-11-02, Failure to Control Lifted Cables and Wires Per Approved Procedures or Drawings

The inspector reviewed the applicability to Unit 2 of TVA corrective actions in response to Unit 1 Violation 390/87-11-02.

TVA's overall program for Unit 1 to complete the evaluation and implementation of corrective actions associated with both electrical and cable issues was defined in Watts Bar Nuclear Plant Unit 1 Cable and Electrical Issues Project Plan (PWL EA). PWL EA stated that "potential programmatic problems and data discrepancies between the installed cable records and the engineering computer cable routing system (CCRS) data base have been identified." Among the remaining actions listed in PWL EA to be completed by TVA was the following statement "as new cable issues are identified (e.g., cable damage or discrepancies identified as result of cable damage inspection) they are assessed with regard to their impact on the cable issues." TVA stated that similar procedures will be used for the evaluation and implementation of corrective actions associated with both electrical and cable issues in Unit 2.

TVA was required, by AI-2.8.15, "Corrective Action, WBN," Revision 2, May 20, 1991 (formerly AI-2.8.5, "Conditions Adverse to Quality - Corrective Actions"), to review Unit 1 CAQRs for applicability to unit 2. The inspector reviewed documentation that such a review was done by TVA for the several CAQRs related to violation 50-390/87-11-02. For example, TVA determined the conditions described in CAQR WBP870632 were applicable to Unit 2 and the Unit 2 equivalent was CAQR WBQ870694. TVA described CAQR WBQ870694 as a programmatic problem that applied to both WBN units. Also, TVA determined the

conditions described in CAQR WBP890560 were applicable to Unit 2 and the Unit 2 equivalent was CAQR WBP890497. CAQR WBP890497 was open and was on "Unit 2 hold" (Unit 2 construction work was stopped) at the time of this inspection.

The inspector concluded Unit 2 control of lifted cables and wires per approved procedures or drawings was adequately documented in TVA's corrective action program. However, because VIO 50-390/87-11-02 was related to Unit 1 only, corrective action for Unit 2 was identified as IFI 50-391/91-14-04, Resolution of CAQR WBP890497, pending the inspector's review of corrective actions for Unit 2.

b. (Closed) CDR 390/86-55, Questionable Locations of Installed Unit 1 Engineered Supports

This 50.55(e) report involves the discovery, in May 1986, that no proceduralized requirement existed for the as-built locations of engineered supports attached to building or supplemental steel to be documented on FCRs when the supports are installed by WBN Modifications Branch. Without such documentation, engineering review and approval of the as-built locations would not be performed.

Upon discovery of this condition, the licensee accomplished the following actions:

- SCR-WBN-CEB-8650 was issued on May 12, 1986.
- ECN 6420 was initiated to incorporate the necessary requirements into drawing 47A050-1L1, Mechanical Hanger Drawing General Notes.
- Revision 2 to drawing 47A050-1L1 was issued September 10, 1986, to add note 128, incorporating ECN 6420.
- A review of the type of supports in question revealed that only one engineered support attached to building steel had been installed by Modifications without an FCR. Subsequently, FCR 86-28 was issued and the as-built location was approved by engineering.
- On May 7, 1991, Site Instruction MAI-4.2.A, "Piping/Tubing Supports," was issued as part of the procedure upgrade program. Section 6.1.13 of this instruction delineates the appropriate requirement for engineering approval of the location of attachments to building or supplemental steel.

The inspector reviewed SCR-WBN-CEB-8650, ECN-6420, Drawing 47A050-1L1, Revision 2, FCR 86-28, and MAI-4.2.A, and determined that they are adequate to assure that the necessary engineering approvals are obtained. This item is closed.

