



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION II  
245 PEACHTREE CENTER AVENUE NE, SUITE 1200  
ATLANTA, GEORGIA 30303-1257

May 15, 2014

Mr. Michael D. Skaggs  
Senior Vice President  
Nuclear Generation Development and Construction  
Tennessee Valley Authority  
6A Lookout Place  
1101 Market Street  
Chattanooga, TN 37402-2801

**SUBJECT: WATTS BAR NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC PROBLEM  
IDENTIFICATION AND RESOLUTION INSPECTION REPORT  
05000391/2014611**

Dear Mr. Skaggs:

On April 25, 2014, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection of construction activities at your Watts Bar Unit 2 reactor facility. The enclosed inspection report documents the inspection results, which were discussed on April 25, 2013, with you and other members of your staff.

This problem identification and resolution (PI&R) inspection examined activities conducted under your Unit 2 construction permit as they relate to identification and resolution of problems, compliance with the Commission's rules and regulations, and with the conditions of your construction permit. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

No findings were identified during this inspection.

In accordance with 10 *Code of Federal Regulations* (CFR) 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of the NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

M. Skaggs

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Should you have questions concerning this letter, please contact us.

Sincerely,

**/RA/**

Robert C. Haag, Chief  
Construction Projects Branch 3  
Division of Construction Projects

Docket No. 50-391  
Construction Permit No: CPPR-92

Enclosure: Inspection Report 05000391/2014611  
w/Attachment

cc w/encl: (See next page)

M. Skaggs

2

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cc w/encl: (See next page)

\* Previous Concurrence

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DATE	05/13/2014	05/13/2014	05/13/2014	05/13/2014	05/12/2014	05/12/2014	05/13/2014	05/15/2014
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M. Skaggs

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cc email distribution w/encl:

Greg Scott  
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Letter to Michael D. Skaggs from Robert C. Haag dated May 15, 2014.

WATTS BAR NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC PROBLEM  
IDENTIFICATION AND RESOLUTION INSPECTION REPORT 05000391/2014611

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PUBLIC

U.S. NUCLEAR REGULATORY COMMISSION  
REGION II

Docket No: 50-391

Construction Permit No: CPPR-92

Report No.: 05000391/2014611

Applicant: Tennessee Valley Authority (TVA)

Facility: Watts Bar Nuclear Plant, Unit 2

Location: 1260 Nuclear Plant Rd  
Spring City TN 37381

Inspection Dates: April 21 through April 25, 2014

Inspectors: A. Wilson, (Lead) Construction Project Inspector  
J. Baptist, Senior Construction Project Inspector  
D. Harmon, Construction Project Inspector  
E. Patterson, Construction Resident Inspector  
K. Steddenbenz, Construction Inspector  
C. Taylor, Senior Construction Project Inspector  
S. Temple, Construction Inspector

Approved By: Robert C. Haag, Chief  
Construction Projects Branch 3  
Division of Construction Projects

Enclosure

**EXECUTIVE SUMMARY**  
Watts Bar Nuclear Plant, Unit 2  
NRC Inspection Report 05000391/2014611

**Introduction**

This inspection assessed implementation of the corrective action program for the Watts Bar Unit 2 construction completion project. The inspection program for Unit 2 construction activities is described in NRC Inspection Manual Chapter 2517. Information regarding the Watts Bar Unit 2 Construction Project and NRC inspections can be found at <http://www.nrc.gov/info-finder/reactor/wb/watts-bar/construction-insp-info.html>.

