



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

November 14, 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 INTEGRATED
INSPECTION REPORT 05000391/2014608

Dear Mr. Skaggs:

On September 30, 2014, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection of construction activities at your Watts Bar Unit 2 reactor facility. The enclosed integrated inspection report documents the inspection results, which were discussed on October 23, 2014, with Mr. Hruby and other members of your staff.

This inspection examined activities conducted under your Unit 2 construction permit as they relate to safety and compliance with the Commission's rules and regulations, the conditions of your construction permit, and fulfillment of Unit 2 regulatory framework commitments. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of this inspection, the enclosed report documents two NRC-identified findings and one self-revealing finding which were determined to involve violations of NRC requirements. However, because the findings were all Severity Level IV violations and were entered into your corrective action program, the NRC is treating the violations as non-cited violations (NCVs) consistent with Section 2.3.2 of the NRC Enforcement Policy.

If you contest the non-cited violations in the enclosed report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the United States Nuclear Regulatory Commission, ATTENTION: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Watts Bar Unit 2 Nuclear Plant. In addition, if you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region II, and the NRC Resident Inspector at Watts Bar Unit 2 Nuclear Plant.

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 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).

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

Sincerely,

/RA/

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

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

Enclosure: Inspection Report 05000391/2014608
w/Attachment

cc w/encl: (See next page)

Available Records (PARS) component of 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).

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

Sincerely,

/RA/

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

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

Enclosure: Inspection Report 05000391/2014608
w/Attachment

cc w/encl: (See next page)

* Previous Concurrence

PUBLICLY AVAILABLE
 NON-PUBLICLY AVAILABLE
 SENSITIVE
 NON-SENSITIVE
 ADAMS: Yes
 ACCESSION NUMBER: ML14322A182
 SUNSI REVIEW COMPLETE
 FORM 665 ATTACHED

OFFICE	RII:DCP	RII:DCP	RII:DCP	RII:DCP	RII:DCP	RII:DCP
SIGNATURE	TXN1 via e-mail	EJP1 via e-mail	NDK1 via e-mail	MCM4 via e-mail	JBB5	CJE
NAME	T. Nazario	E. Patterson	N. Karlovich	M. Magyar	J. Baptist	C. Even
DATE	11/12/2014	11/10/2014	11/12/2014	11/10/2014	11/14/2014	11/13/2014
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
OFFICE	RII: DCI	RII: DCI	RII: DCP	RII: DCI	RII: DCI	RII: DCI
SIGNATURE	GXC2 via e-mail	JXL2 via e-mail	AAW via e-mail	JXH13 via e-mail	JAC1	KHS1 via e-mail
NAME	G. Crespo	J. Lizardi	A. Wilson	J. Heisserer	J. Christensen	K. Steddenbenz
DATE	11/10/2014	11/13/2014	11/10/2014	11/10/2014	11/13/2014	11/12/2014
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
OFFICE	RII: DCI	RII: DCI	RII: DRS	RII: DCI	RII: DCI	RII: DRP
SIGNATURE	ADM2 for ATM1	CRS2 via e-mail	TXL3 via e-mail	CNO1 via e-mail	SPS via e-mail	WXD1 via e-mail
NAME	A. Matos-Marin	C. Smith- Standberry	T. Lighty	C. Oelstrom	S. Smith	W. Deschaine
DATE	11/13/2014	11/10/2014	11/08/2014	11/13/2014	11/12/2014	11/10/2014
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
OFFICE	RII: DRS	RII: DRS	RII: DRS	RII: DRS	RII: DCI	
SIGNATURE	BLC2 via e-mail	WTL via e-mail	RKH1 via e-mail	RXK3 via e-mail	CAJ via e-mail	
NAME	B. Caballero	W. Loo	R. Hamilton	R. Kellner	C. Julian	
DATE	11/10/2014	11/10/2014	11/10/2014	11/10/2014	11/07/2014	
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	

cc w/encl:

Mr. Gordon P. Arent
Director, Licensing
Watts Bar Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Spring City, Tennessee 37381

Mr. O. J. Zeringue, General Manager
Engineering and Construction
WBN Unit Two
Watts Bar Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Spring City, Tennessee 37381

Mr. R. A. Hrubby, General Manager
Technical Services
WBN Unit Two
Watts Bar Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Spring City Tennessee 37381

Mr. James O'Dell, Manager
Licensing and Industry Affairs
WBN Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Spring City, Tennessee 37381

Mr. Joseph P. Grimes
Chief Nuclear Officer
and Executive Vice President
Tennessee Valley Authority
1101 Market Place
3R Lookout Place
Chattanooga, Tennessee 37402-2801

County Executive
375 Church Street
Suite 215
Dayton, Tennessee 37321

Mr. Sean Connors
Plant Manager, WBN Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Spring City, Tennessee 37381

Mr. R. R. Baron, Senior Manager
Nuclear Construction Quality Assurance
WBN Unit Two
Watts Bar Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Spring City, Tennessee 37381

Mr. Joseph Shea, Vice President
Nuclear Licensing
Tennessee Valley Authority
1101 Market Street
3R Lookout Place
Chattanooga, TN 37402-2801

Mr. E. J. Vigluicci
Assistant General Counsel
Tennessee Valley Authority
400 West Summit Hill Drive
6A West Tower
Knoxville, Tennessee 37402

Mr. Lawrence E. Nanney, Director
Tennessee Department of Environmental
Health & Conservation
Division of Radiological Health
3rd Floor, L&C Annex
401 Church Street
Nashville, TN 37243-1532

Mr. Kevin Walsh
Site Vice President
Watts Bar Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Spring City, Tennessee 37381

County Mayor
P.O. Box 156
Decatur, Tennessee 37322

Ms. Ann P. Harris
Public
341 Swing Loop
Rockwood, TN 37854

cc email distribution w/encl:

Greg Scott
Tennessee Valley Authority
Electronic Mail Distribution

Watts Bar 2 Licensing
Tennessee Valley Authority
Electronic Mail Distribution

Letter to Michael D. Skaggs from Robert C. Haag dated November 14, 2014.

SUBJECT: WATTS BAR NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED
INSPECTION REPORT 05000391/2014608

Distribution w/encl:

Region II Regional Coordinator, OEDO

J. Quichocho, NRR

J. Poole, NRR

A. Hon, NRR

J. Dion, NRR

V. McCree, RII

L. Douglas, RII EICS

J. Bartley, RII DRP

J. Nadel, RII WBN Unit 1 SRI

OE Mail

ConE_Resource@nrc.gov

PUBLIC

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 50-391

Construction Permit No.: CPPR-92

Report No.: 05000391/2014608

Applicant: Tennessee Valley Authority (TVA)

Facility: Watts Bar Nuclear Plant, Unit 2

Location: Spring City, TN 37381

Dates: August 17 - September 30, 2014

Inspectors:

- T. Nazario, Senior Resident Inspector, Construction Projects Branch (CPB) 3, Division of Construction Projects (DCP), Region II (RII)
- E. Patterson, Resident Inspector, CPB3, DCP, RII
- N. Karlovich, Resident Inspector, CPB3, DCP, RII
- M. Magyar, Resident Inspector, CPB3, DCP, RII
- J. Baptist, Senior Construction Project Inspector, CPB3, DCP, RII, Section P.1.3
- C. Even, Senior Construction Project Inspector, CPB3, DCP, RII, Section P.1.2
- A. Wilson, Construction Project Inspector, CPB3, DCP, RII, Section C.1.3
- G. Crespo, Senior Construction Inspector, Construction Inspection Branch (CIB) 1, Division of Construction Inspection (DCI), RII, Sections OA.1.5, OA.1.6, OA.1.7, OA.1.8 and OA.1.10
- C. Julian, Senior Construction Inspector, CIB 1, DCI, RII, Sections OA.1.5, OA.1.6, OA.1.7, OA.1.8 and OA.1.10
- A. Matos-Marin, Construction Inspector, CIB 1, DCI, RII, Sections OA.1.5, OA.1.6, OA.1.7, OA.1.8 and OA.1.10
- C. Smith-Standberry, Construction Inspector, CIB 1, DCI, RII, Section OA.1.3
- J. Lizardi, Construction Inspector, CIB2, DCI, RII, Section OA.1.4
- C. Oelstrom, Construction Inspector, CIB2, DCI, RII, Section OA.1.4
- S. Smith, Senior Construction Inspector, CIB2, DCI, RII, Section OA.1.4
- J. Heisserer, Senior Construction Inspector, CIB3, DCI, RII, Section P.1.3
- J. Christensen, Construction Inspector, CIB3, DCI, RII, Sections P.1.3 and OA.1.12
- K. Steddenbenz, Construction Inspector, CIB3, DCI, RII, Sections P.1.3 and OA.1.4

Enclosure

- T. Lighty, Project Engineer, Engineering Branch (EB) 1, Division of Reactor Safety (DRS), RII, Section O.1.2
- B. Caballero, Senior Operations Engineer, Operations Branch 2, DRS, RII, Section O.1.1
- W. Deschaine, Resident Inspector, Reactor Projects Branch 6, Division of Reactor Projects, RII, Sections OA.1.4 and OA.1.9
- R. Hamilton, Senior Health Physicist, Plant Support Branch (PSB) 1, DRS, RII, Sections P.1.4, P.1.5, P.1.6, P.1.7 and P.1.8
- W. Loo, Senior Health Physicist, PSB1, DRS, RII, Sections P.1.4, P.1.5, P.1.6, P.1.7 and P.1.8
- B. Kellner, Health Physicist, PSB1, DRS, RII, Sections P.1.4, P.1.5, P.1.6, P.1.7 and P.1.8

Approved by:

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

EXECUTIVE SUMMARY

Watts Bar Nuclear Plant, Unit 2

This integrated inspection included aspects of engineering and construction activities performed by TVA associated with the Watts Bar Nuclear (WBN) Plant Unit 2 construction project. This report covered a seven-week period of inspections in the areas of quality assurance (QA), identification and resolution of construction problems, engineering and construction activities, preoperational testing, operational readiness activities, and follow-up of other activities. The inspection program for Unit 2 construction activities is described in Nuclear Regulatory Commission (NRC) Inspection Manual Chapter (IMC) 2517, "Watts Bar Unit 2 Construction Inspection Program." Information regarding the WBN Unit 2 Construction Project and NRC inspections can be found at <http://www.nrc.gov/info-finder/reactor/wb/watts-bar.html>.

Inspection Results

- A self-revealing finding and Severity Level (SL) IV non-cited violation (NCV) of 10 *Code of Federal Regulations* (CFR) Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was identified for the applicant's failure to follow the procedure for preparing clearances when the responsible engineer failed to reference the correct drawings in order to identify the appropriate fuse to safely tag out equipment. This issue was associated with WO 09-954158-001 and resulted in the inappropriate fuse being pulled. The inspectors determined that this performance deficiency was more than minor because it challenged auxiliary feedwater capacity, as required in Unit 1 Technical Specification Requirement 3.7.5, and it represented an improper work practice that did impact safety involving safety-related structures, systems, and components (SSCs). The inspectors determined this finding to be of very low safety significance in accordance with Section 6.5 of the NRC Enforcement Policy. Specifically, the inspectors determined this finding to be of very low safety significance, SL IV, because it did not represent a breakdown of the applicant's QA program. This issue was entered in to the corrective action program as PERs 939312 and 938866. The finding has a cross-cutting aspect in the Work Management aspect of the Human Performance area, as defined in IMC 0310, because the work process did not include the identification and management of risk commensurate to the work. Specifically, the drawing referenced by the responsible engineer had identification numbers for fuses, but the identification number on the drawing did not include a Unit 1 or Unit 2 designator. In order to mitigate the risk of impacting Unit 1, additional drawings needed to be referenced in order to verify the fuse was associated with Unit 2. [H.5] (Section C.1.2).
- The NRC identified a SL IV NCV of 10 CFR Part 50, Appendix B, Criterion XIII, "Handling, Storage and Shipping," for failure to properly store safety-related equipment in accordance with procedure 25402-PRO-007, "Field Material Storage Control," to prevent damage or deterioration. The inspectors determined that the failure to properly store safety-related equipment, in accordance with procedure 25402-PRO-007, was a performance deficiency. This performance deficiency was considered more than minor in accordance with IMC 2517, "Watts Bar Unit 2 Construction Inspection Program," and IMC 0613, "Power Reactor Construction Inspection Reports," because it was similar to example 18 in IMC 0613. The similarity existed because their NCV dealt with the environmental storage conditions of SSCs not meeting the licensee's QA program requirements which in inadequate environmental storage conditions that adversely affected stored items requiring a detailed engineering analysis to establish the adequacy

of the SSCs. The inspectors determined this finding to be of very low safety significance in accordance with Section 6.5 of the NRC Enforcement Policy. Specifically, the applicant failed to adequately store safety-related equipment; however, this finding did not represent a breakdown in the applicant's QA program for receipt, storage, and handling of equipment and material, or one with multiple significant examples. The applicant issued PER 920312 to address this issue. The finding has a cross-cutting aspect in the Procedure Adherence component of the Human Performance area, as defined in IMC 0310, because the applicant failed to following procedure 25402-PRO-007, "Field Material Storage Control." [H.8] (Section O.1.2)

- The NRC identified a SL IV NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the applicant's failure to accurately prescribe the work activities of WO 115834758, which were intended to correct a condition adverse to quality related to PER 858657. The inspectors determined that the failure to accurately prescribe the work activities of WO115834758 was a performance deficiency. This performance deficiency was determined to be more than minor in accordance with IMC 2517, Appendix C, because the failure to provide accurate work instructions in WO115834758 represented an improper work practice that could impact quality involving safety-related SSCs. The inspectors determined this finding to be of very low safety significance, SL IV, in accordance with Section 6.5 of the Enforcement Policy, because the work activities associated with WO115834758 did not result in multiple examples of recurring significant deficiencies associated with a single construction activity. This finding has a cross-cutting aspect in the Resolution component of the Problem Identification and Resolution area, as defined in IMC 0310, because the applicant failed to take effective corrective actions to address a condition adverse to quality [P.3] (Section OA.1.9).
- The inspectors concluded that issues pertaining to several open items, including one construction deficiency report (CDR), one unresolved item (URI), one temporary instruction (TI), seven inspection procedures (IPs), and one supplemental safety evaluation report (SSER) Appendix HH item have been appropriately addressed for WBN Unit 2. These items are closed.
- Other areas inspected were adequate with no findings identified. These areas included QA; mechanical systems and components; electrical systems and components; preoperational testing activities; operational preparedness; and various NRC inspection procedures.

Table of Contents

I.	QUALITY ASSURANCE PROGRAM	8
Q.1.1	Identification and Resolution of Construction Problems (Inspection Procedure 35007)	8
Q.1.2	Safety Conscious Work Environment (Inspection Procedure 35007 and Temporary Instruction 2512/015)	9
II.	MANAGEMENT OVERSIGHT AND CONTROLS	9
C.1	Construction Activities	9
C.1.1	Unit 1 and Unit 2 Construction Activity Interface Controls	9
C.1.2	Post-Fukushima Diverse and Flexible Construction Activities	11
C.1.3	Electrical Components and Systems – Work Observation (Inspection Procedure 51053)	12
C.1.4	Instrument Components and Systems – Work Observation (Inspection Procedure 52053)	13
C.1.5	Piping – Work Observations (Inspection Procedure 49063)	14
C.1.6	Verification of As-Built for Safety-Related Piping Systems (Inspection Procedures 37051 and 50073)	14
C.1.7	(Closed) Reactor Vessel and Internals QA Review (Inspection Procedure 50051)	16
P.1	Preoperational Activities	19
P.1.1	Preoperational Test Program Implementation Verification (Inspection Procedure 71302)	19
P.1.2	Preoperational Test Procedure Review (Inspection Procedures 70300 and 70336)	20
P.1.3	Preoperational Test Witnessing – Reactor Coolant System Cold Hydrostatic Test (Inspection Procedures 70302, 70312 and 70462)	21
P.1.4	(Closed) External Occupational Exposure Control and Personal Dosimetry (Pre-Operational) (Inspection Procedure 83524)	23
P.1.5	(Closed) Internal Exposure Control and Assessment [Preoperational] (Inspection Procedure 83525)	24
P.1.6	(Discussed) Control of Radioactive Materials and Contamination, Surveys, and Monitoring (Pre-Operational) (Inspection Procedure 83526)	25
P.1.7	(Closed) Facilities and Equipment (Preoperational) (Inspection Procedure 83527)	26
P.1.8	(Closed) Maintaining Occupational Exposures ALARA [Preoperational] (Inspection Procedure 83528)	27
T.1	Training and Qualification of Plant Personnel	28
T.1.1	Craft Training associated with Construction Deficiency Report 89-09, Damaged, Loose, or Missing hardware (Inspection Procedure 35007)	28

III. OPERATIONAL READINESS ACTIVITIES.....	29
O.1 Operations	29
O.1.1 (Closed) Pre-Licensing Review of Training & Qualification Programs (Inspection Procedure 41301).....	29
O.1.2 (Closed) Quality Assurance Program - Receipt, Storage, and Handling of Equipment and Material and Unresolved Item 05000391/2014607-01, Potential Inadequate Storage of Safety-Related Equipment (Inspection Procedure 35747B)	30
F. 1 Fire Protection.....	33
F.1.1 Procedures - Fire Prevention/Protection (Inspection Procedure 64051)	33
IV. OTHER ACTIVITES	35
OA.1.1 (Discussed) Cable Issues Corrective Action Program – Sub-Issue: Supports in Vertical Trays and Construction Deficiency Report 50-391/89-04: Support of Class 1E Cables Installed in Long Vertical Cable Tray Runs (Temporary Instruction 2512/016 and Inspection Procedure 51063).....	35
OA.1.2 (Discussed) Cable Issues Corrective Action Program Sub-issue: Physical Cable Separation and Electrical Isolation (Temporary Instruction 2512/016).....	36
OA.1.3 (Discussed) Generic Letter 96-01, Testing of Safety-Related Logic Circuits (Temporary Instruction 2515/139)	36
OA.1.4 (Discussed) Equipment Seismic Qualification Corrective Action Program Plan (Temporary Instruction 2512/021 and Inspection Procedures 51053, 51055, 52053, 52055, 50073, and 37051)	37
OA.1.5 (Discussed) Generic Letter 2006-02: Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power (Inspection Procedure 92701)	41
OA.1.6 (Discussed) Three Mile Island Action Item II.D.3 – Direct Indication of Relief-and Safety-Valve Position and Supplemental Safety Evaluation Report Appendix HH Item 074: Installation of the Acoustic monitoring system for the Power Operated Relief Valves (Inspection Procedure 92701)	42
OA.1.7 (Discussed) Hydrogen Igniter Backup Power – Generic Safety Issue 189 and Temporary Instruction 2515/174 (Inspection Procedure 92701)	43
OA.1.8 (Discussed) Generic Letter 79-36, Adequacy of Station Electric Distribution System Voltages (Inspection Procedure 92701)	44
OA.1.9 (Discussed) Construction Deficiency Report 391/89-09, Significant Trend Associated with Damaged, Loose, or Missing Hardware (Inspection Procedure 35007)	45
OA.1.10 (Closed) Supplemental Safety Evaluation Report App HH Open Item 23: Environmental Qualification Testing of Main Steam Isolation Valve Solenoids (Inspection Procedure 92701)	47
OA.1.11 (Closed) Hanger Analysis and Update Program Corrective Action Program (Temporary Instruction 2512/023 and Inspection Procedure 50090)	48
OA.1.12 (Closed) Construction Deficiency Report 50-391/86-08: Incorrect Tubing Configuration on Containment Isolation Valve Actuators (Inspection Procedures 52053 and 52055)	51
V. MANAGEMENT MEETINGS.....	52
X1 Exit Meeting Summary.....	52

REPORT DETAILS

Summary of Plant Status

During the inspection period covered by this report, Tennessee Valley Authority (TVA) performed construction completion and preoperational testing activities on safety-related systems and continued engineering design activities of the Watts Bar Nuclear (WBN) Plant, Unit 2 (U2).

I. QUALITY ASSURANCE PROGRAM

Q.1.1 Identification and Resolution of Construction Problems (Inspection Procedure 35007)

a. Inspection Scope

The inspectors continued to review problem evaluation reports (PERs), as part of the applicant's corrective action program, to verify that issues being identified under the corrective action program were being properly identified, addressed, and resolved by the applicant.

The inspectors reviewed PER 800665, which documented that a quality assurance (QA) review of 2-CP-070-01-1, "Component Cooling System ESF 2A Header Cleanliness Plan (CP)," Revision (Rev.) 2, identified that flushing acceptance criteria was incomplete. The inspectors reviewed the completed clean plan and interviewed the test director to verify that the clean plan met the acceptance criteria and was completed in accordance with procedure SMP-7.0, "Watts Bar Nuclear Plant Unit 2 Control of Cleanliness, Layup and Flushing," Rev. 3, and American National Standards Institute (ANSI) N45.2.1, "Cleaning of Fluid Systems and Associated Components During Construction Phase of Nuclear Power Plants," 1973.