## c. (Open) URI 390/86-03-01, Sidewall Pressure Calculations

This item involves the discovery, during an NRC inspection in January 1986, that cable sidewall pressure calculations did not address pull-bys, conduit fill, and pull points in the most conservative manner. This issue has since been the subject of numerous meetings between TVA and NRC staff and site visits by NRC staff. As a result of these meetings and visits, NRC issued a safety evaluation on April 25, 1991. The following is a status of these issues, as discussed in appropriate sections of the safety evaluation:

- As stated in section 2.1.1, the staff has found TVA's program to resolve the cable pull-by issue acceptable, except for spare and abandoned cables, in that these cables were not included in TVA's test program. Since the pull-by concern affects all cables in a conduit, the staff has requested TVA to perform additional testing to resolve this concern. This issue will remain open until all testing has been completed and reviewed by the NRC.
- As stated in section 2.1.2, the staff considers TVA's approach to the cable jamming issue acceptable. However, this issue will remain open pending completion of TVA's inspection of a statistically meaningful sample of cables involved, and subsequent NRC review of the inspection results.
- As stated in section 2.1.8, the staff agrees with TVA's resolution of the sidewall bearing pressure issue.
- As stated in section 2.1.9, the staff agrees with TVA's program to resolve the issue of pulling cables through 90 degree condulets and mid-route flexible conduits. However, this issue remains open pending completion of TVA's evaluation of cables involved, and subsequent NRC review of the evaluation results.
- As stated in section 2.2.2, the staff agrees with TVA's program to resolve the issue of pulling large low-voltage cables using standard condulets as pull points.

In conclusion, with the exception of the spare/abandoned cable issue, the staff is in general agreement with TVA's approach to resolving the issues discussed above. However, this unresolved item will remain open, pending additional NRC inspections to assure adequate program implementation. Further, the SER states a supplement to the safety evaluation will be issued when these inspections are complete and any resulting open items are resolved. In view of the above, the inspector determined that programmatic concerns have been adequately addressed and no further actions are needed prior to allowing construction to restart.

d. (Open) CDR 390/86-51, Failure of AFW S/G Level Controllers

This report involved numerous failures of Beckman 8800 model 881320980200 level controllers, whose intended function is to control steam generator (S/G) level through the AFW system.

An investigation by the licensee determined that the controllers have failed to provide their rated 50 milliamp output due to component failures on the voltage/current output boards. Excessive heat buildup inside the controllers is believed to have contributed to the failures, but the exact cause is unknown. The vendor has stated that, although repairs could be made, fulfillment of the requirements of the original procurement contract could not be assured. In addition, this type controller is no longer in production and replacement parts will soon be unavailable. In view of these factors, TVA has procured a different model of controller, and intends to accomplish this modification in accordance with DCN P-3373-A, which is currently in development.

The inspector reviewed the actions taken to date by the licensee and determined that no additional action is required prior to restart of construction activities. However, this item will remain open pending final approval and issuance of DCN P-3373-A and installation of the replacement controllers.

e. (Open) CDR 390/90-11, Potential for Gas Accumulation in ECCS Piping

This report involved a condition identified at TVA's SQN plant where gas accumulation in the CCP piping caused CCP 2B-B to become gas bound when started. As SQN and WBN designs are similar, it was determined that the potential also existed for gasses to accumulate in CCP piping at WBN, and thereby potentially adversely affect pump performance.

In order to prevent similar problems at WBN, the licensee committed to the addition of loop seals in the three inch emergency boration line and the eight inch line downstream of FCV-63-8, and a vent valve at the high point of the emergency boration line. In addition, the licensee has evaluated the piping configurations of all other primary safety systems and determined that there are no other locations where gasses could accumulate and cause similar problems.

The inspector reviewed the above licensee actions and determined they are acceptable and that no further actions are required prior to the resumption of construction activities. However, this item will remain open pending the completion of the above mentioned modifications.

f. (Open) CDR 390, 391/87-02, Unqualified Air Conditioning System Valves

This report involved the discovery that four valves associated with the main control room and electric board room water chillers were originally supplied with manually-operated cast iron bodies instead of the specified cast steel bodies.

Valve replacement was accomplished by installing the specified cast steel valve bodies in accordance with DCNs P-02220-A and P-03113-C. However, it was subsequently discovered that these manually-operated valves could not respond to system transients, thereby defeating the autostart logic for the chiller units. This resulted in the issuance of CAQR WBP900276. To date, HVAC design criteria WB-DC-40-36.1, Revision 4, was issued to prohibit the use of manual valves as automatic temperature control valves on HVAC chillers.

