



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

June 25, 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 05000391/2014604**

Dear Mr. Skaggs:

On May 17, 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 May 22, 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.

No findings were identified during this inspection.

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

M. Skaggs

2

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 05000391/2014604
w/Attachment

cc w/encl: (See next page)

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 05000391/2014604
 w/Attachment

cc w/encl: (See next page)

* Previous Concurrence

PUBLICLY AVAILABLE NON-PUBLICLY AVAILABLE SENSITIVE NON-SENSITIVE
 ADAMS: Yes ACCESSION NUMBER: ML14177A214 SUNSI REVIEW COMPLETE FORM 665 ATTACHED

OFFICE	RII:DCP	RII:DCP	RII:DCP	RII:DCP	RII:DCP	RII:DCP
SIGNATURE	TXN via e-mail	TXN for EJP1 via e-mail	NDK1 via e-mail	MCM4 via e-mail	DJS	CXC10 via e-mail
NAME	TNazario	E. Patterson	N. Karlovich	M. Magyar	J. Seat	C. Cheung
DATE	06/12/2014	06/12/2014	06/10/2014	06/10/2014	06/23/2014	06/17/2014
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
OFFICE	RII: DCP	RII: DCP	RII: DCP	RII: DCP	RII: DCP	RII: DRS
SIGNATURE	MXK7 via e-mail	AJL2 via e-mail	DWP2 via e-mail	CDT via e-mail	JBB5	AND via e-mail
NAME	M. Kowal	A. Lerch	D. Piccirillo	C. Taylor	J. Baptist	A. Nielsen
DATE	06/09/2014	06/09/2014	06/16/2014	06/13/2014	06/23/2014	06/10/2014
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
OFFICE	RII: DCI	RII: DCI	RII: DCI	RII: DCI	RII: DCI	RII: DCI
SIGNATURE	CDJ1 via e-mail	WSP1 via e-mail	CAJ for ATM1 via e-mail	GXC2 via e-mail	CAJ via e-mail	CTJ1 via e-mail
NAME	Clint Jones	W.Pursley	A. Matos	G. Crespo	C. Julian	Carl Jones
DATE	06/13/2014	06/10/2014	06/17/2014	06/09/2014	06/17/2014	06/13/2014
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
OFFICE	RII: DCI	RII: DCI	RII: DCI	RII: DCI	RII: DCI	RII: DCI
SIGNATURE	LVC1 via e-mail	CAJ for RXM3 via e-mail	LJB4 for JXL2 via e-mail	LJB4 for JGV1 via e-mail	SEA1 via e-mail	JAC1 via e-mail
NAME	L. Castelli	R. Mathis	J. Lizardi	J. Vasquesz	S. Temple	J. Christensen
DATE	06//2014	06/17/2014	06/23/2014	06/23/2014	06/09/2014	0613 /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: DRS	
SIGNATURE	TXS2 via e-mail	JBB5 for AJB1	GWL1 via e-mail	AXT6 via e-mail	MES4 via e-mail	
NAME	T. Su	A. Butcavage	G. Laska	A. Toth	M. Speck	
DATE	06/17/2014	06/23/2014	06/16/2014	06/09/2014	06/12/2014	
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	

OFFICIAL RECORD COPY DOCUMENT NAME: OFFICIAL RECORD COPY DOCUMENT NAME:
 G:\CC\DCP\CPB3\WATTS BAR 2\CURRENT DRAFT INSPECTION REPORT\2014\IR 2014-604\INTEGRATED IR
 2014604 FINAL.DOCX

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

M. Skaggs

4

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 June 25, 2014.

SUBJECT: WATTS BAR NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED
INSPECTION REPORT 05000391/2014604

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

R. Monk, 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.: 05000391/2014604

Applicant: Tennessee Valley Authority (TVA)

Facility: Watts Bar Nuclear Plant, Unit 2

Location: Spring City, TN 37381

Dates: April 1 – May 17, 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
C. Jones, Resident Inspector, CPB3, DCP, RII
C. Cheung, Construction Project Inspector, CPB2, DCP, RII
M. Kowal, Senior Construction Project Inspector, CPB2, DCP, RII
A. Lerch, Construction Project Inspector, CPB2, DCP, RII
D. Piccirillo, Senior Construction Project Inspector, CPB2, DCP, RII
C. Taylor, Senior Construction Inspector, CPB4, DCP, RII, Section P.1.6
J. Baptist, Senior Construction Project Inspector, CPB3, DCP, RII, Sections P.1.1, P.1.3, P.1.6
J. Seat, Construction Project Inspector, CPB3, DCP, RII, Sections P.1.2, P.1.6, OA.1.14, OA.1.15
A. Nielsen, Senior Health Physicist, Plant Support Branch (PSB) 1, Division of Reactor Safety (DRS), RII, Sections P.1.4, R.1.1, OA.1.3
W. Pursley, Health Physicist, PSB1, DRS, RII, Sections P.1.4, R.1.1, R.1.2, OA.1.3
A. Matos, Construction Inspector, Construction Inspection Branch (CIB) 1, Division of Construction Inspection (DCI), RII, Sections P.1.5, OA.1.17, OA.1.18, OA.1.19, OA.1.20, OA.1.21, OA.1.25
G. Crespo, Senior Construction Inspector, CIB1, DCI, RII, Sections OA.1.18, OA.1.19, OA.1.20, OA.1.21
C. Julian, Senior Construction Inspector, CIB1, DCI, RII, Section OA.1.4

Enclosure

- C. Jones, Senior Construction Inspector, CIB1, DCI, RII, Section OA.1.23
- L. Castelli, Senior Construction Inspector, CIB1, DCI, RII, Section OA.1.4
- R. Mathis, Construction Inspector, CIB1, DCI, RII, Sections OA.1.4, OA.1.24
- J. Lizardi, Construction Inspector, CIB2, DCI, RII, Sections OA.1.26, OA.1.27
- J. Vasquez, Construction Inspector, CIB2, DCI, RII, Sections OA.1.26, OA.1.27
- S. Temple, Construction Inspector, CIB2, DCI, RII, Sections OA.1.8, OA.1.29
- J. Christensen, Construction Inspector, CIB3, DCI, RII, Sections OA.1.6, OA.1.7
- T. Su, Reactor Inspector, Engineering Branch (EB) 1, DRS, Section OA.1.4
- A. Butcavage, Reactor Inspector, EB3, DRS, Section OA.1.5
- G. Laska, Senior Operations Engineer, Operations Branch (OB) 1, DRS, Sections O.1.1, OA.1.16, OA.1.28
- A. Toth, Operations Engineer, OB2, DRS, Sections O.1.1, OA.1.16, OA.1.28
- M. Speck, Senior Emergency Preparedness Inspector, PSB1, DRS, RII, Sections OA.1.9, OA.1.10, OA.1.11

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, pre-operational testing, operation readiness activities, and follow-up of other activities. The inspection program for Unit 2 construction activities is described in NRC Inspection Manual Chapter 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

- The inspectors concluded that issues pertaining to several open items, including seven construction deficiency reports (CDRs), one violation, five temporary instructions (TIs), two Three Mile Island (TMI) action items, one Appendix HH items, two bulletins (BLs), one unresolved item (URI), and six inspection procedures (IPs) 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; piping and supports; mechanical systems and components; electrical systems and components; pre-operational testing activities; operational staffing; and various NRC inspection procedures.

Table of Contents

I. QUALITY ASSURANCE PROGRAM.....	6
Q.1 Quality Assurance Oversight Activities.....	6
Q.1.1 Identification and Resolution of Construction Problems (Inspection Procedure 35007).....	6
II. MANAGEMENT OVERSIGHT AND CONTROLS.....	6
C.1 Construction Activities.....	6
C.1.1 Unit 1 and Unit 2 Construction Activity Interface Controls.....	6
C.1.2 Reactor Coolant Pressure Boundary Piping Work Observation, Nondestructive Examination Procedure Liquid Penetrant Examination (Inspection Procedures 49053 and 57060).....	7
C.1.3 Conduit Walkdowns and Loading Calculations (Inspection Procedures 51063, 51053, and 37051).....	8
C.1.4 Reactor Vessel and Internals Work Observation (Inspection Procedure 50053) ..	9
C.1.5 (Closed) Heating, Ventilating, and Air Conditioning Systems (Inspection Procedure 50100).....	9
C.1.6 (Closed) Pipe Support Work Observations (Inspection Procedure 50090)	12
C.1.7 Post-Fukushima Diverse and Flexible Construction Activities.....	17
P.1 Pre-Operational Activities.....	19
P.1.1 Preoperational Test Program Implementation Verification (Inspection Procedure 71302).....	19
P.1.2 Preoperational Test Procedure Review (Inspection Procedures 70300, 70311, and 70339).....	20
P.1.3 Preoperational Test Procedure Review (Inspection Procedures 70333, 70336, and 70343).....	22
P.1.4 (Closed) Solid Wastes (Pre-Operational and Supplemental) (Inspection Procedure 84522).....	23
P.1.5 Preoperational Test Procedure Review (Inspection Procedures 70300 and 70305).....	24
P.1.6 Preoperational Test Witnessing (Inspection Procedure 70312).....	25
III. OPERATIONAL READINESS ACTIVITIES.....	26
O.1 Operations.....	26
O.1.1 (Closed) Emergency Procedures (Inspection Procedure 42452).....	26
R.1 Radiation Safety.....	27
R.1.1 (Closed) Radiation Protection, Plant Chemistry, Radwaste, and Environmental: Organization and Management Controls (Inspection Procedure 83522)	27
R.1.2 (Closed) Radiation Protection, Plant Chemistry, Radwaste, Transportation and Environmental: Training and Qualifications (Inspection Procedure 83523).....	28

F.1 Fire Protection.....	29
IV. OTHER ACTIVITES	30
OA.1.1 (Discussed) Cable Issues Corrective Action Program – Sub-Issue: Supports in Vertical Conduits and Construction Deficiency Report 50-391/85-35, Support of Conductors Inside Vertical Conduit Runs (Inspection Procedure 35007)	30
OA.1.2 (Discussed) Construction Deficiency Report 391/93-02, Loose Flexible Conduit Fittings (Inspection Procedure 35007).....	31
OA.1.3 (Discussed) Three Mile Island Action Item II.B.2, Plant Shielding (Inspection Procedure 92701).....	33
OA.1.4 (Discussed) Environmental Qualification Special Program (Temporary Instruction 2512/036)	35
OA.1.5 (Discussed) Inspection Procedure 71111.07, Heat Sink Performance, Subissue: Emergency Raw Cooling Water Testing and Supplemental Safety Evaluation Report, Appendix HH, Open Item 90: Emergency Raw Cooling Water Pumps Meeting General Design Criteria 5 Requirements for Two-Unit Operation (Inspection Procedure 92701)	37
OA.1.6 (Discussed) Construction Deficiency Report 391/86-08, Incorrect Tubing Configuration on Containment Isolation Valve Actuators (Inspection procedures 52053 and 52055)	38
OA.1.7 (Discussed) Three Mile Island Action Item II.D.1, Performance Testing of Boiling-Water Reactor and Pressurized-Water Reactor Relief and Safety Valves (Inspection Procedure 50071)	40
OA.1.8 (Discussed) Violation 391/87-19-01: Failure to Follow Procedures for Installing Equipment in the North and South Valve Rooms (Inspection Procedure 92702).....	41
OA.1.9 (Discussed) Supplemental Safety Evaluation Report, Appendix HH, Open Item 38: Availability and Operability of the Emergency Response Data System (Inspection Procedure 92701)	42
OA.1.10 (Discussed) Supplemental Safety Evaluation Report, Appendix HH, Open Item 40: Confirm the Adequacy of the Emergency Facilities and Equipment to Support Dual Unit Operations (Inspection Procedure 92701).....	43
OA.1.11 (Discussed) Supplemental Safety Evaluation Report , Appendix HH, Open Item 41: Update Plant Displays to include Unit 2 and Update Dose Assessment Models to provide Capabilities for Assessing Releases from Both WBN Units (Inspection Procedure 92701)	44
OA.1.12 (Closed) Bulletin 74-03, Failure of Structural or Seismic Support Bolts on Class I Components (Inspection Procedure 35007).....	45
OA.1.13 (Closed) Bulletin 88-09, Thimble Tube Thinning in Westinghouse Reactors (Inspection Procedure 35007)	46
OA.1.14 (Closed) Construction Deficiency Report 391/83-07, Transfer Valves to Auxiliary Feedwater Have Non-Divisional Power (IP 35007)	48
OA.1.15 (Closed) Violation 391/87-05-01, Failure to Consider Vendor Requirements in the Design of the Hydrogen Analyzer System and Failure to Specify Classes of Cleanliness in Specifications or Drawings.....	48
OA.1.16 (Closed) Supplemental Safety Evaluation Report , Appendix HH, Open Item 73: Confirm that TVA has completed Watts Bar Unit 2 Emergency Operating Procedures prior to Fuel Load (Inspection Procedure 42452).....	49
OA.1.17 (Closed) Three Mile Island Action Item II.E.3.1, Emergency Power for Pressurizer Heaters (Inspection Procedure 92701).....	49

OA.1.18	(Closed) Unresolved Item 391/86-24-06, Review of cable splicing as required by FSAR (Inspection Procedure 51063).....	50
OA.1.19	(Closed) Cable Issues Corrective Action Program – Sub-issue: Splices (Temporary Instruction 2512/016)	51
OA.1.20	(Closed) Cable Issues Corrective Action Program – Sub-issue: Cable Bend Radius (Temporary Instruction 2512/016, Inspection Procedure 51063).....	52
OA.1.21	(Closed) Construction Deficiency Report 391/82-76, Cable Bend Radius Deficiencies (Inspection Procedure 51063).....	53
OA.1.22	(Closed) Construction Deficiency Report 391/86-03 Equipment Pigtail	54
OA.1.23	(Closed) Construction Deficiency Report 391/95-05, Loose Connections in Vendor-Wired Electrical Panels (Inspection Procedure 35007)	55
OA.1.24	(Closed) Cable Issues Corrective Action Program – Sub-issue: Cable Proximity to Hot Pipes and Construction Deficiency Report 391/90-03, Cable Proximity to Hot Pipes (Temporary Instruction 2512/016, Inspection Procedure 35007).....	57
OA.1.25	(Closed) Construction Deficiency Report 391/85-22, Undervoltage Condition on 125 Volt Direct Current Vital Control System to Auxiliary Feedwater Components (Inspection Procedures 51063 and 92701)	58
OA.1.26	(Closed) Electrical Conduit and Conduit Supports Corrective Action Program (Temporary Instruction 2512/018, Inspection Procedures 37051, 51053, and 51055)	59
OA.1.27	(Closed) Construction Deficiency Report 391/87-18, Deficiencies in Installation of Electrical Conduit and Conduit Supports (Temporary Instruction 2512/018, Inspection Procedures 51053 and 51055).....	65
OA.1.28	(Closed) Three Mile Island Action Item I.C.1, Short Term Accident and Procedure Review (Inspection Procedure 42452)	66
OA.1.29	(Closed) Q-List Corrective Action Program (Temporary Instruction 2512/029)...	67
V.	MANAGEMENT MEETINGS	69
X1	Exit Meeting Summary	69

REPORT DETAILS

Summary of Plant Status

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

I. QUALITY ASSURANCE PROGRAM

Q.1 Quality Assurance Oversight Activities

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 applicant disposition and actions associated with PER 808623, which documented the removal of pressurizer instrument nozzle couplings, to include the repair of the nozzle couplings; observation of the final nondestructive examination (NDE); and review the NDE records. See Section C.1.2 of this report for further discussion.

b. Observations and Findings

No findings were identified.

c. Conclusions

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

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, at least once per week, 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 select 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 select 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 associated with:

- Work Order (WO) 114485379, Design Change Notice (DCN) 60684 Stage 8 for Emergency Raw Cooling Water (ERCW) Supply Header 2B, Fukushima Modifications
- WO 114485358, DCN 60684 Stage 7 for ERCW Supply Header 1B, Fukushima Modifications
- WO 114113726, Startup test (SUT) System 063 2-PTI-063-02 Perform Accumulator Test
- WO 114485347, DCN 60684 Stage 5 for ERCW Supply Header 1A, Fukushima Modifications (FLEX)

Specific work activities that the applicant had screened out as not affecting Unit 1 included, but were not limited to, testing, flushing, and refurbishment activities as noted in this inspection report.

b. Observations and Findings

No findings were identified.

c. Conclusions

Overall, adequate management oversight and controls were in place for observed construction activities that could potentially impact the operating unit.

C.1.2 Reactor Coolant Pressure Boundary Piping Work Observation, Nondestructive Examination Procedure Liquid Penetrant Examination (Inspection Procedures 49053 and 57060)

a. Inspection Scope

The inspectors observed in-process liquid penetrant examinations (PT) and reviewed PT records for the installation of the replacement couplings on the pressurizer instrumentation nozzles as part of the corrective actions for PER 808623. The inspections were completed to verify that the quality of the NDE process and records were in accordance with procedure GQP-9.7, Solvent Removable Liquid Penetrant Examination and Acceptance Standards for Welds, Base Materials, and Cladding, Revision (Rev.) 16, and the 1973 edition of the American Society of Mechanical Engineers (ASME) Section III code.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The PT process and records were completed in accordance with the approved procedures.

C.1.3 Conduit Walkdowns and Loading Calculations (Inspection Procedures 51063, 51053, and 37051)

a. Inspection Scope

The inspectors reviewed ampacity calculations, environmental thermal load calculations, and integrated cable and raceway design system (ICRDS) data that showed the mass loading for as-built power cable conduits 2PP2181A and for as-built control cable conduits 2VC9708A and 2M4654B. The inspectors performed as-built walkdowns of the conduits to verify that location, routing, supports, separation and isolation, and identification, was consistent with ICRDS data, associated drawings, and specifications.

The inspectors performed an as-built walkdown of Class 1E cable tray (Raceway ID 4B 2062:2084) which contained a power cable. The inspectors verified that the drawings matched the as-built condition by examining the physical location and routing, the location and sizes of supports, the physical separation and isolation, the tray loading (ampacity, thermal, and mass), and identification. Additionally, the inspectors reviewed applicant documents to support the as-built verification. The documents reviewed included calculations, drawings, procedures, and specifications.

The following samples were inspected:

- IP 51063 Section 02.03 - 4 samples
- IP 51053 Section 02.02.f - 4 samples
- IP 37051 Section 02.01.b.2 - 4 samples

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors concluded that the conduits and raceway were adequately installed. These inspection procedures remain open for additional samples of field observations.

C.1.4 Reactor Vessel and Internals Work Observation (Inspection Procedure 50053)

a. Inspection Scope

The inspectors observed work associated with WO 111821966 which installed temporary cribbing below the upper internals to support inspection activities. The inspectors observed controls in place during the placement of the cribbing, verified that lifting was performed in accordance with site procedures, and verified that key components were being protected during the work activities. The inspectors also observed the installed vessel to verify that measures were in place to protect the vessel from construction damage.

- IP 50053 Section 02.02.a - 1 sample
- IP 50053 Section 02.02.b - 1 sample
- IP 50053 Section 02.03.b - 1 sample
- IP 50053 Section 02.03.c - 1 sample

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Adequate controls were in place to protect the reactor vessel and internals.

C.1.5 (Closed) Heating, Ventilating, and Air Conditioning Systems (Inspection Procedure 50100)

a. Inspection Scope

Background: As described in Inspection Manual Chapter (IMC) 2517, Watts Bar Unit 2 Construction Inspection Program, TVA addressed WBN Unit 1 construction quality issues as part of the implementation of its Nuclear Performance Plan (NPP). The results of the NRC inspection program were published in NUREG-1528, Reconstitution of the IMC 2512 Construction Inspection Program for Watts Bar Unit 1 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML073450842). In 1985, construction on Watts Bar Unit 1 and Watts Bar Unit 2 was stopped due to the identification of multiple construction quality issues. TVA completed Unit 1 in 1995 but had conducted very little Unit 2-specific work since 1985. In 2007, TVA decided to finish the Unit 2 plant. As part of confirming that all issues and inspection requirements would be completed for Unit 2, a review of all NRC inspection reports was initiated to determine the status of the required inspection procedures (IPs) contained in IMC 2512, Light Water Reactor Inspection Program – Construction Phase, at the time construction was stopped. This effort was called the reconstitution process. The NRC used the results of the reconstitution process to identify areas which would require additional inspections. Integrated Inspection Report (IIR) 05000391/2009602 (ADAMS Accession No. ML091210420), Attachment 2, documented the reconstitution results for IP 50100 and determined that the requirements of the IP were met for Unit 2. The inspection scope for

new work was limited and included samples of safety-related heating, ventilating, and air conditioning (HVAC) activities. The majority of the HVAC work was completed and inspected prior to Unit 2 construction reactivation in 2007. This work included HVAC systems serving common and/or shared components in the following areas:

- control room
- switchgear and battery room
- access control area
- HVAC equipment room
- computer room
- spent fuel pool area
- spent fuel cooling pumps room
- radwaste areas
- auxiliary building
- service water pump house
- diesel generator area
- emergency gas treatment system
- auxiliary building gas treatment system

Inspection Activities: The purpose of this IP was to verify, by observation and independent evaluation, that activities related to safety-related HVAC were accomplished in accordance with NRC requirements, commitments, and the applicant's procedures. The following table lists additional inspections that were performed under this IP.

IP Section	Inspection Report
02.01 – Review of Contractor QA Manual	05000391/2013604(ML13179A079)
02.02 – Review of QA Implementing Procedures	05000391/2013604
02.03 – Review of Work Procedures	05000391/2011608(ML11311A082) 05000391/2012603(ML12123A156)
02.04 – Observation of Work and Work Activities	
02.04.a – Personnel Interviews	05000391/2012603 05000391/2012610(ML13035A201) 05000391/2013604 05000391/2013612(ML13088A066)
02.04.b – Installation Activities	05000391/2012610 05000391/2013612
02.04.c – As Installed Equipment	05000391/2009603(ML092120326) 05000391/2009604(ML093030479) 05000391/2011608 05000391/2013604 05000391/2014604
02.05 – Records Review	
02.05.a – Documentation Requirements Review for Work Performed	05000391/2013604(ML13179A079)
02.05.b – Nonconformance Review	05000391/2013604(ML13179A079)

02.05.c – Audit Report Review	05000391/2013604(ML13179A079)
-------------------------------	-------------------------------

During this inspection period, the inspectors performed physical walkdowns of as-built HVAC systems and reviewed drawings, procedures, and specifications of safety-related HVAC components to ensure conformance to applicable codes and requirements. The following attributes were inspected to determine if:

- QA plans, instructions, and procedures for specific safety-related activities had been implemented and conformed to the QA program as described in the Final Safety Analysis Report (FSAR). Also, to ensure that the contractor had established a program for ensuring that all personnel were qualified to the work procedures involved.
- QA manual and implementing procedures indicated that:
 - adequate inspection procedures have been established for the HVAC activity;
 - provisions have been made to ensure that those engaged in conducting inspections were qualified in the design and construction aspects of the HVAC systems and did not have direct responsibility for work in the areas being inspected;
 - means had been established to verify that the technical requirements were included in appropriate work and QC inspection procedures;
 - provisions had been made to ensure that electrical components had been properly qualified;
 - means had been established to verify that any significant design and field changes from approved drawings were adequately controlled and processed commensurate with the original design;
 - provisions had been established to ensure that quality requirements were met; and
 - safety-related/nonsafety-related boundaries and equipment were clearly defined and delineated.

Additionally, the inspectors reviewed the completed installation of emergency exhaust equipment, the cooler unit in the safety injection 2B pump room, and ductwork in the auxiliary feedwater room to verify proper location, configuration, identification, and absence of damage.

The inspectors also reviewed the records, for installed HVAC systems, to determine the effectiveness of the documentation by comparing records against requirements for accuracy and completeness.

The following samples were inspected:

- IP 50100 Section 02.01 – one sample
- IP 50100 Section 02.02 – two samples
- IP 50100 Section 02.04.c – eight samples
- IP 50100 Section 02.05.a – two samples (two systems sampled)

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusion

The inspectors determined that the work activities associated with the safety-related HVAC met the applicable requirements. IP 50100 is considered closed; however, if additional safety-related activities are performed, inspections may be performed at the NRC's discretion.

C.1.6 (Closed) Pipe Support Work Observations (Inspection Procedure 50090)

a. Inspection Scope

Background: As described in IMC 2517, TVA addressed WBN Unit 1 construction quality issues as part of the implementation of its NPP. The results of the NRC inspection program were published in NUREG-1528, Reconstitution of the IMC 2512 Construction Inspection Program for Watts Bar Unit 1. In 1985, construction on Watts Bar Unit 1 and Watts Bar Unit 2 was stopped due to the identification of multiple construction quality issues. TVA completed Unit 1 in 1995 but had conducted very little Unit 2-specific work since 1985. In 2007, TVA decided to finish the Unit 2 plant. As part of confirming that all issues and inspection requirements will be completed for Unit 2, a review of all NRC inspection reports was initiated to determine the status of the required IPs, contained in IMC 2512, in effect at the time construction was stopped. This effort was called the reconstitution process. The NRC used the results of the reconstitution process to identify areas which require additional inspections. IIR 05000391/2009602 (ADAMS Accession No. ML091210420), Attachment 2, documented the reconstitution results for IP 50090 and determined that a total of 54 additional samples were required for Sections 02.03.b, c, d, e, and f for Unit 2. At that time, the requirements of the IP were met for all other sections; however, additional samples were performed for new work activities.

IIR 05000391/2011609 (ADAMS Accession No. ML11350A229) documented the status of IP 50090, including several sections of the IP and sample sizes that had been met during earlier inspection efforts with the exception of inspection activities of dynamic restraints. Since 2011, a number of inspections have been performed of those activities associated with pipe support installations. These inspections and their respective reports are listed in the table below.

Inspection Activities: The purpose of this IP was to verify, by observation and independent evaluation of work performed and completed, that activities related to pipe supports were accomplished in accordance with approved procedures and NRC requirements.

The inspectors reviewed three procedures associated with snubber installation to verify the procedures were reviewed and approved and to determine whether they incorporated the following:

- controls to ensure that the type and classification of pipe support complied with approved drawings and vendor specifications and met licensee commitments;

- instructions and precautions to ensure that welding, bolting, and machining were performed in a manner that would prevent the snubbers from being degraded;
- provisions for ensuring that required pre-installation and in-process inspections were performed at the appropriate time;
- means to ensure that bolts, nuts, washers, lubricant, and lock ties were of the proper type, size, and material with required identification markings; and
- means to ensure that bolts, nuts, washers, and lubricant were correctly installed.

The inspectors observed dynamic pipe support (snubber) installations/post-installations for the following samples and reviewed the as-built records to verify that the work activities relative to dynamic pipe support systems were completed in accordance with NRC requirements and the applicant's approved procedures.