The inspectors observed corrective actions associated with PER 924558, which documented the applicant's discovery of a leaking plug weld in steam generator (S/G) #2 during preparation for the reactor coolant system (RCS) hydrostatic test. The inspectors observed mock-up practice welding and the weld preparation surrounding the removed plugs to determine if the repairs were to be performed in accordance with the requirements of the American Society of Mechanical Engineers (ASME) Section III Code 1973 edition and applicable quality requirements. The inspectors also held discussions with the applicant's engineering and metallurgical staff to determine if their assessment of the apparent cause and extent of condition were sound and would thoroughly bound the condition. In addition, the inspectors observed the liquid penetrant (PT) examination for four welded plugs in S/G #2 and one welded plug in S/G #1, to verify that the nondestructive examination (NDE) was completed in accordance with procedure GQP-9.7, "Liquid Penetrant Examination and Acceptance Standards for Welds, Base Materials and Cladding," Rev. 16. Also, the inspectors reviewed the three NDE PT level II personnel certifications to verify the NDE personnel were qualified in accordance with procedure GQP-9.0, "Training, Qualification, examination and Certification of NDE Personnel in Accordance with SNT-TC-1A and CP 189," Rev. 15. The inspectors reviewed the Westinghouse S/G tube leak report to verify that the investigation and apparent cause evaluations were complete and accurate. In addition, the inspectors witnessed the performance of pre-operational test instruction (PTI) 2-PTI-068-14,

“Reactor Coolant System Primary Hydrostatic Test, U2,” which tested the integrity of the system piping and welds within the RCS boundary. This is discussed further in Section P.1.3 of this report. Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The issues identified in the PERs reviewed were adequately identified, addressed, and resolved.

Q.1.2 Safety Conscious Work Environment (Inspection Procedure 35007 and Temporary Instruction 2512/015)

a. Inspection Scope

On September 24, 2014, the inspectors met with TVA and Bechtel employee concerns program (ECP) coordinators to discuss the 2014 second quarter analysis of concerns and any trends. The inspectors reviewed existing program requirements and recent concerns identified by the applicant’s and contractor’s ECP.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors did not identify any issues or concerns regarding the ability of the applicant to provide a safety-conscience work environment.

II. MANAGEMENT OVERSIGHT AND CONTROLS

C.1 Construction Activities

C.1.1 Unit 1 and Unit 2 Construction Activity Interface Controls

a. Inspection Scope

The inspectors independently assessed applicant controls, associated with Unit 2 construction work activities, to prevent adverse impact on Unit 1 operational safety. The inspectors attended routine Unit 1/Unit 2 interface meetings to assess the exchange and sharing of information between the two site organizations. Periodic construction and planning meetings were observed to assess the adequacy of the applicant’s efforts to identify those construction activities that could potentially impact the operating unit. This included the review of selected work activities, which the applicant had screened as not affecting Unit 1, to verify the adequacy of that screening effort. Additionally, the inspectors independently assessed selected construction activities to verify that potential impacts on the operating unit had been identified and adequately characterized with appropriate management strategies planned for implementation. Furthermore, the

inspectors performed independent walkdowns of select construction work locations to verify that controls to protect the operating unit provided an adequate level of protection and had been properly implemented.

Specific work activities observed included:

- Work order (WO) 09-954158-001 CCI EDCR 52740 SYS 003 2-ISIV-003-0172A Install Valve
- WO 114900869, Differential Pressure Testing of ERCW valve WBN-2-FCV-067-0125-A

b. Observations and Findings

The following finding was identified:

Introduction: A self-revealing finding and Severity Level (SL) IV non-cited violation (NCV) of 10 *Code of Federal Regulations* (CFR) Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was identified for the applicant's failure to follow the procedure for preparing clearances when the responsible engineer failed to reference the correct drawings in order to identify the appropriate fuse to safely tag out equipment. This resulted in the inappropriate fuse being pulled. This issue was associated with WO 09-954158-001.

Description: On September 26, 2014, during placement of the clearance, a fuse associated with the Unit 1 turbine-driven auxiliary feedwater pump level control valve for S/G #3 was improperly removed by Unit 2 electrical craft as part of WO 09-954158-001. WO 09-954158-001 was implemented to install a new 3-way valve, solenoid valve, and positioner for the turbine-driven auxiliary feedwater pump level control valve for S/G 3 on Unit 2. The resulting main control room indication response was noted by the Unit 1 staff. Unit 1 entered into an unplanned 72-hour limited condition for operation (LCO). The fuse was re-installed and conditions returned to normal. It was later discovered that the clearance instructions were incorrect due to the responsible engineer's failure to reference the correct drawings to identify the appropriate fuse when preparing the clearance package, per the clearance procedure NPG-SPP-10.2, "Clearance Procedure to Safely Control Energy."

The inspectors determined that this performance deficiency was more than minor because it challenged auxiliary feedwater capacity, as required in Unit 1 Technical Specification Requirement 3.7.5, and it represented an improper work practice that did impact safety involving safety-related structures, systems, and components (SSCs). The inspectors determined this finding to be of very low safety significance in accordance with Section 6.5 of the NRC Enforcement Policy. Specifically, the inspectors determined this finding to be of very low safety significance, SL IV, because it did not represent a breakdown of the applicant's QA program. This issue was entered in to the corrective action program as PERs 939312 and 938866. The finding has a cross-cutting aspect in the Work Management aspect of the Human Performance area, as defined in NRC Inspection Manual Chapter (IMC) 0310, because the work process did not include the identification and management of risk commensurate to the work [H.5]. Specifically, the drawing referenced by the responsible engineer had identification numbers for fuses, but the identification number on the drawing did not include a Unit 1 or Unit 2 designator.

In order to mitigate the risk of impacting Unit 1, additional drawings needed to be referenced in order to verify the fuse was associated with Unit 2.

Enforcement: 10 CFR 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” requires, in part, that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Procedure NPG-SPP-10.2, “Clearance Procedure to Safely Control Energy,” Section 3.3.2.B, requires the preparer of the clearance to review the request and “the necessary information such as drawings...to identify the energy isolating control devices necessary to safely clear the equipment.” Contrary to this, on September 26, 2014, it was self-revealing that the applicant had not reviewed the necessary drawings to identify the energy isolating control devices necessary to safely clear the equipment. Specifically, the preparer of the clearance referenced drawings which led to the fuse associated with the level control valve for S/G #3 on Unit 1 to be pulled, instead of the drawings with the correct fuse. This finding was determined to be a SL IV violation using Section 6.5 of the Enforcement Policy. Because this was a SL IV violation and the issue was entered into the applicant’s corrective action program as PERs 939312 and 938866, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy: NCV 05000391/2014608-01; “Failure to reference correct documentation.”

c. Conclusions

With the exception of the above noted self-revealing finding, adequate management oversight and controls were in place for observed construction activities that could potentially impact the operating unit, and an adequate level of protection had been implemented.

C.1.2 Post-Fukushima Diverse and Flexible Construction Activities

a. Inspection Scope

Background: Inspections of the diverse and flexible coping strategies (also known as FLEX) modifications have been previously documented and discussed in the following inspection reports:

- Section C.1.7 of integrated inspection report (IIR) 05000391/2014604 (Agencywide Documents Access and Management System (ADAMS) Accession Number (No.) ML14177A214)
- Section C.1.4 of IIR 05000391/2014605 (ADAMS Accession No. ML14226A049)
- Section C.1.3 of IIR 05000391/2014607 (ADAMS Accession No. ML14274A076)

The inspections performed during the inspection period reflect ongoing construction activities in this area.

Inspection Activities: The inspectors reviewed and inspected the following for the structures and equipment noted below:

- Auxiliary feedwater storage tank (AFWST) radiographic test (RT) records
The inspectors reviewed a sample of radiographic film from construction of the AFWST. Specifically, the inspectors reviewed film numbers 1, 2, 3, 5, 7, 9, 15, and 7T1 to determine if welds were made in accordance with the requirements of American Petroleum Institute (API) 620, 11th Edition, 3rd Addenda. Additionally, the inspectors verified that the applicant adequately expanded their sample size around a rejected weld as required by the API code.

Documents reviewed are listed in the Attachment.

b. Observation and Findings

No findings were identified. Three weld seams were identified to have failed the radiographic examinations. Additional radiographs were performed in the weld areas which identified additional indications. Additional radiographs were performed to bound the condition in accordance with approved standards and the welds were repaired in accordance with the API 620 code.

c. Conclusions

The inspectors reviewed RT records associated with the construction of the AFWST. The RT film and records were acceptable and completed in accordance with API 620, 11th Edition, 3rd Addenda.

C.1.3 Electrical Components and Systems – Work Observation (Inspection Procedure 51053)

a. Inspection Scope

The inspectors performed an as-built verification of the following components:

- 2A residual heat removal pump motor, WBN-2-MTR-74-10-A
- 2B safety injection pump motor, WBN-2-MTR-63-15-B
- 2B containment spray pump motor, WBN-2-MTR-72-10-B

The inspectors compared construction installation drawings and associated installation documentation against the actual installation of the components. The inspectors performed this comparison to determine whether components, shown on the drawing, were of the type specified and whether they have been installed, located, oriented, supported, and protected in accordance with the drawings.

The inspectors verified the status of design changes on the selected drawings to determine whether the applicant properly controlled and documented changes for engineering review, approval, and subsequent incorporation into the as-built drawings.

The following sample was inspected:

- IP 51053 Section 02.02.f – three samples

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusion

The inspectors concluded that the equipment observed was installed in accordance with procedures and drawings.

C.1.4 Instrument Components and Systems – Work Observation (Inspection Procedure 52053)

a. Inspection Scope

The inspectors observed in-process work associated with WO 110950607 which involved containment differential pressure transmitter 2-PDT-30-42-G. The inspectors observed that the latest revisions of applicable drawings were available for the installers, that the components were as specified, that the mounting hardware was the material specified, that the components were installed in the proper location and orientation by qualified craft personnel using suitable equipment and tools, that component identification was properly maintained, that inspections were performed before the covering up of the work to be inspected, and that inspection activities were timely and properly completed by qualified personnel.

The inspectors performed an as-built verification of the following components:

- 2-FT-68-29A, Reactor Coolant Flow Transmitter
- 2-FT-68-6B, Reactor Coolant Flow Transmitter
- 2-LT-3-42-G, Steam Generator Level Transmitter
- 2-LT-3-110-G, Steam Generator Level Transmitter
- 2-PT-68-322, Pressurizer Pressure Transmitter
- 2-PT-68-323, Pressurizer Pressure Transmitter

The inspectors compared construction installation drawings and associated installation documentation against the actual installation of the components. The inspectors performed this comparison to determine whether components, shown on the drawings, were of the type specified and whether they have been installed, located, oriented, supported, and protected in accordance with the drawing.

For the as-built verifications, the inspectors verified the status of design changes on the selected drawings to determine whether the applicant properly controlled and documented changes for engineering review, approval, and subsequent incorporation into the as-built drawings.

The following samples were inspected:

- IP 52053 Section 02.02.c - one sample (Engineered Safety Features Actuation System)
- IP 52053 Section 02.02.e - six samples

Documents reviewed are listed in the Attachment.

b. Observation and Findings

No findings were identified.

c. Conclusion

The inspectors concluded that the equipment observed was installed in accordance with procedures and drawings.

C.1.5 Piping – Work Observations (Inspection Procedure 49063)

a. Inspection Scope

The inspectors observed a final borescope inspection of the pressurizer surge line following implementation of clean plan 2-CP-068-03 for cleanliness in accordance with ANSI N45.2.1, "Cleaning of Fluid Systems and Associated Components During Construction Phase of Nuclear Power Plants," 1973. The inspectors reviewed the engineering evaluation and interviewed cognizant personnel to verify the cleanliness evaluation was acceptable. Documents reviewed are listed in the Attachment.

b. Observation and Findings

No findings were identified.

c. Conclusions

The inspectors concluded that clean plans were being implemented adequately and issues with cleanliness were evaluated and dispositioned in accordance with engineering and ANSI standards.

C.1.6 Verification of As-Built for Safety-Related Piping Systems (Inspection Procedures 37051 and 50073)

a. Inspection Scope

The inspectors performed field walkdowns of selected portions of the RCS piping to determine if final design drawings and specifications reflected:

- as-built conditions for supports (location, type, and configuration);
- pipe welds (locations and identification); and
- piping (location, size, configuration, component location, and valve orientation including valve actuators)

The inspectors performed inspection activities on the following mechanical SSCs:

System 068 RCS:

Miscellaneous Nozzles

- pipe section between RCS loop 2 crossover leg drain line and node 3 on drawing 2-47W465-218
- pipe section between RCS loop 2 cold leg accumulator #2 nozzle and node 101 on drawing 2-47W435-267A
- pipe section between RCS loop 2 boron injection tank nozzle and node 61 on drawing 2-47W435-218

Reactor Coolant Loop (RCL) Piping

- RCL 2 crossover leg piping documented on drawing 2281WBT-5
- RCL 1 hot leg piping documented on drawing 2281WBT-4
- RCL 2 cold leg piping documented on drawing 2281WBT-6

Pressurizer (includes pressurizer surge line and portions of pressurizer relief line from the pressurizer to PORVs)

- pipe section between nodes 40 and 34 on drawing 2-47W465-211
- pipe section between nodes 34 and 24a including valve 2-FCV-68-333 on drawing 2-47W465-211
- pipe section between nodes 34 and 45 including valve 2-FCV-68-332 on drawing 2-47W435-211
- pipe supports 2-68-001 and 2-68-005
- pipe section between nodes 2 and 29 on drawing 2-47W465-221

Reactor Coolant Pump (RCP) supports

- portions of RCP loop 2 tie rod structural steel equipment support document on drawings 48N413, 48N415, and 48N424
- portions of three RCP loop 2 vertical column structural steel equipment supports documented on drawings 48N411 and 48N412

Crossover Leg (CXL)

- portions of CXL loop 2 structural steel equipment support documented on drawing 48N421

S/Gs supports

- portions of S/G loop 2 lower structural steel equipment support documented on drawings 48N414 and 48N423
- portions of S/G loop 2 upper structural steel equipment support documented on drawings, 48N416, 48N417, 48N418, and 48N426
- portions of one S/G loop 2 vertical column structural steel equipment support documented on drawings 48N411 and 48N412

The following samples were inspected:

- IP 37051 Section 02.01.b.1 – one sample
- IP 50073 Section 02.04 – two samples

b. Observation and Findings

No findings were identified.

c. Conclusions

Based on the activities reviewed, the inspectors concluded that the as-built configurations of the sampled system reflected the construction drawings and specifications, safety analysis report (SAR), and NRC requirements.

C.1.7 (Closed) Reactor Vessel and Internals QA Review (Inspection Procedure 50051)

a. Inspection Scope

Background: In 1985, construction on WBN Units 1 and 2 was stopped due to the identification of multiple construction QA issues. As described in inspection manual chapter (IMC) 2517, TVA addressed these WBN Unit 1 construction quality issues as part of the implementation of its Nuclear Performance Plan (NPP). In 1985, the NRC had completed its initial IMC 2512 inspection program for the construction of WBN Unit 1. However, the initial WBN inspection program was found to have some weaknesses, which were identified and corrected after the construction inspection program was completed for Unit 1 but before the facility was licensed. Because of the complexity of the rework activities under the NPP, the NRC implemented a reconstitution of the construction inspection program to verify that construction-related inspections conducted after 1985 met the requirements of the IMC 2512 program. The results of this program were published in NUREG-1528, "Reconstitution of the IMC 2512 Construction Inspection Program for Watts Bar Unit 1." TVA completed Unit 1 in 1995 but had conducted very little Unit 2-specific work since 1985. In 2007, TVA decided to complete construction of Unit 2. As part of confirming that all issues and inspection requirements would be completed, the NRC performed a reconstitution of the IMC 2512 construction inspection program for Unit 2. This reconstitution determined, through review of NRC inspection reports, the status of the IMC 2512 inspection procedures (IPs) in effect at the time construction was stopped. The NRC used the results of the reconstitution process to identify areas which required additional inspections. IIR 05000391/2009602 (ADAMS Accession No. ML091210420), Attachment 2, documented the reconstitution results for IMC 2512 IPs relating to construction. The NRC determined that this IP would be implemented based on new work and in-place storage if new procedures were established.

Inspection Activities: The purpose of this IP was to confirm that:

- the applicant adequately addressed requirements through construction specifications, drawings, and work procedures;
- the applicant had QA plans, instructions, and procedures for the reactor vessel and internals established in the facility QA manual and implementing procedures; and
- the applicant had specifications or procedural controls associated with the reactor vessel and internals

Portions of this IP have been previously addressed through inspection samples credited in the following IIRs, including some where IPs 50053 and 50055 reactor vessel and internals work observations and records reviews were performed:

- 05000391/2009602 (ADAMS Accession No. ML091210420)
- 05000391/2009603 (ADAMS Accession No. ML092120326)
- 05000391/2011610 (ADAMS Accession No. ML12034A202)
- 05000391/2012604 (ADAMS Accession No. ML12167A212)
- 05000391/2012609 (ADAMS Accession No. ML12356A073)
- 05000391/2013612 (ADAMS Accession No. ML13088A066)
- 05000391/2014607 (ADAMS Accession No. ML14274A076)

The intent of this inspection effort was to perform a review of applicant procedures, including those previously reviewed, to verify that this IP can be closed.

Section 02.01 of this IP required the completion of IP 35100, which was completed and documented in IIR 05000391/2009602, Attachment 3. Additionally, inspectors previously reviewed PCI Energy Service's ASME QA manual for reactor pressure vessel (RPV) stud hole remediation work documented in IIR 05000391/2012604 to verify procedures and instructions had been established.

Section 02.02 of this IP required a review of the applicant's audit program to determine if the applicant had an established audit program (including plans, procedures, and schedules) for monitoring the personnel, work, and quality control (QC) functions for the limited reactor and internals installation work. The inspectors reviewed the audit plans and seven completed QA surveillances and determined that the applicant had established an audit program for monitoring reactor and internals work activities. The inspectors also previously sampled 10 PCI surveillances associated with protection and storage as documented in IIR 05000391/2012604. Additionally, the inspectors reviewed Bechtel's QA manual, as documented in IIR 05000391/2013609 (ADAMS Accession No. ML13353A599), which included a review of audits and surveillances in accordance with 10 CFR 50 Appendix B Criterion XVIII.

Section 02.03 of this IP was to determine the adequacy of the licensee and contractor training and qualification programs for personnel performing work with the reactor and internals installation. The inspectors reviewed Westinghouse Electric Company (WEC) document WBT-D-5038, "Qualifications for Westinghouse Personnel Performing Inspections of the Reactor Vessel Internals for the Tennessee Valley Authority Watts Bar Nuclear Plant 2," which qualified four individuals based on technical competence and experience commensurate with the scope of work performed.

Section 02.04 of this IP was to determine if appropriate and adequate procedures were included or referenced in the QA manual to ensure that specific work activities pertaining to reactor vessel and internals were controlled and performed according to NRC requirements and SAR commitments.

- Section 02.04.a, Receipt Inspection and Handling: The inspectors reviewed the applicant's receipt records of the Unit 2 RPV from Rotterdam Dockyard prior to TVA suspending construction in 1985. Subsequent to the construction restart, TVA and WEC drafted a Memorandum of Understanding to transfer responsibility of the RPV to WEC for any new work. The inspectors have previously reviewed

procedures and work activities associated with the RPV protection, handling, and storage requirements specifically with regards to stud hole remediation, split pin replacement, and quarterly storage and protection inspections meeting the intent of IP 50053, "Reactor Vessel and Internals Work Observation." Stud hole remediation was documented in IIR 05000391/2011610, IIR 05000391/2012604, and IIR 05000391/2012609. Split pin work was documented in IIR 05000391/2009603.

- Section 02.04.b, Crane and Rigging Testing and Vessel Lifting, required a review of crane rigging testing and vessel lifting procedures as well as braking and holding test procedures. This section was completed in IIR 05000391/2014607, Section C.1.4, with one sample obtained.
- Section 02.04.c, RPV and Internals Installation, required a review of work procedures established for handling, placement, leveling, and final adjustment as well as using special technical personnel. This section was completed in IIR 05000391/2014607, Section C.1.4, with one sample obtained.
- Section 02.04.d, RPV and Internals Installation Inspection, required a review of work procedures for inspection activities associated with RPV and internals installation. This section was completed in IIR 05000391/2014607, Section C.1.4, with one sample obtained.
- Section 02.04.e, Post-Installation Activities, required a review of vessel and internals protection and cleanliness procedures. This section was completed in IIR05000391/2014607, Section C.1.4, with one sample obtained.