**Inspection Results**

- In general, the threshold for initiating problem evaluation reports (PERs) was low and PERs were appropriately categorized. For the majority of PERs reviewed, the inspectors determined that problem evaluations were effective in identifying corrective actions that addressed the problem. [Section Q.1.1]
- The inspectors determined that adequate measures have been established to evaluate and incorporate applicable operating experience into the corrective action program. [Section Q.1.1]
- The inspectors determined that TVA and Bechtel have established an acceptable program and environment for allowing employees to identify quality or safety-related concerns. [Section Q.1.1]



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## REPORT DETAILS

### I. QUALITY ASSURANCE PROGRAM

#### Q.1 Quality Assurance Program Implementation

##### Q.1.1 Implementation of Corrective Action Program During Construction (Inspection Procedure 35007)

###### a. Inspection Scope

The inspectors assessed the adequacy of the Tennessee Valley Authority (TVA) and Bechtel program for identification, evaluation, and corrective action of conditions adverse to quality during the period since the previous problem identification and resolution inspection in April 2013. This was accomplished by reviewing selected PERs, verifying corrective actions were implemented and attending meetings where PERs were screened for significance to determine whether the licensee was identifying, accurately characterizing, and entering problems into the Corrective Action Program (CAP) at an appropriate threshold.

The inspectors reviewed a sample of PERs and Service Requests (SRs) selected from the applicant's CAP for Watts Bar Unit 2. The sample included problems addressed by a diverse selection of plant departments and problems classified under all of the significance levels. The sample also covered a diverse selection of sources, including problems identified in audits and assessments, nonconforming results from inspections and tests, findings from NRC inspections, concerns from anonymous sources, and concerns identified as adverse trends. Most PERs were reviewed after corrective actions had been implemented; however, some were reviewed after the corrective action plan was developed but prior to implementation.

The inspectors also reviewed the applicant's alternate issue tracking systems that address issues that were not classified as conditions adverse to quality. This review targeted verification of appropriate characterization and closure of issues managed outside the corrective action program. The alternative issue tracking systems that were sampled included Test Deficiency Notices (TDNs) and Quality Control (QC) Rejects. These systems were defined as corrective Work Processes approved to track/implement correction, according to TVA's CAP procedure (NC-PP-3, Revision 15).

The inspectors reviewed applicable portions of TVA's and Bechtel's Quality Assurance Program (QAP) implementing procedures in order to ensure that commitments for the identification, evaluation, and resolution of conditions adverse to quality had been adequately addressed. The inspectors' review evaluated the applicant's consideration for extent of condition, generic implications, common cause and previous occurrences (trending), including the identification of root and contributing causes along with actions to prevent recurrence for significant conditions adverse to quality.

The inspectors reviewed TVA's and Bechtel's respective programs for resolving employee concerns. The inspectors interviewed TVA and the major contractor's (Bechtel) employee concern representatives, reviewed a sample of PERs referred to employee concerns and PERs initiated as a result of employee concerns. The

inspectors also reviewed several anonymous PERs to determine if they had been adequately captured and addressed. The inspectors reviewed and evaluated the adequacy of the programs, which provide employees with an alternate method to identify quality or safety-related concerns. The inspectors also reviewed surveys and assessments of the employee concerns programs.

The inspectors reviewed a sample of the applicant's management and quality assessments, audits, and trend reports to verify adverse results were properly evaluated and dispositioned within the corrective action program. The inspectors reviewed the revision history for corrective action program implementing procedures and assessed the integration of industry operating experience into the corrective action process. Direct observations by inspectors included meetings of the Project Review Committee (PRC) and the Construction Completion Management Review Committee (CCMRC) as they screened newly reported problems and reviewed dispositions for selected issues.

Specific PERs and other documents reviewed are listed in the attachment.

b. Observations and Findings

No findings were identified.

The inspectors made the following observations as a result of their inspections:

(1) Effectiveness of Identifying, Evaluating, and Correcting Problems

Identifying Problems

The inspectors determined that, for the most part, the applicant was effective in identifying problems and entering them into the CAP. PERs normally provided complete and accurate characterization of the subject issues. Employees were encouraged by management to initiate PERs.

Evaluating Problems

The inspectors attended several meetings throughout the week, including the PRC and the CCMRC. It was determined that the applicant had adequately prioritized issues entered into the CAP consistent with established procedures. SRs that were being initiated and discussed during the meetings were being appropriately dispositioned. The inspectors determined that the threshold of closing items as SRs, closing items to a work order (WO), and creating a PER when necessary was adequate.