Snubbers inspected:

- WBN-2-SNUB-062-0139; size PSA ¼, chemical and volume control system (CVCS)
- WBN-2-SNUB-068-0470; size PSA ¼, reactor coolant system (RCS)
- WBN-2-SNUB-068-0520E; size PSA ¼, reactor coolant system
- WBN-2-SNUB-068-0520W; size PSA ¼, reactor coolant system
- WBN-2-SNUB-001-2SG1A, Steam Generator Paul Monroe Snubber
- WBN-2-SNUB-001-2SG1B, Steam Generator Paul Monroe Snubber
- WBN-2-SNUB-001-2SG1C, Steam Generator Paul Monroe Snubber
- WBN-2-SNUB-001-2SG1D, Steam Generator Paul Monroe Snubber
- WBN-2-SNUB-001-2SG1E, Steam Generator Paul Monroe Snubber
- WBN-2-SNUB-001-2SG3A, Steam Generator Paul Monroe Snubber
- WBN-2-SNUB-001-2SG3B, Steam Generator Paul Monroe Snubber
- WBN-2-SNUB-001-2SG3D, Steam Generator Paul Monroe Snubber
- WBN-2-SNUB-001-2SG3E, Steam Generator Paul Monroe Snubber
- WBN-2-SNUB-001-2SG4A, Steam Generator Paul Monroe Snubber
- WBN-2-SNUB-001-2SG4B, Steam Generator Paul Monroe Snubber
- WBN-2-SNUB-001-2SG4C, Steam Generator Paul Monroe Snubber
- WBN-2-SNUB-001-2SG4D, Steam Generator Paul Monroe Snubber
- WBN-2-SNUB-001-2SG4E, Steam Generator Paul Monroe Snubber

The inspectors observed snubber installations to verify:

- the supports were free of damage and corrosion;
- pre-installation checks were completed;
- the latest issue (revision) of applicable drawings or procedures were available to the installers;
- significant modifications to supports were approved by appropriate personnel before implementation;
- existing clearances between the pipe and restraints are as specified;
- correct materials were used;
- support plates, extension rods, and connecting joints were not deformed;
- the snubbers were installed with the correct pin-to-pin and cold setpoints in accordance with the design specifications; and
- measuring and test equipment (M&TE) were properly controlled and calibrated.

Design and installation records were reviewed to verify that the design inputs, to include field changes and vendor specifications, were properly translated to the field installation procedures and that the pipe support installations were completed in accordance with the approved drawings and design specifications.

The inspectors conducted interviews with two craft engaged in the installation of snubbers to verify:

- pre-installation checks were performed for damage, rust, or other conditions that may interfere with their proper operation;
- pre-installation checks were made to ensure that bolts, nuts, and other fastener items were available and of the correct type, size, and material with the required identification markings;
- any pre-installation field repairs or adjustments to the units were performed in accordance with specifications to ensure that proper seal materials and performance requirements were met;
- installation equipment such as torque wrenches and other testing and measuring devices were properly controlled, calibrated, and adjusted at specified periods; and
- personnel engaged in the installation of safety-related pipe supports and restraints were adequately trained to perform the tasks and processes contained in procedures, specifications, and WOs.

The inspectors reviewed the completed records for the following snubbers to determine the effectiveness, accuracy, and completeness of final record review and to ensure that the recorded information meets the documentation requirements.

Snubbers records inspected:

- WBN-2- SNUB-062-0161; size PSA $\frac{1}{4}$, CVCS
- WBN-2- SNUB-062-0170N; size PSA 1, CVCS
- WBN-2-SNUB-063-0442; size PSA 1, safety injection system

The inspectors reviewed the records to verify:

- the type and classification of snubbers complied with drawings and specifications;
- the location, spacing, and critical clearances met licensee's specifications and were verified by QC inspection;
- the required scope of QA/QC inspections were met;
- QA oversight of installation activities was adequate; and
- weld identification and location corresponded to the material specified.

The inspectors reviewed a sample of five PERs and associated documentation for nonconformances identified during the installation of snubbers and the applicant's system for reporting and dispositioning these nonconformances to verify:

- the records adequately documented the status of nonconformances and deviations;

- the records were legible, complete, and indicated that reports were promptly reviewed by qualified personnel for evaluation and disposition;
- the records were routinely being processed through established channels for resolution of the immediate problem as well as for generic implications;
- the records were being properly identified, stored, and could be retrieved in a reasonable time;
- nonconformance reports included the status of corrective action or resolution; and
- resolution of nonconformances was appropriate and demonstrated good engineering practices.

The following samples were inspected and documented in this inspection report:

- IP 50090 Section 02.02a – 3 samples
- IP 50090 Section 02.02b – 3 samples
- IP 50090 Section 02.03a – 2 samples
- IP 50090 Section 02.03c – 18 samples
- IP 50090 Section 02.04a – 3 samples
- IP 50090 Section 02.04b – 5 samples

Documents reviewed are listed in the Attachment.

The following table summarizes the inspections that were performed under this IP after the reconstitution.

IP Section	Inspection Reports
Section 02.01	05000391/2009602 (ML091210420) 05000391/2009603 (ML092120326) 05000391/2010605 (ML110410680) 05000391/2011607 (ML112730197) 05000391/2011609 (ML11350A229)
Section 02.02	05000391/2009602 05000391/2009603 05000391/2009604 (ML093030479) 05000391/2010603 (ML102170465) 05000391/2011604 (ML111810890) 05000391/2011607 05000391/2011609
Section 02.03.a	05000391/2010603 05000391/2010604 (ML103060240) 05000391/2010605 05000391/2011605 (ML112201418) 05000391/2011607 05000391/2013610 (ML14049A158)

Section 02.03.b	05000391/2010603 05000391/2010605 05000391/2011603 (ML111370702) 05000391/2011604 05000391/2011605 05000391/2011607 05000391/2011608 (ML11311A082)
Section 02.03.c	05000391/2011603 05000391/2013608 (ML13316A776) 05000391/2013609 (ML13353A599) 05000391/2013610
Section 02.03.d	05000391/2010603 05000391/2011603 05000391/2011604 05000391/2011605 05000391/2011607
Section 02.03.e	05000391/2009603 05000391/2009604 05000391/2011603 05000391/2011604 05000391/2011605 05000391/2011607 05000391/2011609
Section 02.03.f	05000391/2009602 05000391/2009603 05000391/2009604 05000391/2010603 05000391/2011603 05000391/2011604 05000391/2011605 05000391/2011607
Section 02.04.a	05000391/2009603 05000391/2009604 05000391/2011609
Section 02.04.b	05000391/2011608 05000391/2011609
Section 02.04.c	05000391/2011605 05000391/2011609
Section 02.04.d	05000391/2011609

b. Observations and Findings

No findings were identified.

The following table summarizes the completion status for each IP section:

IP Section	Completion Status
Section 02.01	Closed in 05000391/2011609
Section 02.02	Closed in 05000391/2011609

Section 02.03.a	Closed in current IIR
Section 02.03.b	Closed in 05000391/2011609
Section 02.03.c	Closed in current IIR
Section 02.03.d	Closed in 05000391/2011609
Section 02.03.e	Closed in 05000391/2011609
Section 02.03.f	Closed in 05000391/2011609
Section 02.04.a	Closed in current IIR
Section 02.04.b	Closed in current IIR
Section 02.04.c	Closed in 05000391/2011609
Section 02.04.d	Closed in 05000391/2011609

c. Conclusions

The procedures and records reviewed associated with pipe support and restraint systems were found to conform to the applicable regulatory requirements. Also, the installations of the dynamic supports (snubbers) were completed in accordance with the approved drawings and procedures. The requirements of this IP are considered to be complete. This determination was made based on initial construction inspections and recent inspection efforts for new work. IP 50090 is considered closed; however, if additional pipe support activities are performed, inspections may be performed at the NRC's discretion. Additional as-built inspections, including those of pipe supports, will continue under IP 37051, As-Built, and will be documented accordingly in future inspection reports.

C.1.7 Post-Fukushima Diverse and Flexible Construction Activities

a. Inspection Scope

Background: On March 12, 2012, the NRC issued a Mitigation Strategies Order EA-12-049, (ADAMS Accession No. ML12054A735) requiring all U.S. nuclear power plants to implement strategies that will allow them to cope without their permanent electrical power sources for an indefinite amount of time.

The Order was issued in response to the Fukushima accident. The NRC created a task force of senior NRC staff that reviewed the circumstances of the event to determine what lessons could be learned. In July 2011, the task force provided recommendations to enhance U.S. reactor safety; these became the foundation of the NRC's post-Fukushima activities.

These diverse and flexible coping strategies (also known as FLEX) are expected to use a combination of currently installed equipment (e.g., steam-powered pumps), additional portable equipment that is stored on-site, and equipment that can be flown in or trucked in from support centers to maintain the reactor core and spent fuel pool cool.

On July 15, 2013, TVA submitted a letter (ADAMS Accession No. ML13206A383) to the NRC updating their FLEX strategy plans to comply with NRC Order EA-12-049.

Since that time, TVA has implemented several of these actions, made modifications to the plant, and introduced new equipment. The NRC has witnessed and inspected a sampling of these modifications as noted below. The inspections centered around critical

design and structural attributes. Additionally, inspections were performed of as-built and completed modifications to verify that specifications, drawings, requirements, and standards were met.

More recently, IIR 05000391/2014603 (ADAMS Accession No. ML14129A381), Section OA.1.1 documented a review of several corrective actions as part of two PERs associated with activities during the construction of the auxiliary feedwater storage tank (AFWST).

Inspections have also been performed for those modifications specific to Unit 1 and future inspections will be documented under the Unit 1 docket number of 05000390.

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

Flexible Storage Building

- Reviewed Rebar placement for wall sections of the northwest corner of the FLEX Building, north portion of the FLEX Building slab, and outer north and south portions of the roof to verify they were in accordance with applicable drawings.
- Reviewed Micropile locations for the FLEX Building to verify they were in accordance with applicable drawings.
- Reviewed Micropile Load Test Data to verify any discrepancies were addressed in accordance with the applicant's corrective action program.
- Witnessed concrete placement of FLEX Building slab, walls, and roof to verify placement was conducted in accordance with applicable procedures, design specifications, and standards.
- Reviewed Concrete Compressive Strength Test Reports to verify that results met required design strength and any discrepancies were addressed in accordance with the applicant's corrective action program.
- Interviewed design engineer and TVA QA personnel to confirm personnel were knowledgeable of ongoing construction activities.

AFWST

- Reviewed Rebar placement and spacing for sections of the AFWST concrete foundation to verify they were in accordance with applicable drawings.
- Reviewed Micropile locations for the AFWST to verify they were in accordance with applicable drawings.
- Witnessed Micropile Load Test to verify test was conducted in accordance with instructions.
- Interviewed design engineer and TVA QA personnel to confirm personnel were knowledgeable of ongoing construction activities.

Documents reviewed are listed in the Attachment.

b. Observation and Findings

No findings were identified.

c. Conclusions

The inspectors observed various work activities associated with FLEX. At the time of the inspection, work was ongoing and continuing on the AFWST. This work included installation of piping and other related modifications. Additional field inspections may be performed to review a sample of the remaining modifications to the plant and verify that work activities and the final as-builts comply with applicable specifications, standards, and requirements.

P.1 Pre-Operational Activities

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

a. Inspection Scope

2.01 (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 were limited during the inspection period and included the following systems or portions thereof:

- System 063 - Safety Injection System (SIS)

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. The inspectors also reviewed 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 applicant procedures (further discussed in Section F.1.1);
- activities in progress (e.g., maintenance, preoperational testing, etc.) were being conducted in accordance with applicant procedures;
- the public address system announcements to ensure that blind spots do not exist (i.e., cannot be heard clearly enough to be understood); and
- construction work force to ensure they were authorized to perform activities on systems or equipment.

In addition, the inspectors witnessed the performance of component test procedure GTM-02, Pump Functional Test, Rev. 2, for the 2A-A safety injection pump. The inspectors also witnessed the coupled running of the centrifugal charging pump 2B-B (CVCS, system 62) motor to speed increaser and the testing associated with the rework of the containment spray (CS, system 72) pump motor 2A. The inspections were completed to verify that the testing was conducted in accordance with approved procedures. The inspectors observed the following activities associated with these tests:

- all test personnel were on station and had the latest revision of the procedure;
- plant systems were in service to support the test;
- testing equipment was installed and within calibration;
- testing was performed in accordance with the approved procedure;
- testing events and discrepancies were properly documented;
- testing was executed and coordinated properly; and
- data was properly collected.

In addition, the inspectors observed the tests to verify whether the overall test acceptance was met. The inspectors also observed that testing events and discrepancies were properly documented for the GTM-02 test of containment spray pump 2A-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 67) as part of Startup Manual Procedure (SMP) 4.0, System Completion and Turnover, Rev.9, 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 maintenance had not been performed but the methodology was discussed with the Refurbishment and Preventative Maintenance Manager to determine how systems with completed preoperational testing would be protected.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

The applicant's implementation of the preoperational test program and the CVCS motor run-in test was performed in accordance with procedures for those activities observed during the inspection period.

P.1.2 Preoperational Test Procedure Review (Inspection Procedures 70300, 70311, and 70339)

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 pre-operational test procedure 2-PTI-070-01, Component Cooling Water Pump/Valve Logic Test, Rev. 3 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;
- the last page was clearly identifiable by markings;
- 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;
- instrumentation units consistent for data collection;
- graphs, charts, tables, data sheets, and work sheets are clearly usable;
- 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;
- clear quantitative acceptance criteria with acceptability and contingencies; and
- overall sequence of the procedure was consistent with obtaining the intended result.

The inspectors also reviewed the procedure to verify that precautions or explanations were placed immediately ahead of the steps to which they applied. The inspectors performed a detailed review with the responsible test engineer to verify that the acceptance criteria met design requirements.

The review was conducted to verify the procedures focused on important system performance functions such as:

- engineering safety features (ESF) are demonstrated; and
- components properly operate in various system modes.

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 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. 0. This completes the procedure review of pre-operational test procedure 2-PTI-070-01.

P.1.3 Preoperational Test Procedure Review (Inspection Procedures 70333, 70336, and 70343)

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. As identified in IIR 05000391/2014603 (ADAMS Accession No. ML14129A381) Section P.1.2, multiple procedures were reviewed to support the applicant's testing of emergency core cooling systems. Because certain procedural aspects from select primal systems were incorporated into the applicant's procedures reviewed in Section P.1.2, additional inspection effort was warranted. The following inspection was performed in relation to satisfying the required procedural review.

Inspection Activities: The inspectors reviewed pre-operational test procedures for the following safety injection tests:

- 2-PTI-063-01, SIS Integrated Test, Rev.0
- 2-PTI-063-03, SIS Charging, SI, and RHR Flow Balance, Rev.0

These reviews were performed to verify that important system performance functions were adequately reflected in the test procedure. Specifically, for the following IPs the review was to ensure that injection rates were specified, the system was able to receive water from decay heat pumps, ESF are tested, and components demonstrate that they can operate in various system modes.

- IP 70333, Chemical Control System Test Preoperational Test Procedure Review

- IP 70336, Residual Heat Removal System Test Preoperational Test Procedure Review
- IP 70343, Containment Spray System Test Preoperational Test Procedure Review

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors determined that the applicant's test procedures were 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. 0.

P.1.4 (Closed) Solid Wastes (Pre-Operational and Supplemental) (Inspection Procedure 84522)

a. Inspection Scope

The inspectors performed walk-downs of accessible sections of the solid radioactive waste (radwaste) processing system and assessed the components for conformance with system design and operation documents including the FSAR, Process Control Program, and site implementing procedures. Inspected equipment included radwaste storage tanks, resin transfer piping, and radwaste packaging components. The inspectors discussed component function and radwaste program implementation with applicant staff.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified concerning Unit 2 solid radwaste system construction activities. The inspectors determined that the bulk of the Unit 2 solid radwaste processing system is shared with Unit 1 and has been successfully operating since Unit 1 startup (1996). This includes radwaste sampling and characterization activities to show compliance with 10 CFR 20 and 10 CFR 61. One item that is not shared is the connection point isolation valve and block plate between the Unit 2 CVCS demineralizer beds and the Spent Resin Storage Tank. The inspectors verified that this connection point is scheduled to be removed and turned over to Preoperational Startup Engineering per Design Change 56035. The inspectors also noted that solid radwaste system components were designed and built for dual-unit operational capacities.

c. Conclusions

No further inspection is required under this inspection procedure. IP 84522 is closed.

P.1.5 Preoperational Test Procedure Review (Inspection Procedures 70300 and 70305)

a. Inspection Scope:

Background: IMC 2513, Light Water Reactor Inspection Program - Preoperational Testing and Operational Preparedness Phase, issue date January 1, 1984, defines the minimum inspection program for a finding of readiness for operating 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 for the mandatory testing associated with the reactor protection system (RPS).

Inspection Activities: The inspectors reviewed pre-operational test procedures 2- PTI-099-04, Safeguard System Operational Test, 2-PTI-099-05, Overpower Delta-T and Overtemperature Delta-T Turbine Runback, 2-PTI-099-06, Reactor Protection Setpoint Verification, and 2-PTI-099-08, Safeguards System Test Panel, to verify that the procedures were technically adequate, consistent with regulatory requirements and licensee commitments, and 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;
- the last page was clearly identifiable by markings;
- there was a clear statement of procedure purpose/objectives;
- planning information such as prerequisites, precautions, required tools, reference documents, and coordination requirements were included;
- signoff requirements including concurrent and independent verification steps were included where appropriate;
- equipment alignment instructions were clear and concise;
- equipment identifiers were accurate;
- actions to be taken within the steps were clearly identified;
- tables, data sheets, and work sheets were clearly usable;
- calculation sheets were technically accurate;
- there were clear instructions for system restoration;
- there were overall, clear concise steps for testing with action critical (acceptance criteria) steps identified;
- there were clear quantitative acceptance criteria with acceptability and contingencies;
- the overall sequence of the procedure was consistent with obtaining the intended result; and
- precautions or explanations were placed immediately ahead of the steps to which they applied.

The review was conducted to verify the procedures focused on important system performance functions of RPS components such as:

- response time of protection channels
- correct operation of protection systems

- alarm functions
- electrical independence and redundancy
- logic functions
- automatic and manual system operation
- permissive, prohibit, and bypass functions
- ESF signal functions

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

This inspection effort was partially complete at the end of this inspection period. Inspection completion will be documented in a subsequent report.

P.1.6 Preoperational Test Witnessing (Inspection Procedure 70312)

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 pre-operational 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 pre-operational test witnessing.

Inspection Activities: The inspectors witnessed the performance of pre-operational test instruction 2-PTI-063-02, SIS Accumulators, Rev. 0001 to verify that the testing was conducted in accordance with approved procedures and to verify the adequacy of test program records and preliminary evaluation of test results. The inspectors assessed the following attributes associated with this test observation:

- all test personnel were on station and had the latest revision of the procedure;
- test prerequisites were performed;
- plant systems were in service to support the test;
- test equipment was installed and within calibration;
- testing was performed in accordance with the approved procedure;

- test interruptions and continuations were handled in accordance with approved procedures;
- testing events and discrepancies were properly documented;
- testing was executed and coordinated properly;
- data was properly collected;
- temporary equipment was installed and tracked appropriately;
- administrative test controls were properly followed; and
- test personnel were using approved drawings and vendor manuals.

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

b. Observations and Findings

No findings were identified.

c. Conclusions

The inspectors determined that the applicant's test procedure was performed in a manner consistent with the guidance of procedure SMP-9, Watts Bar Nuclear Plant Unit 2 Conduct of Test, Rev. 2.

III. OPERATIONAL READINESS ACTIVITIES

O.1 Operations

O.1.1 (Closed) Emergency Procedures (Inspection Procedure 42452)

a. Inspection Scope

The inspectors reviewed a sample of the applicant's emergency and abnormal operating procedures using criteria in:

- American National Standards Institute (ANSI) standard N18.7-1972, Administrative Controls for Nuclear Power Plants;
- American Nuclear Society (ANS) 3.2/ANSI N18.7-1976, Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants;
- Regulatory Guide (RG) 1.33-1978, Quality Assurance Program Requirements (Operation), Rev. 2;
- RG 1.33-2013, Quality Assurance Program Requirements (Operation), Rev. 3;
- TVA-NQA-PLN89-A, Quality Assurance Program Description; and
- Westinghouse Owners Group (WOG) Emergency Response Guidelines, Rev. 2.

Each inspection activity was performed to ascertain whether plant emergency procedures are prepared to adequately control safety related functions in the event of system or component malfunction indication.

Inspectors obtained a copy of an index of the plants emergency, abnormal, and annunciator response procedures and reviewed it for completeness.

The inspectors reviewed and compared a sampling of Unit 1 and Unit 2 emergency, abnormal, and annunciator response procedures to verify unit differences were incorporated, and the procedures met the criteria in RG 1.33.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified. All procedures reviewed were in the correct format in accordance with Technical Instruction 12.06, Writer's Guide For Abnormal and Emergency Operating Instructions, Rev.6.

c. Conclusions

The inspectors determined that the Watts Bar emergency, abnormal and annunciator response procedures are prepared to adequately control and correct safety-related functions in the event of a system or component malfunction indication. IP 42452 is closed.

R.1 Radiation Safety

R.1.1 (Closed) Radiation Protection, Plant Chemistry, Radwaste, and Environmental: Organization and Management Controls (Inspection Procedure 83522)

a. Inspection Scope

The inspectors reviewed the applicant's staff organization using criteria in ANSI standard N18.1-1971, Selection and Training of Nuclear Power Plant Personnel, ANSI/ANS 3.1-1981, Selection, Qualification and Training of Personnel for Nuclear Power Plants, TVA-NQA-PLN89-A, Quality Assurance Program, FSAR Section 13, and applicable sections of Technical Specifications 5, Administrative Controls, in regards to the planned startup of Unit 2. Organizational structure, responsibilities, and organization interfaces related to the control of radiation, radioactive material and plant chemistry relative to current NRC commitments were evaluated. Onsite radiation protection (RP), chemistry, and radwaste organizations were evaluated for adequacy to support dual-unit operations. The RP and chemistry manager's responsibilities, authority, and management support were evaluated by the inspectors as well as the adequacy of current staffing levels, during discussions with plant staff and applicable document reviews.

The inspectors evaluated the applicant's methodology for hiring, training, and directing the work of personnel in RP, chemistry, radwaste and environmental programs. Methods for identification and correction of weaknesses in these programs as well as the procedures that implement these guidelines were reviewed and discussed with applicant staff.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified concerning Unit 2 RP, chemistry, radwaste, environmental organization, and management controls. The organization is staffed to support dual-unit operation of Watts Bar. Staffing levels are commensurate with the Sequoyah Nuclear station which currently operates two units in the TVA fleet and is of a similar design.

c. Conclusions

No further inspection is required under this inspection procedure. IP 83522 is closed.

R.1.2 (Closed) Radiation Protection, Plant Chemistry, Radwaste, Transportation and Environmental: Training and Qualifications (Inspection Procedure 83523)

a. Inspection Scope

The inspectors reviewed the Unit 2 training and qualification program using criteria in ANSI standard N18.1-1971, Selection and Training of Nuclear Power Plant Personnel, ANSI/ANS 3.1-1981, Selection, Qualification and Training of Personnel for Nuclear Power Plants, TVA-NQA-PLN89-A, Quality Assurance Program, FSAR Section 13, and applicable sections of Technical Specifications 5, Administrative Controls, in regards to planned startup of Unit 2. Corporate and site programs regarding training, initial qualification and continuing training in the areas of general employee training (GET), radiation worker training (RWT), RP, chemistry, radwaste, and environmental were reviewed. The inspectors reviewed qualifications for RP and chemistry training instructors as well as the RP and chemistry Managers. Current status of technician qualifications for personnel working in RP and chemistry were evaluated against position requirements.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified concerning Unit 2 RP, chemistry, radwaste, and environmental training and qualification programs. Training and qualification programs for GET and RWT are the same as those required for Unit 1 as well as the rest of the TVA fleet. This is also true of the basic RP, chemistry, radwaste and environmental training programs for each specific job designation in the TVA fleet. As noted in section R.1.1, the chemistry organization is fully staffed; however, not all chemistry staff will be fully qualified when Unit 2 is ready to startup. To address this, the applicant has staffing contingencies in place to ensure it meets chemistry's plant support obligations for dual-unit operation until all personnel are fully qualified. The inspectors determined that the applicant can achieve and maintain an adequate level of training in the areas of GET, RWT, RP, chemistry, radwaste, and environmental programs.

c. Conclusions

No further inspection is required under this inspection procedure. IP 83523 is closed.

F.1 Fire Protection

F.1.1 Fire 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 20 fire suppression devices.

The inspectors visually observed fire hose stations to assure all required equipment was at the location, the stations were not obstructed, and the equipment appeared operable. Specific attributes inspected included hose water content, nozzle blockage or damage, hose and nozzle storage condition, valve and handwheel condition, and general hose station condition for damage or obstructions. The inspectors also 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, seals were not broken, and that there was no evidence of physical damage, corrosion, or other impairments.

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 under WO 115324035, Cutting and capping of charging pump 2A drain lines
- Welding under WO 114485358, Installation of new pipe connection, spool piece, valve and hose connector to ERCW piping
- Welding under WO 115283168, Flex Modification installation of fuel line to 225 KV diesel generator

The following fire suppression devices were observed:

Fire Hose Stations

- 2-ISV-26-696 (Additional Equipment Building, EL 763.5, COL A11-X)
- 2-ISV-26-686 (Additional Equipment Building, EL 729, COL A11-X)
- 0-ISV-26-662 (Auxiliary Building, EL 692, A8-T)
- 2-ISV-26-668 (Auxiliary Building, EL 692, A13-S)
- 0-ISV-26-661 (Auxiliary Building, EL 713, A8-T)
- 2-ISV-26-667 (Auxiliary Building, EL 713, A13-S)
- 2-ISV-26-666 (Auxiliary Building, EL 737, A13-T)
- 2-ISV-26-670 (Auxiliary Building, EL 757, A12-V)
- 2-ISV-26-669 (Auxiliary Building, EL 782, A12-V)
- 0-SPV-26-1077 (Diesel Generator Building, EL 742, outside Diesel 2A-A Room)
- 0-SPV-26-1080 (Diesel Generator Building, EL 760, entrance to 1A Board Room)
- 0-SPV-26-1082 (Diesel Generator Building, EL 760, Air Exhaust 2B Room)

- 0-SPV-26-597 (Intake Pumping Station Building, EL 727, Strainer B Room)

Portable Fire Extinguishers

- AB-26 (Auxiliary Building, EL 713, A-11)
- AB-33 (Auxiliary Building, EL 713, at elevator)
- AB-57 (Auxiliary Building, EL 737, A9-V)
- AB-58 (Auxiliary Building, EL 737, A7-W)
- U2-25A (Containment Building, EL 702, Az. 145)
- U2-18 (Containment Building, EL 702, Az. 145)
- IPS-5 (Intake Pumping Station Building, EL 727, Strainer B Room)

The following samples were inspected:

- IP 64051 Section 02.07 – 20 samples
- IP 64051 Section 02.08 – 3 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 Conduits and Construction Deficiency Report 50-391/85-35, Support of Conductors Inside Vertical Conduit Runs (Inspection Procedure 35007)

a. Inspection Scope

Background: The Cable Issues Corrective Action Program (CAP) Sub-Issue: Supports in Vertical Conduits, and the construction deficiency report (CDR) 391/85-35: Support of Conductors Inside Vertical Conduit Runs, are similar issues and were inspected together.