Documents reviewed are listed in the Attachment.

b. Observations and Findings:

Below is a summary of each section of IP 50051:

- Section 02.01 – Complete
- Section 02.02 – Complete
- Section 02.03 – Complete
- Section 02.04 – Complete

c. Conclusion:

The inspectors determined that new procedures reviewed and work performance associated with the RPV and internals were adequate and established within QA requirements. Based on the historical NRC inspections and the recent inspection efforts, a sufficient number of samples have been performed in order to consider IP 50051 closed.

P.1 Preoperational Activities

P.1.1 Preoperational Test Program Implementation Verification (Inspection Procedure 71302)

a. Inspection Scope

02.01 (Weekly Inspection Activities): The inspectors verified that the applicant's management control system was effectively discharging its responsibilities over the preoperational testing program by direct observation of activities, tours of the facility, interviews and discussions with the applicant's personnel, and reviewing facility records. Preoperational testing activities included, as part of the weekly inspection activities during the inspection period, the following systems or portions thereof:

- System 062, Chemical and Volume Control System

As systems became available for preoperational testing, inspectors toured the accessible areas of the facility to make an independent assessment of equipment conditions, plant conditions, security, and adherence to regulatory requirements. Inspectors also verified the following, as available and on a sampling basis, during the tours:

- general plant/equipment conditions;
- plant areas for fire hazards - examined fire alarms, extinguishing equipment, actuating controls, firefighting equipment, and emergency equipment for operability and also verified that ignition sources and flammable material were being controlled in accordance with licensee's procedures (further discussed in Section F.1.1);
- activities in progress (e.g., maintenance, preoperational testing, etc.) were being conducted in accordance with licensee's procedures;
- listened for the public address system announcements to determine that blind spots do not exist; (i.e., cannot be heard clearly enough to be understood); and
- construction work force was authorized to perform activities on systems or equipment.

In addition, the inspectors observed the preoperational test setup of motor-operated chemical and volume control isolation valve 2-FCV-062-0090-A.

02.02 (Monthly Inspection Activities): During this inspection period, the inspectors reviewed the turnover package for the Unit 2 portion of the emergency raw cooling water system (System 67) as part of procedure SMP 4.0, "System Completion and Turnover," Rev.12, to verify jurisdiction controls were appropriate and applicant procedures were followed. Additionally, the inspectors reviewed the turnover package to ensure required preventative maintenance was incorporated into a schedule for accomplishment.

The inspectors reviewed maintenance plans on safety-related equipment, to determine if the maintenance was scheduled in accordance with developed procedures and that these procedures were adequate for the maintenance being performed. The inspectors also discussed the methodology of the maintenance program with the refurbishment and preventative maintenance manager to determine how systems with completed preoperational testing would be protected once they transition to operations.

b. Observations and Findings

No findings were identified.

c. Conclusion

The applicant's implementation of the preoperational test program was in accordance with procedures for those activities observed during the inspection period.

P.1.2 Preoperational Test Procedure Review (Inspection Procedures 70300 and 70336)

a. Inspection Scope

Background: The purpose of IMC 2513, Light Water Reactor Inspection Program - Preoperational Testing and Operational Preparedness Phase, issue date January 1, 1984, is to verify through direct observation, personnel interviews, and review of facility records that:

- Systems and components important to the safety of the plant are fully tested to demonstrate that they satisfy their design requirements.
- Management controls and procedures, including quality assurance programs, necessary for operation of the facility have been documented and implemented.

IMC 2513 defines the minimum inspection program for a finding of readiness for license issuance (IP 94300, Status of Plant Readiness for an Operating Licensee). IMC 2513 requires the procedural review of the mandatory tests defined in IMC 2513 and five of the primal tests defined in IMC 2513. The following inspection was performed in relation to satisfying the required procedural review.

Inspection Activities:

The inspectors reviewed 2-PTI-074-02A, "RHR Midloop Operation", Rev. 0 to verify that the procedure contained the following administrative good practice attributes:

- the title described the purpose of the procedure;
- the cover page had appropriate information and approval signatures;
- each page had appropriate identification information;
- a clear statement of procedure purpose/objectives;
- planning information such as prerequisites, precautions, required tools, reference documents, and coordination requirements;
- signoff requirements including concurrent and independent verification steps established where appropriate;
- equipment alignment instructions are clear and concise;
- equipment identifiers are accurate;
- actions to be taken within the steps are specifically identified;
- graphs, charts, tables, data sheets, and work sheets are clearly usable;
- calculation sheets technically accurate;
- clear coordination instructions for test activities involving multiple test personnel;
- clear instructions for system restoration;
- guidance for follow-up actions and points of contact;

- overall, clear concise steps for testing with action critical (acceptance criteria) steps identified; and
- overall sequence of the procedure consistent with the obtaining the intended result.

Additionally, the inspectors reviewed the procedure to insure that the following important system performance functions were adequately reflected in the test procedure:

- ability of the system to dissipate residual heat;
- proper operation of system components;
- controls and logic functions;
- all flow paths in each system configuration; and
- Engineered Safety Features.

The inspectors also reviewed the procedure to verify that precautions or explanations were placed immediately ahead of the steps to which they applied.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors determined that the applicant's test procedure was written in a manner consistent with the guidance of procedure SMP-8.0, "Watts Bar Nuclear Plant Unit 2 Administration of Preoperational Test Instructions," Rev.10. This completes the procedure review of pre-operational test procedure 2-PTI-074-02A.

P.1.3 Preoperational Test Witnessing – Reactor Coolant System Cold Hydrostatic Test (Inspection Procedures 70302, 70312 and 70462)

a. Inspection Scope:

Background: IMC 2513, Light Water Reactor Inspection Program - Preoperational Testing and Operational Preparedness Phase, issue date January 1, 1984, purpose is to verify through direct observation, personnel interviews, and review of facility records that:

- Systems and components important to the safety of the plant are fully tested to demonstrate that they satisfy their design requirements.
- Management controls and procedures, including quality assurance programs, necessary for operation of the facility have been documented and implemented.

IMC 2513 defines the minimum inspection program for a finding of readiness for license issuance (IP 94300, Status of Plant Readiness for an Operating Licensee). IMC 2513 requires the preoperational test witnessing of the mandatory tests defined in IMC 2513 and five of the primal tests defined in IMC 2513. The following inspection was performed in relation to satisfying the required preoperational test witnessing of a mandatory test.

Inspection Activities: The inspectors witnessed the performance of preoperational test procedure 2-PTI-068-14, "Reactor Coolant System Primary Hydrostatic Test, U2," to verify that the testing was conducted in accordance with applicant procedure SMP 9.0

“Conduct of Test”, Rev.4 and to verify the adequacy of test program records and preliminary evaluation of test results. The inspectors performed the following activities associated with this test observation:

- all test personnel were on station and had the latest revision of the procedure;
- test prerequisites were performed, specifically:
 1. joints, including welded joints, are left uninsulated and exposed for examination during the test
 2. valve lineup/system checklists are complete
 3. water quality and temperature are as stated in the procedure(s)
 4. properly calibrated pressure gauges of the required range are installed where required
 5. properly calibrated relief valves of the required setpoint and capacity are installed where required;
- plant systems were in service to support the test;
- test equipment was installed and was within calibration;
- test was performed in accordance with the approved procedure;
- test interruptions and continuations were handled in accordance with approved procedures and documented in the chronological test log;
- testing events and discrepancies were properly documented in the test deficiency log;
- test was executed and coordinated properly;
- data was properly collected;
- temporary equipment was installed and tracked appropriately;
- administrative test controls were properly followed;
- test personnel were using approved drawings and vendor manuals; and
- reviewed pump and valve hydrostatic test requirements to verify they were met on either a shop hydrostatic test or during a field hydrostatic test.

The inspectors observed the test to independently verify that test acceptance criteria were met by:

- visually examining at least 10 percent of all joints, connections, and regions of high stress, such as regions around openings and thickness transition sections;
- visually examining at least 20 percent of the pumps and valves located within the test boundaries; and
- verifying that leakage from temporary seals or leakage permitted by the design specification is being directed away from the surface of the component to avoid masking leaks from other joints.

Specifically, the inspectors performed walkdowns during the hydrostatic test, examining welds, pumps, valves, and major components. The inspectors examined Loop 1, Loop 2, the pressurizer shed, the RPV and nozzles, accumulators 1 and 2, and the seal table/keyway. These inspection areas included 50 percent of the pumps, over 75 percent of the welds, and over 30 percent of the valves in the reactor coolant system. The inspectors also observed the test conduct from the control room and verified that the pressure gauges indicated that the required hydrostatic pressure was met for the duration of the required hold time. Additionally, the hydrostatic test pressure gauges (M&TE #E51361 and E51365) were reviewed to verify that they were installed directly

into the RCS, had a range of 1.5 – 4 times test pressure, and otherwise complied with Subsection NB-6411 of the ASME code.

After the hydrostatic test of the vessel, the inspectors observed the applicant's magnetic particle examination of S/G 1 and S/G 2 primary hemispherical head to tube sheet circumferential weld joints and two heat-affected zones of Weld Category A, as identified by ASME Section III Subsection NB-5400. Additionally, the inspectors verified measuring and test equipment (M&TE) was within its respective calibration date and was used in accordance with procedure.

The inspectors conducted a review with the responsible test engineer to assure that the preliminary test evaluation was consistent with the inspector's observations. During the test, the inspectors observed important data gathering activities to ensure the data was properly gathered and recorded. A post-test review of the test data was performed to verify legibility, traceability, and permanence of the data sheet entries.

The inspectors performed a review of six design changes associated with the RCS since the system was turned over to the applicant's start-up group to verify that reviews, processing, and implementation were performed in accordance with established procedures.

The inspectors selected field change requests 62001, 62932, 62939, and the associated drawings which were changed, to verify that the changes were referred to the appropriate design engineers for review and revision.

The inspectors reviewed training records for four personnel involved in the cold hydrostatic test to verify they had received appropriate training for performing the test. Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors determined that the applicant's test was conducted in accordance with SMP 9.0 "Conduct of Test" and that the preliminary evaluation of test results was adequate and consistent with inspector observations. IP 70462 remains open pending verification that post-hydrostatic NDE results meet the applicable acceptance criteria (Step 02.03d).

P.1.4 (Closed) External Occupational Exposure Control and Personal Dosimetry (Pre-Operational) (Inspection Procedure 83524)

a. Inspection Scope

The inspectors reviewed and discussed with the applicant's staff the administrative measures for controlling access and external radiological exposures in both normal and emergency operations. The inspectors reviewed the adequacy of the licensee's dosimetry program to meet normal and emergency operational needs to meet NRC regulatory requirements, and Final Safety Analysis Report (FSAR) commitments. The inspectors focused on the emergency operations aspects, as the normal operations

aspects were covered under operational inspections of Unit 1. Specifically, the inspectors had performed a baseline inspection of the U1 Radiological Hazards Assessment and Exposures Controls using IP 71124.01 that included the access controls and exposure controls for normal operations during the week of April 14-18, 2014, and performed the baseline inspection of the Unit 1 Occupational Dose Assessment IP 71124.04 during the period of July 22-August 16, 2013. The results of the baseline operational inspections were documented in the U1 quarterly IIRs 05000390/2014003 (ADAMS Accession No. ML14213A424) and 05000390/2013004 (ADAMS Accession No. ML13309B280), respectively.

The inspectors reviewed applicant procedures to verify that adequate provisions had been made for providing around the clock coverage by individuals who have the authority in an emergency to authorize exposures in excess of 10 CFR 20 limits with specified criteria for using that authority, and that the program was consistent with current Environmental Protection Agency (EPA) emergency worker and lifesaving protective action guidelines. The inspectors assessed the adequacy of the provisions for contractor and other persons/agencies augmenting the onsite emergency organization and provisions for the controlling of exposures to security personnel to determine if the Radiological Emergency Plan Annex C adequately addressed both augmentation and security personnel. Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified concerning Unit 2 external exposure control or personal dosimetry. It was noted that the telemetric dosimetry in the guard towers provided real time data to the radiation protection organization of radiological conditions on site.

c. Conclusions

The inspectors determined that the occupational external exposure control and personal dosimetry programs that have been in place, since before the Unit 1 startup in 1996, are adequate to address the addition of Unit 2 as an operational unit. No significant program changes are anticipated for Unit 2 operation. No further inspection is required, IP 83524 is considered closed.

P.1.5 (Closed) Internal Exposure Control and Assessment [Preoperational] (Inspection Procedure 83525)

a. Inspection Scope

The inspectors reviewed and discussed with the applicant's staff the administrative measures for control and assessment of internal radiological exposures in both normal and emergency operations. The inspectors reviewed the adequacy of the licensee's respiratory protection, self-contained breathing apparatus (SCBA), and internal dosimetry programs to meet normal and emergency operational needs and to meet NRC regulatory requirements and FSAR commitments. The inspectors focused on the emergency operations aspects as the normal operations aspects were covered under operational inspections of Unit 1. Specifically, the inspectors had performed a baseline inspection of the Unit 1 Radiological Hazards Assessment and Exposures Controls using IP 71124.01 that included the access controls and exposure controls for normal operations during the week of April 14-18, 2014, and performed the baseline inspection

of Unit 1 In-Plant Airborne Radioactivity Control and Mitigation, IP 71124.03, during the period of July 22-August 16, 2013. The results of the baseline operational inspections were documented in the U1 quarterly IIRs 05000390/2014003 (ADAMS Accession No. ML14213A424) and 05000390/2013004 (ADAMS Accession No. ML13309B280), respectively. Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified concerning Unit 2 internal exposure control or internal dosimetry assessment. The inspectors determined that adequate provisions had been made for providing around the clock coverage, by individuals who have the authority in an emergency to authorize exposures in excess of 10 CFR 20 limits with specified criteria for using that authority, and that the program was consistent with current EPA emergency worker and lifesaving protective action guidelines. The adequacy of the provisions for contractor and other persons/agencies augmenting the onsite emergency organization and provisions for the controlling of exposures to security personnel were assessed. The security personnel have respirators pre-staged and readily available, which would reduce internal exposures due to particulates.

c. Conclusions

The inspectors determined that the occupational internal exposure control and internal dosimetry programs that have been in place since before the Unit 1 startup in 1996 are adequate to address the addition of Unit 2 as an operational unit. Adequate provisions for engineering controls, as well as respiratory protection, were in place. The licensee's program for logistically supporting the use of SCBAs in an emergency was acceptable. Dosimetry had adequate provisions for in-vivo and in-vitro bioassay in place. No significant program changes are anticipated for Unit 2 operation. No further inspection is required. IP 83525 is closed.

P.1.6 (Discussed) Control of Radioactive Materials and Contamination, Surveys, and Monitoring (Pre-Operational) (Inspection Procedure 83526)

a. Inspection Scope

The inspectors discussed the status of in-plant area radiation and airborne radioactivity monitoring and the expected turnover schedule. The inspectors walked down and reviewed portable instruments and equipment dedicated for emergency response in the Operations Support Center, Technical Support Center and field team vehicles including dosimetry, survey instruments, sample counters, air samplers and protective clothing. The inspectors reviewed program provisions for radioactive material and contamination controls to meet NRC regulatory requirements and FSAR commitments. The inspectors focused on the items that were not redundant to the baseline radiation protection inspections on the operating unit. Specifically, the inspectors had performed a baseline inspection of Unit 1 Radiological Hazards Assessment and Exposures Controls using IP 71124.01 that included radioactive material and contamination controls, surveys and monitoring for normal operations during the week of April 14-18, 2014, and performed the baseline inspection of Unit 1 Radiation Protection Instrumentation, IP 71124.05, during the period of July 22-August 16, 2013. The results of the baseline operational inspections are documented in the Unit 1 quarterly IIRs 05000390/2014003 (ADAMS

Accession No. ML14213A424) and 05000390/2013004 (ADAMS Accession No. ML13309B280), respectively. Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified. The Unit 2 in-plant area radiation monitors and airborne radiation monitors were not fully installed and had not been turned over for testing or calibration, therefore, unavailable for inspection. As a result, this IP was not completed.

The inspectors determined that there was sufficient stock and variety of portable instruments available to support both normal and emergency operations. The inspectors determined that the existing radioactive material and contamination control programs to include protective clothing supplies were adequate. The inspectors determined that the existing programs for calibration and use of portable instruments, in place since the startup of Unit 1, was adequate. The inspectors determined that the existing radiation, contamination, and airborne radioactivity programs would require minimal adjustment when Unit 2 becomes operational.

c. Conclusions

This inspection could not be completed at this time due to in-plant installed radiation monitoring and airborne radioactivity monitoring systems not being ready for inspection. The aspects of this procedure dealing with portable instruments, surveys, contamination monitoring and protective clothing were adequately addressed by the baseline inspections on Unit 1.

P.1.7 (Closed) Facilities and Equipment (Preoperational) (Inspection Procedure 83527)

a. Inspection Scope

The inspectors reviewed the radiation protection facilities and equipment for adequacy and as described in the FSAR. Even though the facilities for Unit 2 are common with those for Unit 1, the inspectors reviewed the facilities for factors that were not normally addressed in the baseline IPs for an operating unit. The inspectors reviewed the area used to calibrate/function test certain instruments with respect for the potential to interfere with low background counting equipment. The inspectors reviewed and discussed the facilities used to clean, repair, and decontaminate personal protective equipment, monitoring instruments, hand tools, and other equipment. The condition of the personnel decontamination area was inspected with respect to minimal facilities, the availability of replacement clothing, and personnel contamination monitoring equipment. The inspectors looked at pre-staged equipment such as survey equipment, signs, rope, and protective clothing. The inspectors reviewed the on hand instruments and equipment for adequacy to meet most operating and emergency contingencies with recognition that nearly identical assets were available at the Sequoyah facility, which is located approximately an hour away. Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified. The plant relies on TVA's Western Area Radiological Laboratory (WARL) in Muscle Shoals, Alabama for calibration of most hand-held instruments, but had a box calibrator to function check dose rate instrumentation. The location of this calibrator was such that it would minimally contribute to the background

of any low background counting instruments. Most of the low background counting to environmental levels was performed at the WARL facility. The calibration of contamination monitoring instrumentation uses sources that do not produce an appreciable radiation field and was likewise, unlikely to interfere with low level counting. The facility did have the capability for flow calibrating air samplers that were used inside the plant.

The facilities used to decontaminate plant equipment and highly contaminated tools were not used to decontaminate respirators. The radiological control area (RCA) access and egress control area was adequately equipped, posted, monitored, and supervised. The personnel decontamination facility had a shower, basin, and small dress area. Locker space was located a distance away from the personnel decontamination facilities but modest clothing was available if needed. Drainage from the decontamination facilities was collected in a dedicated tank for monitoring and processing.

The site had several areas that could be used to store contaminated equipment if necessary. The site had a fairly large training facility with classrooms, labs, and appropriate facilities to support concurrent training of various groups.

The office space for the permanent radiation protection staff was divided into three distinct areas. The first was in the administration building and serves the various management, supervisory, and technical personnel. The second was adjacent to the RCA control point for the technicians performing routine operational coverage. The third area was located in the training center for dosimetry personnel and equipment. The overall office space was deemed adequate.

The site had a medical facility in the training facility that could be used to stabilize a potentially contaminated patient prior to transport to a medical facility. The Radiological Emergency Plan had agreements with two local hospitals and had provisions with an area trauma center hospital. Procedures were in place for utilization of the various medical treatment resources.

Equipment used to support radiation protection that was not otherwise inspected had been routinely observed during radiation protection baseline inspections of Unit 1 and includes portable ventilation units with high efficiency particulate air filters, temporary and permanent shielding, and radios, phones, and page/intercom systems. The inspectors determined that the radiation protection facilities and equipment that have been in place since before the Unit 1 startup in 1996 are adequate to address the addition of Unit 2 as an operational unit.

c. Conclusions

No further inspection is required. IP 83527 is closed.

P.1.8 (Closed) Maintaining Occupational Exposures ALARA [Preoperational] (Inspection Procedure 83528)

a. Inspection Scope

The inspectors reviewed and discussed with licensee staff the ALARA (as low as reasonably achievable) Program to include current status with regard to cumulative

exposure and efforts taken to reduce source term. The inspectors have performed baseline inspections of the ALARA Program routinely since Unit 1 went on line in 1996. The inspection was last performed from July 22 through August 16, 2013 and was documented in the Unit 1 quarterly IIR 05000390/2013004 (ADAMS Accession No. ML13309B280). Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified. The plant ALARA Program was in place and functioning properly. The plant ranks in the first quartile with respect to pressurized water reactors throughout the United States when ranked for a three year rolling average dose in Rem/Operating Unit/Year. The plant three year rolling average for 2011-2013 was 38.805 Rem, which compares well with the 48 rem average for the pressurized water reactor fleet. The ALARA program in place for Unit 1 will be implemented for dual unit operation. The ALARA Program had covered Unit 2 construction and preoperational testing activities and will cover Unit 2 during start-up testing and plant operations.

c. Conclusions

No further inspection is required. IP 83528 is closed.