The inspector reviewed the above corrective action and determined that no further actions need to be taken prior to the resumption of construction activities. However, this item will remain open pending the following:

- Purchase and installation of seismically qualified, ASME Section III, Valves, operators, controllers, and control circuitry which conforms to the above revised design criteria document.
- Issuance of a DCN to document this equipment modification, and
- Initiation of a FSAR change request to document the change from manual valves to modulating water-regulating valves.

g. (Closed) P21 85-05, Faulty AK and AKR Low-Voltage GE Power Circuit Breakers

This item involves a 10 CFR 21 notification, by GE, of faulty type AK and type AKR circuit breakers equipped with undervoltage trip devices. As discussed in IR 50-390, 391/90-17, TVA was requested to provide information for the applicability of this problem to WBN, and to determine whether a review was performed for applicability when originally notified (September 1985).

In accordance with the above request, TVA has provided the following information:

- Per September 26, 1990, telecon between TVA and GE, the GE representative stated that the Part 21 notification is applicable only to type AK and AKR breakers with undervoltage trip devices, and that he was not aware of any Westinghouse plants (i.e., WBN) utilizing such an application.
- Failures of GE type AK breakers was also addressed in IE Information Notice 85-58. TVA has provided various correspondence (RIMS B45860221259, B45851203271, and B45850918265) which documents that TVA was aware of the problem

and had determined that none of these types of breakers had been either purchased or specified for WBN and this issue was not applicable to WBN.

The inspector reviewed the above referenced correspondence between TVA, GE, and Westinghouse and determined that TVA's applicability review of this issue is adequate. This item is closed.

- h. (Closed) CDR 391/86-26, Box Anchor Rear Plates Fused to Pipe by Welding

This report was previously reviewed for closure in Report No. 50-390, 391/90-24. At that time the inspector identified several failures by the licensee to implement timely and adequate corrective action and cited these failures in Violation 50-390/90-24-02. The physical conditions associated with the CDR have been reworked. However, the analytical calculations supporting resolution of the issue were the subject of Violation 50-390/90-24-02. Therefore, this CDR is considered closed and implementation of future corrective actions will continue to be tracked under Violation 390/90-24-02.

- i. (Open) CDR 390/90-02, Lack of Containment Isolation Valves on Instrument Lines

This report involved the discovery that the original design of the instrument lines to seven containment pressure sensing instruments did not provide adequate containment isolation capability as required by GDC-56 and RG 1.11. The test tee connections for these lines were provided with only a compression fitting cap at the end of each line which does not provide the required redundant isolation.

Actions taken by TVA to correct this condition were as follows:

- DCN M-11799-A was issued to install two normally closed manual valves, in series, in each test tee line.
- FSAR tables 6.2.4-1 and 6.2.6-2A have been revised to include the added valves.
- Pre-op Test Scoping Document TVA-2 has been updated to include the added valves in the LRT program.

The inspector reviewed the documents listed above, found them to adequately address the design deficiency, and determined that no further actions are needed prior to allowing construction to restart. However, this item will remain open pending completion of the installation of the specified valves.

- j. (Closed) URI 390/90-15-05, Tube Turn Penetration 1X-46, Weld 14

This item involved the discovery by an NRC inspector, of an unacceptable linear indication shown on the radiographic film for weld 14 on penetration 1X-46. Upon notification of this condition,

TVA issued CAQR WBP900148 and performed an engineering evaluation for acceptability. After discussion with the NRC inspector, TVA took the following additional actions to resolve this item:

- Further review revealed that although the vendor performed radiography on the subject weld, it was not required by ASME code. The weld is actually considered an integral attachment to the penetration assembly and is not a pressure retaining weld. Therefore, ASME Section III Class 2 requires either liquid penetrant or magnetic particle examination, but no radiography.
- Revision 1 to CAQR WBP900148 was issued to require a liquid penetrant examination, which was performed under MR A625625, with acceptable results.

The inspector reviewed the corrective measures consisting of an acceptable liquid penetrant test and the engineering analysis of the linear indication and determined them to be acceptable. This item is closed.

- k. (Closed) CDR 391/82-104, Postulated Accident Blowdown of More Than One Steam Generator

This report involved the discovery of a design deficiency which could allow the failure of a nonsafety-related component to adversely affect the safe shutdown of the plant. The non-safety related automatic control loop for S/G 1 and 4 PORVs could fail (e.g., loss of power) in a manner as to cause the PORVs to stick open. During a postulated main steam or main feedwater line break, a stuck open PORV could cause an uncontrolled blowdown of more than one S/G, which is contrary to assumptions in FSAR section 15.4.2.1.2.

