



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION II  
SAM NUNN ATLANTA FEDERAL CENTER  
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January 29, 2010

Mr. Ashok S. Bhatnagar  
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Tennessee Valley Authority  
6A Lookout Place  
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**SUBJECT: WATTS BAR NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED  
INSPECTION REPORT 05000391/2009605**

Dear Mr. Bhatnagar:

On December 31, 2009, 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 January 15, 2010, with Mr. Masoud Bajestani 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, with the conditions of your construction permit, and with fulfillment of Unit 2 regulatory framework commitments. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

In addition, during this inspection period, your evaluations and methodologies associated with the Soil Liquefaction Special Program (SP) and one Cable Corrective Action Program (CAP) sub-issue related to the pulling of cables through 90-degree condulets and mid-route flexible conduits, were reviewed by the NRC staff and determined to be applicable to both Units 1 and 2. Issues pertaining to this SP and the CAP sub-issue as they relate to Unit 2, have been previously addressed in NRC inspections reports, correspondence, and NUREG-1232. Based on the results of this inspection, the subject SP and the CAP sub-issue are closed for Unit 2; however, future inspections may be conducted for new related activities.

Based on the results of this inspection, no findings or violations of significance were identified and your oversight of construction completion activities was generally effective.

In accordance with 10 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).

Sincerely,

**/RA/**

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

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

Enclosure: Inspection Report 05000391/2009605 w/attachment

cc w/encl: (See next page)

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).

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Letter to Ashok S. Bhatnagar from Robert C. Haag dated January 29, 2010.

SUBJECT: WBN NUCLEAR PLANT UNIT 2 CONSTRUCTION - NRC INTEGRATED  
INSPECTION REPORT 05000391/2009605

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 50-391

Construction Permit No.: CPPR-92

Report No.: 05000391/2009605

Applicant: Tennessee Valley Authority (TVA)

Facility: Watts Bar Nuclear Plant, Unit 2

Location: 1260 Nuclear Plant Rd  
Spring City TN 37381

Dates: October 1– December 31, 2009

Inspectors: W. Bearden, Senior Resident Inspector, Construction Projects  
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C.1.2, F.1 and T.1.1

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

Enclosure

## EXECUTIVE SUMMARY

Watts Bar Nuclear Plant, Unit 2  
NRC Inspection Report 05000391/2009605

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 three-month period of inspections in the areas of quality assurance (QA); identification and resolution of construction problems; construction activities; training and qualification of plant personnel; fire protection; and follow-up of other activities. The inspection program for Unit 2 construction activities is described in NRC Inspection Manual Chapter (IMC) 2517. Information regarding the WBN Unit 2 Construction Project and NRC inspections can be found at <http://www.nrc.gov/reactors/plant-specific-items/watts-bar.html>.

### Inspection Results

- Problem Evaluation Reports (PERs) reviewed during the three-month period properly identified, addressed and resolved issues. (Section Q.1.1)
- The Soil Liquefaction special program (SP) was closed for Unit 2 based on previous corrective actions taken for Unit 1. The methodology used for the closure of the SP is applicable to Unit 2, including common structures, which were addressed as part of the closure of the SP. (Section OA.1.1)
- Evaluations and methodology associated with the Cable corrective action program (CAP) sub-issue, regarding pulling cables through 90-degree condulets/mid-route flexible conduits, were reviewed and determined to be applicable to both Units 1 and 2. Based on the results of this inspection, this sub-issue is closed for Unit 2; however, future inspections may be conducted for new related cable design and construction activities. (Section OA.1.2)
- Discussions were held with both TVA and Bechtel engineering and licensing personnel regarding the actions planned to resolve the issues associated with several CAPs and SPs. (Section OA.1.3)
- Other areas inspected were adequate with no findings of significance identified. These areas included protection of installed equipment; physical walkdowns in support of the conduit supports CAP; safety related piping work observation; radiograph film interpretation of safety related welds; electrical cable signal tracing; craft training; and fire protection. (Sections C.1.1 through C.1.5, T.1.1 and F.1)



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## REPORT DETAILS

### Summary of Plant Status

During the current inspection period, TVA performed pre-service inspection (PSI) activities, developed implementation plans for CAPs and SPs and installed plant modifications during the WBN Unit 1 outage, that were required to support the construction completion of WBN Unit 2. In addition, engineering design activities and limited physical plant walkdowns to determine the existing status of structures, systems, and components (SSCs) continued during this inspection period.