T.1 Training and Qualification of Plant Personnel

T.1.1 Craft Training associated with Construction Deficiency Report 89-09, Damaged, Loose, or Missing Hardware (Inspection Procedure 35007)

a. Inspection Scope

The inspectors observed activities associated with damaged, loose, or missing hardware training. This item is associated with Construction Deficiency Report (CDR) 89-09, Damaged, loose, or missing hardware which is further discussed in Section OA.1.9 of this report. The inspectors monitored field engineering classroom and the hands-on practical training sessions associated with the walkdown verifications for construction area completion and damaged, loose, or missing hardware. The inspectors reviewed construction area completion procedure NC PP-35, "Walkdown Verification for Construction Area Completion and Damaged, Loose, or Missing Hardware," Rev. 2, and verified that key procedure attributes were discussed during the training.

b. Observations and Findings

No findings were identified.

c. Conclusions

The applicant's programs for training field engineers to support the walkdown verifications for construction area completion were adequate.

III. OPERATIONAL READINESS ACTIVITIES

O.1 Operations

O.1.1 (Closed) Pre-Licensing Review of Training & Qualification Programs (Inspection Procedure 41301)

a. Inspection Scope

Background: The Unit 1 operations training programs are based on a Systems Approach to Training, as prescribed by the Institute of Nuclear Power Operations (INPO). Since the Unit 1 training programs are already established, the Unit 2 inspection was to evaluate the licensee's implementation of the September 2013 version of the Multi-Unit Operator Training and Certification Program (ADAMS Accession No. ML13319B206) to verify differences between Unit 1 and Unit 2 were incorporated to the Licensed Operator Continuing Training program. Specifically, the inspection was to verify that the facility "differences training," including the comprehensive "differences" written examination, job performance measure (JPM) test, and simulator modifications, supported the finding required by 10 CFR 55.47 (a)(3) that each applicant "has learned the operating procedures for and is qualified to operate competently and safely" WBN Unit 2.

On August 27, 2010, TVA submitted the "Watts Bar Nuclear Plant, Units 1 and 2 Multi-Unit Operator Training and Certification Program and Request for Review" (the Plan) (ADAMS Accession No. ML102930482). By letter dated November 18, 2010, TVA submitted Revision 1 to the Plan (ADAMS Accession No. ML111010586). The Plan described the licensee's approach for seeking dual-unit operator licenses, prior to Unit 2 initial fuel load, for operators already licensed on Unit 1 using a training program that was based on analysis of the differences between Unit 1 and 2.

In September 2013, because of delays with the construction of Unit 2, TVA updated the Watts Bar Unit Differences and Training Plan Report to incorporate facility changes that reconciled previously described plant differences. Specifically, a digital control system was installed in Unit 1 which reconciled approximately 50 percent of the differences identified in the previous Multi-Unit Operator Training and Certification Program. Accordingly, TVA revised the Multi-Unit Operator Training and Certification Program, which superseded the previous version in its entirety. The licensee had implemented the September 2013 version of the Multi-Unit Operator Training and Certification Program, with the exception of the power ascension testing training, which is scheduled to be conducted during the first segment of LOR training in January 2015.

Inspection Activities: The inspectors verified that the following WBN training programs' accreditation was renewed by the National Academy for Nuclear Training:

- Non-licensed operator
- Reactor operator
- Senior reactor operator
- Continuing training for licensed personnel
- Shift manager
- Shift technical advisor
- Instrument and control technician

- Electrical maintenance personnel
- Mechanical maintenance personnel
- Radiological protection technician
- Chemistry technician
- Engineering support personnel

The inspectors reviewed the September 2013 Multi-Unit Operator Training and Certification Program, including Attachment 1, Detailed Control Room Design and Instrument Location Unit Differences, and Attachment 2, Technical Specification Differences, to verify that the differences 1) were incorporated into the licensed operator requalification (LOR) Training Program, and 2) were not so significant that they would affect the operator's ability to operate each unit safely and competently.

As previously documented in WBN Unit 2 IIR 05000391/2014605 (ADAMS Accession No. ML14226A049), the inspectors evaluated the LOR differences training lesson plans, training delivery methods, and the quality of the test items on the comprehensive differences written examination.

The licensee subsequently administered the comprehensive written examination and JPM test over five weeks from August 1 – August 29, 2014, during LOR Cycle 14-03. The inspectors reviewed the licensed operators' scores and pass rates on the comprehensive differences exam, the JPM test scores, and the methods the licensee used to ensure exam security over the five weeks that the examinations were administered. Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The established and accredited Unit 1 training programs are acceptable to support the operation of Unit 2 for the licensed and non-licensed staff, in part, because Unit 2 is similar to Unit 1. The licensee's implementation of the September 2013 version of the Multi-Unit Operator Training and Certification Program (ADAMS Accession No. ML13319B206) supports the finding required by 10 CFR 55.47 (a)(3) that each applicant "has learned the operating procedures for and is qualified to operate competently and safely" WBN Unit 2. IP 41301 is considered closed.

O.1.2 (Closed) Quality Assurance Program - Receipt, Storage, and Handling of Equipment and Material and Unresolved Item 05000391/2014607-01, Potential Inadequate Storage of Safety-Related Equipment (Inspection Procedure 35747B)

a. Inspection Scope

Background: Until commercial operations begin for WBN Unit 2, the construction receipt, storage, and handling of equipment and material program activities are being performed and supervised by TVA's construction contractor using their own TVA-approved QA manual and procedures.

Inspection Activities: An unresolved item (URI) was identified in IIR 05000391/2014607 (ADAMS Accession No. ML14274A076) regarding inadequate storage of safety-related equipment. Additional information was required to determine if a performance deficiency existed, specifically a review of the following information was required to address the URI:

- review the actions associated with PER 920312;
- perform an independent review of the extent of condition data; and
- evaluate the corrective actions associated with those items applicable to WBN Unit 2.

b. Observations and Findings

The following finding was identified:

Introduction: The NRC identified a SL IV NCV of 10 CFR Part 50, Appendix B, Criterion XIII, "Handling, Storage and Shipping," for failure to properly store safety-related equipment in accordance with procedure 25402-PRO-007, "Field Material Storage Control," to prevent damage or deterioration.

Description: On August 6, 2014, the inspectors walked down the WBN Unit 2 warehouses to verify safety-related equipment was being properly stored and handled. A walkdown of WBN Unit 2 contractor warehouses four, five, six, and seven, and the Spring City warehouse revealed that safety-related equipment that was tagged "Level S Storage" may have been stored in warehouses with inadequate temperature controls to ensure the component's life cycle was not reduced due to environmental conditions. The inspectors performed an independent walkdown of WBN Unit 2 warehouses and identified a Rosemount pressure transmitter in WBN Unit 2 warehouse seven. Warehouse seven is a Level B storage facility with a temperature band of 40-140°F. The Rosemount transmitter has an allowable temperature band of -40-120°F which is more restrictive than the Level B temperature band. The inspectors also identified that the applicant's material storage and handling procedures do not define Level S storage. The applicant completed the extent of condition review and noted the following components may have been improperly stored:

- ASCO solenoid valves (less than 100F)
- Rosemount Pressure Transmitters (-40F-120F)
- Ameron yellow epoxy coatings (40F-100F)
- Ameron Safety Red epoxy (40F-100F)
- Keeler & Long red enamel coatings (50F-85F)
- Keeler & Long blue enamel coatings (50F-85F)
- Keeler & Long green enamel coatings (50F-85F)
- Keeler & Long Brown siloxane coatings (40F-100F)
- Keeler & Long Blue siloxane coatings (40F-100F)
- Keeler & Long Pacific Blue siloxane coatings (40F-100F)
- Keeler & Long Azure Blue siloxane coatings (40F-100F)
- Keeler & Long Powder Blue siloxane coatings (40F-100F)
- Keeler & Long White siloxane coatings (40F-100F)
- Keeler & Long Yellow siloxane coatings (40F-100F)
- Keeler & Long Purple siloxane coatings (40F-100F)
- Keeler & Long Black siloxane coatings (40F-100F)

Keeler & Long Red siloxane coatings (40F-100F)
 Keeler & Long Parchment siloxane coatings (40F-100F)
 Keeler & Long White self priming Kit enamel coatings (40F-100F)
 Keeler & Long Gray self priming Kit enamel coatings (40F-100F)
 PPG Compound Filler Kit (40-100F)
 PPG Self Leveling floor epoxy (50F-85F)
 Instacote Adhesive Kit (65F-105F)
 Instacote Primer Kit (65F-105F)
 Instacote Primer epoxy Kit (50F-95F)
 Henkel/Loctite Lapping Compound (46F-82F)

Based on the extent of condition review completed in PER 920312, additional evaluations were required for the ASCO solenoid valves. The evaluation determined the ASCO valves were impacted and had a reduction in shelf life and the site calculation was updated. The vendor was contacted for the other equipment where storage temperatures exceeded the allowable temperature ranges. The only equipment that was removed and scrapped was the Henkel/Loctite lapping compound; all of the other equipment remained unaffected.

All of the Level S equipment has been moved to conservatively posted and monitored warehouses that would ensure adequate temperatures are maintained. The other corrective actions address the programmatic and procedural problems, and the effectiveness review should verify the corrective actions were adequate.

The inspectors determined that the failure to properly store safety-related equipment in accordance with procedure 25402-PRO-007, "Field Material Storage Control," to prevent damage or deterioration was a performance deficiency. This performance deficiency was considered more than minor in accordance with IMC 2517, "Watts Bar Unit 2 Construction Inspection Program," and IMC 0613, "Power Reactor Construction Inspection Reports," because it was similar to example 18 in IMC 0613. Specifically, the performance deficiency is more than minor because inadequate environmental storage conditions adversely affected stored equipment requiring significant correction actions, such as a detailed engineering analysis, to establish the adequacy of the ASCO solenoid valves, and Henkel/Loctite lapping compound. The inspectors determined this finding to be of very low safety significance in accordance with Section 6.5 of the NRC Enforcement Policy. Specifically, the applicant failed to adequately store safety-related equipment; however, this finding did not represent a breakdown in the applicant's QA program for receipt, storage, and handling of equipment and material, or one with multiple significant examples. Specifically, most of the equipment was not affected; only the ASCO solenoid valves and Henkel/Loctite compound. The applicant issued PER 920312, "Material Tagged with Storage Level S EOC and Report," to address this issue. The finding has a cross-cutting aspect in the Procedure Adherence component of the Human Performance area, as defined in IMC 0310, because the applicant failed to following procedure 25402-PRO-007, "Field Material Storage Control." [H.8]

Enforcement: 10 CFR Part 50, Appendix B, Criterion XIII, "Handling, Storage and Shipping," requires, in part, that "measures shall be established to control the handling, storage, shipping, cleaning and preservation of material and equipment in accordance with work and inspection instructions to prevent damage or deterioration. When necessary for particular products, special protective environments, such as inert gas

atmosphere, specific moisture content levels, and temperature levels, shall be specified and provided.”

Contrary to the above, prior to August 6, 2014, the applicant failed to ensure that safety-related equipment was properly stored in accordance with site procedures to prevent deterioration by ensuring the equipment was maintained and stored in vendor-accepted temperature levels. Specifically, the applicant failed to ensure that ASCO solenoid valves, and other safety-related equipment, were being stored in temperature environments recommended by the vendor. Because this was a SL IV violation and the issue was entered into the applicant’s corrective action program as PER 920312, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. This violation is identified as NCV 05000391/2014608-02, “Inadequate Storage of Safety-Related Equipment.”

c. Conclusions

The inspectors concluded no further inspections are required to verify the adequacy of IP 35747B. IP 35747B and URI 05000391/2014607-01, Potential Inadequate Storage of Safety-Related Equipment, are considered closed.

F. 1 Fire Protection

F.1.1 Procedures - Fire Prevention/Protection (Inspection Procedure 64051)

a. Inspection Scope

The inspectors performed a walkdown of construction areas to determine whether construction activities and areas met procedure requirements for fire protection. The inspectors selected a limited set of field-verifiable attributes from fire operating requirement instructions and preventive maintenance guidance for field observation and evaluated 14 fire suppression devices.

The inspectors visually observed the physical condition of portable fire extinguishers in the Unit 2 construction areas to ensure they were free of obstructions and easily accessible, that seals were not broken, and that there was no evidence of physical damage, corrosion, or other impairments. The inspectors reviewed preventive maintenance instructions to determine whether records of these 14 fire suppression devices met procedure inspection requirements.

The inspectors observed three construction activities using ignition sources to determine whether fire prevention procedure requirements were met. This included the handling and use of flammable materials and the use of combustible materials relative to locations of flammable ignition sources. Specifically, the inspectors observed fire watch activities related to:

- welding and grinding under WO 116027915, Modify HVAC Support 121-1688, U2 Containment;
- welding and grinding under WO 115778492, TD Auxiliary Feedwater Pump 2A-S, Auxiliary Building EL 692; and
- welding under WO 115499021, Unit 1 High Pressure Fire Protection System, Auxiliary Building EL 737. Fire protection Impairment Permit # C14-0683,

supported the cutting out of valve 2-ISV-26-688 and installation of new valve 2-ISV-26-1476B

The following fire suppression devices were observed:

Portable Fire Extinguishers

- AB-6 (Auxiliary Building, EL 692, A8W, Outside M&TE Hot Tool Room)
- AB-10 (Auxiliary Building, EL 692, A8T, by elevator)
- U2-27A (U2 Containment Building, EL 713, Az. 45)
- U2-21 (U2 Containment Building, EL 713, Az. 45)
- U2-19-A (U2 Containment Building, EL 713, Az. 80)
- U2-25 (U2 Containment Building, EL 713, Az. 80)
- U2-28 (U2 Containment Building, EL 709, Az. 340)
- U2-18 (U2 Containment Building, EL 709, Az. 340)
- U2-22 (U2 Containment Building, EL 708, Az. 305)
- U2-29 (U2 Containment Building, EL 708, Az. 305)
- U2-20-A (U2 Containment Building, EL 708, Az. 145)
- U2-26 (U2 Containment Building, EL 708, Az. 145)
- U2-33 (U2 Containment Building, EL 708, Az. 165)
- U2-32 (U2 Containment Building, EL 708, Az. 165)

The following samples were inspected:

- IP 64051 Section 02.07 – 14 samples
- IP 64051 Section 02.08 – three samples

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The applicant generally implemented adequate fire protection measures and controls to support Unit 2 construction activities and minimize impact on Unit 1 operational activities.

IV. OTHER ACTIVITIES

OA.1.1 (Discussed) Cable Issues Corrective Action Program – Sub-Issue: Supports in Vertical Trays and Construction Deficiency Report 50-391/89-04: Support of Class 1E Cables Installed in Long Vertical Cable Tray Runs (Temporary Instruction 2512/016 and Inspection Procedure 51063)

a. Inspection Scope

Background: The Cable Issues CAP – Sub-Issue: Supports in Vertical Trays and CDR 391/89-04: Support of Class 1E Cables Installed in Long Vertical Cable Tray Runs, are similar issues and have been inspected together.

The concern that long vertical cable tray runs may not be adequately supported was initially reported to the NRC on May 26, 1989, in accordance with 10 CFR 50.55(e) as Condition Adverse to Quality Report (CAQR) WBP 880575. The follow-up final report associated with the notification (ADAMS Accession No. ML073551053) was transmitted by letter dated September 7, 1990, and identified the apparent cause, safety implications, and planned or completed corrective actions.

TVA's plans were to use the same approach as used at WBN Unit 1 and using the requirements in General Construction Specification G-38, which meets current standards. TVA commitments in this regard (NCOs 890140002, 890140007) are to:

- report on support of Class 1E cables installed in long vertical cable tray runs in Unit 2 before Unit 2 fuel loading; and
- complete calculations, walkdowns, evaluations, and rework for Unit 2, as required to address this issue, before Unit 2 fuel loading.

IIR 05000391/2013605 (ADAMS Accession No. ML13220A640) concluded in Section OA.1.2 that the programmatic aspects of the applicant's implementation plan for this CAP were adequate. This is generally the same conclusion reached in Section OA.1.13 as reported in IIR 05000391/2010605 (ADAMS Accession Number ML110410680). One observation of work associated with kellem grips was observed in IIR 05000391/2014605 (ADAMS Accession Number ML14226A049)

Inspector Activities: The inspectors observed the installation of kellem grips in vertical cable tray 3B11911/3B1912, associated with WO 114316597, to verify that the weight of the cables was on the kellem grips. The WO installed seven kellem grips in the cable tray. The inspectors also determined whether the installation was done in accordance with drawings and procedure MIA 3.2, "Cable Pulling for Insulated Cables Rated Up to 15,000 Volts," Rev. 27. Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusion

The inspectors concluded that the sampled vertical supports were installed in accordance with the drawings and procedure. This item is remaining open for additional samples of field observations.

OA.1.2 (Discussed) Cable Issues Corrective Action Program Sub-issue: Physical Cable Separation and Electrical Isolation (Temporary Instruction 2512/016)

a. Inspection Scope

IIR 0500391/2014605, Section OA.1.2, discussed the Cable Issues Corrective Action Program Sub-issue: Physical Cable Separation and Electrical Isolation. During a review of the report, it was determined that TI 2512/016 was an incorrect TI. The correct TI should be 2512/020. No inspection activities were performed during this report period; this section is only intended to provide clarification for incorrect reference to TI 2512/016.

b. Observations and Findings

No findings were identified.

c. Conclusions

TI 2512/016 was incorrectly referenced in IIR 0500391/2014605. This serves as clarification that the correct TI is TI 2512/020.

OA.1.3 (Discussed) Generic Letter 96-01, Testing of Safety-Related Logic Circuits (Temporary Instruction 2515/139)

a. Inspection Scope

Background: In 1996, the NRC published Generic Letter (GL) 96-01 (ADAMS Accession No. ML031110002) requesting licensees to verify that surveillances, required by technical specifications (TS), were being properly performed. Specifically, licensees were requested to: 1) compare electrical schematic drawings and logic diagrams for the reactor protection system (RPS), emergency diesel generator load shedding and sequencing, and actuation logic for the engineered safety features systems against plant surveillance test procedures to ensure that all portions of the logic circuitry, including parallel logic, interlocks, bypasses, and inhibit circuits, were adequately covered in surveillance procedures to fulfill the TS requirements; and 2) modify the surveillances necessary for completed testing to comply with the technical specifications. These actions were to be accomplished prior to startup from the first refueling outage commencing one year after the issuance of the GL.

For Unit 1, the licensee provided a "Response to Generic Letter 96-01, Testing of Safety Related Logic Circuits", (ADAMS Accession No. ML082401216) which included commitments to complete reviews of Surveillance Instructions (SIs) that implemented TS requirements for Unit 1 and evaluate the procedures in accordance with GL 96-01 recommendations. NRC Generic Letter 96-01 Review Report, dated March 1998, was completed by the licensee and detailed the review that took place to fulfill the generic letter requirements on Unit 1. The licensee also committed to implement the

recommendations of GL 96-01 prior to initial fuel load for Watts Bar Unit 2. These commitments were also included in the “Watts Bar Nuclear (WBN) - Unit 2 – Regulatory Framework for the Completion of Construction and Licensing Activities for Unit 2” (ADAMS Accession No. ML080320443).

Inspection Activities: During the inspection period, the inspectors reviewed SIs identified by the applicant as being related to the scope of the GL. The SIs reviewed were 2-SI-99-202-A, “18 Month Trip Actuating Device Operational Test of Reactor Trip Bypass Breaker A From Automatic SI Input From ESFAS Train B”, and 2-SI-99-202-B, “18 Month Trip Actuating Device Operational Test of Reactor Trip Bypass Breaker B From Automatic SI Input From ESFAS Train A”. The documents were reviewed and compared to the TS to verify that the documents were in alignment and the testing completed by the applicant applied “all portions of the logic circuitry, including parallel logic, interlocks, bypasses, and inhibit circuits” as needed to fulfill the requirements of TS. The inspectors also reviewed logic drawing, 2-45W600-99-1, which was issued for Unit 2, to verify that SIs were reviewed against referenced logic and schematic drawings and the appropriate updates were applied to the drawings. Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified. The inspectors determined that the applicant had not accomplished the GL 96-01 reviews and had not met the GL requirements and their commitments. In response to the inquiries made in the inspection, the applicant proposed actions in PER 931429, “NRC identified level of detail used in review of SIs.”

c. Conclusion

The inspectors concluded that further inspection will be required, including review of corrective actions for PER 931429. Therefore, GL 96-01 will remain open for further review.

OA.1.4 (Discussed) Equipment Seismic Qualification Corrective Action Program Plan (Temporary Instruction 2512/021 and Inspection Procedures 51053, 51055, 52053, 52055, 50073, and 37051)

a. Inspection Scope

Background: The Equipment Seismic Qualification Corrective Action Program (ESQ CAP) was developed by TVA to provide reasonable assurance that Category I and I(L) equipment were adequately qualified for design basis seismic events and were in compliance with the regulatory and licensing requirements. IIR 05000391/2013610 (ADAMS Accession No. ML14049A158) documented inspection results and background details of the ESQ CAP. Recent inspection efforts associated with the ESQ CAP were documented in IIRs 05000391/2011608 (ADAMS Accession No. ML11311A082) and 05000391/2014605 (ADAMS Accession No. ML14226A049).