The concern that long vertical conduit runs may not be adequately supported and that random failures due to cutting of the insulation and conductor creep may occur during normal service condition, especially silicone rubber insulated cables, was initially reported to the NRC on September 6, 1985, in accordance with 10 CFR 50.55(e) as nonconformance report (NCR) W-262-P, and superseded by Condition Adverse to Quality Report (CAQR) Watts Bar Program (WBP) 890295 for Unit 1 and CAQR WBP 890269 for Unit 2. The follow-up final report associated with the notification (ADAMS Accession No. ML082401652) was transmitted by letter dated October 3, 1985, and

identified the apparent cause, safety implications, and planned or completed corrective actions.

TVA plans on addressing this sub-issue using the same approach that was used at WBN Unit 1 and using the requirements in General Construction Specification G-38, Installation, Modification, and Maintenance of Insulated Cables Rated Up to 15,000 Volts. TVA commitments (NCOs 850440002, 890140007) were created to identify and evaluate all previously installed vertical conduit runs (exposed and embedded) containing Class 1E designated cables, in accordance with established criteria, and complete any rework necessary.

IIR 05000391/2013605 (ADAMS Accession No. ML13220A640) concluded in Section OA.1.1 that the programmatic aspects of the applicant's implementation plan for this CAP were adequate to address the concerns in the CDR. This is generally the same conclusion reached in Section OA.1.12 as reported in IIR 05000391/2010605 (ADAMS Accession No. ML110410680).

Inspection Activities: The inspectors observed the installation of a kellems mesh (basket) grip for cables installed in vertical conduit 2VC3447B to verify the basket grip was installed in accordance with design drawings and procedures and that the cable support spacing was adequate.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings identified

c. Conclusion

The inspectors concluded that the vertical support sampled was adequately installed. These items remain open pending additional samples of field installation observations.

OA.1.2(Discussed) Construction Deficiency Report 391/93-02, Loose Flexible Conduit Fittings (Inspection Procedure 35007)

a. Inspection Scope

Background: During a QA assessment of Watts Bar Unit 1, portions of the Electrical Issues CAP loose flexible conduit fittings were identified. To address this issue, Watts Bar issued Significant Corrective Action Report (SCAR) WBSA930071, which was recorded as CDR 50-390/93-02 and 50-391/93-02.

To address the loose flexible conduit on Unit 2, all flexible conduit not evaluated by Unit 1 was evaluated to determine the acceptability of the conduit installation and condition according to General Construction Specification G-40, Installation, Modification and Maintenance of Electrical Conduit, Cable Trays, Boxes, Containment Electrical Penetrations, Electric Conductor Seal Assemblies, Lighting, and Miscellaneous Systems. Calculation EDQ00299920090001 was prepared to evaluate all the flexible conduit fittings.

After the issuance of calculation EDQ00299920090001, additional flexible conduit was identified as not being tightened in accordance with Modification/Addition Instruction (MAI) - 3.1, Installation of Electrical Conduit Systems & Conduit Boxes. PER 549197 was initiated to document these conditions.

Corrective actions for PER 549197 included updating site installation procedures to ensure that the newly installed flexible conduit would be installed in accordance with the requirements and training of personnel. All previously installed flexible conduits were walked down to validate tightness and repair, if needed.

Inspection Activities: The inspectors reviewed the background documentation for this issue including:

- the engineering complete closure package for loose flex conduit;
- CDR 50-391/93-02;
- General Construction Specification G-40 ; and
- Installation Procedure MAI-3.1.

The inspectors reviewed PER 549197 to evaluate whether the actions described would adequately address the loose flexible conduit. The inspectors reviewed the completed corrective actions including proposed changes made to procedures, the applicant's extent of condition, and the repair and rework that was performed to address the loose flexible conduit.

To verify that the applicant's actions were completed, in accordance with the updated procedures, the inspectors walked down flexible conduit installation in the reactor building, auxiliary building, and control building to verify the connections were wrench tight, match-marked, and that no damage had been done to any of the flexible conduit.

These flexible conduits included:

- 2VC9678
- 2VC809
- 2VC1638
- 2VC1633
- 2VC1632A
- 2VC1575A
- 2M3119

In addition, the inspectors reviewed system and room turnover procedures to evaluate the extent to which the walkdowns performed during system and room turnover would verify the condition of the flexible conduit.

Documents reviewed are listed in the Attachment.

b. Observation and Findings

No findings were identified. During the inspection period and prior to the inspectors performing their inspection of loose flexible conduits, the applicant identified loose flexible conduit connections which were not tightened and match-marked in accordance

with procedures MAI-3.1 and G-40. This issue was entered into the corrective action program as PER 873418.

c. Conclusions

The inspectors reviewed the applicant's actions and field work completed as a resolution to CDR 50-391/93-02 and PER 549197. Additional field inspections are planned to review the corrective actions of PER 873418, ensure that the repair and rework address the concern, and verify that the flexible conduits are installed adequately.

OA1.3 (Discussed) Three Mile Island Action Item II.B.2, Plant Shielding (Inspection Procedure 92701)

a. Inspection Scope

Background: As part of the response to the Three Mile Island (TMI) accident, Section II.B.2 of NUREG-0737, Clarification of TMI Action Plan Requirements, (ADAMS Accession No. ML102560051) required licensees and applicants to perform a radiation shielding design review of the spaces around systems that may, as the result of an accident, contain highly radioactive materials. The goal was to ensure that operator actions in vital areas necessary to mitigate the effects of an accident could be performed without exceeding the dose limits of 10 CFR 50 App A, General Design Criteria (GDC) 19. To this end, plants performed "mission dose" calculations to verify that these dose limits could be met for specific post-accident tasks. Section II.B.2 also required plants to assess the environmental qualification (EQ) of safety-related components in the vicinity of post-accident high radiation fields. Section 12.7.1 of the Watts Bar Unit 2 safety evaluation report (SER) states that the methodology used for these mission dose calculations is subject to verification via NRC inspection.

Inspection Activities: The inspectors evaluated the following mission dose calculations chosen from a list of 14 essential, post-accident tasks:

- WBNAPS3124, Dose to Personnel from Obtaining Post-LOCA Liquid Sample from Hot Sample Room, Rev. 3
- WBNAPS3125, Post-LOCA RE-90-106, 112 Radiation Monitor Grab Sample Mission Dose, Rev. 2
- WBNTSR114, Mission Dose for Manual Isolation Control Air, ERCW, and CCS Valves, Rev. 6

The calculations were reviewed to determine if appropriate mission steps had been evaluated, whether vital area locations had been adequately identified, and whether calculation methodology and assumptions were reasonable. The inspectors also discussed the calculations with applicant staff. The calculations were reviewed against the requirements of GDC 19 and NUREG-0737 Sections II.B.2 and II.B.3.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

The mission dose calculations contained certain assumptions regarding operator actions, timing of the missions post-accident, and pre-positioning of tools and

equipment. These assumptions are necessary to ensure the dose limits can be met. The inspectors evaluated the implementation of one of these assumptions for calculation WBNAPS3124. For this calculation, the inspectors verified that a lead transport cask with a minimum shielding thickness of one inch (1") was available for use to transport hot samples to the radiochemistry lab. However, it was unclear at the time of inspection how the other assumptions for WBNAPS3124 and the other two calculations had been incorporated into implementing-level procedures or other administrative guidance. The inspectors acknowledged that some of these implementing-level procedures may not be completed until shortly before startup. In addition, the inspectors noted that WBNAPS3125 contained an applicant-tracked Unverified Assumption that required Unit 2 radiation monitors RE-90-106 & 112 to be of similar design to Unit 1. It was unclear at the time of inspection whether this assumption was valid.

One Unresolved Item (URI) dealing with mission dose calculation methodology was identified. This URI has two components:

- As part of WBNAPS3124, the applicant calculated a mission dose of 74.99 rem to the extremity of a technician (the limit is 75 rem per NUREG-0737, II.B.3). The inspectors noted that the 74.99 rem was accrued during travel from the radiochemistry lab to the hot sample room, retrieval of the sample, and travel back to the radiochemistry lab. Later in the calculation, different scenarios were presented where the technician begins at the Operation Support Center or Main Control Room, rather than the radiochemistry lab. These new starting points added a small amount of travel time and therefore additional dose. Additions were appropriately made to Whole Body Dose which was still within the limits. However, the description of how extremity dose was handled for these new starting points was vague and didn't appear to address the dose accrued from the additional travel time. Given that this mission dose has very little margin, the NRC requires further clarification on the methodology used to evaluate Extremity Dose for this calculation.
- In order to meet the dose limits, all three of the calculations contained an assumption that Self-Contained Breathing Apparatus (SCBA) or other types of respiratory protection would be used to mitigate airborne radioactivity. As discussed in RG 8.15, Acceptable Programs for Respiratory Protection, consideration should be given to decreased worker efficiency whenever respiratory protection devices are used. The inspectors noted that WBNTSR114 contained a discussion of worker inefficiency due to SCBA use and included an appropriately reduced travel speed (1.5 feet/second) to account for this. However, WBNAPS3124 and WBNAPS3125 did not discuss the impact of SCBA use on technician efficiency. Instead, these two calculations relied on actual time-and-motion studies performed by a contractor. It was unknown at the time of inspection whether these studies were performed while wearing a SCBA. Therefore, the NRC requires additional information regarding how these time-and-motion studies were performed and how they accounted for worker inefficiency due to the use of respiratory protection devices.

This unresolved item is identified as URI 05000391/2014604-01, TMI Action II.B.2, Plant Shielding, Evaluate Methodology for Calculating Mission Doses.

c. Conclusions

The inspectors determined that further inspection activities are required to close this item. Specifically, the inspectors must verify that assumptions contained in the mission doses have been incorporated into implementing-level procedures or other administrative guidance. In addition, the applicant-tracked Unverified Assumption that radiation monitors 2 RE-90-106 & 112 are of similar design to U1 will require inspector verification. The inspectors also require information regarding the URI identified above, and, as a consequence of the issues identified, the inspectors plan to choose additional inspection samples from the list of 14 essential, post-accident tasks.

Because the evaluation of EQ for safety-related components in the vicinity of post-accident high radiation fields is covered through other inspection efforts, (Environmental Qualification Special Program (SP) and Mechanical Qualification SP), no further EQ aspects will be addressed under this inspection item.

OA.1.4 (Discussed) Environmental Qualification Special Program (Temporary Instruction 2512/036)

a. Inspection Scope

Background: 10 CFR 50.49 requires the EQ of safety-related and important to safety electrical equipment to ensure the electrical equipment required to maintain the reactor coolant pressure boundary integrity, to shut down the reactor and maintain it in a safe shutdown condition, and to prevent or mitigate the consequences of accidents that could result in offsite exposures comparable to the 10 CFR Part 100 guidelines, remains operable when needed. It is furthermore required that the records that substantiate equipment EQ capabilities be available and maintained in auditable files. The applicant initiated the EQ SP at Watts Bar 2 to ensure and document that safety-related electrical equipment installed in the plant is qualified to perform their designated function in the potentially harsh environment to which they will be subjected during normal plant operation, as well as, during postulated accidents; and that programs and procedures are established to ensure that qualification is maintained as the plant ages and as future plant modifications are made. The applicant is developing EQ data package (EQDP or EQ Binder) change documents for Unit 2 equipment to later integrate them into the existing EQDPs for unit 1. For new model or types of equipment which are only installed in Unit 2, new EQ files and documents are being developed. The purpose of this inspection was to review the status and progress of this effort in anticipation of closure of this item during a future inspection.

Inspection Activities: The inspectors interviewed responsible personnel to verify that personnel performing review and approval of qualification documentation have appropriate training, experience, and knowledge of EQ program requirements and procedures. The inspectors reviewed samples of completed EQ change supplements (EQCS) and EQ information releases (EQIR). EQCSs are used to document the engineering basis for the qualification of equipment. EQCSs were reviewed to ensure that engineering design information for Unit 2 components and cables, that provided EQ basis, were appropriately extracted from engineering document construction releases (EDCRs). This information would be included in the EQCS documents for later addition to the corresponding combined Units 1 and 2 EQDPs. EQIRs are used to document actual field installation of equipment. Samples of completed EQIRs were reviewed to

ensure that as-installed devices were the same or similar to those devices identified in the EQCS and to ensure that information required for maintaining installed equipment and maintaining compliance to 10 CFR 50.49 was properly documented.

The inspectors reviewed calculation document EDQ00299920090011, WBN Unit 2 – List of 10 CFR 50.49 Components and Cables, Rev. 3. From that document, the inspectors selected a sample of EQ components and cables to assess the completeness of the associated EQDPs and to assess any differences from the corresponding Unit 1 packages. The inspectors selected components and cables from ERCW (system 67) and Component Cooling Water (CCS) (system 70) systems. Cables from CS (system 72), residual heat removal (RHR) (system 74), and CVCS (system 62) systems were also selected as samples. The inspectors reviewed the associated EQCS and EQIR packages for the selected components and cables. The components and cables selected were associated with EQDPs MOV-001, SOV-005, CABL-002, CABL-052, and CABL-064. Additionally, the inspectors reviewed the Hot Leg resistance temperature detector (RTD) and the Kurtz flow element EQDPs.

The inspectors reviewed SPP-9.2, Equipment EQ Program, Rev. 4 to assess the process to update the Unit 2 EQ qualification data to the applicable WB site databases. The inspectors interviewed the Unit 1 EQ program manager, Unit 2 EQ program manager, and the Unit 2 EQ program lead to discuss the turnover of the Unit 2 EQ program to Operations. The inspectors also reviewed, 0-TI-441, WB Nuclear Plant Unit 1 & 2 Technical Instruction, Operational Readiness Process for Unit 2 systems. The inspectors noted that 0-TI-441 prescribes performance of an operational readiness evaluation for the Unit 2 EQ program and requires a sign-off for the operational readiness of the EQ program. The inspectors reviewed 25402-3DP-GEE-00001-003, Engineering Department Procedure Instruction Equipment Environmental Qualification Program, dated June 28, 2012 and noted the program manager is responsible for maintaining a log for Watts Bar Unit 2 EQIRs. The inspectors reviewed the EQ Binder Status Excel Log, dated April 16, 2014, to assess its compliance with the Engineering Department Instruction.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Based on the above activities, the inspectors gained a clearer understanding of the status and direction of the EQ SP for Watts Bar Unit 2. The inspectors plan to perform additional inspections when the applicant is closer to completion of the EQ SP.

OA.1.5 (Discussed) Inspection Procedure 71111.07, Heat Sink Performance, Subissue: Emergency Raw Cooling Water Testing and Supplemental Safety Evaluation Report, Appendix HH, Open Item 90: Emergency Raw Cooling Water Pumps Meeting General Design Criteria 5 Requirements for Two-Unit Operation (Inspection Procedure 92701)

a. Inspection Scope

Background: Initial review by NRC staff resulted in listing NRC generic letter (GL) 89-13, Service Water System Problems Affecting Safety-Related Equipment; and temporary instruction (TI) 2515/118, Service Water System Operational Performance Inspection (SWSOPI), Rev. 2 as recommended for inspection, at Watts Bar Unit 2, as repeated industry problems had led to the development of these inspection requirements. This inspection area has been considered significant enough, since these requirements were initiated, to warrant ongoing inspections of operating reactors via IP 71111.07, Heat Sink Performance. Review of the above documents has indicated that IP 71111.07 sufficiently covers the key elements of GL 89-13 and TI 2515/118, primarily via the triennial inspection requirements. It was determined that inspection of the ultimate heat sink using specific portions of IP 71111.07 could satisfy the intent of the key elements outlined in GL 89-13 and TI 2515/118 as related to WBN Unit 2.

The ERCW system is a shared system for WBN Units 1 and 2. The staff of the NRC previously evaluated the ERCW system in Section 9.2.1 of SER NUREG-0847, Safety Evaluation Report Related to the Operation of Watts Bar Nuclear Plant Units 1 and 2, (ADAMS Accession No. ML073450540) issued June 1982. Based on its review, the staff concluded that the ERCW system conformed to the requirements of GDC 2, 4, 5, 44, 45, and 46 in 10CFR50 Appendix A, General Design Criteria for Nuclear Power Plants. Subsequent system testing performed by TVA revealed that the ERCW pumps did not perform in accordance with the design-basis capability. Consequently, as documented in SER Supplement (SSER) 18, (ADAMS Accession No. ML070530364) issued October 1995, applicant staff concluded that the ERCW system did not conform to GDC 5, Sharing of Structures, Systems, and Components, for two-unit operation, and that the ERCW system was acceptable for Unit 1 operation only. GDC 5 requires that structures, systems, and components important to safety not be shared among nuclear power units unless it can be shown that such sharing will not significantly impair their ability to perform their safety functions, including, in the event of an accident in one unit, an orderly shutdown and cooldown of the remaining unit. In its letter dated August 3, 2007 (ADAMS Accession No. ML072190047), TVA stated the following:

The existing ERCW pumps were sized in 1974. In order to license WBN Unit 2, a two-unit preoperational flow balance test will be required. In their present conditions, the ERCW pumps do not provide adequate flow margin to meet the acceptance criteria of a two-unit flow balance test.

An engineering study was performed to determine the best alternative for meeting the design requirements of the ERCW system for two-unit operation. In Enclosure 1 to its response dated December 10, 2010 (ADAMS Accession No. ML103480708; Enclosure 1 to the letter is not publicly available), to NRC staff Request for Additional Information (RAI) 9.2.1-ERCW-5, TVA stated the following:

All eight ERCW pumps are being replaced with new ERCW pumps prior to the ERCW dual unit flow balance that meet all specified performance requirements and have sufficient capability to supply all required ERCW normal and accident flows for dual unit operation and accident response.

It was determined that the NRC staff should verify that the ERCW system dual unit flow balance confirms that the ERCW pumps meet all specified performance requirements and have sufficient capability to supply all required ERCW normal and accident flows for dual unit operation and accident response, in order to verify that the ERCW pumps meet GDC 5 requirements for two-unit operation.

Inspection Activities: The inspectors witnessed the execution of the dual-unit ERCW system flow balance testing and documented this in Section P.1.6 of IIR 050002014602 (ADAMS Accession No. ML14086A063). In this current inspection period the inspectors reviewed the applicant's available test results, performed a system walkdown with the applicant's system engineer, reviewed engineering documentation and procedural guidance, and held discussions with individuals who were knowledgeable of the system and who were directly involved in the system testing that was performed.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified. The applicant's review and acceptance of the test results from the ERCW system flow balance testing have not been completed. As a result of the testing, the applicant's evaluation of test results is ongoing to determine the need for any corrective actions that may be required to improve the system flow characteristics in specific areas of the system.

c. Conclusions

Based on the above activities and the status of the testing results, these items will remain open until further inspection activities can be completed.

OA.1.6 (Discussed) Construction Deficiency Report 391/86-08, Incorrect Tubing Configuration on Containment Isolation Valve Actuators (Inspection procedures 52053 and 52055)

a. Inspection Scope

Background: As reported in CDR 50-391/86-08, the applicant identified that containment isolation valves 2-FCV-30-10 and 2-FCV-30-40 did not meet the closing time requirements as specified in WBN FSAR Section 6.2.4. This deficiency was documented in NCR WBN 6328. The applicant determined the cause to be that speed control valves were installed in the exhaust lines of the valves. The speed control valves are intended to control opening times only and must be installed in the supply airline; however, speed control valves were actually installed in the exhaust port of quick exhaust valves. Speed control valves installed in this configuration could change the closure time of containment isolation valves or result in failure of the actuator to close the valve. The applicant issued significant condition report (SCR) WBN MEB 8546 for WBN Unit 2 with the purpose of identifying all WBN system 30 (Auxiliary Building, Reactor Building, and

Turbine Building Ventilation) containment isolation valves that have a speed control valve installed in the exhaust port of the quick exhaust valve.

The applicant determined this deficiency was the result of the following combination of causes:

- insufficient tubing configuration details on vendor drawings to support field work on the air actuator's supply and exhaust air lines;
- insufficient details to reflect the correct installation of a quick exhaust valve on single- and double-cylinder air actuators;
- failure to require vendor drawings and documents, used for source inspection, to accurately reflect the proper configuration of valves/actuators; and
- failure to request clarification to design requirements.

This condition resulted in the affected containment isolation valves inability to meet their closing time requirements in the event of a design basis accident, and was documented as CDR 50-391/86-08. The applicant issued PER 143540 to track and resolve CDR 50-391/86-08.

IIR 05000391/2013603 (ADAMS Accession No. ML13134A239) documented a previous review of this matter, where the inspectors performed a partial review of EDCR 54923, the engineering change associated with CDR 391/86-08, 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.

Inspection Activities: The inspectors reviewed NCR WBN 6328 for completeness and to determine the extent of the deficient condition. The inspectors also reviewed SCR WBNMEB8546R2 for completeness and to determine the apparent root cause and corrective action created by the applicant. The inspectors reviewed and performed walkdowns of two completed actuator replacement WOs (valves 2-FCV-030-0051 and 2-FCV-030-0053) and two completed quick exhaust valve (QEV) change out WOs (valves 2-FCV-030-0014 and 2-FCV-030-0019) to verify that the work was performed in accordance with the procedure, that the WO contained correct material information, and that the design documents matched the as-built conditions. The inspectors reviewed the procedures to verify that they were approved and properly completed. The inspectors also reviewed completed work to verify that the speed control valves were removed during the execution of the two QEV change out WOs.

The inspectors observed in-process work associated with removal and replacement of control air lines associated with containment isolation valves 2-FCV-030-0007 and 2-FCV-030-0009, including pressure regulators, solenoid valves, and quick exhaust valves. The purpose of the observation was to evaluate if the materials used were as specified, material was installed at the proper location by qualified craft personnel using suitable tools, adequate documentation of installation activities was completed in a timely manner, and required inspections were performed by qualified QC personnel. Additionally, the inspectors observed in-process installation to verify the following:

- the latest approved revision of applicable construction specifications, drawings and/or procedures were available and used by the installers;

- the components were as specified, such as: type, range, proof pressure/rating and material;
- associated mounting hardware and supports were of the type and material specified and properly located;
- the components were installed in the proper location and orientation by qualified craft personnel using suitable equipment and tools in accordance with Drawing Revision Authorization (DRA) 54923-413;
- the required component identification was properly maintained or established;
- licensee/contractor inspections are performed, or scheduled to be performed, before completing the work to be inspected;
- inspection activities were timely and properly completed by qualified personnel; and
- installed components were adequately protected from damage by adjacent construction activities.

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 50-391/86-08; however, this item will remain open pending the applicant's development of test procedures to verify valve closure time.

OA.1.7 (Discussed) Three Mile Island Action Item II.D.1, Performance Testing of Boiling-Water Reactor and Pressurized-Water Reactor Relief and Safety Valves (Inspection Procedure 50071)

a. Inspection Scope

Background: Following the 1979 event at Three Mile Island Unit 2, the NRC formed a Lessons Learned Task Force to provide recommendations from the accident. These recommendations were released in NUREG-0578 (ADAMS Accession No. ML090060030). Section 2.1.2 of NUREG-0578 described the short term recommendation for the performance testing for BWR and PWR Relief and Safety Valves. TMI Action Items were developed as a result of these recommendations and published in NUREG-0660 Volumes 1 and 2, NRC Action Plan Developed as a Result of the TMI-2 Accident (ADAMS Accession Nos. ML072470526 and ML0727470524).

TMI Action Item II.D.1 established the requirements for Reactor Coolant System Relief and Safety Valves Testing. This action item states that licensees and applicants shall conduct testing to qualify reactor coolant system relief and safety valves under expected operating conditions for design basis transients and accidents, including under Anticipated Transient without SCRAM (ATWS) conditions. NUREG-0737 (ADAMS

Accession No. ML051400209) clarified this statement, adding the qualification of PWR block valves as a new requirement.

Inspection Activities: The inspectors interviewed the TVA Pre-Service/In-Service Testing (PST/IST) lead engineer to determine the scope of the PST/IST program and to ensure the relief and safety valves were contained within the PST/IST program. The inspectors also verified where and how the testing would be performed. The inspectors reviewed the in-service testing program document to verify that it contained the reactor coolant system relief and safety valves, as required, and to determine the frequency and type of testing to be performed. The inspectors also reviewed the technical specifications for the testing of the relief and safety valves to verify completeness.

Documents reviewed are in the Attachment

b. Observations and Findings

No findings were identified. The In-Service Test Program procedure combines the currently approved and in-use Unit 1 program with the Unit 2 program and will become effective prior to operation of Unit 2. The inspectors found that TVA submitted relief request IST-RR-4 to the NRC in a letter dated December 12, 2013 (ADAMS Accession No. ML13358A066) that pertained to the pre-operational testing of the safety valves. If approved, TVA will have the valves tested at a vendor facility rather than testing the safety valves in-place.

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 implement a relief and safety valve testing program as required by TMI Action Item II.D.1. This item will remain open until the NRC response to relief request IST-RR-4 (or its descendant) is issued and the need for additional inspection of the testing of the block valves and associated piping is evaluated. Following disposition of the relief request, further review of the applicants testing plan will be required including an evaluation of ATWS requirements associated with the primary relief and safety valves.

OA.1.8 (Discussed) Violation 391/87-19-01: Failure to Follow Procedures for Installing Equipment in the North and South Valve Rooms (Inspection Procedure 92702)

a. Inspection Scope

The inspectors continued inspection efforts initiated in NRC IIR 05000391/2013605 (ADAMS Accession No. ML13220A640) Section OA.1.6. Specifically, the inspectors reviewed a sample of the closure packages associated with this violation to determine if the proposed actions addressed the issues documented in violation (VIO) 391/87-19-01. For some of the examples associated with this violation, PER closure packages were unavailable because the issues were closed by the applicant under the old process. These were documented in CAQRs. The inspectors reviewed the following packages to verify that deficiencies associated with improper equipment installation were properly addressed.

- engineering complete closure package for PER 143790
- final complete closure package for PER 143939
- final complete closure package for PER 143940
- CAQR WBN871087
- CAQR WBN871088

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Some of the actions associated with VIO 391/87-19-01 were still in process. The inspectors recommend reviewing the remaining closure packages and performing an independent verification of completed field activities, associated with the closure packages, prior to closing this violation.

OA.1.9 (Discussed) Supplemental Safety Evaluation Report, Appendix HH, Open Item 38: Availability and Operability of the Emergency Response Data System (Inspection Procedure 92701)

a. Inspection Scope

Background: Appendix HH open item 38 is identified in NUREG-0847, Safety Evaluation Report Related to the Operation of Watts Bar Nuclear Plant, Unit 2, SSER 22 (ADAMS Accession No. ML110390197). Section 13.3.2.6 states that NRC staff will confirm the availability and operability of the emergency response data system (ERDS) data capabilities prior to the issuance of the Unit 2 operating license.