As a result of an analysis performed by Westinghouse, the licensee implemented a design change (via ECN 3925 and workplan 3688) to rearrange the power supplies to S/G 1 and 4 PORV remote manual control circuits to allow an operator to close a stuck PORV from the control room and prevent the uncontrolled blowdown of more than one steam generator.

The inspector reviewed the Westinghouse analysis, ECN 3925, completed workplan 3688, and associated QC records and determined that the licensee's actions are acceptable. This item is closed.

- l. (Closed) CDR 391/83-39, Sensing of Pipe Breaks in Component Cooling System

This report involved the discovery that the initial design of certain component cooling system (CCS) instrumentation may not be adequate to detect a pipe break in the nonsafety-related portion of the system. The CCS piping which supplies the condensate demineralizer waste evaporator (CDWE) is not safety-related and is isolated from the



safety-related portion of CCS by two isolation valves. These valves were originally designed to close upon a low pressure signal, indicating a pipe break in the non-safety related piping. However, it was later shown that no pressure switch setpoint could be determined that would reliably detect a pipe break and yet allow continued CDWE operation during all normal operational modes.

The Unit 1 portion of this issue and actions taken to prevent recurrence were previously reviewed and closed in NRC IR 390/84-53. Below are the licensee's completed actions pertaining to Unit 2.

- ECN 4253 was issued to install a class 1E circuit that automatically closes valves 1-FCV-70-207 and 2-FCV-70-207 on a low-low level condition in the train B side of either Unit 1 or Unit 2 CCS surge tank.
- The above hardware modifications were completed in February 1984 in accordance with workplan 3677.

The inspector reviewed the above ECN and workplan and determined that the licensee's actions are acceptable. This item is closed.

m. (Open) CDR 390/85-39, Inadequate Separation of Trained Cables

This report involved the discovery that an A train cable, 1PL4975A, was installed at a location less than 20 feet from a B train cable, which is not in accordance with 10 CFR 50, Appendix R, paragraphs III.G.2.b and III.G.2.c.

Upon discovery of this condition the licensee initiated SCR WBNNEB8527. Corrective actions completed in accordance with this SCR were as follows:

- As the subject cable was a train A auxiliary power system cable, and had been recently rerouted in an attempt to comply with Appendix R requirements, a review was performed of the Unit 1 auxiliary power key diagram to determine if any other cables had been similarly mis-routed. The review revealed one more A train cable (2PL4975A) with less than the required 20 foot separation from a B train cable. This second cable was documented on SCR WBNEEB8547.
- ECNs 5875 and 5923 were issued to protect the two identified cables with one-hour fire-rated barriers, in order to comply with Appendix R requirements.
- The installation of the specified barrier for cable 1PL4975A was completed in accordance with workplan E5875-1 in October 1985.

The inspector reviewed the above completed actions and determined that they were acceptable. Therefore, no further actions are required to be completed prior to the resumption of construction

activities. However, this item will remain open pending the completion of field activities necessary to bring cable 2PL4975A into compliance with Appendix R requirements.

- n. (Open) CDR 390/87-06, Ice Condenser Floor Drain Piping Inadequately Qualified

This report involved ice condenser floor drain piping and check valves which do not conform to WBN design criteria WB-DC-40-36. According to this design criteria, components required to perform a containment cooling safety function should be TVA piping class C (ASME Section III, Class 3). These drains were originally designed and installed as TVA piping class G (non-safety grade, B31.1) because they were not assumed to perform an essential function. However, in 1978 an assumption in the ECCS net positive suction head analysis (FSAR section 9.2.7.1) was revised to state that the ice-melt solution would be available to the RHR sump for ECCS operation following a LOCA, thereby requiring the drains to perform a containment cooling safety function.

The licensee has issued DCN P-0414-A to remove the existing B31.1 piping and valves and replace them with ASME Section III Class 3 components. In addition, Nuclear Engineering Procedures NEP-3.1, Revision 1-PCN8 "Calculations" and NEP-5.2, Revision 0-PCN4 "Review," which were not in place in 1978, provide procedural controls to prevent recurrence of this type of deficiency.