Inspection Activities: The purpose of this inspection was to gather sufficient information to determine if the applicant’s ESQ CAP plan was satisfactorily implemented and to verify that the issues addressed in the CAP were adequately resolved. The inspectors

reviewed and evaluated a representative sample of WBN Unit 2 seismic category I equipment and instrumentation, and evaluated several corrective actions performed by the applicant to resolve historic issues of the ESQ CAP for WBN Unit 2. The review included field observation of actual equipment configuration and installation, accepted by QC, to verify their compliance with NRC requirements and applicant commitments. The inspectors reviewed seismic test and analysis documentation and conducted walkdowns of the following installed Category I equipment and instrumentation:

Equipment Type	Equipment Unique Identification Number (UNID)
Bypass Valve	WBN-2-BYV-062-0538-S
Bypass Valve	WBN-2-BYV-068-0552
Fan	WBN-2-FAN-030-0074-A
Fan	WBN-2-FAN-030-0214
Motor	WBN-2-MTR-062-0061-B
Motor	WBN-2-MTR-068-0332-B
Motor Operated Valve	WBN-2-MVOP-063-0001-A
Motor Operated Valve	WBN-2-MVOP-067-0083-B
Pump	WBN-2-PMP-070-0131-A
Pump	WBN-2-PMP-070-0130-B
Temperature Control Valve	WBN-2-TCV-067-0092-A
Temperature Control Valve	WBN-2-TCV-067-0115
Tank	WBN-2-TANK-062-0129
Tank	WBN-2-TANK-062-0239

The inspectors reviewed the seismic qualification documents, for the selected equipment, to verify that they were retrievable and that the equipment was adequately qualified for the design seismic conditions. Additionally, the inspectors interviewed applicant staff and reviewed a number of drawings, test reports, walkthrough data, design calculations, and seismic calculations. The inspectors reviewed these qualification documents to verify that they complied with the applicable requirements of the design criteria, and that the interface was properly considered as an input to these documents. The inspectors reviewed several of the seismic and interaction inputs documented in equipment qualification records and piping analysis calculations to verify their adequacy.

Field verifications were performed by the inspectors to determine if the equipment installed mounting configuration was consistent with applicable installation drawings and the analyzed mounting configuration. The inspectors examined several pieces of equipment to verify that selected attributes of the design and construction documents were adequately reflected in the installation. The attributes observed by the inspectors included mounting details, anchorage of equipment, condition of mounted instruments, and equipment locations. The inspectors also reviewed outstanding design changes for some of the selected equipment and instrumentation and confirmed that these changes were properly controlled and documented.

The inspectors also observed the completed installation of the selected equipment to determine, as applicable, whether:

- installation requirements such as proper location, placement, orientation, configuration, alignment, mounting (including bolt torqueing of), flow direction, and tolerances were met;
- specified instrument components and associated items were used.
- components were correctly and permanently identified;
- cleanliness requirements were maintained or otherwise satisfied;
- installed equipment was adequately protected from adjacent construction activities;
- nonconforming components or conditions were identified and controlled in accordance with approved procedures;
- status of completion, maintenance, and readiness for preoperational testing was documented;
- adequate provisions were taken to ensure that the validation of the environmental qualification of instrument components was maintained;
- appropriate drawings and work procedures were available to installers;
- installation requirements, construction drawings, specifications, and work procedures were technically adequate and of the latest approved issue;
- design changes relevant to the work being observed had been appropriately processed through required review and approval routes;
- compared portions of drawings matched the actual installation;
- final design drawings and specifications reflected as-built conditions;
- the pertinent quality-related records relative to the components conform with established procedures and reflected work accomplishment consistent with requirements;
- hold points were observed; and
- preparation and maintenance of installation and inspection records were adequate.

Identification and Resolution of Historic ESQ CAP Problems

The inspectors reviewed several PERs issued to track and resolve historic issues of the ESQ CAP for WBN Unit 2. This was done to determine if these issues were properly identified, addressed, and resolved by the applicant as part of the implementation of the ESQ CAP. The inspectors reviewed and evaluated the corrective actions associated with the following PERs:

- PER 172739 was documented to identify remote valve extension operators attached to safety-related valves and ensure adequate seismic qualification documentation was provided. This condition existed on Unit 1 and calculation WCG-ACQ-0365 was created to evaluate the existing conditions of the remote valve operator system. In addition, the calculation analyzed the two most limiting conditions for seismic capability, thereby enveloping the remaining remote valve operating systems. For Unit 2, the applicant's ESQ CAP closure report addressed the issue of the remote valve operator systems impact on the seismic qualification of the associated valves. These valves, with remote valve operator systems, were also evaluated and qualified using calculation WCG-ACQ-0365. In addition, some remote valve operator systems for safety-related valves required redesign and rework to meet the bounding conditions of the calculation.

The inspectors reviewed a sample of engineering document construction releases (EDCRs), 52945, Rev. B and 53122, Rev. B, to determine if the modifications met the qualifications of calculation WCG-ACQ-0365. The review included a determination that the documentation and field observations of completed and on-going work demonstrated that installations of remote valve operator systems conformed to the above calculation. The inspection sample included direct observations of the following installations of remote valve operator systems:

- 2-RROD-062-0538
 - 2-RROD-062-0539
 - 2-RROD-062-0541
-
- PER 145138 was originally identified to document the inability to retrieve the evaluation for 1-3/8" A325 bolts that attached the Residual Heat Removal (RHR) Heat Exchanger to the upper steel support frame. In order to address this PER, the licensee revised the Units 1 and 2 calculations for all heat exchangers, as needed to address anchorage concerns. As part of the review of this PER, the inspectors reviewed the calculations and verified that field conditions were accurately reflected in the calculations. Specifically, the inspectors reviewed the portion of the calculation related to the seal water heat exchanger (WBN-2-HTX-062-0066) and verified that the installed configuration was accurately reflected in the design calculation.
 - PER 143828 was issued to address concerns previously documented in PER WBP870261 that identified mechanical piping and isolation valves attached to the steel containment vessel penetrations (i.e. X-4, X-5, X-6, X-7, X-9A, X-9B, X-10A, X-10B, X-11, and X-80) did not have qualification documentation readily retrievable. It also identified that the physical drawings did not reflect existing analysis identification for those piping attachments. The applicant performed and issued 10 piping stress evaluations for the isolation valves and penetrations to meet the requirements of ASME Section III and Design Criteria WB-DC-40-31.7, "Analysis of Category I and I(L) Piping Systems." The inspectors reviewed the stress evaluations as well as the summary of the overall piping analysis to verify adequacy of corrective actions.
 - PER 144114 was issued to address concerns documented in Significant Corrective Action Report (SCAR) WBP890358 that identified electrical components and circuits of non-safety-related electric air heaters located in safety-related structures that were not seismically qualified to prevent them from falling on or interfering with the function of safety-related equipment, as required for Category I(L) equipment. These air heaters were evaluated as part of the Integrated Interaction Program's engineering walkthroughs and calculations and they were qualified without the need for modifications. The inspectors reviewed qualification documents and observed the existing field conditions from three of these heaters to verify that they were adequately qualified and evaluated.

The following samples were inspected:

- IP 52053 Section 02.02d – four samples
- IP 52053 Section 02.02e – four samples
- IP 50073 Section 2.02.c – six samples
- IP 50073 Section 2.04 – six samples
- IP 51053 Section 2.02.f – one sample
- IP 37051 Section 2.01.b – five samples

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors concluded that the reviewed corrective actions associated with the ESQ CAP were adequately performed, documented, and completed.

The ESQ CAP (TI 2512/021) will remain open pending inspection of the following associated items:

- Additional field verification of final as-builts for several equipment categories.
- Additional review of several programmatic aspects of the ESQ CAP, including the review of interface and seismic evaluations.

OA.1.5 (Discussed) Generic Letter 2006-02: Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power (Inspection Procedure 92701)

a. Inspection Scope

Background: Starting with the blackout event that took place on August 14, 2003, in the Northeastern United States and parts of Canada, along with information obtained from inspections and risk insights developed by an NRC expert panel, concerns were raised that degraded conditions associated with grid reliability may impact public health and safety and/or compliance with regulations. These conditions included the use of long-term periodic grid studies and informal communication arrangements to monitor real-time grid operability, potential shortcomings in grid reliability evaluations performed as part of maintenance risk assessments, lack of pre-established arrangements identifying local grid power sources and transmission paths, and potential elimination of grid events from operating experience and training. GL 2006-02 "Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power" (ADAMS Accession No. ML060180352) was issued on February 1, 2006, to determine if compliance was being maintained with regulatory requirements governing electric power sources and associated personnel training.

In a letter dated May 3, 2007, (ADAMS Accession No. ML071080225) the NRC notified TVA that their response to GL 2006-02 was considered complete for the Watts Bar Nuclear Plant, Unit 1. The NRC completed a safety evaluation (ADAMS Accession No. ML100080768) of TVA's response to GL 2006-02 for Unit 2. The safety evaluation report

(SER), dated January 20, 2010, concluded that TVA's response and regulatory commitments made for GL 2006-02 were acceptable. The report also indicated that prior to closing out the review of TVA's response to this GL for Unit 2, the following would be required:

- independent verification that the regulatory commitments discussed have been met; and
- a review of the associated electrical design calculations for WBN Unit 2.

The commitments are listed in Enclosure 2 of a TVA letter dated October 9, 1990 (ADAMS Accession No. ML073551056).

Inspection Activities: The inspectors reviewed historical documents and interviewed responsible engineers to understand the status of the updated two-unit baseline electrical calculations required for the development of protocols in place between WBN and the power system operator and any associated revisions to the implementing procedures. The inspectors reviewed the current version of calculation EDQ00099920070002, "AC Auxiliary Power System Analysis," Rev. 39, to verify that the scope covered the analysis for the adequacy and functionality of the auxiliary power system to support two unit operations. Documents reviewed are listed in the Attachment.

b. Observations and findings

No findings were identified. The inspectors observed that the two-unit operation calculation had not yet been updated and released as an official record.

c. Conclusion

Based on the inspection results, the inspectors concluded that additional inspection should be performed when final revisions are completed for applicable calculations, analyses, and procedures addressing the issues in GL 2006-02.

OA.1.6 (Discussed) Three Mile Island Action Item II.D.3 – Direct Indication of Relief and Safety-Valve Position and Supplemental Safety Evaluation Report Appendix HH Item 074: Installation of the Acoustic monitoring system for the Power Operated Relief Valves (Inspection Procedure 92701)

a. Inspection Scope

Background: This Three Mile Island (TMI) action item requires that RCS relief and safety valves provide positive indication of valve position in the main control room and that indication is derived from a reliable valve-position detection device or a reliable indication of flow in the discharge pipe. Implementation is required to be completed prior to fuel-load. The inspectors had previously documented their review of actions to address this item in IIR 05000391/2010603 Section OA.1.13 (ADAMS Accession No. ML102170465), IIR 05000391/2010605 Section OA.1.5 (ADAMS Accession No. ML110410680), and 05000391/2012605 Section OA.1.6 (ADAMS Accession No. ML12220A536). These previous reviews included verification that NRC requirements and SAR commitments were correctly translated into design drawings and design change packages and that procedures for Unit 2 assured that designs were adequately

controlled. These inspection activities were conducted to verify that procurement documentation and storage of related components adhered to the applicable procedural requirements and specifications.

Inspection Activities: During this inspection period, the inspectors reviewed the overall status of the actions to comply with the subject TMI action item. The inspectors reviewed drawings and conducted interviews with responsible engineers to assess the components of the acoustic monitoring system that are still pending installation. The inspectors conducted walkdowns as necessary to verify that the following indications exist in the main control room; in accordance with TVA's overall response to this TMI action item:

- Temperature downstream of the power-operated relief valves (PORVs)
- PORV direct valve position indication light
- Pressurizer Relief tank (PRT) temperature
- PRT pressure
- PRT fluid level

All components necessary to drive the signals for these indications were not installed. The inspectors conducted walkdowns to independently assess the work, performed under WOs 110800410 and 113690910, associated with the acoustic monitoring system of the pressurizer safety relief valves and PORVs. The inspectors reviewed manufacturer drawings and installation instructions to verify the adequacy of installed equipment configurations. Documents reviewed are listed in the Attachment.

b. Observations and findings

No findings were identified.

c. Conclusion

This TMI action item should remain open until WBN Unit 2 has finalized the installation of associated components. SSER Appendix HH, Item 74, will remain open until the inspectors are able to independently verify that the remaining components of the acoustic monitoring system have been installed and wired. Specifically, the inspectors need to sample completed installation of the sealed piezoelectric accelerometers and remaining wiring of the system to include the terminations upstream and downstream of the charge converters.

OA.1.7 (Discussed) Hydrogen Igniter Backup Power – Generic Safety Issue 189 and Temporary Instruction 2515/174 (Inspection Procedure 92701)

a. Inspection Scope:

Background: The inspectors had previously reviewed the applicant's documentation to verify system design, SAR commitments, equipment arrangement, wiring diagrams, load calculations, portable diesel load testing, and walkdown of the equipment as identified in IIR 05000391/2011608, Section OA.1.7 (ADAMS Accession No. ML11311A082), and 05000391/2012609, Section OA.1.2 (ADAMS Accession No. ML12356A073).

Inspection Activities: The inspectors reviewed Unit 2 portable equipment connection procedures, staff training plans, equipment maintenance procedure and schedules to determine the adequacy of the implementation process. The inspectors interviewed responsible individuals for the training and maintenance of equipment to determine adequacy of staff knowledge and involvement in system operability. The inspectors reviewed WOs to verify that periodic maintenance and testing being conducted on portable power equipment, to be used as the source of backup power for the hydrogen igniters, were consistent with vendor recommendations. The maintained and tested equipment included the portable diesel generator and the associated dry type transformer. Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusion

The inspectors concluded that the documented maintenance activity to support the readiness of the portable equipment that provides back-up power for the hydrogen igniters was adequate. The inspectors concluded that this item will remain open until the system components are installed in their final location, Unit 2 implementation procedures are approved and issued, the assessment of an established Unit 2 training program, and the review of initial operational test results are performed.

OA.1.8 (Discussed) Generic Letter 79-36, Adequacy of Station Electric Distribution System Voltages (Inspection Procedure 92701)

a. Inspection Scope

Background: The inspectors had previously reviewed the applicant's documentation to verify system design, SAR commitments, equipment arrangement, and performed walkdowns of the equipment as identified in IIR 05000391/2011612, Section E.1.1 (ADAMS Accession No. ML11348A081), and 05000391/2014605, Section OA.1.5 (ADAMS Accession No. ML14226A049).

Inspection Activities: The inspectors reviewed the commitment completion final closure package (10177824, Rev. 1) for the modified response to GL 79-36, to determine if the applicant's analysis and tests documented the adequacy of station electric distribution system voltages. The inspectors reviewed calculations attached to the closure package to determine if the analysis covered the GL guidelines to establish the adequacy and functionality of the auxiliary power system to support a two-unit operation. As indicated in the GL, in order to address the two-unit operation a separate analysis should be performed for each unit assuming (1) an accident in the unit being analyzed and simultaneous shutdown of all other units at the station or (2) an anticipated transient in the unit being analyzed and simultaneous shutdown of all other units at the station, whichever presents the largest load demand situation. The inspectors reviewed calculations developed by the applicant for the two-unit operation. The inspectors reviewed other calculations that dealt with diesel generator loading (EDQ00099920080014) to establish the unit that showed the heaviest loading to apply that information to the analysis for the voltage drop across the electrical distribution system. Documents reviewed are listed in the Attachment.

b. Observations and findings

No findings were identified.

c. Conclusion

The inspectors concluded that TVA has conducted adequate testing to perform a comparison between analyzed voltage levels and measured voltage readings. However, this item will remain open pending review of the revised two-unit operation analysis for accident conditions and simultaneous shutdown of the other unit at this site as indicated by the GL.

OA.1.9 (Discussed) Construction Deficiency Report 391/89-09, Significant Trend Associated with Damaged, Loose, or Missing Hardware (Inspection Procedure 35007)

a. Inspection Scope

Background: On November 15, 1989, TVA notified the NRC, in accordance with 10 CFR 50.55.e, about a significant trend associated with damaged, loose, or missing hardware at WBN Unit 1. The applicant also documented that walkdowns planned at the time the trend was identified did not totally envelope the population of these conditions. The adverse condition revealed a trend involving various hardware and components such as pipe supports, doors, valves, panels, junction boxes, conduits, and other items. The issue was documented as CAQR WBP 890502 and CDR 89-09. An interim report was submitted on December 15, 1989, and a final report submitted on May 10, 1990.

To address these issues for Unit 1, a program was developed to systematically walkdown many of the SSCs. To prevent recurrence, the following actions were taken:

- training was developed,
- procedures were revised to include adequate precautions against plant damage,
- workplans and maintenance requests were revised to better control housekeeping and protection of adjacent plant equipment,
- scaffold procedures were revised to ensure that plant equipment was not affected, and
- controls were reestablished through system turnovers

For Unit 2, TVA initiated PER 145010 to track the historical condition adverse to quality and its applicability to Unit 2. The applicant utilized existing procedures, developed new construction procedures, and provided training to assure correction of damaged, loose, or missing hardware before systems transition to operations.

More recently, IIR 05000391/2013605 (ADAMS Accession No. ML13220A640) Section OA.1.9, documented a review by NRC inspectors of several procedures developed to address the deficiencies previously identified and documented in CDR 89-09.

Inspection Activities: The inspectors reviewed additional procedures that the applicant will use when verifying the final installation of components. The inspectors reviewed these procedures to determine whether they adequately addressed the deficiencies previously identified and documented. The inspectors also reviewed procedures that

were developed to prevent recurrence such as controls for housekeeping and scaffold assembly.

The inspectors observed training associated with the implementation of corrective actions for CDR 89-09, as discussed in Section T.1.1 of this inspection report. The inspectors interviewed personnel to determine how and when the applicant plans on implementing the procedures.

Documents reviewed are listed in the Attachment.

b. Observations and findings

The following finding was identified:

Introduction: The NRC identified a SL IV NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the applicant's failure to accurately prescribe the work activities of WO 115834758 which were intended to correct a condition adverse to quality related to PER 858657.

Description: On September 16, 2014, while conducting a walkdown, the NRC inspectors identified loose flange bolts on WBN-2-RFV-067-1025A-A. The inspectors then asked for a corrective action and WO history on this relief valve and determined that this safety-related relief valve had a condition adverse to quality identified on March 3, 2014, and was never corrected. On March 3, 2014, WBN Unit 2 Construction identified conditions adverse to quality, loose flange bolts, on five relief valves and documented them in their CAP as PER 858657 (C level). One of the five relief valves was WBN-2-RFV-067-1025A-A, which is a safety-related relief valve for the lower containment coolers on the essential raw cooling water side. WO 115834758 was generated to correct the adverse conditions on WBN-2-RFV-067-1025A-A and WBN-2-RFV-067-0566C-A. On July 9, 2014 WO 115834758 was implemented and the wrong valve, WBN-2-RFV-067-1025C-A instead of WBN-2-RFV-067-1025A-A, was worked on and then verified by QC. The WO and PER were closed out as complete. The corrective actions in PER 858657 and portions of WO 115834758 listed the correct valve number designations; however, upon further review of the WO, the inspectors found that the datasheet for WO 115834758 listed the incorrect valve number.

The inspectors determined that the failure to accurately prescribe the work activities of WO115834758, which was intended to correct a condition adverse to quality associated with actions related to PER 858657, was a performance deficiency. This performance deficiency was determined to be more than minor in accordance with IMC 2517, Appendix C, because the failure to provide accurate work instructions in WO115834758 represented an improper work practice that could impact quality involving safety-related SSCs. Specifically, the implementation of WO 115834758 failed to correct the proper safety-related component, WBN-2-RFV-067-1025A-A instead of WBN-2-RFV-067-1025C-A, and the condition adverse to quality, identified in PER 858657, was not corrected. The inspectors determined this finding to be of very low safety significance, SL IV, in accordance with Section 6.5 of the Enforcement Policy. Specifically, the finding was not greater than a SL IV violation, because the failure to accurately prescribe the work activities in WO115834758 did not result in multiple examples of recurring significant deficiencies associated with a single construction activity. This finding has a cross-cutting aspect in the Resolution component of the Problem Identification and

Resolution cross-cutting area, as defined in IMC 0310, because the applicant failed to take effective corrective actions to address a condition adverse to quality [P.3].