The scope of the present review is based on Section 13.3, Emergency Preparedness, of NUREG-0800, Standard Review Plan (SRP) for the Review of Safety Analysis Reports for Nuclear Power Plants, LWR [Light-Water Reactor] Edition (ADAMS Accession No. ML070630046). The SRP provides that, in general, if an application is for an additional reactor at an operating reactor site, and the application proposes to incorporate and extend elements of the existing emergency planning program to the new reactor, those existing elements should be considered acceptable and adequate. This protocol applies to this inspection in that the WBN radiological emergency plan (REP) was written as a site-wide plan and that TVA proposed, and the Commission accepted, a regulatory framework in which TVA would align the Unit 1 and Unit 2 licensing and design basis to ensure design and operational fidelity between the two units.

Inspection Activities: The inspectors reviewed ERDS data point libraries for Unit 2 and Unit 1 and found them to be essentially identical and available for the NRC to develop appropriate displays. The inspectors reviewed the data to verify it was available from the plant computer system and observed the applicant activate ERDS using the prescribed processes and procedures. The inspectors also observed the

applicant send Unit 1 and Unit 2 ERDS data to the NRC via appropriate communications from their corporate central emergency command center.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified. Appropriate Unit 2 ERDS data appeared to be available.

c. Conclusion

Based upon the actions implemented, at such time that the NRC has formatted a selectable display screen to properly verify receipt of Unit 2 ERDS data, the inspectors will request the applicant test the communications capability and verify receipt and proper display of the data in order to close this item.

OA.1.10 (Discussed) Supplemental Safety Evaluation Report, Appendix HH, Open Item 40: Confirm the Adequacy of the Emergency Facilities and Equipment to Support Dual Unit Operations (Inspection Procedure 92701)

a. Inspection Scope

Background: Appendix HH open item 40 is identified in NUREG-0847, Safety Evaluation Report Related to the Operation of Watts Bar Nuclear Plant, Unit 2, SSER No. 22 (ADAMS Accession No. ML110390197). Section 13.3.2.8 states that the NRC staff will confirm the adequacy of the emergency facilities and equipment to support dual unit operations prior to the issuance of the Unit 2 operating license.

The scope of the present review is based on the Section 13.3, Emergency Preparedness, of NUREG-0800, SRP for the Review of Safety Analysis Reports for Nuclear Power Plants, LWR Edition (ADAMS Accession No. ML070630046). The SRP provides that, in general, if an application is for an additional reactor at an operating reactor site, and the application proposes to incorporate and extend elements of the existing emergency planning program to the new reactor (included by reference), those existing elements should be considered acceptable and adequate.

This protocol applies to this inspection in that the WBN REP was written as a site-wide plan and that TVA proposed, and the Commission accepted, a regulatory framework in which TVA would align the Unit 1 and Unit 2 licensing and design basis to ensure design and operational fidelity between the two units.

Inspection Activities: This inspection, focused on ensuring the emergency facilities were adequately equipped for events affecting either Unit 1, Unit 2, or both. The applicant had completed a self-assessment to verify processes and appropriate materials were in place in their emergency response facilities and identified remaining gaps. The inspectors reviewed the self-assessment, applicant procedures, and equipment inventories needed to support dual unit operations. The inspectors toured the technical support center (TSC), the operations support center (OSC), central emergency control center (CECC), and the local recovery facility

with licensee/applicant personnel and discussed the remaining action items from the self-assessment.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified. The inspectors confirmed applicant-identified gaps existed in placing Unit 2 procedures, drawings, and other supporting documents in the TSC and OSC. Additionally, some minor revisions to quarterly facility inventory verifications are yet to be completed. The inspectors did observe that the TSC was recently renovated and upgraded with adequate space to accommodate the additional items once put in place.

c. Conclusions

The inspectors determined that activities were in progress to address the gaps noted in their self-assessment. Further inspection will be performed to verify their implementation.

OA.1.11 (Discussed) Supplemental Safety Evaluation Report , Appendix HH, Open Item 41: Update Plant Displays to include Unit 2 and Update Dose Assessment Models to provide Capabilities for Assessing Releases from Both WBN Units (Inspection Procedure 92701)

a. Inspection Scope

Background: Appendix HH open item 41 was generated in response to an applicant response to a staff request for additional information regarding the capability of the WBN emergency response facilities (ERFs) to simultaneously handle an emergency event affecting both WBN Unit 1 and Unit 2. The inspectors had previously determined and documented plant data displays as being adequate. Confirmation of dual unit dose assessment capabilities remained open.

Inspection Activities: The inspectors evaluated the status of the dose assessment models, displays, and procedure updates to include Unit 2. The inspectors reviewed dose assessment procedures and inputs, used onsite and at the CECC, and also interviewed appropriate plant and corporate personnel to verify the status of outstanding action items.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified. The applicant determined that several outstanding actions remained including completion of their off-site dose calculation manual which serves as an input to some of their calculations. This is necessary as there are slight differences between the Unit 1 and Unit 2 reactor cores and therefore differences in source terms. The inspectors independently confirmed the extent of dose assessment procedures requiring updates.

c. Conclusions

This item will remain open until the updated dose assessment procedures are available for review.

OA.1.12 (Closed) Bulletin 74-03, Failure of Structural or Seismic Support Bolts on Class I Components (Inspection Procedure 35007)

a. Inspection Scope

Background: In March 1974, the NRC issued Bulletin (BL) 74-03, Failure of Structural or Seismic Support Bolts on Class I Components, as a result of bolt failures found at the Haddam Neck pressurized water reactor. During a visual inspection, several steam generator seismic support hold-down bolts were observed to be loose. Subsequent inspections identified a number of bolts that were unable to perform their design function. A preliminary evaluation indicated the bolts had failed in tension, but it was later ascertained that the failures were the result of stress corrosion. BL 74-03 was originally addressed for Units 1 and 2 based on the requirements of NUREG-0577, Potential for Low Fracture Toughness and Lamellar Tearing on PWR Steam Generator and Reactor Coolant Pump Supports (ADAMS Accession No. ML100321810) and documented in Calculation WBNSSG6-002, Rev. 0.

In 2011, during the review of the Unit 2 final closure package for BL 74-03, it was identified that the fracture toughness evaluation for three heats of upper steam generator support bolts in engineering Calculation WBNSSG6-02 could not be located. In addition, conclusions drawn from historical problem evaluation report WBP971126 indicated that problems encountered on the Unit 1 upper steam generator support bolts were the result of a misaligned splice joint as opposed to low fracture toughness.

A violation of regulatory requirements was identified for failure to take adequate corrective actions for a non-conformance associated with the use of seismic support bolts. This violation was documented and discussed in detail in Section Q.1.1 of IIR 05000391/2011605 (ADAMS Accession No. ML112201418).

The applicant issued PER 378538 to address this issue. Immediate actions to correct the issue included a revision of the engineering calculation, issuance of a field change request (FCR), and a revision to the EDCR. The FCR and revised EDCR were issued to ensure that problems encountered with the Unit 1 upper steam generator support bolts did not occur on Unit 2.

Inspection Activities: To address Unit 2, the inspectors performed the following:

- Reviewed the applicant's open item closure report, NCO080008029, Rev. 3, which was revised to include the corrective actions identified in PER 378538 and verified that actions properly addressed the root cause contributing to the problems encountered on the Unit 1 upper steam generator support bolts.
- Reviewed FCR 57884-A and FCR 62974 AA-04/AA-07, which included DRA 48N41748N417, Rev 13, to verify that notes were included to ensure full (or firm) surface contact. The inspectors verified that the change was similar to the change implemented on Unit 1 as implemented under DCN 39821.

- Reviewed WO 112169655, which documented the future installation of beveled washers or elongation of bolt holes as necessary to ensure complete surface contact steam generator upper lateral supports for all four steam generators.
- Inspected tightening and visual inspection, by field engineering, of several bolts to verify that firm contact was achieved
- Reviewed Test Scoping Document for Hot Functional Testing (HFT), 2-TSD-HFT-1, Rev No. 2, Figure 2-3.3.2.3, Steam Generator Support Struts and verified that the figure included a note to specifically check the ring girder bolts at the splice plate for broken, cracked, or loose bolts after HFT.

b. Observations and Findings

No findings were identified. During review of additional documentation, the inspectors became aware of recent Unit 1 PERs 868710 and 869147, which documented loose and sheared bolts on steam generators 2 and 3. As a result of the discovery on Unit 1, the inspectors questioned TVA on whether future inspections would be performed of the Unit 2 upper steam generator bolts after HFT. TVA inserted a note in the test scoping document for Hot Functional Tests, 2-TSD-HFT-1, Rev No. 2, Figure 2-3.3.2.3, Steam Generator Support Struts. The note requires a check of the ring girder bolts at the splice plate for broken, cracked, or loose bolts after HFT. The steam generator bolting issues on Unit 1 were addressed through a Westinghouse evaluation and corrective actions as documented in PERs 868710 and 869147.

c. Conclusions

Based on these actions and the review of the final completion package, including those documented in IIR 05000391/2011605, the inspectors determined that the applicant had resolved BL 74-03 for Unit 2 and implemented actions that addressed the failure of structural or seismic support bolts on Class I components. BL 74-03 is closed.

OA.1.13 (Closed) Bulletin 88-09, Thimble Tube Thinning in Westinghouse Reactors (Inspection Procedure 35007)

a. Inspection Scope

Background: TVA committed by letter dated March 11, 1994 (ADAMS Accession No. ML073241193) for both units to establish a program and to inspect the thimble tubes during the first refueling outage. This was established for Unit 1 by DCN 39481 and through revision of Maintenance Instruction MI-94.004 to perform eddy current testing every refueling outage. This item was identified as closed in SER 16 (ADAMS Accession No. ML073450552), Appendix EE, Page 10. TVA tracked this item in its Framework Letter (ADAMS Accession No. ML110210486) and Status of Generic Communications (Enclosure 3) for Unit 2 with a status of "CI," indicating they considered this item closed awaiting implementation.

However, as construction for Unit 2 proceeded, TVA, in conjunction with its vendor Westinghouse, developed EDCR 52321. This EDCR was issued to install the Westinghouse In-Core Information, Surveillance, and Engineering (WINCISE) System, which employs fixed in-core detectors as opposed to the traditional moveable core detectors utilized on Unit 1. Westinghouse had analyzed the new system to exhibit essentially no wear due to vibrations through its higher natural frequency and lower

vibration amplitude. Additionally, Westinghouse noted that the new in-core instrument thimble assemblies (IITAs) relied on a seal table swagelok fittings to ensure that, even if there was a full penetration wear hole in the IITA outer sheath, there would be no direct loss of reactor coolant pressure boundary integrity into the containment building environment outside of the primary sump recirculation loop.

Hydrostatic testing of the IITA tubes was performed following the vendor test procedure to meet the requirements of ASME Section III NB-6100, given the tubes are considered instrumentation tubes. IITA tubes were hydrostatically tested both internally, externally, and post installation to ensure overall integrity. Post-hydrostatic inspections and helium leak testing were performed in accordance with ASME Section III ND-6224 leakage test after the application of pressure.

Consequently the applicant has determined that issues addressed in BL 88-09 do not apply to the WINCISE system. Previous inspection efforts are discussed in Watts Bar 2 IIRs 05000391/2013609 (ADAMS Accession No. ML13353A599), 05000391/2014602 (ADAMS Accession No. ML14086A068), and 05000391/2014603 (ADAMS Accession No. ML14129A381).

Inspection Activities: To address additional questions identified by the previous inspections, the inspectors performed the following:

- interviewed engineering and management personnel for both Westinghouse and Westinghouse contractors familiar with the WINCISE system design and testing;
- reviewed proprietary design drawings, hydrostatic test procedures, hydrostatic test setup, and hydrostatic test data for both internal and external configurations to verify compliance with ASME requirements and acceptance criteria; and
- reviewed information relating to post installation hydrostatic test setup and procedure to verify compliance with ASME requirements.

b. Observations and Findings

No findings were identified. The inspectors noted, as previously discussed in IIR 05000391/2013609, that as these systems were not subject to a bulletin for thinning concerns, the applicant's approach that the bulletin is no longer valid appeared to have merit. The test configuration and final installation of the fixed detectors had been tested in accordance with vendor acceptance criteria and demonstrated to meet ASME requirements, similar to those requirements established for the previous movable in-core detector system.

c. Conclusions

Based on a review of the applicant's final closure package and inspection of the modifications and test results of the in-core detectors, BL 88-09 is closed.

OA.1.14 (Closed) Construction Deficiency Report 391/83-07, Transfer Valves to Auxiliary Feedwater Have Non-Divisional Power (IP 35007)

a. Inspection Scope

The inspectors continued inspection efforts initiated in IIR 05000391/2012605 (ADAMS Accession No. ML12220A536), Section OA.1.2. The inspector reviewed the applicant's engineering complete closure package, EDCR 54145, and associated WOs. The inspectors also observed completed work associated with EDCR 54145. Specifically, the inspectors performed the following activities:

- performed a walkdown inspection to verify installation of new motor driven auxiliary feedwater pump (MDAFWP) supply line pressure switches and associated components covered by WOs 09-952660-013, 09-952660-015, 112057106, and 111283615; and
- reviewed WO 110983786, which contains work steps to remove the existing turbine driven auxiliary feedwater pump (TDAFWP) supply line pressure switches and associated components, in accordance with EDCR 54145.

b. Observations and Findings:

No findings were identified.

c. Conclusions

The inspectors determined that based on inspection of completed work activities, review of planned work activities, review of the engineering complete closure package, and previous inspection activities, the applicant has adequately addressed or initiated activities to address the original construction deficiency. CDR 391/83-07 is closed.

OA.1.15 (Closed) Violation 391/87-05-01, Failure to Consider Vendor Requirements in the Design of the Hydrogen Analyzer System and Failure to Specify Classes of Cleanliness in Specifications or Drawings

a. Inspection Scope

NRC IIR 05000391/2014603 (ADAMS Accession No. ML14129A381), section OA.1.8, documented the closure of VIO 391/87-05-01. Although the body of section OA.1.8 correctly refers to VIO 391/87-05-01, the title of section OA.1.8 incorrectly refers to this VIO as CDR 391/87-05-01. VIO 391/87-05-01 is also incorrectly referred to as CDR 391/87-05-01 in the "List of Items Opened, Closed, and Discussed" section of the Attachment to IIR 05000391/2014603. No inspection activities were performed during this report period; this section is only intended to provide clarification for incorrect references to VIO 391/87-05-01 as CDR 391/87-05-01 in IIR 05000391/2014603.

b. Observations and Findings

No findings were identified.

c. Conclusions

VIO 391/87-05-01 remains closed, as documented in IIR 05000391/2014603, section OA.1.8.

OA.1.16 (Closed) Supplemental Safety Evaluation Report , Appendix HH, Open Item 73: Confirm that TVA has completed Watts Bar Unit 2 Emergency Operating Procedures prior to Fuel Load (Inspection Procedure 42452)

a. Inspection Scope

The inspectors performed an assessment of the applicant's response to NUREG-0847, Safety Evaluation Report Related to the Operation of Watts Bar Nuclear Plant, Unit 2, SSER 23, Appendix HH, open Item 73, in conjunction with the performance of IP 42452 (Emergency Procedures), as described in section O.1.1 of this report.

b. Observations and Findings

No findings were identified.

c. Conclusions

The list of WBN Unit 2 emergency procedures is complete. Those procedures reviewed were written in accordance with TI-12.06, Writer's Guide for Abnormal and Emergency Operating Instructions, and are complete and ready for approval and use. Open item 73 of Appendix HH is closed.

OA.1.17 (Closed) Three Mile Island Action Item II.E.3.1, Emergency Power for Pressurizer Heaters (Inspection Procedure 92701)

a. Inspection Scope:

Background: Following the accident at TMI Unit 2, the NRC staff developed the action plan, NUREG-0660 Volumes 1 and 2, NRC Action Plan Developed as a Result of the TMI-2 Accident (ADAMS Accession Nos. ML072470526 and ML0727470524), which provided a comprehensive and integrated plan to improve safety at power reactors. Specific items from NUREG-0660 have been approved by the Commission for implementation at reactors. The items approved by the Commission for implementation to date are included in NUREG-0737, Clarification of TMI Action Plan Requirements, (ADAMS Accession No. ML102560051). One of these items is II.E.3.1, Emergency Power for Pressurizer Heaters. In previous inspections, the inspectors were able to verify that TMI actions, NRC requirements, and safety analysis report (SAR) commitments were properly translated into design drawings for adequate control and installation of electrical components. The inspectors had interviews with responsible engineers and examined EDCR packages to determine if critical design requirements were correctly translated into drawings, specifications, and procedures. Previous reports that addressed other aspects of this action item can be found in NRC IIR 05000391/2010603 (ADAMS Accession No. ML102170465) Section OA.1.13 and IIR 05000391/2010605 (ADAMS Accession No. ML110410680) Section OA.1.6.

Inspection Activities: The inspectors walked down the equipment installed to verify compliance with engineering documents, component ratings, labeling, feeder installation, and overall system completion. The inspectors reviewed load calculations to verify emergency diesel generator capacity to support pressurizer heater loads. The inspectors reviewed WO plans for the completion of open items associated with these components including listings of work to install, repair and test the controls, and power feed operations for the pressurizer heater emergency power components. The inspectors reviewed ICRDS reports for the power feeder from the shutdown boards to the primary connections to the pressurizer heater service 480V transformers. The inspectors interviewed responsible engineering personnel to verify adequate control schemes for the operation of these system components.

Documents reviewed are listed 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 concluded that the applicant has adequate implementation plans to complete this TMI Action Item. TMI action item II.E.3.1 is closed.

OA.1.18 (Closed) Unresolved Item 391/86-24-06, Review of cable splicing as required by FSAR (Inspection Procedure 51063)

a. Inspection Scope

Background: As documented in IR 50-391/86-24 (ADAMS Accession No. ML082280247), it was identified by NRC staff that electrical cables were pulled through an enclosed wireway vertical riser, where six of the fourteen cables were spliced, on their way to Control Room Panel M-4-A. The spliced cables were identified as 2PM2241A, 2V1071A, 2PM3989A, 2PM3994A, 2PM4463A, and 2PM4483A. Four of the six cables identified were part of the Unit 1 Splice Program; (2PM2241A, 2V1071A, 2PM3989A, and 2PM3994A) installed after February 15, 1989, and considered acceptable to revised splice requirements. On previous inspections, the inspectors reviewed documentation for the applicant's engineering complete closure package, general engineering specifications, calculations and implementation procedures to verify compliance with criteria and NRC requirements. The inspectors conducted direct observation of installed splices to confirm compliance.

Inspection Activities: The inspectors reviewed WOs, FCRs, and ICRDS reports on the individual cables associated with this URI. The inspectors reviewed the renaming of cables associated with this issue that were abandoned in place and the work of extending new cables for Unit 2 operations to the original destination to verify that work completed and the final configuration were in compliance with specifications, commitments and NRC requirements.

Documents reviewed are listed 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 concluded that the applicant has an adequate implementation plan to complete the resolution for URI 86-24-06. URI 86-24-06 is closed.

**OA.1.19 (Closed) Cable Issues Corrective Action Program – Sub-issue: Splices
(Temporary Instruction 2512/016)**

a. Inspection Scope

Background: The Cable Issues CAP was initiated based on various employee concerns, CAQ documents, and NRC findings related to cable installation and routing. The root cause of these concerns was primarily the absence or incompleteness of specific guidelines in the development of design input or output documents, and in some instances, the lack of procedural details for the installation of cables. There were eleven sub-issues that formed the basis of the Cable Issues CAP. One of the eleven was cable splices. A splice is defined as the connection of two or more field cables to each other or the connection of a field cable to the pigtails of a device not landed on a terminal block. The connection of field cables to equipment pigtails and containment penetrations, are identified as termination splices. The connection of field cable to field cable where the cable unique identifier remains the same is considered an intermediate splice. Previous IIRs that addressed aspects of this Cable Issues CAP can be found in the following reports:

- IIR 05000391/2010605, Section OA.1.14 (ADAMS Accession No. ML110410680)
- IIR 05000391/2011602, Section OA.1.6 (ADAMS Accession No. ML110800483)
- IIR 05000391/2011605, Section OA.1.5 (ADAMS Accession No. ML112201418)
- IIR 05000391/2011607, Section OA.1.10 (ADAMS Accession No. ML112730134)
- IIR05000391/2011610, Section OA.1.6 (ADAMS Accession No. ML12034A202)
- IIR 05000391/2013607, Sections OA.1.12, OA1.13, & OA1.14 (ADAMS Accession No. ML13273A512)
- IIR 05000391/2012608 Section, OA.1.9 (ADAMS Accession No. ML12319A368)
- IIR 05000391/2013608 Section, C.1.7 (ADAMS Accession No. ML13316A776).

Inspection Activities: The inspectors reviewed calculations, the engineering complete closure report, cable splice WO listings, quality surveillance reports, cable termination procedures, the cable splice EQ binder, and self-assessment reports to verify compliance with commitments and requirements in the resolution efforts associated with cable splices. The inspectors observed splices installed inside safety-related panels and junction boxes to verify compliance with general engineering specifications and material qualifications. The inspectors reviewed WOs to verify that the type of splice kits used was in compliance with environmental conditions, cable sizes, and cable types. The inspectors reviewed MAI-3.3, Cable Terminating, Splicing, and Testing for Cables Rated Up To 15,000 Volts, to verify installation QC inspection activities, and splice installation

field comments. The inspectors interviewed responsible engineering personnel to verify adequate implementation procedures and staff understanding of critical characteristics of splice installations.

Documents reviewed are listed 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 concluded that the applicant has an adequate implementation plan to complete the resolution of this CAP sub-issue for Cable Splices. This CAP sub-issue is closed. A final inspection of the applicant's certification that the CAP is complete will be performed at a later time to verify that NRC's conclusions remain valid.

OA.1.20 (Closed) Cable Issues Corrective Action Program – Sub-issue: Cable Bend Radius (Temporary Instruction 2512/016, Inspection Procedure 51063)

a. Inspection Scope

Background: The Cable Issues CAP was initiated based on various employee concerns, CAQ documents, and NRC findings related to cable installation and routing. The root cause of these concerns was primarily the absence or incompleteness of specific guidelines in the development of design input or output documents, and in some instances, the lack of procedural details for the installation of cables. There were eleven sub-issues that formed the basis of the Cable Issues CAP. One of the eleven was cable bend radius. Excessive bending of cable has the potential of damaging and adversely effecting cable performance. Damage can be caused by: (a) elongation stress to the insulation system, which may reduce the qualified life of the cable, (b) interfacial disruption of a medium voltage cable's stress control layers of insulation and insulation shield, which may have the likelihood of corona degradation, and (c) conductor creeping, which would likely put radial stress on the insulation system. Previous IIRs that addressed aspects of this Cable Issues CAP can be found in the following reports:

- IIR 05000391/2011610, Section OA.1.4 (ADAMS Accession No. ML12034A202)
- IIR 05000391/2012602, Section OA.1.5 (ADAMS Accession No. ML12087A324)
- IIR 05000391/2012604, Section OA.1.3 (ADAMS Accession No. ML12167A212)
- IIR 05000391/2013610, Section OA.1.7 (ADAMS Accession No. ML14049A158)

Inspection Activities: The inspectors reviewed the applicant's Cable Bend Radius closure report, Electrical Design Standard, calculations, DRAs, WOs, quality surveillance reports, general engineering specifications, nuclear generation development and construction (NGDC) PP-19-2 completion forms, and self-assessment reports to establish compliance with commitments and requirements in the implementation of the resolution efforts associated with cable bend radius. The inspectors observed cable bend radius samples inside a number of panels and junction boxes to verify compliance

with general engineering specifications and electrical design standards. The inspectors observed raceway system modification and junction box replacements to verify corrective actions were implemented in addressing the cable bend radius deficiencies. The inspectors reviewed WOs to verify cable retraining, raceway system modifications, and cable replacements to adequately resolve the corrective action commitments in this cable bend radius corrective action plan sub-issue.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Based on a review of the applicant's engineering complete closure package and the aforementioned inspection activities, the inspectors concluded that the applicant has an adequate implementation plan to complete the resolution of this CAP sub-issue for Cable Bend Radius. This CAP sub-issue is closed. A final inspection of the applicant's certification that the CAP is complete will be performed at a later time to verify that NRC's conclusions remain valid.

OA.1.21 (Closed) Construction Deficiency Report 391/82-76, Cable Bend Radius Deficiencies (Inspection Procedure 51063)

a. Inspection Scope

Background: Various TVA inspections and reviews and NRC inspection findings indicated programmatic violations of bend radius standards. Specifically, TVA engineering standards lacked a documented basis for deviations from industry bend radius standards, and installations existed where bends were in violation of the TVA standards. In addition, WBN cable installation procedures have not always been consistent with the applicable design requirements. Design output documents and implementing procedures for cable installations were assessed (Calculation WBPEVAR8904018) to determine if proper cable inspection attributes existed for the inspection of electrical cable bend radii. Nuclear Engineering calculation WBPEVAR8904064 was issued to define a selection of equipment and raceway to be walked down to determine the extent of the condition to which installed cables do not comply with electrical design standard DS-E12.1.5, Minimum Radius For Field-Installed Insulated Cables Rated 15,000 Volts and Less, Rev.3. This standard reflects the industry standard bend radius values. The reviews and analysis resulted in the establishment of a comprehensive program which is generic to all safety-related cables and consists of testing, analysis, inspection, and rework, where necessary, to provide additional confidence that no significant degradation exists due to the bend radii conditions at WBN.

Inspection Activities: The inspectors reviewed the cable bend radius of cables inside safety-related panels and junction boxes to verify compliance with general engineering specifications and electrical design standards. The inspectors observed raceway system modification and junction box replacements to verify corrective actions implemented in addressing the cable bend radius deficiencies. The inspectors reviewed

WOs to verify cable retraining, raceway system modifications, and cable replacements to adequately resolve the corrective action commitments in the cable bend radius sub-issue corrective action plan.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Based on a review of the applicant's engineering complete closure package and the aforementioned inspection activities, the inspectors concluded that the applicant has an adequate resolution plan to complete CDR 391/82-76. CDR 391/82-76 is closed.

OA.1.22 (Closed) Construction Deficiency Report 391/86-03 Equipment Pigtail Extensions - Training Radius Deficiencies (Temporary Instruction 2512/016)

a. Inspection Scope

Background: In 1986, the applicant issued a report to the NRC per 10 CFR 50.55(e) which identified a nonconforming condition where electrical splices to pigtail extensions from flow solenoid valves had been installed without applying requirements for minimum bend radius as specified in the applicant's electrical standards. The extent of the condition was limited to electrical connections for flow solenoid valves installed on Watts Bar Unit 2. A previous inspection of the applicant's corrective actions was documented in IIR 05000391/2012604 (ADAMS Accession No. ML12167A212). That report identified that the applicant planned to correct the condition by replacing all of the splice connections for Unit 2 flow solenoid valves. The inspectors concluded that actions were still in process and that additional inspection of actual field installations would be required prior to closure.

Inspection Activities: The inspectors interviewed electrical design personnel and construction field engineers to evaluate the scope and status of replacements of electrical splices to flow solenoid valves. The inspector determined that the applicant planned to replace a total of 87 splices qualified for harsh environment and two splices qualified for mild environment.