Correcting Problems

Based on a review of numerous PER corrective actions and their implementation, the team found, for the most part, that the applicant's corrective actions developed and implemented for problems were commensurate with the safety significance of the issues.

(2) Use of Operating Experience

The inspectors determined that the applicant's measures used to identify, evaluate and incorporate applicable industry and operating experience (I&OE) information into the

corrective action program contained processes for including vendor recommendations and internally generated lessons learned. The I&OE information was collected, evaluated, and communicated to the affected internal stakeholders as specified in TVA and Bechtel procedures. The inspectors determined that appropriate corrective actions were developed and taken for the sample of I&OE problem evaluation reports reviewed for the Watts Bar Unit 2 Construction Completion Project.

(3) Safety Conscious Work Environment (SCWE)

The inspectors reviewed several anonymous PERs and PERs that either referred to the employee concerns program (ECP) or PERs generated as a result of employee concerns. Employees interviewed expressed knowledge of the employee concerns program and the ability to raise safety related concerns through various available means. The inspectors also interviewed senior employee concerns coordinators from both TVA and Bechtel. The inspectors determined that TVA's and Bechtel's employee concern programs were adequate. The senior employee concerns coordinators expressed knowledge of the ECP and the ability to raise safety related concerns through various available means. The inspectors noted that the ECP staff provide several training sessions, they provide ECP information in newsletters, and they also walk around the site frequently, talk daily to staff, and attend several meetings to ensure that staff are aware of the ECP and know how to raise concerns if necessary. Also, there appeared to be strong management support for both the Bechtel and TVA ECP.

(4) Corrective Action Program Performance Insights

The sample of audits, assessments, and surveillances reviewed by the inspectors confirmed that management and quality personnel actively conducted observations and effectiveness reviews of the corrective action program. These program assessments concluded that overall, the corrective action program was effectively implemented. The applicant continues to track and trend issues, run summary reports on the trend data, and present results to management in several meetings, such as the site status meeting, CCMRC, etc.

(5) Corrective Action Program Effectiveness

As discussed above, in general, the applicant's CAP was effective and adequate. The inspectors determined that the applicant has maintained implementation of the CAP at an effective level since the last NRC PI&R inspection (April 2013).

c. Conclusions

As documented above, the inspectors determined that implementation of the CAP for the Watts Bar Unit 2 construction completion project was generally adequate. The threshold for initiating PERs was appropriate, PERs were categorized in accordance with their significance, and problem evaluations were effective in identifying appropriate corrective actions.

In regards to maintaining a Safety Conscious Work Environment, the inspectors determined that TVA and Bechtel had established an acceptable program and environment for allowing employees to identify quality or safety-related concerns.

**V. Management Meetings****X.1 Exit Meeting Summary**

On April 25, 2014, the inspectors presented the inspection results to you and other members of your staff. Proprietary information reviewed during the inspection was returned and no proprietary information was included in this inspection report.

## **SUPPLEMENTAL INFORMATION**

### **Partial List of Persons Contacted**

#### Applicant personnel

D. Charlton, TVA - Licensing  
T. Cheek, TVA - CAP Manager  
M. Cooper, TVA – CAP Oversight  
B. Gillham, TVA - Licensing  
B. Heinmiller, Bechtel - CAP Manager  
Y. Hink, Bechtel - Employee Concerns  
R. Kirckpatrick, TVA - Engineering  
T. Niessen, TVA Audits & Assessment Manager  
J. O'Dell, TVA - Regulatory Compliance  
L. Reaves, TVA – Employee Concerns  
K. Rose, Bechtel - CAP Coordinator  
G. Scott, TVA - Licensing  
D. Voeller, TVA - Construction Manager  
N. Welch, TVA - Preoperational Startup Manager

### **Inspection Procedure Used**

IP 35007                      Quality Assurance Program Implementation during Construction