Enforcement: 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. As a resolution to PER 858657, WO 115834758 should have required loose flange bolts on a safety-related relief valve for the lower containment coolers (WBN-2-RFV-067-1025A-A) to be tightened. Contrary to this, on September 16, 2014, the work activities associated with WO 115834758 were not provided by instructions appropriate to the circumstances and the incorrect component (WBN-2-RFV-067-1025C-A) was worked. The finding was determined to be a SL IV violation using Section 6.5 of the Enforcement Policy. Because this was a SL IV violation and the issue was entered into the applicant's corrective action program, this violation is treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. This violation is identified as NCV 05000391/2014608-03, "Failure to Prescribe Accurate Instructions in WO 115834758."

c. Conclusion

The inspectors reviewed the applicant's final closure package; however, it was determined that additional inspection activities may be performed prior to closure of CDR 391/89-09. Specifically, the inspectors plan to observe a sample of TVA's implementation of the procedures used to verify components are installation complete. Additionally, the inspectors identified a SL IV NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," as discussed above.

**OA.1.10 (Closed) Supplemental Safety Evaluation Report App HH Open Item 23:
Environmental Qualification Testing of Main Steam Isolation Valve Solenoids
(Inspection Procedure 92701)**

a. Inspection Scope

Background: 10 CFR 50.49 requires the environmental qualification (EQ) of safety-related and important to safety electrical equipment to ensure the electrical equipment required to maintain the reactor coolant pressure boundary, to shut down the reactor, and mitigate the consequences of accidents, remains operable when needed. It is furthermore required that the records that substantiate equipment EQ capabilities be available and maintained in auditable files.

TVA has stated that the original WBN Unit 2 main steam isolation valves (MSIVs) were environmentally qualified to the standards of NUREG-0588, Category II. TVA is refurbishing the MSIVs by replacing the missing subcomponents, including the solenoid valves, terminal blocks, and manufacturing wiring, with components of the same make, model, and type as supplied on the original purchase order. With the exception of the solenoid valves, the subcomponents will be qualified to NUREG-0588, Category I requirements. TVA at first stated that the solenoids valves were not upgradeable to Category I. The NRC staff took exception to TVA not upgrading the MSIV solenoids and placed the resolution of this issue as Open Item 23 of Supplement 22 of the SSER. A TVA letter dated April 6, 2011, (ADAMS Accession No. ML110980637) stated that TVA

would qualify the MSIV solenoids to the Category I criteria and identified this action as a regulatory commitment in Enclosure 4. In SSER 24, the NRC acknowledged TVA response to Open Item 23 in that it was awaiting completion of TVA qualification of the subject MSIV solenoids valves to Category I criteria. TVA has subsequently issued the Environmental Qualification Documentation Package (EQDP) binder WBNEQ-SOL-010, qualifying the MSIVs solenoids to the criteria of 10CFR50.49 and/or NUREG-0588 Category I. Included within the binder is the qualification test report EDMS document 25402-011-V1 A-PY09-00083-003 presenting the qualification test report from an independent testing laboratory.

Inspection Activities: The inspectors reviewed the subject EQDP to confirm its technical adequacy to support the qualification of the solenoids. Several questions resulting from the NRC review were presented to TVA and TVA provided technically adequate answers. Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified. The inspectors determined that the EQDP documentation reflected that TVA had successfully qualified the MSIV solenoids to the Category I criteria as committed.

c. Conclusions

The inspectors concluded that TVA has successfully qualified the MSIV solenoids to the Category I criteria, as committed. Open Item 23 of Supplement 22 of the Safety Evaluation Report is closed.

OA.1.11 (Closed) Hanger Analysis and Update Program Corrective Action Program (Temporary Instruction 2512/023 and Inspection Procedure 50090)

a. Inspection Scope

Background: The hanger analysis and update program (HAAUP) CAP was established to evaluate a number of identified issues for Category I and I(L) piping and pipe supports and to implement this comprehensive completion plan to adequately resolve these issues. The issues identified in the HAAUP CAP originated from employee concerns, lessons learned, and other applicant source documents such as CAQRs, Corrective Action Tracking Documents (CATDs), Vertical Slice Review (VSR) Discrepancy Reports (DRs), PERs, and NRC open items.

The issues identified, and root causes, were grouped into the following three categories:

- Interface control of design input and output,
- Design and analysis methodology, and
- Level of design documentation

The objectives of this CAP were to assure that pipe and pipe supports were structurally adequate, complied with design criteria, and the design criteria complied with licensing requirements. In addition, the HAAUP CAP included NRC Bulletin (BL) 79-02 and BL 79-14 for anchor bolts and pipe supports, respectively.

The WBN Unit 1 HAAUP CAP was completed and documented in a final report issued on October 27, 1995 (ADAMS Accession No. ML 072890425). Because of the similarities between Units 1 and 2, most of the design commitments for both Units 1 and 2 were addressed in the Unit 1 final report. The HAAUP CAP for Unit 2 was established in December 2007. TVA's regulatory framework letter to NRC dated January 29, 2008, outlined TVA's plan for the implementation of the Unit 2 HAAUP CAP, which stated that the Unit 1 approach would be used. NRC had previously approved the Unit 1 approach in NUREG-1232, SSER 6 dated April 1991 and SSER 8 dated January 1992.

Since 2008, the NRC had inspected, reviewed, and documented several aspects of the HAAUP CAP through open items inspections and inspection of IP 50090 for pipe supports and IP 46071 for anchor bolts. The results of these inspections have been documented in several inspection reports, including IIR 05000391/2011609, Section C.1.8 (ADAMS Accession No. ML11350A229) which closed IP 46071; and IIR 05000391/2014604, Section C.1.6 (ADAMS Accession No. ML14177A214) which closed IP 50090. Additionally, IIR 05000391/2012608, Section OA.1.2 (ADAMS Accession No. ML12319A36) provided a detailed status of the HAAUP. The 2012 inspection report concluded the HAAUP CAP (TI 2512/023) would remain open pending inspection of the following associated items:

- Portions of IP 50090, Pipe Supports, as discussed in IIR 2011609. Specifically inspection of dynamic supports, inspection of a sample population of final as-builts for remaining modified supports, and QA assessments as applicable to future remaining pipe support activities;
- Violation 86-14-03, Failure to establish measures to ensure deviations from specification are controlled;
- CDR 84-07, Support designs do not meet requirements;
- CDR 86-24, Inadequate flexibility of instrument tubing attached to steel containment vessel;
- Violation 87-19-01, Failure to follow procedures for installing equipment in north/south valve rooms; and
- Violation 87-19-02, Failure to preserve equipment installed in north/south valve rooms

TI 2512/023 provided guidance to the inspectors to make a determination as to whether TVA's HAAUP CAP plan had been satisfactorily implemented to ensure that issues were adequately resolved. Some of the objectives included in the TI were also included in IPs 50090 and 46071; therefore, inspection efforts and activities covered under these two IPs and documented in Unit 2 inspection reports were credited towards TI 2512/023.

Inspection Activities: The purpose of this inspection was to gather sufficient information to make a determination as to whether TVA's HAAUP CAP plan was satisfactorily implemented to ensure that the problems addressed in this CAP were adequately resolved. To address the remaining Unit 2 HAAUP CAP open item, inspectors performed the following:

Open Item Title	Remaining Open Actions	Description of Inspection
Portions of IP 50090 (as noted above)	Inspection of dynamic supports, inspection of a sample population of final as-builts for remaining modified supports, and QA assessments as applicable to future remaining pipe support activities	Closed in IIR 05000391/2014604, Section C.1.6 (ADAMS Accession No. ML14177A214).
Violation 86-14-03, Failure to establish measures to ensure deviations from specification are controlled	Inspect and review item	Closed in IIR 05000391/2013607, Section OA.1.11 (ADAMS Accession No. ML13273A512).
CDR 84-07, Support designs do not meet requirements	Inspect and review item	Closed in IIR 05000391/2013605, Section OA.1.23 (ADAMS Accession No. ML13220A640).
CDR 86-24, Inadequate flexibility of instrument tubing attached to steel containment vessel	Inspect and review item	Discussed in IIR 05000391/2012610, Section OA.1.3 (ADAMS Accession No. ML13035A201). This item will be tracked separately from the HAAUP CAP and reviewed and closed during future inspections.
Violation 87-19-01, Failure to follow procedures for installing equipment in north/south valve rooms	Inspect and review item	Closed in IIR 05000391/2014607, Section OA.1.12 (ADAMS Accession No. ML14274A076).
Violation 87-19-02, Failure to preserve equipment installed in north/south valve rooms	Inspect and review item	Discussed in IIR 05000391/2012610, Section OA.1.1 (ADAMS Accession No. ML14274A076). This item will be tracked separately from the HAAUP CAP and reviewed and closed during future inspections.

Additionally, the inspectors reviewed TVA's QA Assessment Report NC-WB-14-009, "Implementation of NRC Inspection and Enforcement Bulletin 79-14," dated May 1, 2014. The inspectors reviewed the QA report to verify that the applicant had documented audit findings in sufficient detail to permit a meaningful assessment by those responsible for corrective action, final disposition, and trending; and that the applicant had taken proper follow-up action on those matters in need of correction.

The inspectors held discussions with TVA personnel and reviewed operating experience to confirm that TVA had performed proper reviews of piping support and analysis operating experience to determine applicability to WBN Unit 2. Some of the operating experience documents included NRC Information Notice 2010-01, "Pipe support anchors incorrectly installed" (ADAMS Accession No. ML090830184) and NRC Information Notice 2009-04, "Age-related constant support degradation" (ADAMS Accession No. ML090340754).

b. Observations and Findings

No findings were identified. The QA Assessment Report, NC-WB-14-009, dated May 1, 2014, documented the evaluation of unmodified portions of existing pipe supports that were modified as part of the WBN Unit 2 construction completion project. Inspectors held earlier discussions with the applicant during the project and questioned if future work would affect the unmodified portions of a piping support, given that the unmodified portions were not always re-inspected by quality control. In the assessment, the applicant performed a 95/95 sampling plan following the guidance in NUREG-1475 (ADAMS Accession No. ML11102A076) to determine if items in the sample population would meet prescribed acceptance criteria (i.e. would sustain imposed loads and function within the specified design limits or allowables). The report concluded that there is 95 percent assurance that at least 95 percent of the remaining supports in the sampled lot would meet applicable codes and standards and perform their safety function. The report noted that several discrepancies were identified between the design outputs and actual construction; however, no significant non-conformances were identified. Additionally, inspectors previously reviewed and inspected a combination of modified and unmodified supports as noted in earlier inspection reports under the HAAUP CAP (TI 2512/023) and IP 50090 and did not identify any significant discrepancies, with the exception of those documented in earlier inspection reports.

c. Conclusions

The inspectors determined that the issues associated with the HAAUP CAP (TI 2512/023) were properly addressed and tracked in the applicant's corrective action program and appropriate measures were taken to prevent recurrence. Two historical items, CDR 86-24 and Violation 87-19-02, that were associated with the HAAUP CAP remain open; however, these items will be tracked, inspected, and closed separately during future inspections. Status of these two sub-items does not affect overall closure of the HAAUP CAP given the broad scope of the HAAUP CAP and the significant inspection effort documented since 2008. Based on a review of the applicant's engineering complete closure package and the results of this inspection, the HAAUP CAP (TI 2512/023) is closed.

OA.1.12 (Closed) Construction Deficiency Report 50-391/86-08: Incorrect Tubing Configuration on Containment Isolation Valve Actuators (Inspection Procedures 52053 and 52055)

a. Inspection Scope

Background: IIR 05000391/2013603 (ADAMS Accession No. ML13134A239) documented a previous review of this item. The inspectors performed a partial review of EDCR 54923, the engineering document associated with CDR 86-08, and its associated WOs to verify that the field changes would, when implemented, correct the deficiencies identified. No field work was inspected because the WOs were still in the planning process.

IIR 05000391/2014604 (ADAMS Accession No. ML14177A214) also documented a previous inspection of this item. The inspectors performed a review of Non-Conforming Condition Report (NCR) 6328 and Significant Condition Report (SCR) WBNMEB8546R2 to determine the root cause and extent of condition of the issue. The inspectors also

observed in-process work associated with the removal and replacement of the control air lines associated with two containment isolation valves. Finally, the inspectors reviewed two completed WOs for actuator replacement and two completed WOs for quick exhaust valve replacement to verify that the design documents matched the as-built conditions, that the WO contained the correct material information, and that the work was performed in accordance with the procedure. This item remained open after the previous two inspections pending the review of test procedures to verify valve operation and stroke time.

Inspection Activities: The inspectors reviewed WBN Unit 2 procedure 2-PTI-030J-01, "Containment Purge," to verify that the containment isolation valves identified by CDR 50-391/86-08 were included in preoperational testing. The inspectors verified that the requirements for stroke time testing identified in the PTI matched the requirements found in the WBN Unit 2 FSAR. Documents reviewed are in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusion

Based on a review of the applicant's engineering complete closure package and the aforementioned inspection activities, the inspectors determined that the applicant has taken steps to adequately correct the discrepancies noted in CDR 86-08. This item is closed.

V. MANAGEMENT MEETINGS

X1 Exit Meeting Summary

An exit meeting was conducted on October 23, 2014, to present inspection results to Mr. Hruby and other members of his staff. The inspectors identified that no proprietary information had been received during the inspection and none would be used in the inspection report. The applicant acknowledged the observations, and provided no dissenting comments.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Applicant personnel

G. Arent, TVA – Licensing Manager
H. Baldner, TVA - Regulatory Compliance
A. Bangladore, Bechtel - Electrical Engineering
R. Baron, TVA - Unit 2 Quality Assurance Manager
J. Boykin, TVA - Quality Programs
M. Bottorpf, TVA - Operations Superintendent
R. Brown, Bechtel - Design Engineering
J. Calle, WBN Interface & Transition Manager
D. Charlton, TVA - Regulatory Compliance
M. DeRoche, TVA - General Training Manager
B. Enis, TVA - Oversight
J. Fisher, TVA - Regulatory Compliance
S. Hilmes, TVA - Electrical Engineering
W. Hooks, TVA – Radiation Protection Manager
R. Hruby, TVA - General Manager Technical Services
K. Lovell, TVA-Senior Manager, Refurbishment Engineering & Construction
B. Moran, TVA - Quality Programs
J. O'Dell, TVA - Regulatory Compliance
G. Scott, TVA – Regulatory Compliance
M. Skaggs, TVA – Senior Vice President
S. Smith, TVA - SUT Assistant Manager
W. Smith, TVA operations Training Manager
B. Sprinkle, TVA Operations Procedure Group Supervisor
B. Sumner, TVA – Radiation Protection ALARA
N. Welch, TVA - Preoperational Startup Manager
T. Wilburn, TVA – Unit 2 RP & Chemistry Transition Manager
O. J. Zeringue, TVA - General Manager Engineering and Construction

INSPECTION PROCEDURES USED

IP 35007	Quality Assurance Program Implementation During Construction and Pre-Construction Activities
IP 35747B	QA Programs (Receipt, Storage and Handling of Equipment and Materials)
IP 37051	Verification of As-Builts
IP 41301	Pre-Licensing Review of Training and Qualification Programs
IP 49063	Piping - Work Observation
IP 50051	Reactor Vessels and Internals-QA Review
IP 50053	Reactor Vessels and Internals-Work Observation
IP 50073	Mechanical Components - Work Observation
IP 50090	Pipe Support and Restraint Systems
IP 51053	Electrical Components and Systems – Work Observation
IP 51055	Electrical Components and Systems - Record Review
IP 51063	Electric Cable - Work Observation
IP 52053	Instrument Components and Systems - Work Observation
IP 52055	Instrument Components and Systems - Record Review
IP 64051	Procedures - Fire Prevention/Protection
IP 70300	Preoperational Test Procedure Review
IP 70302	Preoperational Test Program Implementation
IP 70312	Preoperational Test Witnessing
IP 70336	Residual / Decay Heat Removal System Test - Preoperational Test Review
IP 70462	Reactor Coolant System Hydrostatic Test - Test Witnessing
IP 71302	Preoperational Test Program Implementation Verification
IP 83524	External Occupational Exposure Control And Personal Dosimetry (Preoperational And Supplemental)
IP 83525	Internal Exposure Control and Assessment (Preoperational and Supplemental)
IP 83526	Control Of Radioactive Materials and Contamination, Surveys, and Monitoring (Preoperational And Supplemental)
IP 83527	Facilities and Equipment (Preoperational and Supplemental)
IP 83528	Maintaining Occupational Exposures ALARA (Preoperational)
IP 92701	Follow-up
TI 2512/015	Inspection of Watts Bar Nuclear Plant Employee Concerns Program
TI 2512/016	Inspection of Watts Bar Nuclear Plant Cable Issues Corrective Action Program Plan
TI 2512/021	Inspection of Watts Bar Nuclear Plant Equipment Seismic Corrective Action Program Plan
TI 2512/023	Inspection of Watts Bar Nuclear Plant Hanger Update Corrective Action Program Plan
TI 2515/139	Inspection of Licensee's Implementation of Generic Letter 96-01 - Testing of Safety Related Logic Circuits

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Opened and Closed

05000391/2014608-01	NCV	Failure to reference correct documents (Section C.1.1)
05000391/2014608-02	NCV	Inadequate Storage of Safety-Related Equipment (Section O.1.2)
05000391/2014608-03	NCV	Failure to Execute Work Activities Associated with WO 115834758 (Section OA.1.9)

Closed

50051	IP	Reactor Vessel and Internals QA Review (Section C.1.7)
83524	IP	External Occupational Exposure Control and Personal Dosimetry (Pre-Operational) (Section P.1.4)
83525	IP	Internal Exposure Control and Assessment (Preoperational) (Section P.1.5)
83527	IP	Facilities and Equipment (Preoperational) (Section P.1.7)
83528	IP	Maintaining Occupational Exposures ALARA (Preoperational) (Section P.1.8)
41301	IP	Pre-Licensing Review of Training & Qualification Programs (Section O.1.1)
35747B	IP	Quality Assurance Program - Receipt, Storage, and Handling of Equipment and Material (Section O.1.2)
05000391/2014607-01	URI	Potential Inadequate Storage of Safety-Related Equipment (Section O.1.2)
Open Item 23	SSER Appendix HH	Environmental Qualification Testing of Main Steam Isolation Valve Solenoids (Section OA.1.10)
2512/023	TI	Hanger Analysis and Update Program Corrective Action Program (Section OA.1.11)
391/86-08	CDR	Incorrect Tubing Configuration on Containment Isolation Valve Actuators (Section OA.1.12)

Discussed

83526	IP	Control of Radioactive Materials and Contamination, Surveys, and Monitoring (Pre-Operational) (Section P.1.6)
2512/016	TI	Cable Issues Corrective Action Program – Sub-Issue: Supports in Vertical Trays (Section OA.1.1)
391/89-04	CDR	Support of Class 1E Cables Installed in Long Vertical Cable Tray Runs (Section OA.1.1)
2512/016	TI	Cable Issues Corrective Action Program Sub-issue: Physical Cable Separation and Electrical Isolation (Section OA.1.2)
96-01	GL	Testing of Safety-Related Logic Circuits (Section OA.1.3)
2512-021	TI	Equipment Seismic Qualification (Section OA.1.4)
2006-02	GL	Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power (Section OA.1.5)
II.D.3	TMI Action Item	Inspection of Watts Bar Nuclear Plant Cable Issues Corrective Action Program Plan (Section OA.1.6)
Open Item 74	SSER Appendix HH	Installation of the Acoustic monitoring system for the Power Operated Relief Valves (Section OA.1.6)
2515/174	TI	Hydrogen Igniter Backup Power (Section OA.1.7)
79-36	GL	Adequacy of Station Electric Distribution System Voltages (Section OA.1.8)
391/89-09	CDR	Significant Trend Associated with Damaged, Loose, or Missing Hardware (Section OA.1.9)

LIST OF DOCUMENTS REVIEWED

I. QUALITY ASSURANCE PROGRAM

Q.1.1 Identification and Resolution of Construction Problems

Miscellaneous

Westinghouse Letter WBT-D4768, "Primary Equipment Supports PIN 120398-002," March 26, 2014

WBT-D-5022, Westinghouse Steam Generator Tube Leak Report, SG-SGDA-14-1, Rev. 0

Qualification Records

73566, NDR PT Level II Personnel Certificate, 8/23/2012

73772, NDR PT Level II Personnel Certificate, 9/12/2012

77757, NDR PT Level II Personnel Certificate, 9/12/2013

NDE PT Records

901364-034, PT report weld ID TPW-SG2-CL-R23-C40-R1, 9/9/14

901364-035, PT report weld ID TPW-SG2-CL-R32-C66-R1, 9/9/14

901364-036, PT report weld ID TPW-SG2-CL-R46-C41-R1, 9/9/14

901364-037, PT report weld ID TPW-SG2-CL-R46-C42-R1, 9/9/14

901364-038, PT report weld ID TPW-SG1-CL-R23-C14-R1, 9/10/14

II. MANAGEMENT OVERSIGHT AND CONTROLS

C.1.2 Post-Fukushima Diverse and Flexible Construction Activities

Drawings

187778-000-SP-01-ORD101, DWG R01, Sheet 1, AFWST Shell Record Drawing, Rev. 0

Miscellaneous

CMS-830-15-PR-45034/CMS-830-15-PR-45005, Contract Number 187778, Radiographic Examination Report No. 1, 6/9/14