The inspectors interviewed construction field staff to evaluate procedures used in the implementation of installation criteria and proper compliance with electrical design standards when installing flow solenoid valves. The inspectors reviewed installation records of completed replacement splices to verify the identification numbers for the joined conductors were recorded, the bend radius for the electrical conductors had been measured and verified to conform to specified acceptance criteria, the construction of the electrical splice was documented and the selection and installation of the interconnecting electrical conduit was appropriately sized.

The inspectors evaluated the adequacy of the mountings and supports for the solenoid actuators, the configurations and sizes of splice enclosures, and the fit up and supports for electrical conduits. An inspection was conducted to confirm that pre-existing splice

terminations had been replaced and to verify whether cable bends, that may have been required for the new splices, could be accomplished within the confines of the splice enclosures while meeting restrictions for minimum bend radius.

The inspectors conducted direct observations of the installation of electrical connections to the following flow solenoid valves (FSV):

- 2-FSV-30-56A
- 2-FSV-61-191A-A
- 2-FSV-61-193A-A
- 2-FSV-61-96
- 2-FSV-61-110
- 2-FSV-61-97
- 2-FSV-61-122
- 2-FSV-062-0059-B
- 2-FSV-068-395-B
- 2-FSV-068-396-B

Documents reviewed are listed 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 concluded that the applicant has an adequate resolution plan to complete CDR 391/86-03. CDR 391/86-03 is closed.

OA.1.23 (Closed) Construction Deficiency Report 391/95-05, Loose Connections in Vendor-Wired Electrical Panels (Inspection Procedure 35007)

a. Inspection Scope

Background: A 1993 QA audit identified instances of electrical construction deficiencies, including loose connections in vendor-wired safety-related panels, which had not been adequately evaluated for extent of condition. The NRC review of the condition resulted in violation 390/93-24-01 for a failure to conduct inspections of vendor-wired panels. Closure of the issue for Unit 1 was subsequently documented in inspection reports 50-390/95-72 and 50-391/95-72 (ADAMS Accession No. ML 072610791). The applicant established CDR 50-391/95-05 and issued PER 145184 to track and document corrective actions for Unit 2 vendor-wired safety-related panels/racks.

The previous inspection of the applicant's corrective actions on Unit 2 was documented in IIR 05000391/2012605 (ADAMS Accession No. ML12220A536). That report identified that corrective actions were still in process and that further inspection was required to verify effectiveness of the actions.

Inspection Activities: In this inspection period, the inspectors interviewed electrical design personnel and construction field engineers to evaluate the scope and rigor applied to correction of this construction issue.

Completed records of the applicant's inspections and corrective rework of electrical wiring were reviewed to verify non-conforming electrical connections had been identified and corrected in accordance with approved instructions. The inspectors followed up with direct field observations of the quality of as-installed wiring, including fit-up and compression of termination lugs, material condition of terminal blocks, identification of cables, integrity of cable insulation, maintenance of limits for bending radius, and segregation and protection of conductors. Selected terminations were compared to the associated connection drawings to verify defined configurations had been maintained. In addition, the inspectors observed the applicant probe conductors, in select panels, with a non-conducting dowel to check for looseness at their terminations.

The inspection sample included the following vendor-wired safety-related panels (terminations).

- WBN-2-PNL-278-M003, Unit Control Board (3)
- WBN-2-PNL-278-M004, Unit Control Board (2)
- WBN-2-PNL-278-M005, Reactor Coolant System and Auxiliary Steam (2)
- WBN-2-PNL-092-M13-D, Nuclear Instrument System Protection Channel D (3)
- WBN-2-PNL-099-R46-A, Solid State Protection System Input Panel, Train A (7)
- WBN-2-PNL-099-R49-B, Solid State Protection System Input Panel, Train B (6)

The following samples were inspected:

- IP 51063 02.02.d – 23 samples (terminations)

Documents reviewed are listed 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 implemented appropriate measures to assure electrical connections in safety-related vendor-wired panels have been installed in accordance with defined quality and technical standards. Based on these actions, CDR 391/95-05 is considered closed for Unit 2.

OA.1.24 (Closed) Cable Issues Corrective Action Program – Sub-issue: Cable Proximity to Hot Pipes and Construction Deficiency Report 391/90-03, Cable Proximity to Hot Pipes (Temporary Instruction 2512/016, Inspection Procedure 35007)

a. Inspection Scope

Background: This sub-issue for the Cable Issues CAP and CDR 391/90-03 were developed in response to NRC Information Notice 86-49, which highlighted the potential for cable damage resulting from close proximity to hot pipes. In IIR 05000391/2012603(ADAMS Accession No. ML12123A156), inspectors concluded that the applicant's program to evaluate and identify cables in relation to their proximity to hot pipes was adequate. In IIR 05000391/2013604 (ADAMS Accession No. ML13179A079), the inspectors observed a sample of relocated conduits and determined that the distance to hot pipes was in accordance with design documents.

Inspection Activities: The inspectors interviewed responsible personnel and reviewed Calculation EDQ00299920120001, Unit 2 Hot Pipe Evaluation and Disposition, Rev.11 and EDCR 59055, Rev. A to identify those conduits that were evaluated and determined to not meet the requirements of specification G-40, Installation, Modification and Maintenance of Electrical Conduit Cable Trays, Boxes, Containment Electrical Penetrations, Electric Conductor Seal Assemblies, Lighting and Miscellaneous Systems, Rev. 17 and those that needed to be relocated or removed. As a result, the inspectors selected and reviewed WOs 113496512 and 113280953 to determine whether the documented conduit relocation was performed in accordance with approved drawings, calculations, and installed in the specified location. Additionally, the inspectors reviewed WO 11303543 to verify removal of conduit 2PM5672E to resolve being too close to a hot process pipe. The WOs were reviewed to verify required inspections were performed by qualified personnel and documented accordingly.

The inspectors also performed field walkdowns of conduits designated as 2VC2932A and 2PLC1560B to verify their relocation to an acceptable distance away from corresponding hot pipes. The measured distance of the relocated conduits from the hot pipes was observed to ensure compliance with EDCR 59055 and specification G-40. The inspectors observed the routing of conduits 2PM5674E and 2PM5675E, which replaced the removed conduit 2PM5672E, to verify cables rerouted, as a result of conduit 2PM5672E being removed, were at an acceptable distance from hot pipes.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified. The inspectors determined from the selected sample that the relocation/removal of conduits in proximity to hot pipes and rerouting of cables to conduits that were in compliance with approved specifications were adequate. Previous NRC inspections reviewed the applicant's program to evaluate and identify cables in proximity to hot pipes and observed the relocation of conduits to meet specified requirements.

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 implemented appropriate measures concerning the Cable Issues CAP sub-issue: Proximity to Hot Pipes and CDR 391/90-03. The Cable Issues CAP sub-issue: Proximity to Hot Pipes and CDR 391/90-03 are closed. A final inspection of TVA's certification that activities covered under TI 2512/016 Cable Issues CAP sub-issue: Proximity to Hot Pipes are complete will be performed at a later time to verify that NRC's conclusions remain valid.

OA.1.25 (Closed) Construction Deficiency Report 391/85-22, Undervoltage Condition on 125 Volt Direct Current Vital Control System to Auxiliary Feedwater Components (Inspection Procedures 51063 and 92701)

a. Inspection Scope

Background: A design review in 1985 identified a non-conforming condition in which some components of the Auxiliary Feedwater Pump Turbine (AFPT) control circuit could receive voltage that is inadequate to ensure their operation. The deficiency was due to the voltage drop in the circuit feeder cable from the 125 Volt (V) Direct Current (DC) vital batteries to the affected components. The condition was documented as NCR WBNEEB8520 and CDR 391/85-22. The actions taken to address this CDR have been previously inspected as described in NRC IIR 05000391/2012604 (ADAMS Accession No. ML12167A212).

Inspection Activities: The inspectors performed document reviews and direct observations of completed work associated with the installation of class 1E cable 2SG220A to verify whether the original 1/2C, #12 American wire gauge (AWG) cable had been replaced with conductors of adequate size. The inspectors identified the new cable as a 2/1C, #2/0 safety-related cable to verify that the cable type and size were in accordance with EDCR 54636, design criteria NPG-DCD-WB-DC-30-27, AC and DC Control Power Systems, and Calculation EDQ00023620070003, 125V DC Vital Battery System Analysis, Rev. 27.

Additionally, the inspectors performed direct observation to verify the following:

- cable identification was preserved;
- required separation and segregation criteria were maintained;
- no evidence of damage to cable existed;
- cable training radius was maintained as specified;
- cables were protected from other construction activities; and
- adequate clearances between cable and adjacent components, such as piping, were maintained.

The following samples were inspected:

- IP 51063 Section 02.02.d – 1 sample (cable)

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Based on a review of the applicant's engineering complete closure package and the aforementioned inspection activities, the inspectors concluded that the applicant has implemented appropriate measures to assure that adequate voltage will be available for the components of the Auxiliary Feedwater Pump Turbine control circuit. CDR 391/85-22 is closed.

OA.1.26 (Closed) Electrical Conduit and Conduit Supports Corrective Action Program (Temporary Instruction 2512/018, Inspection Procedures 37051, 51053, and 51055)

a. Inspection Scope

Background: The Electrical Conduit and Conduit Supports (Conduit CAP) was established to evaluate a number of identified issues for Category 1E and 1(L) electrical conduits and conduit supports and to implement a comprehensive completion plan to adequately resolve these issues. The issues identified in the Conduit CAP originated from employee concerns, lessons learned, and other applicant source documents such as CAQRs, corrective action tracking documents (CATDs), a vertical slice review (VSR), discrepancy reports (DRs), PERs, and NRC open items. The main objectives of this CAP were to verify that conduits and their supports were structurally adequate, complied with design criteria, and ensure the design criteria complied with licensing requirements. The Conduit CAP was developed after the applicant determined that adverse conditions involving electrical conduits and conduit supports were programmatically characterized as having:

- design basis discrepancies;
- design output not enveloping all the design parameters;
- installed configurations not in conformance with exiting design documents; and
- discrepancies between as-installed configurations and inspection documentation.

TVA letter dated September 6, 1991, WBN – Nuclear Performance Plan, Volume 4, Rev. 1, Section III.2.4, Electrical Conduit and Conduit Support (ADAMS Accession No. ML073550296), proposed the applicant's approach for resolving this CAP. In NUREG-1232, Volume 4, Safety Evaluation Report on Tennessee Valley Authority: Watts Bar Nuclear Performance Plan (ADAMS Accession No. ML073620289), the NRC staff concluded that TVA's CAP plan, for Unit 1, was an acceptable methodology to ensure that the conduit runs are adequately supported for all plant design conditions.

For Unit 1, TVA resolved these issues through the following tasks:

- revising the design criteria;
- issuing supporting calculations and updating the FSAR to be consistent with the revised design criteria;

- updating design output documents, including specifications, to factor in changes to design criteria, changes to typical support details, and new support details. Critical case attributes were defined and developed for existing installations, and critical case evaluations were performed to qualify those installations;
- performing walkdowns, first, to support critical case evaluations, and then to identify configurations not enveloped by critical cases;
- performing unique evaluations or modifying installations, as required, when they could not be qualified by the critical case evaluations; and
- revising implementing procedures to ensure the adequacy of new or modified supports and to prevent recurrence.

In a letter from R. R. Baron to the NRC dated October, 30 1995 (ADAMS Accession No. ML072890440), TVA notified the NRC of completion of the Electrical Conduit and Conduit Supports Corrective Action Program for Unit 1. The NRC had previously approved the Unit 1 approach in NUREG-0847, SSER 6 dated April 1991 (ADAMS Accession No. ML082700284) and SSER 8 dated January 1992 (ADAMS Accession No. ML082700714). The Watts Bar Unit 1 Conduit CAP was completed and documented in a final report issued on December 4, 1995 (NRC Inspection Report 50-390/95-69 and 50-391/95-69 ADAMS Accession No. ML072610762). 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 closure report.

TVA's regulatory framework letter to NRC dated January 29, 2008, outlined TVA's plans for the implementation of the Unit 2 Conduit CAP which stated that the Unit 1 approach would be used. NRC letter from P. D. Milano to Mr. Bhatnagar dated February 11, 2009, Watts Bar Nuclear Plant, Unit 2 – Status of Regulatory Framework for the Completion of Corrective Action and Special Programs and Unresolved Safety Issues (ADAMS Accession No. ML090210107), provided the staff's assessment of TVA's approaches for resolving the CAPs and SPs. The staff concluded that there was reasonable assurance that, when implemented as described, the Conduit CAP will be appropriately resolved for Unit 2.

The Unit 2 program used the Unit 1 approach and also addressed TVA's past CATDs. These CATDs were previously listed in IIR 05000391/2010604 (ADAMS Accession No. ML103060240) which also provided background details about this CAP.

Since 2009, the NRC had inspected, reviewed, and documented several aspects of the Conduit CAP through inspections of the CAP, inspection of associated open items, and inspection of IP 51053, Electrical Components and Systems - Work Observation, and IP 51055, Electrical Components and Systems – Record Review, for conduits and supports. Inspection of the Conduit CAP had included inspection of CDR 391/87-18, and aspects of CDR 391/86-59, CDR 391/86-21 and VIO 391/87-19-01 for conduits and supports. The results of these inspections have been documented in previous inspection reports. In addition, TI 2512/018 provided guidance to the inspectors to make a determination as to whether TVA's Conduit CAP had been satisfactorily implemented to ensure that issues were adequately resolved. Some of the objectives included in the TI were also included in IPs 51053 and 51055; therefore, inspection efforts and activities covered under these two IPs and documented in Unit 2 inspection reports were credited towards TI 2512/018.

The following table summarizes recent inspection results for the Unit 2 Conduit CAP, as documented in several inspection reports and their respective sections:

IIR Number and Applicable Section	Summary of Documented Inspection Results
<p>IIR 05000391/2009605 (ADAMS Accession No. ML100290703)</p> <p>Sections C 1.2, and OA.1.3</p>	<ul style="list-style-type: none"> - Observed field activities associated with screening verification walkthroughs of conduit and conduit support installations. The inspectors observed ongoing engineering walk-downs for conduits and supports, including one-hole clamps. - Held discussions about the applicant's planned actions to resolve the issues associated with the Conduit CAP. The actions discussed covered areas of walkdowns, engineering, construction and testing.
<p>IIR 05000391/2010604 (ADAMS Accession No. ML103060240)</p> <p>Sections OA.1.14, C 1.14, and T 1.1</p>	<ul style="list-style-type: none"> - Section OA.1.14 documented previous inspection results and background details of the Conduit CAP. - Observed field activities associated with screening verification walkthroughs of conduit and conduit support installations. The inspectors observed ongoing engineering walk-downs for conduits and supports. - Verified involvement of quality assurance inspectors. - Observed installation of new conduits and supports. - Observed training sessions performed for craft installing anchors, conduits, and supports.
<p>IIR 05000391/2011605 (ADAMS Accession No. ML112201418)</p> <p>Sections OA.1.1</p>	<ul style="list-style-type: none"> - Most instructions, procedures and specifications, associated with the Conduit CAP, were common for both, Unit 1 and 2, however the inspectors reviewed several of these documents to verify that recent revisions would not affect CAP commitments. - Performed as-built verifications for several conduit spans, and one-hole clamps.
<p>IIR 05000391/2011607 (ADAMS Accession No. ML112730197)</p> <p>Sections OA.1.1, C 1.7, and C 1.9</p>	<ul style="list-style-type: none"> - Reviewed calculations, procedures, QA surveillances, qualification records, documents, and design input and output documents. These documents were reviewed to verify whether they were adequate and whether changes to these documents were properly controlled in accordance with Conduit CAP and TVA's Nuclear Quality Assurance Program. - Design basis documents, associated with the Conduit CAP were common for both, Units 1 and 2; however, the inspectors reviewed

	<p>several design basis documents to verify that recent revisions would not affect CAP commitments.</p> <ul style="list-style-type: none"> - Reviewed several training records of engineering personnel. - Observed installation of new conduits and supports.
<p>IIR 05000391/2012607 (ADAMS Accession No. ML12276A028)</p> <p>Section OA.1.1</p>	<ul style="list-style-type: none"> - Verified that the criteria, and methodology used for the Conduit CAP analysis are in accordance with regulatory requirements and commitments, including the FSAR. - Reviewed a random sample of corrective action documents for adequacy. - Verified that Conduit CAP documents and changes are controlled in accordance with applicant's Quality Assurance Program. - Reviewed several training records of walk-down personnel. - Performed as-built verifications for two "Typical 55" conduit supports.
<p>IR 05000391/2013607 (ADAMS Accession No. ML13273A512)</p> <p>Section OA.1.6</p>	<ul style="list-style-type: none"> - Performed field observation and/or as-built verifications for each of the following conduit and support configurations or attributes: Conduit Over-spans, Typical Detail 55 Supports, Typical Detail 66 Supports, Non-Standard (Unique) Supports, Typical 107 and/or 52, Christmas Trees, One Hole Straps, Conduits Installed on the Steel Containment Vessel, Conduits Installed on the Reactor Coolant Loop Structure, Conduits in Areas with High Thermal Differential, Conduits in Yard Structures, Overweight Conduits, and Shake-space Crossing Conduit. - Observations included samples of conduits and supports requiring and not requiring modifications per the engineering evaluations and walk-downs. - Reviewed construction and inspection documentation associated with field observations and as-built verifications. - The inspectors reviewed PER 143791 and PER 143796 to verify if deficiencies associated with conduit installation were properly addressed. These PERs were issued to address conduit installation deficiencies identified in VIO 391/87-19-01. - The inspectors reviewed PER 143879 to verify if deficiencies associated with conduit installation were properly addressed. This PER was issued to address conduit installation deficiencies identified in CDR 391/87-18.

The results of these inspections concluded, collectively, that walkdown packages were performed in accordance with the applicable procedures, design calculations were updated to address previous concerns, and conduits and conduit supports met design requirements. Inspection results documented in IIR 05000391/2013607, Section OA.1.6, credited the Conduit CAP with field inspection of several conduit supports and segments of conduits. At the conclusion of the inspection it was identified that additional samples of electrical conduits and conduit supports, and programmatic reviews were required prior to the closure of the Conduit CAP. The programmatic reviews for closure of this CAP are described in section OA.1.27 of this report, as part of the closure of CDR 391/87-18.

Inspection Activities: During this inspection, the inspectors performed as-built verifications of additional samples which pertain to the following conduit attributes associated with the Conduit CAP:

Non-Standard (Unique) Supports (Seismic Category IE)

Non-Standard (Unique) supports refer to support configurations in which the as-built structure did not meet the main characteristics specified in a typical detail support drawing. The Conduit CAP addressed a number of deficiencies affecting the design capacity of this conduit support type by performing engineering evaluation walkdowns, refining design analysis, and modification of discrepant conduit supports. The inspectors reviewed records to verify whether the Conduit CAP identified and corrected this issue by reviewing walkdown packages, engineering drawings, calculations, and ICRDS records associated with unique support attributes to determine if these adequately incorporated and evaluated the observed as-built condition of this support type. For the following conduit segments containing unique supports, the inspectors observed the installed conditions to verify allowable conduit spans between supports, conduit support configuration, base-plate weldments, conduit fittings, and any evidence of damaged, missing or mismatched support parts:

- Conduit segment 2-VC-293-1899A located between 2-FCV-63-80-A and penetration 2-PENT-293-21-A.
- Conduit segment 2-VC-293-1261B located between penetration 2-PENT-293-9-B and flow control valve 2-FCV-74-9-B.
- Conduit segment 2-PM-7444E located between penetration 2-PENT-293-19-E and panel 2-PNL-276-L182-A.

L-Shaped Conduit Cantilevers (Seismic Category IE)

The term L-Shaped Conduit Cantilever refers to a long projecting conduit which it is not being supported at one end. It often contains a curved section and exceeds the maximum span allowed by the 47A056 typical drawing series. The scope of the Conduit CAP was to address the seismic adequacy of conduits and supports affected by this configuration, including all the associated hardware. The inspectors reviewed limited scope walkdown packages, drawings, calculations and engineering specifications associated with this configuration. In addition, the inspectors reviewed conduit field configurations, conduit span between supports, field change requests, and interviewed applicant personnel regarding the seismic qualification of L-shaped conduits. The inspectors sampled the following category I and I(L) conduit segments:

- Conduit segment 2-AC-599 located between support C5-AB-14116 and Junction Box 2-JB-292-8723
- Conduit segment 2-PM7267G, which starts its run at Junction Box JB-4005.
- Conduit segment 2-VC-4934 located in the South Valve room.

As part of the inspection activities, the inspectors also performed field inspections of closed WOs to verify that the information documented in the WOs matched field conditions. The inspectors performed as-built walkdowns of the conduits to verify that location and routing, supports, separation and isolation, and identification, was consistent with ICRDS data, associated drawings, and specifications. The selected WOs for both electrical conduit and conduit support modifications included:

- 113402733
- 113402616
- 113200118
- 113536465
- 113199113
- 113142378

Specifically, the inspectors performed as-built walkdowns to verify actual conduit installation against drawings, field change requests, and the WOs mentioned above. In addition, the inspectors interviewed applicant personnel responsible for conduit modifications to determine whether the applicant had properly documented the modification of existing conduits. Additionally, actions performed for the CATDs and corrective actions included in the Unit 2 Conduit CAP Implementation Plan were reviewed to determine if these items were adequately addressed.

The following samples were inspected:

- IP 51053 Section 02.02.f – six samples

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Based on a review of the applicant's engineering complete closure package and the aforementioned inspection activities, the overall program implementation of the Conduit CAP was determined to be adequate and TI 2512/018 is considered closed. A final inspection of TVA's certification that activities covered under TI 2512/018 are complete will be performed at a later time to verify that NRC's conclusions remain valid. Further, due to the current status of the IP 51053, the inspectors will continue to observe documentation and work activities associated with conduits and supports under the scope of this IP.

OA.1.27 (Closed) Construction Deficiency Report 391/87-18, Deficiencies in Installation of Electrical Conduit and Conduit Supports (Temporary Instruction 2512/018, Inspection Procedures 51053 and 51055)

a. Inspection Scope

Background: On December 9, 1985, the applicant reported a problem, in accordance with 10 CFR 50.55(e), relative to various discrepancies on conduits and conduit supports of Unit 1 and Unit 2. An interim report was issued on January 29, 1986 and a final report was issued on August 31, 1990. Various conduit support discrepancies identified, as a result of employee concerns, were documented in various CAQ documents and NCRs and reported to the NRC in CDRs 390/86-14 and 391/87-18 for WBN Units 1 and 2, respectively. Conduit and support discrepancies were initially documented in NCR WBN6463. NCR W-433-P was issued for additional conduit support deficiencies identified later, and it was added to the scope of NCR WBN6463. Significant condition action report (SCAR) 6463SSCA was subsequently issued.

The following is a summary of the discrepancies reported by the CDRs:

- Installed components deviated from applicable drawings.
- Support type installed different from that specified on drawing.
- Required supports not installed in field.
- Supports installed in field where none were required by drawings.
- Discrepancies in design basis.
- All design requirements not enveloped by the original design.
- Installed configuration and inspection documentation not consistent.
- Conduit overspan.
- Flexible conduit deficiencies.

The applicant developed the Conduit CAP to resolve the conditions documented in SCAR 6463SSCA and NCRs, plus other issues related to conduits and conduit supports, and committed to resolve all the discrepancies within the Conduit CAP. The Conduit CAP was approved by the NRC, and it was developed to:

- revise design criteria, implementing procedures, and specifications;
- update design output documents, and the FSAR;
- issue supporting analysis or calculations, and engineering dispositions; and
- perform, as necessary, walkdowns, walkthroughs, modifications, and rework of existing installations.

Based on a previous review of the completed and proposed corrective actions for the above mentioned NCRs and SCAR 6463SSCA and inspection of the Unit 1 Conduit CAP implementation, the inspectors had determined that CDR 390/86-14 had been adequately resolved for Unit 1, as documented in IR 390/95-69 and 391/95-69(ADAMS Accession No. ML072610762).

For Unit 2, the inspectors reviewed the applicant's engineering complete open item closure report, including referenced documents and actions associated with PERs 143879, 144966, and 144177 which were issued to track required Unit 2 actions for CDR 391/87-18. This was performed to determine if the corrective actions associated with the hardware deficiencies in conduit and conduit supports were properly resolved and

documented. These inspections were documented in IIR 05000391/2013605 (ADAMS Accession No. ML13220A640), Section OA 1.8. IIR 05000391/2013608 (ADAMS Accession No. ML13316A776), Section OA 1.4, documented as-built observations for several conduits, identified in these PERs, and compared them against PER records, engineering evaluation walkdown packages, and engineering drawings to determine if they matched the as-built condition. Additionally, the Unit 2 Conduit CAP was closed in Section OA.1.26 of this IIR.

Inspection Activities: During this inspection period, the inspectors interviewed responsible personnel in conjunction with documents reviewed to determine if the implemented and proposed corrective actions, associated with the hardware deficiencies in conduit and conduit supports, were properly resolved and documented. Specifically, the inspectors discussed and reviewed work instructions developed, by the applicant, for addressing previously identified issues associated with loose, damaged and missing hardware, and conduit parts. The inspectors reviewed the work scope for several of these work instructions to verify whether they adequately resolve the deficiencies if these are implemented as described.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified. Several of the corrective actions have not yet been implemented; however, the applicant has initiated work instructions to accomplish the remaining work.

c. Conclusions

Based on a review of the applicant's engineering complete closure package and the aforementioned inspection activities, the inspectors concluded that the applicant either implemented or initiated appropriate actions to resolve the original construction deficiency. Based on these proposed actions, CDR 391/87-18 is closed.

OA.1.28 (Closed) Three Mile Island Action Item I.C.1, Short Term Accident and Procedure Review (Inspection Procedure 42452)

a. Inspection Scope

The inspectors performed an assessment of the applicant's actions to NUREG-0737, TMI Action Item I.C.1, Short Term Accident and Procedure Review, in conjunction with the performance of IP 42452 (Emergency Procedures), as described in section O.1.1 of this report.

b. Observations and Findings

No findings were identified.

c. Conclusions

The Watts Bar Unit 2 Emergency procedures were written in accordance with TI-12.06, Writer's Guide for Abnormal and Emergency Operating Instructions and are essentially

the same as Unit 1's Emergency Procedures, which were initially developed in accordance with WOG Emergency Response Guidelines (ERG), revision 1B. Both Unit 1 and 2 Emergency Procedures have been upgraded using WOG ERG, Rev. 2. The Unit 1 emergency procedures were previously validated in the simulator and trained on in initial license and continued operator training. Based on the Unit 2 procedures being essentially the same as Unit 1 procedures, the inspectors concluded the action required by TMI Action Item I.C.1 for Unit 2 were met. TMI Action Item I.C.1 is closed.