### **List of Items Opened, Closed, and Discussed**

#### Opened

None

#### Opened and Closed

None

#### Discussed

None

## List of Documents Reviewed

### Problem Evaluation Reports

262178	Trend in Red-Line Process Issues
394793	Ineffective Preventive Actions Associated with PER 262178
581841	ASME Non-conformance
615657	Improvements Needed to Prevent Recurrence of Missed QC Holdpoints
706129	Potential problem with Westinghouse ARD relays for DC application
708450	NRC Id'd: Hardware Non-Conformance for HVAC Support in Closed WO
709036	Anonymous PER: Hostile Work Environment
709637	Multiplication Error in Rosemount 1152 Calculation
713135	ASME Hardware Non-Conformance DRAVO Spool S/N 11450 Historic Issue
713742	PER closure – QA Assessment NC-WB-13-006
715564	NRC Id-d: Upper Lateral Support Material Not Tested In Accordance with Requirements
724028	WO 110932752 does not provide adequate precautions for work on ABSCE support
725478	ASME III Hardware Non-Conformance.Sys 030/067 Indication On Piping For WBN-2-Ccu-030-0078-B
735081	Hardware Non-Conformance: QA3 Mat'l Used In QA1 Application. Sys 3, 61, 62, 63, 68, 70, 72
738567	Missing cross reference for PER to WO
738580	Work not completed to address non-conforming condition
739613	Evaluate Westinghouse TB-13-1 applicability to WBN2.
741744	Historical: Wood insulation discovered in ice condenser personnel access door
742527	CCE, SYS WBN063, WBN-2-3VC-293-6044-B, Conduit exceeds 360° bends with cable pulled in
742574	Unit 2 construction radiography. Weld 2-062B-D139-27 C1R0; metallic debris in pipe
743615	Adverse Trend for By-passed ANI/QC Holdpoints, Witness points, reviews, and notifications
745899	Supplier Quality Rep, personnel qualification records are not in EDMS
748557	Common Q Panels may not have properly adjusted retaining angle brackets for seismic event
750214	Anonymous PER: Bechtel Supervisor rushing craft to the field w/o proper paperwork
753260	ASME related: Failure to follow procedure MGT-0003
754455	A Dye Penetrant Exam Of Weld# 2-063b-T071-28-C0r0, Revealed A 3-1/2" Linear Indication In The Pipe
754469	ASME Related, Errors in PCI Documents (RTD Bypass) Found During Final Review
756990	Potentially Reportable Hardware Non-Conformance: 10 CFR Part 21 notification
763291	Pressurizer PORV Cv Design Change
766429	Errors in WBNTSR008 calculation
766488	Anonymous PER: Issues with FCR approval process
777477	Personal documenting approval of ASME Section III Design Specification not adequately qualified
781458	QA identified Adverse Trend in CAP Action Closure Quality
788677	Anonymous PER: Work orders have recurring problems
790185	Unauthorized Rework on Flex Conduit 800044
790717	Review of WO#110990376 R1 CCE, SYS. WBN074, and WBN063 associated commodities
790722	Incorrect dimensions not identified on FCR 61876 AA-02
790730	ASME: Missing dates for approval/concurrence reviews for Supplier Quality Procedure and Manual