The inspector reviewed the above completed actions and determined that no further actions are necessary prior to the resumption of construction activities. However, this item will remain open pending the following:

- Completion of the necessary hardware replacement.
- Submittal of a revision to the appropriate paragraphs of FSAR section 6.7.

- o. (Closed) CDR 390/87-16, 391/87-17, Failure to Adequately Control and Document Instrument Accuracy Requirements

This report involved a concern that the ability of certain safety-related equipment to perform its intended function may be in question since it was originally established based on instrument accuracy requirements taken from the Westinghouse Documents for setpoint methodology and post-accident monitoring system functional requirements. Although accurate when originally issued, neither of these documents has been regularly updated to reflect subsequent design changes and licensing commitments.

To correct this condition, the licensee has completed the following actions:

- The Westinghouse Setpoint Methodology Document (WCAP-12096) was updated from Revision 2 to Revision 3 and baselined against TVA design documents.
- WCAP-12096 was established as design input for the reactor protection system (RIMS B26 890607 302).
- The Westinghouse PAMS functional requirements document was converted to a historical record and design criteria WB-DC-30-7, Revision 2, was updated to include the required instrument accuracies and ranges (RIMS B26 890405 014).

The inspector reviewed the above licensee actions and determined that they are adequate to assure that instrument setpoints, accuracies and ranges are properly controlled. This item is closed.

- p. (Closed) CDR 390/86-12, CDR 391/86-10, Incorrect Substitution of Bergen-Patterson Clamps

This report involved the unauthorized substitution of Bergen-Patterson (BP) #175 pipe clamps for #298 pipe clamps, caused by the inappropriate application of a drawing note. This issue has been the subject of two interim inspections, whose results and items remaining to be addressed are discussed in detail in NRC IR 390, 391/90-22 and 90-27.

Subsequent to the above two inspections, the following actions have been completed.

- Of the six remaining identified supports requiring rework:
  - o One was determined to contain the correct type 298 clamp, making rework unnecessary.
  - o Four will be removed and scrapped in accordance with PER WBP900528, Revision 1, due to an unrelated problem pertaining to ASME Section XI documentation.
  - o The one remaining (unit 2) support was reworked using the correct type 298 clamps via workplan JR062CZ.
- The part of this issue involving incorrectly identified and controlled material is being addressed by the licensee, within the scope of SCAR WBP 880474SCA, which generically covers the material traceability, identification and storage program at WBN. Corrective actions pertaining to this SCAR are anticipated to be complete in early 1992.

- The engineer who incorrectly procured QA level III clamps instead of the required QA level II clamps was temporarily filling in for the hanger engineer, and was unfamiliar with the material procurement requirements. Conversations with licensee personnel indicate that there are now two hanger engineers knowledgeable of the procurement requirements, and therefore, similar future errors should not occur.

The inspector reviewed PER WBP900528, Revision 1 and SCAR WBP880474SCA, and verified that the correct clamps are now installed on Unit 2 support 46A406-13-46. The above corrective actions in conjunction with those previously reviewed in IR 390, 391/90-22 and 90-27 are determined to adequately address this concern. This item is closed. Further NRC review of licensee actions pertaining to SCAR WBP880474SCA are being tracked under CDR 390, 391/91-34.

#### 5. Exit Interview

The inspection scope and findings were summarized on July 19, 1991, with those persons indicated in paragraph one. The inspectors described the areas inspected and discussed in detail the inspection results listed below. The licensee did not identify as proprietary any of the material provided to or reviewed by the inspectors during this inspection. Dissenting comments were not received from the licensee.