OA.1.29 (Closed) Q-List Corrective Action Program (Temporary Instruction 2512/029)

a. Inspection Scope

Background: The Q-List CAP was developed after TVA identified the following issues with the WBN Unit 1 Q-List Program:

- Multiple Q-Lists existed.
- Project personnel were inadequately trained.
- Safety and quality related classifications were lacking or incorrect.
- The Q-List contained incorrect component identifications.

As part of corrective actions for the Unit 1 CAP, TVA developed a new Q-List, compared it to the old Q-List and reviewed records for maintenance and modification activities to assure that these activities had the appropriate QA program controls in place. This effort resulted in over 5000 Unit 1 component classification upgrades. The resulting final Q-List and development plan was previously reviewed by the NRC and the Unit 1 Q-List CAP was closed in NRC inspection report 50-390/94-27 and 50-391/94-27 (ADAMS Accession No. ML072530549). In this report, the NRC inspection team reached the following conclusions:

- The development and implementation of the new Q-List was satisfactory.
- The historical reviews conducted by TVA, concerning the effects of the differences between the classification of items on the old and new lists, were technically sound.
- These reviews demonstrated that the differences in classification of plant items resulted in no technical differences in the way work or maintenance was completed.

The Q-List has since been incorporated into the Master Equipment List (MEL) maintained in the MAXIMO database. The safety-related and quality-related component classifications for both units were merged into the MEL from the updated Q-List. The MEL is intended to be a record of the final, as-installed hardware and components to be used to support operation, maintenance, and modifications.

In lieu of developing and comparing a new Unit 2 Q-List to the old Unit 2 Q-List, TVA used the Unit 1 Q-List as the basis for the Unit 2 Q-List. The Unit 2 Construction Completion MEL was copied from the Unit 1 MEL with unit designators changed to Unit 2 and all the data initially shown as unverified. Also, the Unit 2 components required for Unit 1 operation were removed from the Unit 2 list because they were already turned over to Unit 1 operations. For those components which had the same unique identifier (UNID) and function in both units, classification for Unit 2 was based on Unit 1 but verified to be correct. For those systems where the components in Unit 2 had a different

UNID than the same components in Unit 1, TVA evaluated the components in the Unit 2 MEL for proper classification. TVA evaluated existing safety-related and quality-related components by program and system to determine acceptability as “use as is.” Components not meeting the programmatic acceptability requirements were, or are planned to be, replaced or refurbished to ensure the appropriate quality level is achieved.

Inspection Activities: The inspectors continued inspection efforts initiated in IIR 05000391/2013608 (ADAMS Accession No. ML13316A776) Section OA.1.1 regarding the applicant’s resolution of the Q-List CAP.

The inspectors reviewed the revised Unit 2 Q-List CAP engineering complete closure report to ensure that the proposed actions would satisfy the concerns that initiated the Q-List CAP. The inspectors reviewed a sample of completed actions associated with the Q-List CAP to evaluate whether the program was adequately developed and implemented. The inspectors reviewed several implementing procedures associated with the Q-List CAP to determine if the corrective actions were adequately captured and communicated and to verify that changes to these procedures had no adverse impact. Several procedures for entering, changing, and verifying information on the MEL and in MAXIMO were also reviewed to evaluate the adequacy of administrative controls and any changes to these procedures did not affect this.

The inspectors reviewed MEL records of installed hardware for a sample of safety-related components associated with the 6.9kv Reactor Coolant Pump Boards (System 202) and the RCS (System 68). Additionally, the inspectors completed a walkdown of System 202 and portions of System 68 to independently verify that reliable data was established in the information system including:

- the MEL accurately reflected the component status in the field;
- the components were appropriately labeled in the field;
- the MEL contained correct component safety and quality classifications, UNIDs, and locations; and
- the hardware information, such as type of component and manufacturer, was accurately documented in the MEL.

A sample of PERs, and associated corrective actions, and a sample of surveillance reports were reviewed to verify that the Q-List CAP was being implemented appropriately within the MEL.

Documents reviewed are listed in the Attachment.

b. Observations and Findings

No findings were identified.

c. Conclusions

Based on a review of the applicant’s engineering complete closure package and the aforementioned inspection activities, the inspectors concluded that the applicant either implemented or initiated appropriate actions to resolve the original objectives of the Q-

List CAP. Therefore, inspection activities associated with closure of the Q-List CAP were completed and the Q-List CAP is closed. A final inspection of TVA's certification that activities covered under TI 2512/029, Q-List CAP, are complete will be performed at a later time to verify that NRC's conclusions remain valid.

V. MANAGEMENT MEETINGS

X1 Exit Meeting Summary

An exit meeting was conducted on May 22, 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

A. Aboulfaida, Bechtel – Electrical Design
J. Adair, QA Oversight, TVA, Unit 2
H. Baldner, TVA Regulatory Compliance
A. Bangalore, Bechtel – Electrical Engineer
R. Baron, TVA - QA Manager, Unit 2
D. Beckley, Bechtel – Electrical Design
J. Calle, Manager, WBN Interface & Transition
D. Charlton, TVA Regulatory Compliance
T. Detchmندی, EP Supervisor
W. Deen, Bechtel - Unit 2 EQ Program Manager
B. Enis, TVA Oversight
J. Fisher, TVA – Regulatory Compliance
R. Goyal, Civil Engineering, Bechtel
J. Hartline, Bechtel – Electrical
W. Hooks, Radiation Protection Manager
R. Hruby, TVA - General Manager Technical Services
B. Hunt, WBN Operations Dual Unit Transition Manager
G. Jones, Bechtel - Unit 2 EQ Program Lead
K. King, System Engineer
M. Kirk, Technical Training Manager
W. Lee, Corporate EP Manager
R. Stroud, Licensing
C. Maples, Bechtel - Unit 1 EQ Program Manager
M. Marinac, Ops Support TCOA, FLEX, APP-R, PAT Liaison
M. McGrath, TVA - Oversight
J. O'Dell, TVA - Regulatory Compliance
R. Onis, QA Oversight, TVA, Unit 2
M. Phillips, EP Specialist
G. Scott, TVA – Regulatory Compliance
M. Skaggs, TVA – Senior Vice President
N. Welch, TVA - Preoperational Startup Manager
M. White, EP Specialist
T. Wilburn, WBN U2 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 37051	Verification of As-Builts
IP 42452	Emergency Procedures
IP 49053	Reactor Coolant Pressure Boundary Piping - Work Observation
IP 50053	Reactor Vessel and Internals Work Observation
IP 50071	Safety Related Components – Procedure Review
IP 50090	Pipe Support and Restrain Systems
IP 50100	Heating, Ventilating, and Air Conditioning Systems
IP 51053	Electrical Components and Systems – Work Observation
IP 51055	Electrical Components and Systems – Record Review
IP 51063	Electrical Cable – Work Observation
IP 52053	Instrument Components and Systems - Work Observation
IP 52055	Instrument Components and Systems – Records Review
IP 57060	Nondestructive Examination Procedure Liquid Penetrant Examination Procedure Review/Work Observation/Record Review
IP 64051	Procedures - Fire Prevention/Protection
IP 70300	Preoperational Test Procedure Review
IP 70305	Reactor Protection System Test Preoperational Test Procedure Review
IP 70311	Preoperational Testing Procedure Verification
IP 70312	Preoperational Test Witnessing
IP 70333	Chemical Control System Test – Pre-operation Test Procedure Review
IP 70336	Residual / Decay Heat Removal System Test - Preoperational Test Review
IP 70339	Component Cooling Water System Test - Preoperational Test Procedure Review
IP 70343	Containment Spray System Test- Preoperational Test Procedure Review
IP 71302	Preoperational Test Program Implementation Verification
IP 84522	Solid Wastes (Pre-Operational and Supplemental)
IP 83522	Radiation Protection, Plant Chemistry, Radwaste, and Environmental: Organization and Management Controls
IP 83523	Radiation Protection, Plant Chemistry, Radwaste, Transportation and Environmental: Training and Qualifications
IP 92701	Follow-up
IP 92702	Follow-up on Corrective Actions for Violations and Deviations
TI 2512/016	Inspection of Watts Bar Nuclear Plant Cable Issues Corrective Action Program Plan
TI 2512/018	Inspection of Watts Bar Nuclear Plant Electrical Conduit and Supports Corrective Action Program Plan
TI 2512/029	Inspection of Watts Bar Nuclear Plant Q-List Corrective Action Program Plan
TI 2512/036	Inspection of Watts Bar Nuclear Plant Environmental Qualification

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

05000391/2014604-01	URI	TMI Action Item II.B.2, Plant Shielding, Evaluate Methodology for Calculating Mission Doses (Section OA.1.3)
---------------------	-----	--

Opened and Closed

None

Closed

50100	IP	Heating, Ventilation, and Air Conditioning Systems (Section C.1.5)
50900	IP	Pipe Support Work Observations (Section C.1.6)
84522	IP	Solid Wastes (Pre-Operational and Supplemental) (Section P.1.4)
42452	IP	Emergency Procedures (Section O.1.1)
83522	IP	Radiation Protection, Plant Chemistry, Radwaste, and Environmental: Organization and Management Controls (Section R.1.1)
83523	IP	Radiation Protection, Plant Chemistry, Radwaste, Transportation and Environmental: Training and Qualifications (Section R.1.2)
74-03	BL	Failure of Structural or Seismic Support Bolts on Class I Components (Section OA.1.12)
88-09	BL	Thimble Tube Thinning in Westinghouse Reactors (Section OA.1.13)
391/83-07	CDR	Transfer Valves to Auxiliary Feedwater Have Non-Divisional Power (Section OA.1.14)
391/87-05-01	VIO	Failure to Consider Vendor Requirements in the Design of the Hydrogen Analyzer System and Failure to Specify Classes of Cleanliness in Specifications or Drawings (Section OA.1.15)
Open Item 73	SSER Appendix HH	Confirm that TVA has completed Watts Bar Unit 2 Emergency Operating Procedures prior to Fuel Load (Section OA.1.16)
II.E.3.1	TMI	Emergency Power for Pressurizer Heaters (Section OA.1.17)
391/86-24-06	URI	Review of cable splicing as required by FSAR (Section OA.1.18)
2512/016	TI	Cable Issues CAP – Sub-Issue: Splices (Section

		OA.1.19)
2512/016	TI	Cable Issues Corrective Action Program – Sub-issue: Cable Bend Radius (Section OA.1.20)
391/82-76	CDR	Cable Bend Radius Deficiencies (Section OA.1.21)
391/86-03	CDR	Equipment Pigtail Extensions – Training Radius Deficiencies (Section OA.1.22)
391/95-05	CDR	Loose Connections in Vendor-Wired Electrical Panels (Section OA.1.23)
391/90-03	CDR	Cable Proximity to Hot Pipes (Section OA.1.24)
2512/016	TI	Cable Issues Corrective Action Program – Sub-issue: Cable Proximity to Hot Pipes (Section OA.1.24)
391/85-22	CDR	Undervoltage Condition on 125 Volt Direct Current Vital Control System to Auxiliary Feedwater Components (Section OA.1.25)
2512/018	TI	Electrical Conduit and Conduit Supports CAP (Section OA.1.26)
391/87-18	CDR	Deficiencies in installation of electrical conduit and conduit supports (Section OA.1.27)
I.C.1	TMI	Short Term Accident and Procedure Review (Section OA.1.28)
2512/029	TI	Q-List Corrective Action Program (Section OA.1.29)
<u>Discussed</u>		
2512/016	TI	Cable Issues CAP – Sub-Issue: Supports in Vertical Conduits (Section OA.1.1)
391/85-35	CDR	Support of Conductors Inside Vertical Conduit Runs (Section OA.1.1)
391/93-02	CDR	Loose Flexible Conduit Fittings (Section OA.1.2)
II.B.2	TMI	Plant Shielding (Section OA.1.3)
2512/036	TI	Environmental Qualification Special Program (Section OA.1.4)
71111.07	IP	Heat Sink Performance, Subissue: Emergency Raw Cooling Water Testing (Section OA.1.5)
Open Item 90	SSER Appendix HH	ERCW Pumps Meeting GDC 5 Requirements for Two-Unit Operation (Section OA.1.5)
391/86-08	CDR	Incorrect Tubing Configuration on Containment

		Isolation Valve Actuators (OA.1.6)
II.D.1	TMI	Performance Testing of Boiling-Water Reactor and Pressurized-Water Reactor Relief and Safety Valves (Section OA.1.7)
391/87-19-01	VIO	Failure to Follow Procedures for Installing Equipment in the North and South Valve Rooms (Section OA.1.8)
Open Item 38	SSER Appendix HH	Availability and Operability of the Emergency Response Data System (Section OA.1.9)
Open Item 40	SSER Appendix HH	Confirm the Adequacy of the Emergency Facilities and Equipment to Support Dual Unit Operations (Section OA.1.10)
Open Item 41	SSER Appendix HH	Update Plant Displays to include Unit 2 and Update Dose Assessment Models to provide Capabilities for Assessing Releases from Both (Section OA.1.11)

LIST OF DOCUMENTS REVIEWED

I. MANAGEMENT OVERSIGHT AND CONTROLS

C.1.2 Reactor Coolant Pressure Boundary Piping Work Observation, Nondestructive Examination Procedure Liquid Penetrant Examination

PT 906861-03, PT Report, 3/31/2014
 PT 906861-09 Rev. 1, PT Report, 4/4/2014
 PT 906861-02, PT Report, 3/29/2014
 PT 906861-13 Rev. 1, PT Report, 4/5/2014
 PT 906861-04, PT Report, 3/31/2014
 PT 906861-08 Rev. 1, PT Report, 4/4/2014
 PER 808623, Pressurizer instrument nozzle couplings removed, 11/14/2013

C.1.3 Conduit Walkdowns and Loading Calculations

Calculations

EDQ00299920080002, Unit 2 Class 1E V4 Cable Ampacity, Rev. 26
 WBPEVAR8907004, Confirmation of Resident Data for Cable Diameters and Unit Weight Contained in the On-Line CCRS Data Base, Attachment 8.28, Rev. 43
 WBN EEB-MS-TI09-0038, Electrical Heat Generation in the Auxiliary Building-Elevation 713 (RMS A1, A6, &A19), Rev. 009
 WBN EEB-MS-TI09-0047, Electrical Heat Generation in the Auxiliary Building - EL. 674.0, 676.0, 685.0, and 692.0
 WBN EEB-MS-T109-0048, Electrical Heat Generation in the Auxiliary Building- EL. 713 (RMS A3-A5, A7, A9, A11-A16, A18, A20, A24-A26, A28, A29, P9 and P19)
 WBN EEB-MS-TI09-0042, Electrical Heat Generation in the Control Building Main Control Room EI 708 (RMS C1 and C4) and EL 729 (RM C1), Rev. 27
 EDQ00299920080001, Unit 2 V5 Cable Ampacity, Rev. 11,
 EDQ00299920080006, Unit 2 Class 1E V3 Cable Ampacity, Rev. 21

Drawings

45W888-9, Conduit & Grounding Cable Tray Node Diagram, EL 713.0 COL A8-A15, Q-U-NV-4A, NV-4B, NV-4, Rev. 0
 45W888-10, Conduit & Grounding Cable Tray Node Diagram, EL 713.0 COL C1-A15, U-X-NV-4A, NV-4B, NV-4, Rev. 0
 2-47E235-52, Environmental Data, Environment - Harsh, EL 713.0, Revision 0
 DRA 53292-033, Rev. 3
 48W1296-2, Cable Tray Supports Below EL 737, Rev. 20
 48W1295-4, Cable Tray Supports Below EL 713, Rev. 17
 48W1296-3, Cable Tray Supports Below EL 737, Rev. 19
 48W1296-4, Cable Tray Supports Below EL 737, Rev. 26
 47A056-200, Mechanical Category I Support Conduit Typical, Rev. 4
 47A056-200A, Mechanical Category I Support Conduit Typical, Rev. 5
 47A056-201, Mechanical Category I Support Conduit Typical, Rev. 1
 47A056-205, Mechanical Category I Support Conduit Typical, Rev. 2
 47A056-214, Mechanical Category I Support Conduit Typical, Rev. 3
 47A056-217, Mechanical Category I Support Conduit Typical, Rev. 2
 DRA 55523-028, Rev. 0
 DRA 54633-019, Rev. 8
 DRA 54636-018, Rev. 1
 DRA 54636-015, Rev. 16
 DRA 54633-221, Rev. 0
 DRA 54633-203, Rev. 0
 DRA 54633-207, Rev. 0
 45N820-2, Rev. 6 Conduit & Grounding EL 676 – COLS A5-A11, U-W Floor Plan
 45W3000-1, Cable/Wiring Separation Requirements Notes, Rev. 1
 45W3000-2, Cable/Wiring Separation Requirements Details, Rev. 0

ICRDS

Raceway Standard Report 0-4TRY-292-2062/2084-B, May 14, 2014
 Cable Standard Report 2V2612B, May 14, 2014
 Cable Type (OnMark) Report – Mark Number WLC, May 14, 2014
 ICRDS Software Requirements Specification (Nuclear), Revision 5
 ICRDS Raceway 2PP2181A, dated Thursday, March 20, 2014
 ICRDS Raceway 2M4654B, dated Monday, March 17, 2014
 ICRDS Raceway 2VC9708A, dated Thursday, March 27, 2014

Procedures, Specifications, and Standards

25402-000-GPP-0000-N3302, Raceways and Accessories, Rev. 7
 MAI-3.9, Installation of Cable Tray, Cable Tray Supports, And Cable Tray Covers, Rev. 11
 DS-E12.6.3, Auxiliary and Control Power Cable Sizing, Up to 15,000 Volts, Rev. 10
 G-40, Installation, Modification and Maintenance of Electrical Conduit, Cable Trays, Boxes, Containment Electrical Penetrations, Electric Conductor Seal Assemblies, Lighting and Miscellaneous Systems, Rev. 18
 N3C-944, Conduit and Conduit Support Installations, Rev. 1
 MAI 3.1, Installation of Electrical Conduit Systems & Conduit Boxes, Rev. 25
 WB-DC-30-4, Separation/Isolation, Rev. 23

C.1.4 Reactor Vessel and Internals Work Observation

WO# 111821966, Perform preliminary cleaning to support OVT of upper and lower internals and place cribbing

C.1.5 Heating, Ventilating, and Air Conditioning Systems

Drawings

2-47W866-11, Rev. 5, Flow Diagram, HVAC
 2-47W866-8, Rev. 7, Flow Diagram, HVAC
 47W920-2, Rev. 55, Mechanical, HVAC
 45W2614-11, Rev. 8, Wiring Diagram, AFW pump & turbine connections
 2-45W760-30-17, Rev. 2, Wiring Diagrams, Ventilating System Schematic Diagram
 2-45W760-30-12, Rev. 0, Wiring Diagrams, Ventilating System Schematic Diagram
 2-45W756-5, Rev. 1, Wiring Diagrams 480V Cont & Aux Bldg VT BD
 2-47W611-30-6, Rev. 1, Electrical Logic Diagram Ventilation System
 2-47W610-30-6, Rev. 0, Electrical Control Diagram Ventilation System
 2-47W610-30-5, Rev. 2, Electrical Control Diagram Ventilation System

Work Orders

11589446
 112055367
 110842688
 112371180
 111380703
 110779483
 09-953176-000
 111266208

Components

WBN-2-HS-030-0217
 WBN-2-MTR-030-0179-B
 WBN-2-CLR-030-0179
 2-STR-030-0214-S
 2-FAN-030-0214
 2-FAN-030-0217
 2-TS-030-0214-S

Engineering Document Construction Release (EDCR)

EDCR 53763
 EDCR 53788
 EDCR 54172
 EDCR 54923
 EDCR 53290

Procedures

MAI-3.3, Rev. 0033, Cable Terminating, Splicing, and Testing
 MAI-3.8, Rev. 0009, Installation of Electrical Components
 25402-3DP-G04G-00081, Rev. 16, Engineering Department Procedure Instruction, EDCR,
 Bechtel
 25402-3DP-G04-00062, Rev. 020, Engineering Department Procedure Instruction, Field
 Change Request, Bechtel
 25402-000-GPP-0000-N3105, Rev. 0016, Construction Completion Project Procedure, Field
 Change Requests

C.1.6 Pipe Support Work Observations

Drawings

DRA 25494-240, Rev. 1
 DRA 25494-240, Rev. 2
 DRA 25494-241, Rev. 0
 DRA 25494-242, Rev. 1
 DRA 52483-032, Rev. 2
 DRA 52487-013, Rev. 2
 DRA 52487-014, Rev. 2
 DRA 52487-015, Rev. 2
 DRA 52487-028, Rev. 0
 DRA 52487-029, Rev. 0
 DRA 52487-030, Rev. 0
 DRA 52487-067, Rev. 3
 DRA 52487-068, Rev. 2
 DRA 52487-102, Rev. 4
 DRA 52524-015, Rev. 1
 DRA 52524-016, Rev. 1
 DRA 52525-015, Rev. 1
 DRA 52525-016, Rev. 1
 FCR 63050 – A – AA05
 FCR 63050 – A – AA06

Procedures

0-MI-0.044, "Removal and Reinstallation of Mechanical Snubbers", Rev. 1
 25402-000-GPP-0000-N3504, "Pipe And Instrument Tubing Supports", Rev. 4
 MAI-4.2A, "Piping/Tubing Supports", Rev. 0018

PERs

498376, "In Process Receipt Activity: Item failed to meet vendor data sheet"
 537560, "Attachment E of 25402-000-GPP-0000-N3504 is not being implemented as required by Section 6.5.2"
 779184, "WO 114875948 Clamp Ear Gaps Out of Tolerance and Lock Nuts Missing"
 807003, "Clamp replaced without work step"
 813689, "NRC Identified discrepancies in WO 112838331"

EDCRs

52487, "Modification of pipe supports on the Chemical and Volume Control System (System 062)", Rev. C
 52494, "Modification of pipe supports on the Safety Injection System (System 063)", Rev. E
 52524, "Modification of pipe supports on the Reactor Coolant System (System 068)" Rev. D
 52525, "Modification of pipe supports on the Reactor Coolant System (System 068)", Rev B

Work Orders

112781172, "CCM EDCR 52487C SYS 062 WBN-2-062-RB Modify System 062 Pipe Supports"
 112794587, "WBN Record ID, EDCR-2 52494 System 063, Hangers, Reac Bldg"
 112876239, "CCM EDCR 52487 Rev.C SYS 062 WBN-2-HGR-062-RB"
 114546277, "CCM EDCR 52487 SYS 062 WBN-2-SNUB-062-0161"
 114546909, "CCM EDCR 52487 SYS 062 WBN-2-SNUB-062-0170N"
 114675415, "CCM EDCR 52524 SYS 068 WBN-2-SNUB-068-0470"
 115031313, "CCM EDCR 52494 SYS 063 WBN-2-SNUB-063-0443"
 115239758, Install Paul Monroe Snubber on Steam Generator #3

M&TE

E 46530 Torque Wrench, 11/12/14

E 46533 Torque Wrench, 11/22/14

Miscellaneous

Surveillance No. 25402-WBN-SR-13-2541, "Review of Subcontractor Basic-PSA, Inc. Document Submittal Requirements", 3/12/13

Surveillance No. 25402-WBN-SR-13-2793, "Residual Heat Removal Snubber Installation", 9/13/13

Surveillance No. 25402-WBN-SR-13-2882, "Chemical Volume Control Snubber Installation", 10/31/13

Surveillance No. 25402-WBN-SR-13-2942, "Snubber Installation Chemical Volume Control System", 12/10/13

C.1.7 Post-Fukushima Diverse and Flexible Construction Activities

Calculation CDN 0003602013000307, FLEX Storage Building Micropiles to Drawing 0-10W370 Sheets 6-8 (DCA 59084 Sheets 1-22, Rev 0000) FLEX Building DCN 59084A, FLEX Equipment Storage Building
 Concrete Mix Design Submittal, Letter No. KPN-TVA-S-052
 Concrete Compressive Strength Test Reports E2131136.0009A
 Micropile Load Test Results Letter dated October 20, 2013
 DCA 60060-105, Rev. 0, AWST
 DCN 62324, Rev. A, Design and install deep foundation for new AFW supply tank
 Drawing CMC-13-VDWC-000005, Dated 2/11/14

P.1 Pre-Operational Activities**P.1.1 Preoperational Test Program Implementation Verification**

WO 112243775, SUT SYS 072 WBN-2-PMP-072-0027-A PERFORM GTM-02
 WO 115272791, SUT to support the PSSS rework of the 2A Containment Spray Pump Motor
 WO 111453617, Perform GTM-02 for Pump Functional Test for WBN-2-PMP-063-0010-A
 WO 09-952741-000, Inspect and rebuild as necessary CCP 2B-B speed increaser

P.1.2 Preoperational Test Procedure Review

2-TSD-70-01, Component Cooling System Test Scoping Document, Rev.3
 SMP-8.0, Watts Bar Nuclear Unit 2 Administration of Preoperational Test Instructions, Rev.9
 WBN2-70-4002, System Description for Component Cooling System

P.1.4 Solid Wastes (Pre-Operational and Supplemental)

WBN2-77B-4001, System Description for Solid Waste Disposal, Rev. 2
 Process Control Program, Rev. 3
 DCN 56035, 9/26/13

P.1.5 Preoperational Test Procedure Review

2-PTI-099-04, Safeguard System Operational Test, Rev. 0
 2-PTI-099-05, Overpower Delta-T and Overtemperature Delta-T Turbine Runback, Rev. 0
 2-PTI-099-06, Reactor Protection Setpoint Verification, Rev. 0
 2-PTI-099-08, Safeguards System Test Panel, Rev. 0
 WBN2-99-4003, Reactor Protection System, Rev. 0

2-SI-99-300-A, Engineered Safety Features Actuation System Slave Relay Go Test Train A, Rev. 0

2-SI-1-906-A Main Steam Valves Position indication Verification-Train A, Rev. 0

2-SI-1-902-B, Valve Full Stroke Exercising During Cold Shutdown-Main Steam (Train B), Rev. 0

II. OPERATIONAL READINESS ACTIVITIES

O.1 Operations

O.1.1 Emergency Procedures

Procedures

TI-12.06, Writer's Guide for Abnormal and Emergency Operating Instructions, Rev 6

1-E-0 and 2-E-0, Reactor Trip or Safety Injection, (R0002, R0000)

1-E-1 and 2-E-1, Loss of Reactor or Secondary Coolant, (R0000, R0000)

1-E-3 and 2-E-3, Steam Generator Tube Rupture, (R0001, R0000)

1-ECA-0 and 2-ECA-0, Loss of Shutdown Power, (R0001, R0000)

1-ES-0.1 and 2-ES-0.1, Reactor Trip Response, (R0024, R0000)

1-FR-0 Unit 1 Status Trees, and 2-FR-0, Status Trees, (R0002, R0000)

1-FR-S.1 and 2-FR-S.1, Nuclear Power Generation/ATWS, (R0000, R0000)

1-FR-C.1 and 2-FR-C.1, Inadequate Core Cooling, (R0016, R0000)

1-FR-C.2 and 2-FR-C.2, Degraded Core Cooling, (R0012, R0000)

1-FR-H.1 and 1-FR-H.2, Loss of Heat Sink, (R0000, R0000)

1-AOI-6 and 2-AOI-6, Small Reactor Coolant System Leak, (R0002, R0000)