- 791834 FCR written to document As-built condition of installation does not match layout piping DRA
- 793461 Work Order Signatures
- 794620 ASME WO 111059418 was closed without obtaining N-5 and ANI final review as required by N1206
- 794668 Vendor Heat Loss Calculation for Metal Reflective Insulation Does Not Match Design Drawings
- 800044 NRC Identified, Potential Over Torque of Wrapper Plug Assembly
- 800570 Unit 2, 2-FCV-070-0087 MOV actuator mounting hardware is not correct 802311 ASME WO 115220992 WBN-2-CKV-062-0532-B SENSITIZATION
- 804263 ASME System WBN068 Issues found with Archived PER 215474 & BIT 1405
- 807454 Instrumentation tubing sulfur content outside acceptable values for orbital welding
- 808623 PRZR instrument nozzle couplings removed
- 819918 Anonymous PER: Work Orders not Being Worked per Procedures
- 832473 Cable 2PV6750 in Bend Radius Violation (SYS WBN098)
- 832928 System WBN067 TIC's may not maintain position retention
- 834004 Hardware Non-conformance: 3/4" rebar was cut without authorization
- 838631 ECP Referral: Potential damaged rebar and tube bending tool causing damage to 3/4" SS tubing
- 842892 Insufficient Clearance Between Valve WBN-2-CKV-063-0634 and Crane Wall
- 842964 SU Trend PER due to HU incidents at undesirable level
- 844207 SUT SYS WBN027 TDN 13-446 Time Delay Relays did not meet acceptance Criteria
- 844218 NRC Identified: Unit 2 Rack 2 Narrow Range RTD WO 113471100 PMT Data
- 844222 TDN Trending and Processing Errors
- 844234 NRC Identified – Valve data sheets reference incorrect material specification
- 845228 System WBN063 Potential Proximity Interactions
- 850485 Pipefitter performed unauthorized work
- 851810 During disassembly of the 2A Safety Injection Pump, multiple deficiencies were identified
- 857648 Anonymous PER: Craft Being Pushed to Work Fast in an Unsafe Manner
- 857667 ASME Section III Components - Trend PER - assembly quality issues with OEM Flowserve
- 861461 PER 469477 and PER 708506 have been closed without all actions being completed/addressed as required
- 863840 SUTR SYS WBN062 WBN-2-GR-062-0108-A
- 875435 Administrative Closure Issues Found during and Engineering Review of Closed PERs
- 872509 Incorrect wire installed on the output side of Temperature Modulators
- 875435 Administrative Closure Issues Found during an Engineering Review of Closed PERs
- 876414 Missing 18 inch mirror insulation at Acc room #3,el. 702' Az 180, SIS piping
- 877650 CCM SYS WBN040 UNID-2-PIPE-040-G. Nail identified inside RCP 4 oil drain line on EL. 716
- 877665 PI&R NRC ID'd: ASME Code III Hardware SRs closed to work performed, rather than going to a PER

#### Service Requests

- 695055 Existing Root Valve 2-RTV-062-0442A is not operating smoothly
- 724339 Loose bolting on 2-RFV-067-0573B-B
- 724351 Loose bolting on 2-RFV-067-1033A-A, 1029B-b and 2-FE-067-0183
- 724525 SR closed to WO for ASME item without creating a PER



- 732302 Hardware Non-conformance: QA3 Mat'l used in QA1 Application, SYS 3, 61, 62, 63, 68, 70, 72
- 739452 Commodity Clearance Violation on HVAC Support 75-4517
- 739531 ASME Hardware Nonconformance Inadequate Socket Depth of Valves 2-DRV-068-0557 and -0558
- 754881 MAI-5.1B requirements were not completed, System WBN293
- 780734 QA identified Adverse Trend in CAP Action Closure Quality
- 787376 Loose Bolting on Relief Valve in Unit 2
- 792916 Solenoid Valve top cover bent
- 807559 Historical Issue: Broken Embedded Ground Cable
- 836724 ASME Hardware Nonconformance - System 6.1 Indications Violated Min Wall Repair IAW Bechtel SPM
- 855583 ASME Section III Components - Trend PER - assembly quality issues with OEM Flowserve
- 863108 SUTR SYS WBN062 WBN-2-GR-062-0108-A
- 875013 Administrative Closure Issues Found during and Engineering Review of Closed PERs
- 875329 CCM SYS WBN040 UNID-2-PIPE-040-G. Nail identified inside RCP 4 oil drain line on EL. 716
- 876118 Missing 18 inch mirror insulation at Acc room #3,el. 702' Az 180, SIS piping
- 876378 PI&R NRC ID'd: ASME Code III Hardware SRs closed to work performed, rather than going to a PER