CMS-830-15-PR-45034/CMS-830-15-PR-45005, Contract Number 187778, Radiographic Examination Report No. 2, 6/9/14

CMS-830-15-PR-45034/CMS-830-15-PR-45005, Contract Number 187778, Radiographic Examination Report No. 3, 8/22/14

CMS-830-15-PR-45034/CMS-830-15-PR-45005, Contract Number 187778, Radiographic Examination Report No. 4, 6/21/14

C.1.3 Electrical Components and Systems – Work Observation

Work Orders:

08-951179-003

08-951183-006

08-951182-000

Drawings:

8977D68

8246D33

8243D44

Vendor Manuals:
 VTD-W120-0740
 VTD-W120-0590
 VTD-W120-0460

C.1.4 Instrument Components and Systems – Work Observation

Drawings

2-47W600-18, Rev. 1
 2047W600-14, Rev. 0
 47A061-11, Rev. 5

As-built Drawings

2-47W600-307, Rev. 1
 DRA 53638-003 Rev. 4
 2-47W600-1706-4, Rev. 2
 2-47W600-1706-2, Rev. 1
 2-47W600-1704-1, Rev. 0
 2-47W600-16, Rev. 1
 2-47W600-22, Rev. 3
 DRA 52424-281, Rev. 0
 DRA 53419-015, Rev. 0
 DRA 53684-023, Rev. 2
 2-47W600-14, Rev. 0
 DRA 53419-015, Rev. 0
 DRA 52424-281, Rev. 0
 2-47W600-22, Rev. 3
 2-47W600-316, Rev. 3
 DRA 53391-009, Rev. 0
 2-47W600-1709-1, Rev. 0
 DRA 53394-016, Rev. 0
 2-47W600-1709-2, Rev. 0
 DRA 53391-017
 2-47W600-2047, Rev. 0
 DRA 53391-022, Rev. 0
 2-47W600-1715, Rev. 0
 DRA 53391-023, Rev. 0
 2-47W600-332, Rev. 0
 2-47W600-17A, Rev. 1
 DRA 52449-020, Rev. 1
 DRA 52449-016, Rev. 3
 47A0661-26B, Rev. 0
 2-47W600-1921, Rev. 0

C.1.5 Piping – Piping Cleanliness and Flushing Work Observations

PER 914655, Post hydrolased pressurizer surge line boroscope inspection
 (ANSI) N45.2.1, "Cleaning of Fluid Systems and Associated Components During Construction
 Phase of Nuclear Power Plants," 1973
 2-CP-068-03, Reactor Coolant System Cleaness Plan – PRT Relief Lines, Spray Line, and
 Surge Line, Rev 2
 SMP-7.0, Control of Cleaness, Layup, and Flushing

C.1.7 Reactor Vessel and Internals QA Review

WEC Memorandum of Understanding, 01/25/2010

Bechtel Surveillances:

25402-WBN-SR-09-0509, Reactor Upper Internals Rotation
 25402-WBN-SR-10-1247, PCI Westinghouse Reactor Vessel Remediation
 25402-WBN-SR-11-1653, Reactor Vessel Bolt Hole Installation
 25402-WBN-SR-14-3176, Reactor Vessel Cleaning for Pre Cold Hydro
 25402-WBN-SR-14-3184, Reactor Vessel Inspection for Pre Cold Hydro Testing
 25402-WBN-SR-14-3188, RV Stud Cleaning, Testing, and Installation for Cold Hydro
 25402-WBN-SR-14-3191, Installation of RV Lower and Upper Internals and O-Ring for Cold Hydro

WOs

115753972, WHS SYS 068 2-RPV-068-U2 RPV CH Assembly (non-code)
 115505496, CCM SYS 068 2-RPV-068-U2 Westinghouse Perform RV/I Inspections per MRS-SSP-2738

P.1.3 Preoperational Test Witnessing – Reactor Coolant System Cold Hydrostatic Test

Procedures

2-PTI-068-014, "Reactor Coolant System Primary Hydrostatic Test, U2," Revision 2, September 21, 2014
 Change notice CN-1 to procedure 2-PTI-068-014, September 25, 2014
 2-PTI-068-014, "Reactor Coolant System Primary Hydrostatic Test, U2," Revision 3, September 27, 2014
 GQP-9.8, "Magnetic Particle Examination and Acceptance Standards for Welds and Base Materials using Electromagnetic Yokes", Rev 13

Design Change Requests (and associated drawings)

EDCR 53614
 EDCR 53760
 EDCR 54852
 FCR 62001
 FCR 62932
 FCR 62939

Other

Report of Calibration for Pressure Gauge E51361, 8/11/14
 Report of Calibration for Pressure Gauge E51365, 8/11/14
 Test Package 2-068-47W813-1-3-B1, Revision 3
 Training records for employees 100276, ZW9571, 101748, 108622
 Work Order WO111751832, Reactor Coolant Primary Hydrostatic Test for the Reactor Coolant System
 Work Order WO115805782, CCH SYS 068 Bench Test Temp Relief Valve for Primary Cold Hydro
 Work Order WO114107706 (SG1)
 PCI Traveler 903781-SGN-1-NDE-01 (SG1)
 Work Order WO115949440 (SG2)
 PCI Traveler 903781-SGN-2-NDE-01 (SG2)

P.1.4 External Occupational Exposure Control and Personal Dosimetry (Pre-Operational)

EPIP-14, Radiological Control Response, Rev. 24
 EPIP-15, Emergency Exposure Guidelines, Rev. 16
 NPG Calculation WBNTSR115, Radiological Emergency Plan Effluent Radiation Monitor EALs and Radiation Alert Levels, Rev. 7
 NPG-SPP-05.1, Radiological Controls, Rev. 4
 NUREG-0847, Supplement 26, Safety Evaluation Report Related to the Operation of Watts Bar Nuclear Plant, Unit 2, June 2013
 RCDP-1, Conduct of Radiological Controls, Rev. 5
 RCDP-15, Dosimetry Operations, Rev. 0
 RCI-100, Radiological Controls, Rev. 46
 RCI-104, Radiological Response to Abnormal Plant Conditions, Rev. 13
 RCI-111, Special Exposure Monitoring, Rev. 0013
 RCI-135, Area Dosimeter Monitoring Program, Rev. 0005
 RCI-147, Radiation Protection Standards and Expectations, Rev. 11
 RCTP-105, Personnel Inprocessing and Dosimetry Administrative Processes, Rev. 5
 RCTP-106, Special Dosimetry Operations, Rev. 3
 RCTP-113, External Dosimetry MQA Program, Rev. 0
 SSI-19.1, Temporary Suspension and/or Alteration of Security Measures, Rev. 9
 Tennessee Valley Authority Nuclear Power Radiological Emergency Plan, NP-REP Appendix C, Watts Bar Nuclear Plant, Rev. 103
 Watts Bar Nuclear Plant Final Safety Analysis Report (FSAR), Rev. 111
 PER 728019
 NRC Quarterly Inspection Report 05000390/2013004 Section 2RS4 and 05000390/2014003 Section 2RS1

P.1.5 Internal Exposure Control and Assessment

EPIP-15, Emergency Exposure Guidelines, Rev. 16
 NPG-SPP-05.1, Radiological Controls, Rev. 4
 NPG-SPP-05.1.1, Alpha Radiation Monitoring Program, Rev. 4
 RCI-101, Radiation, Contamination, and Airborne Surveys, Rev. 35
 RCI-104, Radiological Response To Abnormal Plant Conditions, Rev. 13
 RCI-111, Special Exposure Monitoring, Rev. 13
 RCI-112, WBC Operation and Calibration, Rev. 19
 RCI-120, TEDE ALARA Evaluation, Rev. 5
 RCDP-7, Bioassay and Internal Dose Program, Rev. 6
 RCTP-106, Special Dosimetry Operations, Rev. 3
 Tennessee Valley Authority Nuclear Power Radiological Emergency Plan, NP-REP Appendix C, Rev. 103
 NRC Quarterly Inspection Report 05000390/2013004 Section 2RS3

P.1.6 Control of Radioactive Materials and Contamination, Surveys and Monitoring

NPG-SPP-05.1, Radiological Controls, Rev. 4
 NPG-SPP-05.1.1, Alpha Radiation Monitoring Program, Rev. 4
 NPG-SPP-05.14, Guide for Communicating Inadvertent Radiological Spills/Leaks to Outside Agencies, Rev. 3
 NPG-SPP-05.6, Controlling Byproduct and Source Material, Rev. 2
 RCDP-11, Protocol for Remediation of Inadvertent Spills or Leaks of Contaminated Liquids, Rev. 0
 RCI-101, Radiation, Contamination, and Airborne Surveys, Rev. 35

RCI-127, Byproduct And Source Material Control, Rev. 16
 RCI-130, Personnel Monitor Alarm Response and Personnel Decontamination, Rev. 16
 RCI-137, Radiation Protection Tritium Control Program, Rev. 5
 RCI-103, Radioactive Material Control, Rev. 38
 RCI-109, Radiological Control Portable Instrumentation, Rev. 21
 RCI-152, Radiological Postings, Rev. 12
 RCI-159, Baseline Radiation Surveys, Rev. 1
 RCI-160, Receipt of Radioactive Material, Rev. 2
 RCI-162, Control of Radiological Work, Rev. 1
 WBN-DCD-40-24, Radiation Monitoring (Unit 1 / Unit 2), Rev. 26
 NRC Quarterly Report 05000390/2014003 Sections 2RS1 and 2RS8

P.1.7 Facilities and Equipment (Pre-Operational and Supplemental)

EPIP-12, Emergency Equipment and Supplies, Rev. 33
 EPIP-14, Radiological Control Response, Rev. 24
 NPG-SPP-5.9, Radiological Control and Radioactive Material Shipment Augmented Quality Assurance Program, Rev. 2
 RCDP-1, Conduct of Radiological Controls, Rev. 5
 RCDP-8, Radiological Instrumentation/Equipment Controls, Rev. 5
 RCI-109, Radiological Control Portable Instrumentation, Rev. 21
 RCI-130, Personnel Monitor Alarm Response and Personnel Decontamination, Rev. 16

P.1.8 Maintaining Operational Exposures ALARA

NPG-SPP-05.1, Radiological Controls, Rev. 4
 NPG-SPP-05.2, ALARA Program, Rev. 4
 NPG-SPP-05.2.1, Operational ALARA Planning and Controls, Rev. 3
 NPG-SPP-05.2.2, Establishing Collective Radiation Exposure Annual Business Plan Goals, Rev. 0
 RCI-120, TEDE ALARA Evaluation, Rev. 5
 RCI-128, ALARA Program Implementation, Rev. 17
 RCI-159, Radiation Baseline Surveys, Rev. 1
 NRC Quarterly Report 05000390/2013004 Section 2RS2

O.1.1 Pre-Licensing Review of Training & Qualification Programs

Procedures

Initial License Training, TPD-HLT, Rev. 8, 4/11/14
 Licensed Operator Requalification, TPD-LOR, Rev. 4, 4/15/14
 Non-Licensed Operator Initial and Continuing Training Program, TPD-NLO, Rev. 6, 6/30/14
 Shift Manager Training, TPD-SM, Rev. 4, 2/28/14
 Shift Technical Advisor Training, TPD-STA, Rev. 2, 6/30/14
 Radiochemical Laboratory Analyst Training Program, TPD-CHM, Rev. 2, 11/4/13
 Electrical Maintenance Training Program, TPD-ELE, Rev. 4, 2/5/14
 Engineering Support Personnel Training, TPD-ESP, Rev. 6, 7/7/14
 Instrumentation and Controls, TPD-ICT, Rev. 2, 1/30/13
 Mechanical Maintenance Training Program, TPD-MEC, Rev. 4, 9/26/13
 Health Physics Technician, TPD-HPT, Rev. 5, 6/24/13

Miscellaneous

Multi-Unit Operator Training and Certification Program, September 2013, (ML13319B206)
 SRO comprehensive differences written exams
 Inadequate Core Cooling Monitor, Common Q Job Performance Measure

F.1.1 Procedures - Fire Prevention/Protection

WBN 0-FPS-510-0001C, File 01, SNM LIC REQ FIRE EXH INSPECT PMUG 9600V, Rev. 10
 WBN 0-FPS-510-EXT/INSP, File 01, PORTABLE FIRE EXTINGUISHER INSPECTION
 CONSTRUCTION AREAS PMUG 0780V, Rev. 1
 NGP-SPP-18.4.8, Control of Ignition Sources (Hot Work), Rev. 0003

IV. OTHER ACTIVITIES

OA.1.1 Cable Issues Corrective Action Program – Sub-Issue: Supports in Vertical Trays and Construction Deficiency Report 391/89-04: Support of Class 1E Cables Installed in Long Vertical Cable Tray Runs

Drawings

FCR 62110 AA-03
 DRA 55116-001, Rev. 1
 DRA 55116-062, Rev. 0

OA.1.3 Generic Letter 96-01, Testing of Safety-Related Logic Circuits

Miscellaneous Documents

Generic Letter 96-01, Testing of Safety-Related Logic Circuits, dated 01/10/1996
 NRC Generic Letter 96-01, "Testing of Safety-Related Logic Circuits" Review Report Watts Bar Nuclear Plant Unit 1, dated March 1998
 Response to Generic Letter (GL) 96-01, Testing of Safety Related Logic Circuits", dated April 18, 1996
 Watts Bar Nuclear (WBN) - Unit 2 – Regulatory Framework for the Completion of Construction and Licensing Activities for Unit 2", dated January 29, 2008
 Watts Bar Nuclear (WBN) Unit 1 Facility Operating License NPF-90 – Licensee Event Report (LER) 50-390/97011, Revision 5 – Generic Letter (GL) 96-01 Review Completion , dated 12/13/1997
 TVA Technical Specifications, Amendment 96, 08/22/2014
 NRC Integrated Report Nos. 50-390/97-04, 50-391/97-04 and Notice of Violation, dated 7/7/1997
 NRC Integrated Report Nos. 50-390/97-07, 50-391/97-07 and Notice of Violation, dated 11/5/1997

Drawings

Drawing 2-45W600-99-1, Revision 4, dated 04/17/2014

PERs

Problem Evaluation Report (PER) WBPER970382, Reactor Trip from Automatic SI Input from ESFAS for Reactor Trip Bypass has not been completely tested using Surveillance Instructions", dated 01/14/1997
 Service Request, SR 930918, "NRC identified level of detail used in review of SIs", dated 09/08/2014

Procedures

Surveillance Instruction 2-SI-99-202-A, "18 Month Trip Actuating Device Operational Test of Reactor Trip Bypass Breaker A From Automatic SI Input From ESFAS Train B", Rev 0001, dated 03/14/2014
 Surveillance Instruction 2-SI-99-202-B, "18 Month Trip Actuating Device Operational Test of Reactor Trip Bypass Breaker B From Automatic SI Input From ESFAS Train A", Revision 0001, dated 03/14/2014

OA.1.4 Inspection of Watts Bar Nuclear Plant Equipment Seismic Corrective Action Program Plan

Work Orders

115027485

115834758, Lower Containment RCP/CRD Cooler C ERCW Supply Header Relief

115755610, TDAFW Emergency Exhaust Fan – Monthly PM, LPM0154

114849718, TDAFW Pump Room 125V DC Emergency Exhaust Fan Motor change out

112498303, CCH SYS 062 WBN-2-PIPE-062-B ASME HYDROTEST 2-062-47W809-1-2-B01A

112800212, CCM PER 589508/706112 SYS 062 070 2-HTX-062-0066 Perform Eddy Current Testing of Ht. Exch.

114211849, CCM SYS 062 SYS 070 WBN-2-HTX-062-0066 Left Shell From Tubesheet to Support Re-Rating

114225269, CCM PER 589508 ASME III SYS 062 WBN-2-HTX-062-0066 Seal Water HTX

114660182, CCH SYS 070 WBN 2-PIPE-070-C Hydrotest 2-070-47W859-1-B2-2-RETEST 2

WO#114315041, CMM EDCR-2 53352 PER 345253 689018 SYS 070 WBN-2-PMP-070-0131-A

WO#09-9521469-007, EDCR2 53352 (U1RG Approved) – Install the 2A-A Thermal Barrier Booster Pump (2-PMP-070-0131-A) AN

WO#09-9521469-006, EDCR2 53352 PER 345246 (U1RG Approved) – Install the 2B-B Thermal Barrier Booster Pump

WO#114314888, CCM EDCR-2-53352 PER 345246 SYS 070 WBN-2-PMP-070-0130-B

EDCR

52945-B

53122-B

Calculation

WCG-1-728, Selection of Worst Category I Tanks and Accumulators, Rev. 2

WCGACQ0473, Seismic Qualification of System 63 Equipment, Rev. 1

MDQ0020672008-0252, Documentary of Design Review, Required Thrust/Torque Calculations and Valve And Actuator Capability for Valve 2-FCV-67-083, Rev. 3

MDQ0020632008-0229, Documentary of Design Review, Required Thrust/Torque Calculations and Valve And Actuator Capability for Valve 2-FCV-67-001, Rev. 3

WCG11007, Anchorage Evaluation of Worst Cases of Tanks Package I, Rev. 3

WCGACQ0381, Evaluation of Seal Water Filter, RC Filter, Volume Control Tank, Seal Water HTX and Letdown HTX Nozzles, VLV 1-FCV-62-98-A Supp, Rev. 4

RAL-20515, Size 0.5, 0.75 Class 1878 Stainless Steel Y-Pattern Globe Valve with Bellows and 10-Inch T-Handle, Rev. 9

WCGACQ0365, Seismic Qualification of Valves with Remote Operator Extensions, Rev. 6

47A054033, Calculation for Typical 47A054-33, Rev. 3

MDQ000622008-0220, Documentation of Design Basis Review, required Thrust/Torque Calculations and valve and actuator capability assessment for Valve 2-FCV-62-061, Revision 3

MDQ0020682008-0274, Documentation of Design Basis Review, required Thrust/Torque Calculations and valve and actuator capability assessment for Valve 2-FCV-68-332, Revision 4

N36709R, "Summary of Piping Analysis Problem No. N3-67-09R," Rev. 006

1114, "Seismic Calculations," 12/03/1980

N367A97A, "Summary of Piping Analysis Problem No. N3-67-A97A," Rev. 006

N33008R, "Summary of Piping Analysis Problem No. N3-30-08R," Rev. 002

WCG-1-869, "SCV Penetration Nozzle and Shell Evaluation Pen X-6," Rev. 003

WCG-1-870, "SCV Penetration Nozzle and Shell Evaluation Pen X-9A," Rev. 003

WCG-1-871, "SCV Penetration Nozzle and Shell Evaluation Pen X-9B," Rev. 003

WCG-1-872, "SCV Penetration Nozzle and Shell Evaluation Pen X-10A," Rev. 003
 WCG-1-1168, "SCV Penetration Nozzle and Shell Evaluation Pen X-80," Rev. 003
 WCG-2-317, "SCV Penetration Nozzle and Shell Evaluation Pen X-10B," Rev. 003
 WCG-2-318, "SCV Penetration Nozzle and Shell Evaluation Pen X-7," Rev. 002
 WCG-2-319, "SCV Penetration Nozzle and Shell Evaluation Pen X-5," Rev. 002
 WCG-2-320, "SCV Penetration Nozzle and Shell Evaluation Pen X-11," Rev. 002
 WCG-2-330, "SCV Penetration Nozzle and Shell Evaluation Pen X-4," Rev. 002
 WCG-2-770, "WBN2 Seismic Category I(L) Equipment Outlier Resolution," Rev. 001
 WCG-2-409, "WBN2 Seismic Category I(L) Equipment (Failure & Falling) Walkthrough
 Screening Evaluation Guidelines," Rev. 002
 Anchorage Evaluation of Worst Cases for Heat Exchangers PKG-3, T95101011503, Rev. 02
 WCG-1-1292, Anchorage Evaluation of Worst Cases for Heat Exchangers PKG-3,
 T93110406007. Rev. 003
 Seismic-Stress Analysis of ASME Section III Class 3 Pumps, T93100902524, Rev. 002

Walk-down Package

WBN2-C-062-1406-00, Document Identification, Anchorage and Mounting Detail on Tanks #
 WBN-VTD-P152-0020, Vendor Manual for Domex Centrifugal Roof Exhauster
 WBN2-C-030-250-46, Walkdown Package for WBN-2-FAN-030-0074
 LSWD-3128, "WBN2 Seismic Category I(L) Equipment (Failure & Falling)," Rev. 0
 LSWD-3140, "WBN2 Seismic Category I(L) Equipment (Failure & Falling)," Rev. 1
 LSWD-3157, "WBN2 Seismic Category I(L) Equipment (Failure & Falling)," Rev. 0
 WP NO. WBN2-C-062-1405-00, Rev. 0, Document Identification, Anchorage and Mounting
 Detail on Heat Exchanger: Letdown Heat Exchanger#WBN-2-HTX-062-0124; Excess Letdown
 Heat Exchanger#WBN-2-HTX-062-0121; CVCS Seal Water Heat Exchanger#WBN-2-HTX-
 062-0066
 WP NO. WBN2-C-062-1421-00, Rev. 0, Document Identification, Anchorage and Mounting
 Detail on Heat Exchanger: Regenerative Heat Exchanger# WBN-2-HTX-062-0120
 LSWD 1277, U2 Pumps, Rev. 0