1-AOI-16 and 2-AOI-16, Loss of Normal Feedwater, (R0002, R0000)

1-AOI-17 and 2-AOI-17, Turbine Trip, (R0000, R0000)

1-AOI-24 and 2-AOI-24, RCP Malfunctions During Pump Operation, (R0029, R0000)

1-AOI-27 and 2-AOI-27, Main Control Room Inaccessibility, (R0002, R0000)

1-AOI-33 and 2-AOI-33, Steam Generator Tube Leak, (R0002, R0000)

0-AOI-43.1, Loss of Unit 1 Train A Shutdown Boards, (R0001)

0-AOI-43.2, Loss of Unit 1 Train B Shutdown Boards, (R0002)

2-AOI-43.3, Loss of Unit 2 Train A Shutdown Boards, (R000U2)

2-AOI-43.4, Loss of Unit 2 Train B Shutdown Boards, (R000U2)

ARI-22-28 and 2-ARI-22-28, Main Turbine, (R0037, R001U2)

ARI-88-94 and 2-ARI-88-94, Reactor Coolant System, (R0026, R000U2)

ARI-95-101 and 2-ARI-95-101, Reactor Coolant Pumps (R0035, R002U2)

1-ARI-116-123 and 2-ARI-116-123, RPS & ESF, (R0001, R002U2)

Miscellaneous

ANSI standard N18.7-1972, Administrative Controls for Nuclear Power Plants

ANS 3.2/ANSI N18.7-1976, Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants

RG 1.33-1978, Revision 2, Quality Assurance Program Requirements (Operation)

RG 1.33-2013, Revision 3, Quality Assurance Program Requirements (Operation)

TVA-NQA-PLN89-A, Quality Assurance Program Description

NUREG-0847 Supplement 22, Safety Evaluation Report, Related to the Operations of Watts Bar Nuclear Plant Unit 2, February 2011

NUREG-0847 Supplement 23, Safety Evaluation Report, Related to the Operations of Watts Bar Nuclear Plant Unit 2, July 2011

NUREG-0737, Clarification of TMI Action Plan Requirements, November 1980

R.1 Radiation Protection

R.1.1 Radiation Protection, Plant Chemistry, Radwaste, and Environmental: Organization and Management Controls

TVA-NQA-PLN89-A, Nuclear Quality Assurance Plan, Rev 29
 NPG-CHDP-2, Conduct of Chemistry, Rev. 03
 Watts Bar Nuclear Plant Chemistry Manual, Chapter 1.04, Conduct of Chemistry, Rev 11
 NPG-EVDP-1, Conduct of Environmental Programs, Rev. 00
 RCDP-1, Conduct of Radiological Controls, Rev. 0005
 CNL-14-027, Watts Bar Nuclear Plant, Units 1 and 2 – Radiological Emergency Plan Updated Appendix C, dated 2/18/2014
 TVA-NPOD89-A, Organization Topical Report, Rev 20
 WBN-CEM-F-14-001, WB2 Chemistry U2 Startup Readiness Assessment, dated 12/16/2013
 WBN-RP-F-14-001, WB2 RP U2 Startup Readiness Assessment, dated 12/16/2013
 WBN U2 Operational Readiness Timeline, dated 03/31/2014
 WBN Chemistry Organizational Chart, dated 01/10/2014
 WBN RP Organizational Chart, dated 01/10/2014
 RP Department Transition and Change Management Plan for Two-Unit Operations at Watts Bar Nuclear Station, Rev 4
 Chemistry Department Transition and Change Management Plan for Two-Unit Operations at Watts Bar Nuclear Station, Rev 3
 25402-MGT-0003, Corrective Action Program, Rev. 16
 PER 846059

R.1.2 Radiation Protection, Plant Chemistry, Radwaste, Transportation, and Environmental: Training and Qualifications

TPD-GET, Nuclear Power Group General Employee Training Program Description, Rev 1
 TPD-CHM, Radiochemical Laboratory Analyst Training Program, Rev 2
 TPD-HPT, Training Program Description for Health Physics Technician, Rev 005
 TPD-HPC, Nuclear Power Group Training Program Description for Contractor Health Physics Technician, Rev 001
 TPD-INS, NPG Corporate Training Instructor Certification and Development Training Program Description, Rev 007
 Generic Plant Access Training, Student Handout, dated 06/18/2013
 Generic Radiation Worker Training, Student Handout, dated 06/18/2013
 Generic Respiratory Protection Training, Student Guide, dated January 2011
 RWTP-100, Radwaste Training Program, Attachment A, Rev. 0003
 Job Position Description for JU0031, Supervisor, RP
 Job Position Description for CM0016, Environmental Scientist
 Job Position Description for JN0173, Manager, Chemistry
 Job Position Description for JN0174, Manager, RP
 Job Position Description for CN0002, Health Physicist
 Job Position Description for DF0048, Tech, Health Physics
 Job Position Description for JT0004, Supt, Rad Waste
 Job Position Description for JU0025, Supv, Chemistry
 Training/Transcript/Qualification Report for RP Manager
 Training/Transcript/Qualification Report for Chemistry Manager
 Qualification Matrix Report for Chemistry Instructor, dated 04/16/14
 Qualification Matrix Report for RP Instructor Instructor, dated 04/16/14
 25402-MGT-0003, Corrective Action Program, Rev. 16

F.1 Fire Protection

F.1.1 Fire Protection

0-FOR-26-4, Quarterly Inspection of Fire Hose Stations in Accessible Areas and Hydrant Support Mobile Equipment, Revision 0008, 11/4/13
 PM 610510001, WBN 0-FPS-510-EXT/INSP, Portable Fire Extinguisher Inspection (Construction Area), 11/16/13
 NGP-SPP-18.4.8, Control of Ignition Sources (Hot Work), Revision 0003, 1/14/14

IV. OTHER ACTIVITIES

OA.1.1 Cable Issues Corrective Action Program – Sub-Issue: Supports in Vertical Conduits and Construction Deficiency Report 391/85-35: Support of Conductors Inside Vertical Conduit Runs.

WO 114316503, Install Cable Kellum Grips in accordance with EDCR 55116 and MAI-3.2 for conduit 2VC3447B
 FCR 63516A-AA2
 DRA 55116-001, Rev. 1
 DRA 55116-057, Rev. 0
 MAI-3.2, Cable Pulling for Insulated Cables Rated Up to 15,000 Volts, Rev. 0027

OA.1.2 CDR 93-02, Loose Flexible Conduit Fittings

Installation of Electrical Conduit Systems & Conduit Boxes, MAI-3.1, Rev. 25
 General Construction Specification G-40, "Installation, Modification and Maintenance of Electrical Conduit, Cable Trays, Boxes, Containment Electrical Penetrations, Electric Conductor Seal Assemblies, Lighting, and Miscellaneous Systems, Rev 18
 PER 549197
 PER 873418
 Evaluation and Disposition of Unit 2 Class 1E Flexible Conduits, EDQ00299920090001, Rev. 0
 EDCR 55120, Rev. A
 Flexible Conduit Installations (CP 5.1), Rev. 0
 Work Order 114876604
 Work Order 114876758
 Work Order 114876186
 Work Order 115274872
 Walkdown Verification for Construction Area Completion and Damaged, Loose, or Missing Hardware", NC-PP-35, Rev. 0002
 System Completion and Turnover, SMP-4.0, Rev. 0010

OA.1.3 TMI Action II.B.2, Plant Shielding

WBNAPS3124, Dose to Personnel from Obtaining Post-LOCA Liquid Sample from Hot Sample Room, Rev. 3
 WBNAPS3125, Post-LOCA RE-90-106, 112 Radiation Monitor Grab Sample Mission Dose, Rev. 2
 WBNTSR114, Mission Dose for Manual Isolation Control Air, ERCW, and CCS Valves, Rev. 6
 Open Items/Commitment Completion Form NCO820253022, Nureg-0737, II.B.2, Plant Shielding
 TI-338, U2 Area Turnover Supporting Operational Readiness, Rev. 8
 PER 877657
 PER 885263

OA.1.4 Environmental Qualification Special Program

Regulatory Response Control Form for Implementation Plan for equipment Qualification Special Program, Date: 11/09/2009

WB Unit 2, Conduct and Test Results Processing of Generic test Instruction, SMP-6.0, Rev. 0007

Bechtel Watts Bar Nuclear Unit 2 Construction Completion Project Procedure, 25402-000-GPP-0000-N1106, Equipment Environmental Qualification, Rev. 0005

Bechtel Watts Bar Nuclear Plant Unit 2 Construction Completion Project, Engineering Department Procedure, Equipment Environmental Qualification Program, 25402-3DP-GEE-0001, Rev. 003, Effective 07-24-2012

TVA NPG Standard programs and Processes, Equipment EQ Program, NPG-SPP-09.2, Rev. 0004

TVA NPG Standard programs and Processes, Plant Modifications and Engineering Change Control, NPG-SPP-09.3, rev. 0016

TVA Engineering Design Guide/Standard, DS-M18.14.1, Design Standard for Environmental Qualification of Electrical Equipment in Harsh Environments, Rev. 0002

TVA Standard Specification, SS-E18.10.01 for Environmental Qualification Requirements for Safety-Related Electrical Equipment, Rev. 04

TVA Standard Specification, SS-E18.10.02 for Environmental Qualification Requirements for Safety Related Electrical Cable, Rev. 04

TVA Division of Nuclear Engineering, Environmental Design, WB-DC-40-42, Rev. 7

TVA Division of Nuclear Engineering, Environmental Qualification to 10 CFR 50.49, WB-DC-40-54, Rev. 5

NGP Calculation, WBNEQ Category C Cable Documentation – Unit 2, EDQ00299920100032, Rev. 001

EDQ00299920090011, “WBN Unit 2 – List of 10 CFR 50.49 Components and Cables,” Revision 3, dated 4/10/2014

WBNEQ-ILM-003, ITT CONOFLOW, Calculation number EDQ0029992010027

WBNEQ-CABL-019, ESSEX POWER AND CONTROL CABLE , Calculation number EDQ0029992010024

WBNEQ-CABL-064, OKONITE CABLE, Calculation number EDQ0029992010024

WBNEQ-IRE-001, GA-RD-23 Radiation Monitor

WBNEQ-ILM-003, IIT CONOFLOW Transducer

WBNEQ-SOL-005, “ASCO-NP Series Solenoid Valves (AC),” EQ Binder Tab B, Revision 29

WBNEQ-SOL-005, “ASCO-NP Series Solenoid Valves (AC),” EQ Binder Tab C, Revision 28

WBNEQ-SOL-005-053986, Watts Bar Nuclear Plant Environmental Qualification Documentation Package (EQDP) Change Supplement (EQCS) “ASCO Solenoid Valves Model 206-380,” Revision 0, dated 12/13/10

WBNEQ-MOV-001-52796, EQ Binder Change Supplement (EQCS), Revision 1 dated 8/20/13.

WBNEQ-MOV-001, Limitorque-Actuators with Class RH Motors, Qualification Maintenance Data Sheets (QMDS), Revision 32

Environmental Quality Information Release (EQIR) 11006, dated June 10, 2013

Environmental Quality Information Release (EQIR) 12055, dated October 6, 2013

Environmental Quality Information Release (EQIR) 12009, dated June 7, 2013

WBNEQ- CABL-002, “American Insulated Wire (AIW) – TVA Types PXJ and PXMJ,” EQ Binder, Revision 21

WBNEQ- CABL-052, “Rockbestos – TVA Types PXJ and PXMJ,” EQ Binder, Revision 26

WBNEQ- CABL-064, “Okonite – TVA Types EPSJ,” EQ Binder, Revision 0

WBNEQ-CABL-002-53746, Watts Bar Nuclear Plant Environmental Qualification Documentation Package (EQDP) Change Supplement (EQCS) “AIW/Low Voltage Power & Control EPDM INS TVA Type PXJ/PXMJ,” Revision 0, dated 2/11/11

WBNEQ-CABL-002-55233-062, Watts Bar Nuclear Plant EQDP Change Supplement (EQCS)
 "AIW/Low Voltage Power & Control EPDM INS TVA Type PXJ/PXMJ," Revision 0, dated
 11/26/13

WBNEQ-CABL-002-55233-070, Watts Bar Nuclear Plant EQDP Change Supplement (EQCS)
 "AIW/Low Voltage Power & Control EPDM INS TVA Type PXJ/PXMJ," Revision 0, dated
 6/20/13

WBNEQ-CABL-002-55233-072, Watts Bar Nuclear Plant EQDP Change Supplement (EQCS)
 "AIW/Low Voltage Power & Control EPDM INS TVA Type PXJ/PXMJ," Revision 0, dated
 9/23/13

WBNEQ-CABL-002-55233-074, Watts Bar Nuclear Plant EQDP Change Supplement (EQCS)
 "Rockbestos Power and Control Cable XLPE (Irradiation) INS TVA Type PXJ and PMXJ,"
 Revision 0, dated 5/15/12

WBNEQ-CABL-052-53711-072, Watts Bar Nuclear Plant EQDP Change Supplement (EQCS)
 "AIW/Low Voltage Power & Control EPDM INS TVA Type PXJ/PXMJ," Revision 0, dated
 9/23/13

WBNEQ-CABL-064-55121-072, Watts Bar Nuclear Plant EQDP Change Supplement (EQCS)
 "Okonite – TVA Type EPSJ," Revision 0, dated 9/23/13

WBNEQ-CABL-064-55229-074, Watts Bar Nuclear Plant EQDP Change Supplement (EQCS)
 "Okonite – TVA Type EPSJ," Revision 0, dated 10/9/13

WBNEQ-CABL-064-54640-062, Watts Bar Nuclear Plant EQDP Change Supplement (EQCS)
 "Okonite – TVA Type EPSJ," Revision 0, dated 11/26/13

WBNEQ 12084, Environmental Quality Information Release (EQIR), Revision 0, dated 1/21/14

WBNEQ 13048, Environmental Quality Information Release (EQIR), Revision 0, dated 11/26/13

WBNEQ 11009, Environmental Quality Information Release, Revision 0, dated 2/3/14

WBNEQ 13018, Environmental Quality Information Release, Revision 0, dated 11/1/12

WBNEQ 13036, Environmental Quality Information Release, Revision 0, dated 2/21/14

EQ Binder Status Excel Log, dated 4/16/2014

SPP-9.2, "TVA Equipment Environmental Qualification (EQ) Program," Rev 4, dated 07-03-2008

0-TI-441, "WB Nuclear Plant Unit 1 & 2 Technical Instruction, Operational Readiness Process
 for Unit 2 systems"

WB-DC-40-54, Watts Bar Nuclear Plant unit1/unit2, Environmental Qualification to
 10CFR50.49", R4, dated 8/12/2008

25402-3DP-GEE-00001-003, Engineering Department Procedure Instruction Equipment
 Environmental Qualification Program, dated 6/28/12

WBN EQ Binder WBNEQ-ITE-003, Hot Leg RTD, Tab, A, B, C, D, E, F and G

WBN EQ Binder WBNEQ-IFE-002, Kurtz K-Bar 16 Sensor, Tab, A, B, C, D, E, F and G

Open Items / Commitment Completion Form, Tracking Number: PER 143837

WB Unit 2 Construction Completion Project Quality Surveillance Report, Environmental
 Qualifications in Work Orders for EDCR 52419, Surveillance No. 25402-WBN-SR-09-0780

WB Unit 2 Construction Completion Project Quality Surveillance Report, EQ Special Program
 Compliance – EDCR 52419, Surveillance No. 25402-WBN-SR-09-0781

WB Unit 2 Construction Completion Project Quality Surveillance Report, EQ Special Program
 Compliance – EDCR 53391, Surveillance No. 25402-WBN-SR-10-0866

WB Unit 2 Construction Completion Project Quality Surveillance Report, Cable Signal Tracing,
 Surveillance No. 25402-WBN-SR-10-1166

WB Unit 2 Construction Completion Project Quality Surveillance Report, EQ Special Program –
 SP4, Surveillance No. 25402-WBN-SR-11-1477

WB Unit 2 Construction Completion Project, Environmental Qualification of Electrical Equipment
 Special Program Self-Assessment Report No. 25402-SA-ENG-10-013

Qualification Maintenance Data Sheet WBNEQ-CSC-004, EGS QDC

Qualification Maintenance Data Sheet WBNEQ-IXT-001, PORV FLOW MONITORING SYSTEM

Commercial Grade Dedication Document Lubricant –Exxon EP-0

OA.1.5 Inspection Procedure 71111.07, Heat Sink Performance, Subissue: Emergency Raw Cooling Water Testing and SSER, Appendix HH, Item 90 Associated with Emergency Raw Cooling Water Pumps Meeting General Design Criteria 5 Requirements for Two-Unit Operation

WBN-SDD-WBN2-67-4002, Essential Raw Cooling Water System (ERCW), System 67, Rev. 0003

DCN 60684-A, Install New Connections for Fukushima Modifications, (ERCW, stage 1-10), Rev. "A".

UFSAR Section 9.2.1, Essential Raw Water Cooling System, Dated September 28, 2011

TS 3.7.8, Essential Raw Water Cooling (ERCW) System., Amendment

2-PTI-067-02-A, ERCW System Flow Balance Test, Rev. 1

2-PTI-067-02-A, ERCW System Flow Balance Test, Select Sections, Rev 4

Test Deficiency Notice Summary List for system #67, 4-23-14

Turnover Walk-down deficiency list for system #67

OA.1.6 Construction Deficiency Report 391/86-08, Incorrect Tubing Configuration on Containment Isolation Valve Actuators

Work Orders

112395292, Revision 0, CCI EDCR 54923 SYS 030/032 WBN-2-PREG-030-0019

112394785, Revision 0, CCI EDCR 54923 SYS 030/032 WBN-2-PREG-030-0014

08-952646-000, Revision 0, CCI EDCR 54923 SYS 030 2-FCV-030-0051

08-952642-000, Revision 0, CCI EDCR 54923 SYS 030 2-FCV-030-0053

110838137, Revision 2, CCI EDCR 54923 SYS 030 & 032 WBN-2-PREG-030-0009

Miscellaneous Documents

DRA 54923-413

EDCR 54923, Revision A, SYS 030 & 032 WBN-2-PREG-030-0009.

FCR 61221

NCR 6328, Rev. 1, dated 9/14/1988

SCR WBNMEB8546R2 dated 2/18/1986

Procedures

WBNP Test Instruction 0-TI-100.006, In-Service Testing Program, Rev. 0000 dated 12/10/2013

Bechtel Construction Completion Project Procedure (CCPP) 25402-000-GPP-0000-N3401, Instrument and Instrument Line Installation

OA.1.7 Three Mile Island Action Item II.D.1, Performance Testing of Boiling-Water Reactor and Pressurized-Water Reactor Relief and Safety Valves

Procedures

WBNP Test Instruction 0-TI-100.006, In-Service Testing Program, Rev. 0000 dated 12/10/2013

Technical Specifications

TVA Tech Spec WBN2TRPORVSTT, Target Rock PORV Stroke Time Testing, Rev. 0 dated 2/25/2014

OA.1.8 VIO 391/87-19-01 Failure to Follow Procedures for Installing Equipment in the North and South Valve Rooms

Miscellaneous

- WO 113285883, "Inspect and Rework as Required, Damaged Terminal Blocks, Loose Connections, Damaged Termination Lugs, and Adhesive-Backed Support Mounts in Panel WBN-2-PNL-278-M003," completed 1/18/2014
- WO 113308160, "Inspect and Rework as Required, Terminal Block Damage, Loose Termination Connections, Cable/Conductor Damage, and Adhesive-Backed Cable Support Mounts in Panel WBN-2-PNL-278-M004," completed 12/17/2013
- WO 113308560, "Inspect and Rework as Required, Terminal Block Damage, Loose Termination Connections, Cable/Conductor Damage, and Adhesive-Backed Cable Support Mounts in Panel WBN-2-PNL-278-M005," completed 12/17/2013
- WO 113314541, "Inspect and Rework as Required, Terminal Block Damage, Loose Termination Connections, Cable/Conductor Damage, and Adhesive-Backed Cable Support Mounts in Panel WBN-2-PNL-099-R46-A," completed 10/30/2013
- WO 113490971, "Inspect and Rework as Required, Terminal Block Damage, Loose Termination Connections, Cable/Conductor Damage, and Adhesive-Backed Cable Support Mounts in Panel WBN-2-PNL-099-R49-B," completed 12/9/2013
- WO 114013679, "Inspect and Rework as Required, Terminal Block Damage, Loose Termination Connections, Cable/Conductor Damage, and Adhesive-Backed Cable Support Mounts in Panel WBN-2-PNL-092-M13-D," completed 1/17/2014

OA.1.9 Availability and Operability of ERDS - SSER 22, Section 13.3.2.6, Item 38

OA.1.10 Confirm the Adequacy of the Emergency Facilities and Equipment to Support Dual Unit Operations – SSER 22, Section 13.3.2.8, Item 40

OA.1.11 Update Plant Displays to include Unit 2 and Update Dose Assessment Models to provide Capabilities for Assessing Releases from Both Units - SSER 22, Section 13.3.2.9, Item 41

Procedures

- EPIP-12, Emergency Equipment and Supplies, Rev. 33
- EPIP-13, Initial Dose Assessment for Radiological Emergencies, Rev. 20
- CECC EPIP-8, Dose Assessment Staff Activities During Nuclear Plant Radiological Emergencies, Rev. 39

Miscellaneous

- WBN-EP-F-11-001, Focused Self-Assessment Report: Evaluate Readiness of the Emergency Preparedness Department for the Start-Up of Unit 2 and Operation of Both Units, September 12, 2011
- WBN-DSL-F-14-001, Focused Self-Assessment Report: Evaluate Readiness of the Safety and Licensing Organization for the Start-Up of Unit 2 and Operation of Both Units, January 7, 2014
- TVA letter to NRC dated June 14, 2012, ERDS and Inspection Planning and Scheduling
- TVA letter to NRC dated November 14, 2011, Instrument and Controls Staff Information Requests
- TVA letter to NRC dated February 18, 2014, WBN Radiological Emergency Plan Updated Appendix C
- Safety and Licensing Department Two-Unit Transition Plan, Rev. 12
- PER 728019; Track Revisions to EPIP's -1, -6, -13, and -14 for Dual Unit Site

OA.1.17 TMI Action Item II.E.3.1: Emergency Power for Pressurizer Heaters

Work Orders

- WO 113195783 - Startup Test Electrical (SUTE) System 068 – 54145 – WBN-2-0XF-068-0341A-A Splice and lug cable 2PP885A IAW PER 503742 and FCR 58022 and MAI 3.3. Dated: 04/28/2014
- WO 112412320 - WBN-2-BKR-068-A/20-A CME SYS 068 PRZR HTR Backup Group 2A-A (2-0XF-68-341A-A) Scope: Complete VLF Testing between the breaker compartment 20 on 6.9kV Shutdown Board 2A – A and the 480V Transformer for PRZR HTR Backup Group 2A-A, Dated: 02/07/2014
- WO 112412685 - WBN-2-BKR-068-B/21-B CME SYS 068 PRZR HTR Backup Group 2C (2-0XF-68-341H) Scope: Complete VLF Testing between the breaker compartment 21 on 6.9kV Shutdown Board 2B-B and the 480V Transformer for PRZR HTR Backup Group 2C, Dated: 02/05/2014
- WO 112412717 - WBN-2-BKR-068-A/21-A CME SYS 068 PRZR HTR Backup Group 2D (2-0XF-68-341F) Scope: Complete VLF Testing between the breaker compartment 21 on 6.9kV Shutdown Board 2A – A and the 480V Transformer for PRZR HTR Backup Group 2D, Dated: 03/17/2014
- WO 114489905 - WBN-2-0XF-068-0341A-A CCE EDCR 55121 Cable 2PP800A SYS 068 PRZR HTR Backup Group Trans 2A-A Scope: Retrain Cable 2PP800A at tray 0-5TRY-292-2255/2256-A IAW ICRDs, EDCR, and MAI-3.2 Dated: 07/23/2013
- WO 114489928 - WBN-2-2PP-068-0820-B CCE EDCR 53756 / 55121 Cable 2PP820B SYS 068 Scope: Retrain Cable 2PP820B at tray transition from tray segment 0-5TRY-292-2158/2157-B to conduit 2PP02620 IAW ICRDs, EDCR, and MAI-3.2 Dated: 02/26/2014
- WO 114957838 - WBN-2-BD-211-A-A CCE BC conduit EDCR2 55120 PER 549197 SYS 068 292 WBN-2-MISC-292 2PP2360A Scope: Rework flex 2PP2360A as needed IAW DRA 55120-001 as a DOC for flex 2VC819A due to EDCR 55233 rework. Dated: 12/04/2013
- WO 115446463 - WBN-2-MISC-292 CCE SR 861567 EDCR2 53756-2 FCR 62627 AA-05 SYS 068 211 292 Scope: Install 2-JB-292-9197 and conduits 2PP3078, 2PP3079 and pullback, splice, and pull new cable 2PP860 and terminate Dated: 03/25/2014

Drawings

- 2-45W724-3, Rev. 8 Wiring Diagrams 6900V Shutdown Board 2A-A Single Line, dated: 04/16/2014
- 2-45W724-4, Rev. 8 Wiring Diagrams 6900V Shutdown Board 2B-B Single Line, dated: 03/05/2014
- 2-45W760-68-3, Rev. 7 Wiring Diagram Reactor Coolant System Schematic Diagrams, dated: 04/07/2014
- 2-45W760-68-4, Rev. 8 Wiring Diagram Reactor Coolant System Schematic Diagrams, dated: 03/27/2014
- 2-45W2724-2, Rev. 0 Wiring Diagrams Pressurizer Heaters Connection Diagrams, dated: 02/29/2012
- 2-45W610-68-6, Rev. 5 Electrical Control Diagram Reactor Coolant System, dated: 04/08/2014
- 2-45W611-68-2, Rev. 4 Electrical Logic Diagram Reactor Coolant System, dated: 02/26/2014

Field Change Request

FCR58022-A Systems 003 & 068 EDCR 2-54145-A Cable 2PP885A was disconnected due to being a U1/U2 interface point. However, the cable was cut off in the panel 2-PNL-211-A and is too short to reach its termination points for Unit 2 operation. Date: 05/18/2011.

Calculations

EDQ00099920080014, Rev. 23 Diesel Generator Loading Analysis Dated: 03/26/2014

Procedures

Watts Bar Nuclear Plant Unit 2 Emergency Operating Instruction 2-ES-0.2 Natural Circulation Cooldown Rev. 0000 dated: Initial Issue.

Watts Bar Nuclear Plant Unit 0, 1 & 2 Abnormal Operating Instruction 0-AOI-35 Loss of Offsite Power, Rev. 0000. New procedure based on AOI-35 R39 dated: 12/06/2011 to support U2 operation

Watts Bar Nuclear Plant Unit 1 Emergency Operating Instruction ES-1.2 Post LOCA Cooldown and Depressurization, Rev. 0015 Dated: 12/21/2010.