#### Test Deficiency Notices

- 13-217 2-HS-67-111C hand switch does not operate valve, no continuity in switch contact circuit
- 13-244 Torque switch operation is suspect
- 13-280 Max seating/unseating est motor torques exceeds limit on design rwg
- 13-281 Running average est motor torques exceeds limit on design rwg
- 13-338 Fuses are blowing after long delay
- 13-361 No seating torque on MOVATS; suspect not tightly closed
- 13-390 MEL data is not filled out correctly
- 13-486 High running load during MOVATS test
- 13-505 Packing/running load exceeded
- 13-515 High running load during MOVATS test
- 13-525 Diode in JB 1910 is installed in the reverse direction
- 13-526 Diode in JB 1910 is installed in the reverse direction
- 14-046 High packing/running load
- 14-058 Packing/running load exceeded
- 14-108 Wiring issue. DRA does not match Cat 1 drawing
- 14-204 Unclear design output for valve stroke time requirements

#### Procedures and Programs

- 25402-MGT-000, "Corrective Action Program," Rev. 16
- 25402-MGT-0004, "Incident Investigation and Root Cause Analysis," Rev. 4
- 25402-000-GPP-0000-N3702, "Arc Strike Removal / Base Metal Repair of Piping / Components and Structural / Miscellaneous Steel," Rev. 2
- 25402-00-GPP-0000-N1206, "Work Order Processing," Rev. 18
- NC-PP-3, "Watts Bar Unit 2 Corrective Action Program," Rev. 15
- NC-PP-8, "Watts Bar Unit 2 Operating Experience / Construction Experience Plan," Rev. 2
- NC-PP-6, "Completion of TVA NC Partial ASME Section III Division 1 N-5 Data Reports",

Rev. 13

NPG-SPP-06.4, "Measuring and Test Equipment," Rev. 2

#### Audit Reports

Audit Report No. NC1302, "Corrective Action Program," dated 6/26/13

Bechtel Audit No. 25402-WBN-AR13-0002, "Bechtel Quality Assurance Manuals," Rev. 0

Quality Assurance Assessment Report NC-WB-13-006, "Problem Evaluation Report Closures,"  
dated 4/18/13

#### Miscellaneous

2013 Assessment of WB2 Safety Conscious Work Environment and Safety Culture

Bechtel Annual SCWE Pulsing Survey; 2012 and 2013 Results Comparison

Bechtel CAP Status Report, dated February 2014

Bechtel Employee Concerns Cases Associated with PERs; 04/01/2013 through 04/23/2014

CAP Trend Report; March 2014

Test Deficiency Notice Trending; 03/19/2014 through 04/17/2014

Watts Bar Nuclear Plant U1/U2 Corrective Action Program Transition Strategy Document

WBC ECP Pulsing Results; Completed 10/23/2013

WBC ECP Pulsing Results; Completed 03/27/2014

WBN U2 CAP Metrics Report, dated February 2014

WBN U2 CAP Self-Assessment WBN2-CAP-14-1, dated 3/25/14

#### Drawing

2-45B2768-11E, Rev. 7

2-47A8910-63-01, Rev. 2

#### Calculation

MDQ0020632008-0229, Rev. 003

#### Field Change Requests

FCR 60603-A, DRA No. 5331-168, -190, -408, and -409, Rev. 0

FCR 59905-A, AA-07, dated 8/1/12

#### Work Orders

WO 114633238, CCM SYS 067 WBN-2-RFV-067-1033A-A ASME Class 3

WO 115149219, CCM EDCR2 53580 SYS 063 PER 760933 2-RFV-063-0627-B PER 760933

FCR 61757-A AA-09

**List of Acronyms**

ADAMS	Agencywide Document Access Management System
CAP	Corrective Action Program
CCMRC	Construction Completion Management Review Committee
CFR	Code of Federal Regulations
ECP	Employee Concerns Program
I&OE	Industry and Operating Experience
IP	Inspection Procedure (NRC)
NRC	Nuclear Regulatory Commission
PARS	Publicly Available Records
PER	Problem Evaluation Report
PI&R	Problem Identification and Resolution
PRC	Project Review Committee
QA	Quality Assurance
QAP	Quality Assurance Program
QC	Quality Control
SCWE	Safety Conscious Work Environment
SR	Service Request
TDN	Test Deficiency Notice
TVA	Tennessee Valley Authority
WBN	Watts Bar Nuclear Plant
WO	Work Order