Specifications

EXG29B-WBN-32, Exception to General Engineering Spec G-29

Drawing

1103E20, Tank Volume Control Vol. 400 cf., Sheets 1 and 2 of 2
 DRA 2-47A465-4-8, Rev. 0
 2-47W465-206, Problem N3-68-04R 068-Pressurizer Spray from Loops 1& 2 Cold Leg to
 Pressurizer Spray
 2-47W406-314, Problem N3-62-17A 062- Charging Line from In-line Anchor to SCV Pen. X-16,
 Rev. 4
 E73-034R, 3" Bolted Bonnet Globe Valve, Rev. G
 N1723-FAN-ASSEMBLY-SUB, TVA Penn Ventilator Exhaust Fan Submittal Drawing PMT Fan
 Model # N1723-PMT-DX16Q1, Revision 5
 N1723-RIVG-1, Radial Inlet Vane Grille, Revision 2
 N1723-CURB-FAB, TVA Penn Ventilator Test Fixture for Shake Table Fabrication Drawing,
 Revision 1
 115E010, Motor Op Gate Valve (Valve ID 3-GM88FNH)
 115E001, Motor Op Gate Valve (Valve ID 4-GM72FB)
 115E002, Motor Op Gate Valve (Valve ID 4-GM72FBH)
 FF-18146-A, Final Assembly, Lower Compartment Cooler Fan
 29836, Lower Compartment Air Cooling Unit, Revision C
 47W915-3, Mechanical Heating, Ventilation and Air Conditioning, Revision 38 & 44
 1-47W866-1, Flow Diagram Heating and Ventilation Air Flow, Revision 61
 Drawing 720010804, Rev. D

Drawing 2-47W450-257, Rev. 5
 Drawing 45W872-8, Rev. 27
 Drawing 2-45N2630-13, Rev. 4
 Drawing Revision Authorization 52861-033, Rev. 0
 Drawing Revision Authorization 52861-036, Rev. 0
 Drawing Revision Authorization 52861-037, Rev. 0
 Drawing 2-47W450-344, Rev. 0
 Drawing Revision Authorization 54903-116, Rev. 1
 Drawing: 48N948, Miscellaneous Steel Equipment Support Sheet 1, Rev. 15, 4/7/88
 Drawing: D-4068-6, 10-128 Seal Water Heat Exchanger, Rev. 06, 7/10/1975
 Drawing: MD22750, Thermal Barrier Booster Pump Model 3196STi Size 1.5X3.0-6, Sheets 1 and 2, Rev. B

Problem Evaluation Report (PERs)

PER 172739, Rev. 0
 PER 143828, "Mechanical Piping and Isolation Valves Attached to the Steel Containment Vessel," 05/3/2008
 PER 144114, "The Electrical Components and Circuits of Non-Safety-Related Electrical Air Heater", 05/03/2008
 PER 722465, Wrong insulation rating for motor
 PER 145138, Documentation for the Evaluation of the 1 3/8" A325 Bolts which Attach RHR Heat
 WBPER950063, Rev. 0, T42950415867

Procedures and Standards

WB-DC-40-31.12, Seismic/Structural Qualification of Seismic Category I and I(L) In-line Valves and Other In-line Fluid System Components, Rev. 11
 WB-DC-40-31.6, Seismic/Structural Qualification of Seismic Category I and I(L) Tank and Vessel Assemblies, Rev. 10
 WB-DC-40-31.2, Seismic/Structural Qualification of Seismic Category I Electrical and Mechanical Equipment, Rev. 14
 NEDP-9, Seismic/ Structural Qualification, Rev. 0011.
 WB-DC-40.31.2, "Seismic/Structural Qualification of Seismic Category I Electrical and Mechanical Equipment," Rev. 14
 WB-DC-40.31.12, "Seismic/Structural Qualification of Seismic Category I and I(L) In-Line Valves and Other In-Line Fluid System Components," Rev. 11
 MAI-4.2A, "Piping/Tubing Supports," Attachment 1: "Support Fabrication and Installation Tolerances," Rev. 0020
 Guidelines and Methodology for Assembling and Tensioning Threaded Connections, MMTP-104, Rev. 06, 2/4/14
 General Design Criteria WB-DC-40-31.13, Seismic/Structural Qualification of Seismic Category I(L) Electrical and Mechanical Equipment, Rev. 08
 General Design Criteria WB-DC-40-31.6, Seismic/Structural Qualification of Seismic Category I and I(L) Tank and Vessel Assemblies, Rev. 10
 Seismic-Stress Analysis of ASME Section III Class 3 Pumps, T93100902524, Rev. 002
 Design and Seismic Report for Horizontal Centrifugal Pump, 25402-011-V1B-MPCA-00017-002, Rev. A
 Anchorage Evaluation of Worst Cases for Heat Exchangers PKG-3, T93110406007, Rev. 003, 4/5/2011
 Design and Seismic Report MA 22752, Rev. A, T97100721002

Miscellaneous

Boric Acid tank B# WBN-2-TANK-062-00239 and Volume Control Tank # WBN-2-TANK-062-0129, Rev. 0
 WAT-D-8703, Equipment Seismic Qualification – Tasks 1 & 2, 12/02/1991

T97130311002, Report No. RAL-20515 Rev. 9, 03/11/2013
 25402-011-V1A-MG00-05064-001, Westinghouse MG00 WBT-D-4217 Summary of Seismic Evaluations for Watts Bar Unit 2
 EDMS Number: T97121115004, Approval of Preferred Metal Technologies Report #N1723-SEIS-1, Rev1
 EDMS Number: T97121129003, Approval of Trentec Report No. M9026-SE
 M9026-SE, Trentec Seismic Report for Reactor Lower Compartment Cooling Unit Components 25402-011-G26-GAKS-06447-001, "Seismic Report 1114," Rev. B
 810212A0043, "Seismic Qualification of Valve Seismic Calculations' Document 1114 from Masoneilan," 02/091981
 WBN2-PD-067-365-00, "As-Built Walkdown of Piping and Supports System 067, Pipe Stress Problem N3-67-09R, PER 146882, PER 146704, RFI-613, PER 164557 (RFI-260 R1), PER 177671," Rev. 3
 Certificate of Conformance/Compliance, No. 628417, For 2-TCV-067-0092, 03/04/2011
 T49 140620 849, PEG PKG No. CEE179A, "Procurement Data Sheet, Receipt Verification/Inspection Requirements, Test/Verification Requirements, Special Receipt Inspection Requirements," Rev. 6
 URDI-TR-76-28A1, "Seismic Qualification of Penn Controls Water Regulating Valves," 12/14/1976
 WBP870261, Rev. 2
 SCAR WBP890358, Rev. 0
 Service Request 936255, NRC Identified – Loose bolt on TD AFW Pump fan

OA.1.5 Generic Letter 2006-02: Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power

Calculations:

EDQ00099920070002 Rev. 39, AC Auxiliary Power System Analysis, dated 6/9/2014

Miscellaneous:

TVA Letter, "Watts Bar Nuclear Plant (WBN), Unit 2 – Generic Communications Status for Unit 2 – Restructured Tables", dated March 20, 2008 (ML080850253).
 TVA letter, "Watts Bar Nuclear Plant (WBN), Unit 2 – Initial Responses to Bulletins and Generic Letters", dated September 7, 2007.
 TVA letter, "Browns Ferry Nuclear Plant (BFN) Units 1, 2 & 3, Sequoyah Nuclear Plant (SQN) Units 1 & 2 and Watts Bar Nuclear Plant (WBN), Unit 1 – NRC GL 2006-02: Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power – Response", dated April 3, 2006 (ML060950306).
 TVA letter, "Browns Ferry Nuclear Plant (BFN) Units 1, 2 & 3, Sequoyah Nuclear Plant (SQN) Units 1 & 2 and Watts Bar Nuclear Plant (WBN), Unit 1 – Request for Additional Information Regarding Resolution of GL 2006-02, Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power (TAC NOS. MD0947 through MD1050)", dated January 31, 2007.
 TVA letter, "Watts Bar Nuclear Plant Units 1 and 2 – Lack of Adequate Calculations to Document Electrical System Design Basis - WBRD-50-390/86-17 and WBRD-50-391/86-13 – Revised Final Report", dated October 9, 1990 (ML073551056).

OA.1.6 TMI Action Item NUREG 0737 II.D.3 – "Direct Indication of Relief-and Safety-Valve Position"; and SSER App HH Item 074: "Installation of the Acoustic monitoring system for the PORVs"

Drawings:

45N706-2, Rev. 21 Units 1 & 2 – Wiring Diagram / 120V AC Vital Inst Power BDS 1-II & 2-II / Connection Diagram – Sheet, dated: 9/29/1986

45N1658, Rev. N Units 1 & 2 – Wiring Diagrams / Unit Control Board Panel O-M-25 Connection Diagram, dated: DTS
 45N1660-6, Rev. 10 (DRA 53760-055 / EDCR 53760-A) – Wiring Diagram – Unit Control Boards Panel O-M-27A Connection Diagram Sheet 6, dated: 2/24/2012
 45N2632-17, Rev. 8 (DRA 53760-073 / EDCR 53760-A) – Wiring Diagram – Miscellaneous Controls Connection Diagrams Sheet 17, dated: 2/23/2012.
 45W876-14, Rev. 18 (DRA 53760-084) – Detail J14 / Accelerometer Cable Support, dated: 1/10/2013.
 45N2632-17, Rev. 8 (DRA 53760-092) – 2-TB-68-2 (AZ 95°, EL. 756') & 2-TB-68-1 (AZ95°, EL. 756'), dated: 4/15/2014.
 45N2632-17, Rev. 8 (DRA 55174-016) – 2-TB-68-2 (AZ 95°, EL. 756') & 2-TB-68-1 (AZ95°, EL. 756'), dated: 3/14/2014
 45N2632-17, Rev. 8 (DRA 55174-110) – 2-TB-68-2 (AZ 95°, EL. 756') & 2-TB-68-1 (AZ95°, EL. 756'), dated: 5/7/2014

Miscellaneous Documents:

FCR 62541-A, dated November 11, 2013
 NGDC PP-19-2 Engineering Complete, Tracking Number NCO820253028 (Rev 1)
 TVA Letter, "Watts Bar Nuclear Plant (WBN) Units 1 and 2 - NUREG-0737, ITEM II.D.3 – Direct Indication of Relief and Safety Valve Position – Revised Response", dated November 7, 1994 (ML073230714)
 WO 113690910, dated November 8, 2013
 WO 110800410, dated April 14, 2014

OA.1.7 Hydrogen Igniter Backup Power – Generic Safety Issue 189

Miscellaneous Documents:

TVA Letter to NRC, "Watts Bar Nuclear Plant (WBN) Unit 2 – Response to Request for Additional Information Regarding Mitigation Strategy Assessments and Closure Process for Phases 1, 2, and 3," dated March 28, 2011
 Work Order (WO) # 115227409, "SUT SYS 997 WBN-2-MISC-997 perform load test on 2 megawatt generator," dated April 23, 2014

OA.1.8 Generic Letter 1979-36, Adequacy of Station Electric Distribution System Voltages

Calculations:

EDQ00099920070002 Rev. 39, AC Auxiliary Power System Analysis, dated 6/9/2014
 WBNEEBEDQ1999010001 Rev. 89, AC Auxiliary Power System Analysis, dated: 4/28/2014
 Study EEB-WBN-12-001 Rev. 2, Sensitivity Study of Degraded Voltage Relay (DVR) Protection During Motor Starting, dated: 6/3/2014
 Study 2GDS777RP, Auxiliary Power Test and Verification Study, dated: 8/31/1984
 Study N3-235-V, 120V AC Vital Instrument Power Verification of Design Calculation Methods, dated: 10/25/1984.
 EPM-AAP-081090, Rev. 5, Diesel Generators Fuel Oil 7-Day Tank Capacity and Level Setpoint Calculation, dated: 8/31/95
 EPM-MGF-092089, Rev. 3, Diesel Generator System Fuel Oil Flow Requirements, dated: 1/28/1995
 WBPE2119202001, Rev. 011, 6.9KV Shutdown & Logic Undervoltage Relays Requirement / Demonstrated Accuracy Calculation, dated: 10/25/2012
 WBN-EEB-MS-T120-0026, Rev. 2, GDC 17 Verification, dated: 12/12/2001

Miscellaneous Documents:

Final Closure NGDC PP-19-2, Tracking Number 10177824, R1 IP&S Number: 194, Item 82 of Enclosure 2 of the Reference reads "GL 1979-36, "Adequacy of Station Electric Distribution System Voltages" - Perform verification of adequacy of voltages during the preoperational testing." [Item 82 of Enclosure 2 of Letter T90 080128 001], dated: 6/26/2014

Unit 0 – Surveillance Instruction 0-SI-82-3, Rev. 55 - 18 Month Loss of Offsite Power with Safety Injection – DG 1A-A, dated: 7/7/2014

Unit 0 – Surveillance Instruction 0-SI-82-4, Rev. 55 - 18 Month Loss of Offsite Power with Safety Injection – DG 1B-B, dated: 7/7/2014

Unit 0 – Surveillance Instruction 0-SI-82-5, Rev. 33 - 18 Month Loss of Offsite Power– DG 2A-A, dated: 3/24/2014

Unit 0 – Surveillance Instruction 0-SI-82-6, Rev. 35 - 18 Month Loss of Offsite Power– DG 2B-B, dated: 3/24/2014.

Unit 0 – Surveillance Instruction 0-SI-82-11-A, Rev. 42 Monthly Diesel Generator Start and Load Test DG 1A-A, dated: 1/28/2014

Unit 0 – Surveillance Instruction 0-SI-82-11-B, Rev. 44 Monthly Diesel Generator Start and Load Test DG 1B-B, dated: 1/27/2014

Unit 0 – Surveillance Instruction 0-SI-82-12-A, Rev. 46 Monthly Diesel Generator Start and Load Test DG 2A-A, dated: 1/21/2014

Unit 0 – Surveillance Instruction 0-SI-82-12-B, Rev. 46 Monthly Diesel Generator Start and Load Test DG 2B-B, dated: 1/28/2014

Unit 1 – Surveillance Instruction 1-SI-57-1-A, Rev. 14 - 18 Month Unit 1 A Train ESF Load Sequence and Reset Timer Test, dated: 7/18/2012

Unit 1 – Surveillance Instruction 1-SI-57-1-B, Rev. 16 - 18 Month Unit 1 B Train ESF Load Sequence and Reset Timer Test, dated: 7/18/2012

Unit 2 – Surveillance Instruction 2-SI-57-1-A, Rev. 10 - 18 Month Unit 2 A Train ESF Load Sequence and Reset Timer Test, dated: 7/18/2012

Unit 2 – Surveillance Instruction 2-SI-57-1-B, Rev. 11 - 18 Month Unit 2 B Train ESF Load Sequence and Reset Timer Test, dated: 9/10/2013

Unit 0 – Surveillance Instruction 0-SI-211-1, Rev. 15 - 18 Month 6.9 KV Shutdown Boards Transfer From Normal to Alternate Supply, dated: 12/7/2012.

Unit 1 – Surveillance Instruction 1-SI-211-3-A, Rev. 12 - 18 Month System Functional Test on 6900V SD BD 1A-A Degraded Voltage and Undervoltage Relays, dated: 2/23/2009

Unit 1 – Surveillance Instruction 1-SI-211-3-B, Rev. 10 - 18 Month System Functional Test on 6900V SD BD 1B-B Degraded Voltage and Undervoltage Relays, dated: 2/23/2009

Unit 2 – Surveillance Instruction 2-SI-211-3-A, Rev. 11 - 18 Month System Functional Test on 6900V SD BD 2A-A Degraded Voltage and Undervoltage Relays, dated: 3/18/2009

Unit 2 – Surveillance Instruction 2-SI-211-3-B, Rev. 10 - 18 Month System Functional Test on 6900V SD BD 2B-B Degraded Voltage and Undervoltage Relays, dated: 3/18/2009

OA.1.9 Construction Deficiency Report 391/89-09, Significant Trend Associated with Damaged, Loose, or Missing Hardware

Procedures

25402-000-GPP-0000-N1601, System Completion and Turnover, Rev. 0007
 TI-437, Operational Readiness Turnover Process for Unit 2 Systems, Rev. 11
 TI-338, Operational Readiness Turnovers, Rev. 0010
 25402-000-GPP-0000-N2103, Scaffold Control and Management, Rev. 0005
 25402-000-GPP-0000-N1206, Work Order Processing, Rev.18
 25402-000-GPP-0000-N2102, Housekeeping, Rev.0009

OA.1.10 SSER App HH Open Item 23: EQ Testing of MSIV Solenoids

TVA letter to NRC, "Watts Bar Nuclear Plant (WBN) Unit 2 - Safety Evaluation Report Supplement 22 (SSER 22) - Response to NRC Required Action Items", April 6, 2011

NGDC PP-19-2 Open Item/Commitment Completion Form 112145110, TVA will qualify MSIV solenoids to the Category I criteria. (response to action item 23), 4/30/14
 Environmental Qualification Documentation Package Binder WBNEQ-SOL-010, Rev. 0 issued 4/18/2014
 Wylie report 58686RI2, Qualification Test Report for Hanna Pilot Control Solenoids P/N NC2233-A and P/N N606-00200-000 For Use in Watts Bar Nuclear Plant Units 1 & 2, Rev. B
 Wylie report 58686PII, Qualification Plan for Hanna Pilot Control Solenoids P/N NC2233-A and P/N N606-00200-000 For Use in Watts Bar Nuclear Plant Units 1 & 2, Rev. A

OA.1.12 Construction Deficiency Report 50-391/86-08: Incorrect Tubing Configuration on Containment Isolation Valve Actuators

Procedures

WBNP Preoperational Test Instruction 2-PTI-030J-01, Containment Purge, Rev 001 dated: 7/11/2012

Reports

Watts Bar Unit 2 Final Safety Analysis Report, Rev 112

LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
AFWST	Auxiliary feedwater storage tank
ALARA	As Low As Reasonably Achievable
ANSI	American National Standards Institute
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
BL	NRC Bulletin
CAP	Corrective Action Program
CAQR	Condition Adverse to Quality Report
CATD	Corrective Action Tracking Document
CDR	Construction Deficiency Report
CFR	Code of Federal Regulations
DR	Discrepancy Report
ECP	Employee Concerns Program
EDCR	Engineering Document Construction Release
EPA	Environmental Protection Agency
EQ	Environmental Qualification
EQDP	Environmental Qualification Documentation Package
ESQ CAP	Equipment Seismic Qualification Corrective Action Program
FLEX	Flexible Coping Strategies
FSAR	Final Safety Analysis Report
GL	Generic Letter
HAAUP CAP	Hanger Analysis Update Program Corrective Action Program
IMC	Inspection Manual Chapter (NRC)
INPO	Institute of Nuclear Power Operations
IP	Inspection Procedure (NRC)
IIR	Integrated Inspection Report
JPM	Job Performance Measurement
LCO	Limiting Condition for Operation
LOR	Licensed Operator Requalification

M&TE	Measuring and Test Equipment
MSIV	Main Steam Isolation Valves
NCR	Nonconformance Report
NCV	Non-Cited Violation
NDE	Nondestructive Examination
No.	Number
NPP	Nuclear Performance Plan
NRC	Nuclear Regulatory Commission
PER	Problem Evaluation Report
PORV	Power-Operated Relief Valve
PRT	Pressurizer Relief Tank
PT	Liquid Penetrant
PTI	Pre-Operational Test Instruction
QA	Quality Assurance
QC	Quality Control
RCA	Radiological Control Area
RCL	Reactor Coolant Loop
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
Rev.	Revision
RHR	Residual Heat Removal
RPS	Reactor Protection System
RPV	Reactor Pressure Vessel
RT	Radiological Test
SAR	Safety Analysis Report
SCAR	Significant Corrective Action Report
SCBA	Self-Contained Breathing Apparatus
SCR	Significant Condition Report
SER	Safety Evaluation Report
SG	Steam Generator
SI	Surveillance Instruction
SL	Severity Level
SSER	Supplemental Safety Evaluation Report
SSCs	Structures, Systems, or Components
TI	Temporary Instruction (NRC)
TMI	Three Mile Island
TS	Tech Support
TVA	Tennessee Valley Authority
URI	Unresolved Item
WARL	Western Area Radiological Laboratory
WBN	Watts Bar Nuclear Plant
WEC	Westinghouse Electric Company
WO	Work Order