Manuals

Westinghouse – Pressurizer Instructions for TVA Watts Bar Unit No. 2 - Technical Manual 1440-C257 dated: June 1975

Miscellaneous Documents

TVA NPG System Description Document – Reactor Coolant System – NPG-SDD-WBN2-68-4001, Rev. 0003, dated: 11/12/2013

OA.1.18 URI 86-24-06: Review of cable splicing as required by FSARWork Orders:

W.O. 111525655, CCE EDCR 54144 FCR 56684 AA-07 PER 178012 Systems 003, 290 Scope: Cut cables 2V1071A, 2PM2241A, 2PM3989A, 2PM3994A, 2PM4463A, and 2PM4483A at entry into riser 0Z71A and pull back to 0-JB-290-3434A splice box. Pull new section of cables 2PM2241A, 2PM2242A, 2PM3989A, 2PM3994A, 2PM4463A, and 2PM4483A from 0-JB-290-3434A to 2-PNL-278-M4/A through conduits 0MC932A and 0MC894A and splice to existing cables in 0-JB-290-3434A. Dated: 04/16/2014.

Field Change Request (FCR):

FCR56684-A Revise ICRDS for cables 2PM2241A, 2PM2242A, 2PM3989A, 2PM3994A, 2PM4463A, and 2PM4483A to alleviate splice in JB 8333A and install new cable from JB3434A to 2 PNL-278-M4/A. Delete conduit 0MC3518A and junction box 2-JB-290-8333A. Reroute conduit 0MC894A to 2-M-4. Dated: 09/30/2010.

Miscellaneous Documents:

ICRDS – Cable Standard Report Cable-2V1071A Dated: 4/28/2014.
 ICRDS – Cable Standard Report Cable-2PM2241A Dated: 4/28/2014.
 ICRDS – Cable Standard Report Cable-2PM2242A Dated: 4/28/2014.
 ICRDS – Cable Standard Report Cable-2PM3989A Dated: 4/28/2014.
 ICRDS – Cable Standard Report Cable-2PM3994A Dated: 4/28/2014.
 ICRDS – Cable Standard Report Cable-2PM4463A Dated: 4/28/2014.
 ICRDS – Cable Standard Report Cable-2PM4483A Dated: 4/28/2014.

OA.1.19 Cable Issues CAP – Sub-issue: SplicesWork Orders:

WO 110965861 - CCE EDCR 55117 Sys 099 WBN-2-PNL-R47-A, Replace existing splice with EQ qualified splices for system 099 cables. Dated: 07/06/2010
 WO 110965968 – CCE EDCR 55117 SYS 070 WBN-2-MISC-070, Replace existing splices with EQ qualified splices for system 070 cables. Dated: 08/16/2011.
 WO 110966007 – CCE EDCR 55117 SYS 072 WBN-2-FCV-072-0039-A, Replace existing splices with EQ qualified splices for system 072 cables. Dated: 06/14/2013.
 WO 110966014 – CCE EDCR 55117 SYS 030 WBN-2-MISC-030, Replace existing splices with EQ qualified splices for system 030 cables. Dated: 02/07/2012.

- WO 110966029 – CCE EDCR 55117 SYS 074 WBN-2-MISC-074, Replace existing splices with EQ qualified splices for system 074 cables. Dated: 04/13/2011.
- WO 110966674 – CCE EDCR 55117 SYS 063 WBN-2-MISC-063, Replace existing splices with EQ qualified splices for system 063 cables. Dated: 06/13/2011.
- WO 110966709 – CCE EDCR 55117 SYS 001, 031, 065, 074 WBN-0-BD-236-0004-G, 125V Vital Batt BD IV, Replace existing splices with EQ qualified splices for system 001, 031, 065, & 074 cables. Dated: 03/25/2014.
- WO 110966863 – CCE EDCR 55117 SYS 068 & 067 WBN-0-JB-290-5981, Replace existing splices with EQ qualified splices for system 067 and 068 cables. Dated: 02/01/2011.
- WO 111038499 – CCE EDCR 55117 55174 54639 55121 SYS 074, 063 WBN-2-MISC-074, Replace existing splices with EQ qualified splices for system 074 cables. Dated: 10/3/2013.
- WO 113146612 – CCE EDCR 55117 FCR 57384 PER 257379 463356 SYS 063, 292 WBN 2-JB-292-1570-B. Replace existing splices with EQ qualified splices in 2-JB-292-1570-B. Dated: 10/09/2013.

Procedures:

Watts Bar Nuclear Plant Unit 2 Construction Completion Project Procedure Unit 2 Construction – Title Cable Terminations No. 25401-000-GPP-0000-N3304 Rev. 0004 dated: 01/20/14.

Miscellaneous Documents:

- Quality Surveillance Report No. 25402-WBN-SR-09-0714, dated: 10/13/09 Title: Cable Issues – Splices CAP (CP1.8) Review
- Quality Surveillance Report No. 25402-WBN-SR-10-1347, dated: 6/14/10 Title: Electrical Penetration Cable De-termination and Flex Conduit Replacement.
- Quality Surveillance Report No. 25402-WBN-SR-10-1382, dated: 6/14/10 Title: Inspection of Kapton insulated conductors/splices.

Work Orders:

WO 111525655, CCE EDCR 54144 FCR 56684 AA-07 PER 178012 Systems 003, 290 Scope: Cut cables 2V1071A, 2PM2241A, 2PM3989A, 2PM3994A, 2PM4463A, and 2PM4483A at entry into riser 0Z71A and pull back to 0-JB-290-3434A splice box. Pull new section of cables 2PM2241A, 2PM2242A, 2PM3989A, 2PM3994A, 2PM4463A, and 2PM4483A from 0-JB-290-3434A to 2-PNL-278-M4/A through conduits 0MC932A and 0MC894A and splice to existing cables in 0-JB-290-3434A. Dated: 04/16/2014.

Field Change Request (FCR):

FCR56684-A Revise ICRDS for cables 2PM2241A, 2PM2242A, 2PM3989A, 2PM3994A, 2PM4463A, and 2PM4483A to alleviate splice in JB 8333A and install new cable from JB3434A to 2 PNL-278-M4/A. Delete conduit 0MC3518A and junction box 2-JB-290-8333A. Reroute conduit 0MC894A to 2-M-4. Dated: 09/30/2010.

Miscellaneous Documents:

- ICRDS – Cable Standard Report Cable-2V1071A Dated: 4/28/2014.
- ICRDS – Cable Standard Report Cable-2PM2241A Dated: 4/28/2014.
- ICRDS – Cable Standard Report Cable-2PM2242A Dated: 4/28/2014.
- ICRDS – Cable Standard Report Cable-2PM3989A Dated: 4/28/2014.
- ICRDS – Cable Standard Report Cable-2PM3994A Dated: 4/28/2014.
- ICRDS – Cable Standard Report Cable-2PM4463A Dated: 4/28/2014.
- ICRDS – Cable Standard Report Cable-2PM4483A Dated: 4/28/2014.

OA.1.20 Cable Issues CAP – Sub-issue Cable Bend RadiusWork Orders:

- WO 112787129 – CCE EDCR 55121 PER 366694 SYS 074 WBN-2-FCV-074-0009-B, Determ/Pullback cable 2V2151B. Dated: 02/13/2012.
- WO 113227034 – CCE PER 787521 793441 EDCR 55121 FCR 57130, 56071 MTR-63-15-B, Determ cables 2PP0612B to achieve pullbacks, repulls, reterms, and splices as necessary for bend radius corrections. Dated: 11/04/2013.
- WO 110991108 – CCE EDCR 55121 55121 SYS 043 WBN-2-MISC-043, Lift/Reland, Pullback cables 2M2400A and 2V9724A, Rework conduits 2M3091A and 2VC2103A to address bend radius violations. Dated: 06/19/2013.
- WO 110993344 – CCE EDCR 55121 SYS 067 WBN-2-MISC-067, Determ/Pullback cables as required to facilitate replacement of conduit fittings that cause cables to violate minimum bend radius requirements. Dated: 10/22/2010.
- WO 113228892 – CCE SR 777972, 778560 SYS 072 EDCR 55121 FCR 57130 56071 2-MTR072-10-B, Pull back cables (replace as necessary) from conduit as needed to satisfy CAL. #WBN-EEB-EDQ00299920090005 Rev. 0 as specified by FCR 56071A for bend radius corrections. Dated: 09/15/2013.
- WO 113227034 – CCE PER 787521, 793441 EDCR 55121 FCR 57130 56071 MTR-63-15-B, Pull back cables (replace as necessary) from conduit as needed to satisfy CAL. #WBN-EEB-EDQ00299920090005 Rev. 0 as specified by FCR 56071A for bend radius corrections. Dated: 10/29/2013.
- WO 113280812 – CCE EDCR2 55233 EDCR 55121 SYS 001 292 WBN-2-MISC-292 2PM6326 2PM6327E 2PM6449E BC, Rework conduit and conduit fittings as needed to meet minimum training radius of design loaded cables. Dated: 04/26/2013.

Procedures:

Modification/Addition Instruction MAI-3.2 Rev. 0021, Cable Pulling for Insulated Cables Rated up to 15,000 Volts, Dated: 08/18/2009

Miscellaneous Documents:

- General Engineering Specification G-38 for Installation, Modification, and Maintenance of Insulated Cables Rated up to 15,000 Volts. Rev. 22 Dated: 12/5/2013
- WBN Design Criteria Document – WB-DC-30-5 Rev. 0023 Power, Control, and Signal Cables for use in Category I Structures—(Unit 1 / Unit 2), Dated 09/12/2012

OA.1.21 CDR 391/82-76: Cable Bend Radius DeficienciesWork Orders:

- WO 112378485 – CCE EDCR 55231 PER 366694 SYS 074 WBN-2-FCV-074-0009-B, Determ/Pullback cable 2V2151B. Dated: 02/13/2012.
- WO 112787129 – CCE EDCR 55121 PER 366694 SYS 074 WBN-2-FCV-074-0009-B, Determ/Pullback cable 2V2151B. Dated: 02/13/2012.
- WO 113227034 – CCE PER 787521 793441 EDCR 55121 FCR 57130, 56071 MTR-63-15-B, Determ cables 2PP0612B to achieve pullbacks, repulls, reterms, and splices as necessary for bend radius corrections. Dated: 11/04/2013.
- WO 110991108 – CCE EDCR 55121 55121 SYS 043 WBN-2-MISC-043, Lift/Reland, Pullback cables 2M2400A and 2V9724A, Rework conduits 2M3091A and 2VC2103A to address bend radius violations. Dated: 06/19/2013.
- WO 110993344 – CCE EDCR 55121 SYS 067 WBN-2-MISC-067, Determ/Pullback cables as required to facilitate replacement of conduit fittings that cause cables to violate minimum bend radius requirements. Dated: 10/22/2010.
- WO 113228892 – CCE SR 777972, 778560 SYS 072 EDCR 55121 FCR 57130 56071 2-MTR072-10-B, Pull back cables (replace as necessary) from conduit as needed to satisfy

CAL. #WBN-EEB-EDQ00299920090005 Rev. 0 as specified by FCR 56071A for bend radius corrections. Dated: 09/15/2013.

WO 113227034 – CCE PER 787521, 793441 EDCR 55121 FCR 57130 56071 MTR-63-15-B, Pull back cables (replace as necessary) from conduit as needed to satisfy CAL. #WBN-EEB-EDQ00299920090005 Rev. 0 as specified by FCR 56071A for bend radius corrections. Dated: 10/29/2013.

WO 113280812 – CCE EDCR2 55233 EDCR 55121 SYS 001 292 WBN-2-MISC-292 2PM6326 2PM6327E 2PM6449E BC, Rework conduit and conduit fittings as needed to meet minimum training radius of design loaded cables. Dated: 04/26/2013.

OA.1.22 CDR 391/86-03: Equipment Pigtail Extensions - Training Radius Deficiencies

Work Orders:

112806406 (Open) - 2-FSV-30-56A

111118838 (Open) – 2-FSV-61-110-A, 2-FSV-61-191A, 2-FSV-61-193-A, 2-FSV-61-96

115324715 (Open) - 2-FSV-61-97

114802758 (Open) - 2-FSV-61-122

Drawings:

DRA 54172-133, Rev. 0

DRA 54172-482, Rev. 0 - 2-FSV-30-56A

DRA 53711-21, Rev. 0 - 2-FSV-61-191A-A

DRA 53711-22, Rev. 0 - 2-FSV-61-193A-A

DRA 53711-19, Rev. 0 - 2-FSV-61-96

DRA 53711-20, Rev. 0 - 2-FSV-61-110

DRA 53711-017, Rev. 1 - 2-FSV-61-97

DRA53711-016, Rev.1; FCR 61867-A, AA 05 - 2-FSV-61-122

45W883-3, Rev 12 Conduit & Grounding Penetration Sealing and Fire Stop Details; dated: 8/12/81

45W883-4, Rev 4 Conduit & Grounding Penetration Sealing and Fire Stop Details; dated: 8/22/84

Miscellaneous Documents:

ICRDS Report 2V1628A; dated:5/1/ 2014

WO 113285883, "Inspect and Rework as Required, Damaged Terminal Blocks, Loose Connections, Damaged Termination Lugs, and Adhesive-Backed Support Mounts in Panel WBN-2-PNL-278-M003," completed 1/18/2014

WO 113308160, "Inspect and Rework as Required, Terminal Block Damage, Loose Termination Connections, Cable/Conductor Damage, and Adhesive-Backed Cable Support Mounts in Panel WBN-2-PNL-278-M004," completed 12/17/2013

WO 113308560, "Inspect and Rework as Required, Terminal Block Damage, Loose Termination Connections, Cable/Conductor Damage, and Adhesive-Backed Cable Support Mounts in Panel WBN-2-PNL-278-M005," completed 12/17/2013

WO 113314541, "Inspect and Rework as Required, Terminal Block Damage, Loose Termination Connections, Cable/Conductor Damage, and Adhesive-Backed Cable Support Mounts in Panel WBN-2-PNL-099-R46-A," completed 10/30/2013

WO 113490971, "Inspect and Rework as Required, Terminal Block Damage, Loose Termination Connections, Cable/Conductor Damage, and Adhesive-Backed Cable Support Mounts in Panel WBN-2-PNL-099-R49-B," completed 12/9/2013

WO 114013679, "Inspect and Rework as Required, Terminal Block Damage, Loose Termination Connections, Cable/Conductor Damage, and Adhesive-Backed Cable Support Mounts in Panel WBN-2-PNL-092-M13-D," completed 1/17/2014

OA.1.23 Construction Deficiency Report 391/95-05: Loose Connections in Vendor-Wired Electrical Panels

Miscellaneous

WO 111091659, Rev. 0, "Determinate and Re-Terminate Cables for System 062 Flow Control Valves," completed 12/2/2013

WO 114874695, "Terminate/Splice and Complete Documentation for FSV-68-395-B and 396"

OA.1.24 CDR 391/90-03: Cable Proximity to Hot Pipes

Miscellaneous

NGDC PP-19-2, Closure Report for IP&S 306, "Cable Proximity to Hot Pipes CAP" (Status: Engineering Complete), dated 5/30/12

NGDC PP-19-2, Closure Report for IP&S 441, "Cable Proximity to Hot Pipes" (Status: Engineering Complete), dated 5/31/12 (for PER 144157)

Calculation EDQ00299920120001, "Unit 2 Hot Pipe Evaluation and Disposition," Rev. 1, dated 7/23/12

Calculation MDQ00299920110383, "Electrical Conduit Temperature in the Area of Hot Pipes," Rev. 0, dated 1/3/2012

EDCR 59055, "Hot Pipe Interferences Safety Related Conduits," Rev. A, dated 2/2/12
Specification G-40, "Installation, Modification and Maintenance of Electrical Conduit Cable Trays, Boxes, Containment Electrical Penetrations, Electric Conductor Seal Assemblies, Lighting and Miscellaneous Systems," Rev. 18

WO 113280953, "CCE BC Conduit EDCR2 59055 WBN-MISC-293"

WO 113496512, "CCE EDCR2 59055, 53217 SYS 292 BC Conduit 2VC2932A WBN-2-Misc-292"

WO 113503543, "CCE BC Conduit EDCR2 59055 SYS 293 068 2PM5672E"

WO 113496512, "Install, Reroute, &/or Verify Installation Documentation of Conduit 2VC2932A as Directed by EDCR 50955 to Avoid Interference with Hot Pipe Insulation"

DRA 55231-054

OA.1.25 CDR 391/85-22: Undervoltage Condition on 125V DC Vital Control System to Auxiliary Feedwater Components

Miscellaneous

Calculation EDQ00023620070003, Rev 27, "125V DC Vital Battery System Analysis"

Drawing: 2-45W600-46-6 Rev 3 Wiring Diagram - Feedwater Pump & Turbines

Drawing: SD-E 15.3.4, Dated: January 3, 1977

DRA 54363-099, EDCR 54363-A page 461

DRA 55233-351, EDCR 55233-A page 611

FCR 61316-A, Dated: April 23, 2013

FCR 61825-A, Dated: July 26, 2013

ICARDS Report 2SG220A, Dated: March 18, 2014

ICARDS Cable History Report 2SG220A, Dated: April 1, 2014

NGDC PP-19-2, Closure Report, PER 143658 (Engineering Complete) for IP&S 376, "Undervoltage Condition on 125V DC Vital Control System to Auxiliary Feedwater Components", dated: February, 12, 2012

WO 114366117 "CCE EDCR 54636 55233 53217 53554 PER 241111 SYS 072 074 062 063 001 003 046 278 CT#2V2073A", Dated: October 6, 2013

WO 112362444 "CCE EDCR2 55233 54636 SYS 062 003 046 WBN-2-@-V-062-2073-A CT# 2V2073A", Dated: November, 23, 2013

WO 114871853 "CCE EDCR2 54636 54633 SYS 046 236 292 CABLE TERMINATIONS" (Open)

WO 115325831 "CCE EDCR2 54636 SYS 046 292 235 236 2-MISC-292 CT# 2V2073A" (Open)

OA.1.26 Inspection of Watts Bar Unit 2 Electrical Conduit and Conduit Supports CAP PlanWork Orders

WO 113402733
 WO 113402616
 WO 113200118
 WO 113536465
 WO 113199113
 WO 113142378

Calculations

WCG-2-349, WBN2 Seismic Category I (L) Conduit and Supports Walkthrough Screening Evaluation Guidelines, Revision (Rev.) 3
 WCG-2-571, WBN2 Seismic Category I (L) Conduit Bounding Evaluation of Overspan Outliers Group 1, Rev. 1
 WCG-2-405, Evaluation of Unique Conduit Supports, Rev. 0
 WCG-2-614, WBN2 Seismic Category I (L) Conduit and Supports Program Closure Summary Calculation, Rev. 0

Specifications

WB-DC-40-31.10, Seismically Qualifying Conduit Supports, Rev. 11
 WB-DC-20-32, Integrated Interaction Program Screening and Acceptance Criteria, Rev. 5
 G-32, Bolt Anchors Set in Hardened Concrete, Rev. 23

Procedures

MAI-3.1, Installation of Electrical Conduit Systems & Conduit Boxes, Rev. 25
 N3C-944, Conduit and Conduit Support Installations, Rev. 14
 25402-3DP-G04G-00501, Historical Document Review Process, Rev. 5
 25402-000-GPP-OOOO-N1213, Walkdown Verification for Construction Area Completion and Damaged, Loose, or Missing Hardware, Rev. 0

Field Change Requests

FCR 59606
 FCR 56546-A

Walkdown Packages

LSWD-3092
 LSWD-3081
 LSWD-3107
 LSWD-497
 WBN2-C-293-817-18
 WBN2-C-293-817-28
 WBN2-C-293-817-59

Drawings

DRA 54633-248, Mechanical Category I Support Conduit Typical, Rev. 0
 47A056-214, Mechanical Category I Support Conduit Typical, Rev. 3
 47A056-IV, Mechanical Category I & IL Conduit Supports, Rev. 0
 47A056-55, Mechanical Category I Support Conduit, Rev. 3

Closure Reports/Packages

Open Items/Commitment Completion Form for: 111032056. Partial Closure (Engineering Complete) Dated: 6/19/2012

Miscellaneous Documents

Unit 2 Conduit and Conduit Support CAP Closure Report

Unit 1 Conduit and Conduit Support CAP Closure Report

Open Items/Commitment Completion Form for: PER 143758, Rev. 0. Final Closure
(Engineering Complete) Dated: 6/11/2012

CDR 87-18, Qualification of ASCO solenoid valve conduit connector configuration

PER 143758, Rev. 1, to address CDR 391/86-59, Qualification of ASCO solenoid valve
conduit connector configuration.

VIO 391/87-19-01, Failure to follow procedures for installing equipment in north/south valve
rooms

CDR 86-21, Non-Quality Assurance Data Used in Calculations for Cable Tray and Conduit
Loading

**OA.1.27 Construction Deficiency Report 391/87-18: Deficiencies in installation of
electrical conduit and conduit supports**Work Orders

WO 115608626

WO 113536802

Calculations

WCG-2-796, Evaluation of Christmas Tree Configurations Volume 1, Rev. 0

WCG-2-361, Walkthrough Procedure of Unique Evaluations for Electrical Conduits and
Conduit Supports, Rev. 3

Specifications

WB-DC-40-31.10, Seismically Qualifying Conduit Supports, Rev. 11

WB-DC-20-32, Integrated Interaction Program Screening and Acceptance Criteria, Rev. 5

G-32, Bolt Anchors Set in Hardened Concrete, Rev. 23

Procedures

MAI-3.1, Installation of Electrical Conduit Systems & Conduit Boxes, Rev. 25

N3C-944, Conduit and Conduit Support Installations, Rev. 14

25402-3DP-G04G-00501, Historical Document Review Process, Rev. 5

Field Change Requests

FCR 57609

FCR 56093

FCR 57611

FCR 57130

Walkdown Packages

LSWD-0639

LSWD-0528

WDP-DATA-0587

Closure Reports/Packages

Open Items/Commitment Completion Form for: PERs 143879. Partial Closure (Engineering
Complete) Dated: 6/11/2012

Open Items/Commitment Completion Form for: PERs 144966. Partial Closure (Engineering
Complete) Dated: 2/13/2012

Miscellaneous:

WBRD-50-390/86-14 and WBRD-50-391/87-18

NRC letter dated December 4, 1995 in reference to Inspection Report 50-390/95-69 and 50-391/95-69

OA.1.29 Q-List CAP

Procedures:

25402-3DP-G04G-00028, Q-List and UNID Control, Rev. 3
 25402-3DP-G04G-00503, Master Equipment List, Rev. 6
 25402-3DP-G04G-00081, Engineering Document Construction Release, Rev. 17
 NNC-PL-1, WITEL Coding Guide, Rev. 7
 NEDP-4, Q-List and UNID Control, Rev. 22
 NPG-SPP-09.6, Master Equipment List, Rev. 3
 SMP-4.0, Watts Bar Nuclear Plant Unit 2 System Completion and Turnover, Rev. 11
 TI-437, System Turnover-Startup to Operations, Rev. 2

Miscellaneous:

Surveillance No. 25402-WBN-SR-13-2769, Seismic Qualifications, 8/22/13

PERS:

800662 Drawing 1-47A8910-70 R0 Actuator information does not match the field installed MOV
 808671 WBN-0-ISV-002-0510 Status in MEL
 831083 2-ISV-062-0564S Documentation Inconsistency
 832955 This PER address QC inspector involvement in PER 831083
 854031 Appropriate Master Equipment List (MEL) data was not properly attained/documented
 874760 Incorrect design range for 2-FT-063-0170. Change range and replace.
 768989 Design Verification Report not completed for Master Equipment List Transmittal Form

LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
AFPT	Auxiliary Feedwater Pump Turbine
AFWST	Auxiliary Feedwater Storage Tank
ANS	American Nuclear Society
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ATWS	Anticipated Transient without SCRAM
AWG	American Wire Gauge
BL	Bulletin
CAP	Corrective Action Program
CAQR	Condition Adverse to Quality Report
CATD	Corrective Action Tracking Document
CCS	Component Cooling Water
CDR	Construction Deficiency Report
CECC	Central Emergency Control Center
CFR	<i>Code of Federal Regulations</i>
Conduit CAP	Electrical Conduit and Conduit Supports Corrective Action Program
CS	Containment Spray
CVCS	Chemical Volume Control System
DC	Direct Current
DCN	Design Change Notice
DRs	Discrepancy Reports

DRA	Drawing Revision Authorization
EDCR	Engineering Document Construction Release
EQ	Environmental Qualification
EQCS	Environmental Qualification Change Supplement
EQDP	Environmental Qualification Data Package
EQIR	Environmental Qualification Information Release
ERCW	Essential Raw Cooling Water
ERDS	Emergency Response Data System
ERF	Emergency Response Facilities
ERG	Emergency Response Guidelines
ESF	Engineering Safety Features
FCR	Field Change Request
FSAR	Final Safety Analysis Report
FSV	Flow Solenoid Valve
GDC	General Design Criteria
GET	General Employee Training
GL	Generic Letter
HFT	Hot Functional Testing
HVAC	Heating, Ventilation, and Air Conditioning
ICRDS	Integrated Cable and Raceway Design System
IMC	Inspection Manual Chapter (NRC)
IP	Inspection Procedure (NRC)
IIR	Integrated Inspection Report
IITA	Incore Instrument Thimble Assembly
IP&S	Inspection Planning and Scheduling (NRC)
IR	Inspection Report
IST	In-Service Testing
M&TE	Measuring and Test Equipment
MAI	Modification/Addition Instruction
MEL	Master Equipment List
NCR	Nonconformance Report
NDE	Nondestructive Examination
NGDC	Nuclear Generation Development and Construction
No.	Number
NPP	Nuclear Performance Plan
NRC	Nuclear Regulatory Commission
OSC	Operational Support Center
PER	Problem Evaluation Report
PST	Pre-Service Testing
PT	Liquid Penetrant Examination
QEV	Quick Exhaust Valve
QA	Quality Assurance
RAI	Request for Additional Information
RCS	Reactor Coolant System
Rev.	Revision
REP	Radiological Emergency Plan
RG	Regulatory Guide
RHR	Residual Heat Removal System
RP	Radiation Protection
RPS	Reactor Protection System
RTD	Resistance Temperature Detector
RWT	Radiation Worker Training
SAR	Safety Analysis Report
SCAR	Significant Corrective Action Report

SCBA	Self-Contained Breathing Apparatus
SCR	Significant condition Report
SER	Safety Evaluation Report
SIS	Safety Injection System
SMP	Startup Manual Procedure
SP	Special Program
SRP	Standard Review Plan
SSER	Supplemental Safety Evaluation Report
SUT	Startup Test
SWSOPI	Service Water System Operational Performance Inspection
TI	Temporary Instruction (NRC)
TMI	Three Mile Island
TSC	Technical Support Center
TVA	Tennessee Valley Authority
UNID	unique identifier
URI	Unresolved Item
V	Volt
VIO	Violation
VSR	Vertical Slice Review
WBP	Watts Bar Program
WBN	Watts Bar Nuclear Plant
WINCISE	Westinghouse In-Core Information Surveillance & Engineering
WO	Work Order
WOG	Westinghouse Owners Group