<u>Item Number</u>	<u>Status</u>	<u>Description and Reference</u>
50-391/82-104	Closed	CDR - Postulated Accident Blowdown of More Than One Steam Generator (Paragraph 4.k)
50-391/83-39	Closed	CDR - Sensing of Pipe Breaks in Component Cooling System (Paragraph 4.1)
50-390/P21 85-05 50-391/P21 85-05	Closed	Part 21 - Faulty AK and AKR Low-Voltage GE Power Circuit Breakers (Paragraph 4.g)
50-390/85-39	Open	CDR - Inadequate Separation of Trained Cables (Paragraph 4.m)
50-390/86-03-01	Open	URI - Sidewall Pressure Calculations (Paragraph 4.c)
50-390/86-12 50-391/86-10	Closed	CDR - Incorrect Substitution of Bergen-Patterson Clamps (Paragraph 4.p)

50-391/86-26	Closed	CDR - Box Anchor Rear Plates Fused to Pipe by Welding (Paragraph 4.h)
50-390/86-51	Open	CDR - Failure of AFW S/G Level Controllers (Paragraph 4.d)
50-390/86-55	Closed	CDR - Questionable Locations of Installed Unit 1 Engineered Supports (Paragraph 4.b)
50-390/87-02 50-391/87-02	Open	CDR - Unqualified Air Conditioning System Valves (Paragraph 4.f)
50-390/87-06	Open	CDR - Ice Condenser Floor Drain Piping Inadequately Qualified (Paragraph 4.n)
50-390/87-11-02	Open	VIO - Failure to Control Lifted Cables and Wires Per Approved Procedures or Drawings (Paragraph 4.a)
50-390/87-16 50-391/87-17	Closed	CDR - Failure to Adequately Control and Document Instrument Accuracy Requirements (Paragraph 4.o)
50-390/90-02	Open	CDR - Lack of Containment Isolation Valves on Instrument Lines (Paragraph 4.i)
50-390/90-11	Open	CDR - Potential for Gas Accumulation in ECCS Piping (Paragraph 4.e)
50-390/90-15-05	Closed	URI - Tube Turn Penetration 1X-46, Weld 14 (Paragraph 4.j)
50-390/91-14-01 50-391/91-14-01	Open	IFI - Adequacy of TACF Control Program (Paragraph 3.a)
50-390/91-14-02 50-391/91-14-02	Open	IFI - Nonconformance in Preparation of Records (Paragraph 3.c)
50-391/91-14-03 50-391/91-14-03	Open	IFI - Adequacy of Administrative Instructions for the SNR Process (Paragraph 3.b)
50-391/91-14-04	Open	IFI - Resolution of CAQR WBP890497 (Paragraph 4.a)

## 6. List of Acronyms

AFW	Auxiliary Feedwater System
AI	Administrative Instructions
ASME	American Society of Mechanical Engineers
CAQR	Condition Adverse to Quality Report
CAQ	Condition Adverse to Quality
CCP	Centrifugal Charging Pump
CCRS	Computer Cable Routing System
CCS	Component Cooling System
CCW	Component Cooling Water
CDR	Construction Deficiency Report
CDWE	Condensate Demineralizer Waste Evaporator
CEB	Civil Engineering Branch
CFR	Code of Federal Regulation
CI	Concerned Individual
DCN	Design Change Notice
ECCS	Emergency Core Cooling Systems
ECN	Engineering Change Notice
ECP	Employee Concerns Program
FCR	Field Change Notice
FCV	Flow Control Valve
FIR	Finding Identification Report
FSAR	Final Safety Analysis Report
GDC	General Design Criteria
HVAC	Heating, Ventilation, and Air Conditioning
IC	Instruction Change
IFI	Inspector Follow-up Item
IR	Inspection Report
LOCA	Loss of Coolant Accident
LRT	Leak Rate Testing
MAI	Modification and Addition Instruction
MR	Maintenance Request
NA	Not Applicable
NEP	Nuclear Engineering Procedure
NP	Nuclear Power
NRC	Nuclear Regulatory Commission
P21	Part 21
PAMS	Post Accident Monitoring System
PER	Problem Evaluation Report
PORV	Power Operated Relief Valve
QA	Quality Assurance
QC	Quality Control
QE	Quality Engineering
RG	Regulatory Guide
RHR	Residual Heat Removal
SCAR	Significant Corrective Action Report
SCR	Significant Condition Report
SER	Safety Evaluation Report
S/G	Steam Generator
SNR	Safety Net Review
SQN	Sequoyah Nuclear Plant

SSP	Site Standard Procedure
STD	Standard
TA	Temporary Alteration
TACF	Temporary Alteration Control Form
URI	Unresolved Item
VIO	Violation
WB	Watts Bar
WBN	Watts Bar Nuclear Plant