### **I. Quality Assurance (QA) Program**

#### **Q.1 QA Oversight Activities**

##### **Q.1.1 Identification and Resolution of Construction Problems (Inspection Procedure (IP) 40504)**

###### a. Inspection Scope

During this inspection period, the inspectors reviewed PERs as part of TVA's corrective action program to verify that issues being identified under the corrective action program were being properly identified, addressed, and resolved by TVA. Additionally, the inspectors reviewed one nuclear assurance assessment report regarding the corrective action program and several construction completion project quality surveillance reports associated with field work activities.

The inspectors also observed an all-hands meeting on October 26, 2009, and a supervisors meeting, on November 4, 2009, where PER responsibilities were discussed. Both meetings discussed expectations from both supervisors and employees regarding the corrective action program. Specific documents reviewed are listed in the attachment.

###### b. Observations and Findings

No findings of significance were identified.

###### c. Conclusions

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

### **II. Management Oversight and Controls**

#### **C.1 Construction Activities**

##### **C.1.1 Protection of Installed Plant Equipment during Construction Activities (IP 50053, 50055)**

a. Inspection Scope

The inspectors conducted inspections of the reactor pressure vessel (RPV) and upper internals storage, preservation, housekeeping, and protection activities to determine whether requirements, work procedures, and inspection (quality control) procedures were being met. These activities are controlled by procedure 25402-000-GPP-0000-N2102, Housekeeping, Revision (Rev.) 4. On October 28 and 29, 2009, the inspectors entered the RPV to observe the condition of the RPV and to ensure that housekeeping measures were in place. The inspectors verified that the cover was in place and installed around the top of the open vessel to prevent entry of foreign objects and debris. The core barrel and lower internals were in their storage locations in the refueling cavity and were protected with temporary protective waterproof material. Access controls were verified by the inspectors including a review of access logs and records documenting entry into the RPV between July and October of 2009. Records were reviewed to confirm that housekeeping surveillances were performed of the RPV by quality control (QC) personnel on April 23, 2009 and October 8, 2009 and that controls were maintained during this time. The inspectors also entered the secondary side of steam generator 1 (Work Order (WO) 09-953553-000-003) and observed foreign material exclusion (FME) controls were in place as part of the moisture carryover work in progress.

The following samples were inspected:

- IP 50053 Section 02.01.c - one sample
- IP 50053 Section 02.02.a - one sample
- IP 50053 Section 02.03.b - one sample
- IP 50053 Section 02.03.c - one sample
- IP 50055 Section 02.02.b- one sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

Adequate controls were in place to protect the RPV, core barrel, upper internals and steam generator 1.

**C.1.2 Electrical Systems and Components - Work Observations (IP 51053, TI 2512/018)**

a. Inspection Scope

The inspectors observed activities associated with the conduit supports CAP. This included the observation of the screening verification walkthroughs of conduit and conduit support installations. The screening verification walkthroughs consisted of verifying the seismic adequacy, no structural problems and falling interaction hazards, of WBN2 seismic category I (L) conduits and supports by using screening criteria guidelines and technical procedures, including documentation forms.

Calculation WCG-2-349 provides the criteria and guidelines for the screening verification walkthroughs. The inspectors also verified allowable conduit spans between supports, conduit configurations, conduit fittings, and any missing parts or mismatched support components.

The inspectors observed the screening verification walkthroughs for conduits 2AC1177, PLC434, PLC437, T2144, 2RM716, PLC439, 2T-3506, and 2RM714 in the auxiliary equipment building, Elevation 729 ft. The screening verification walkthroughs were being conducted per Limited Scope Walkdown Request 3111, Rev. 0.

The inspectors also observed the walkdown of Class 1E conduits to verify that one-hole clamp supports have three components: the strap, the spacer, and the anchor bolt assembly. The walkdown also verified that each strap matched the spacer of the same manufacturer and the support span was within allowable limits. Specifically, the inspectors observed the walkdown of conduit one-hole clamp supports for annulus exhaust valve 2-FSV-030-0054 per WO 08-956627-018 for Engineering Document Construction Release (EDCR) 52938.

The inspectors observed the walkdown of the following conduits: 2VC-02204A, 2VC-02206A, 2VC-02207A, 2VC-02208, 2VC-02209, 2VC-02210B, 2VC-02211, 2VC-02212B, 2VC-02213B, and 2VC-02214B.

b. Observations and Findings:

No findings of significance were identified.

c. Conclusions

The inspected activities associated with the conduit supports CAP were performed in accordance with procedures and engineering supporting documentation.

### **C.1.3 Safety-Related Piping Work Observations (IPs 49063, 49065 and 50073)**

a. Inspection Scope

The inspectors reviewed selected construction completion project procedures associated with work on safety-related piping to verify the adequacy of ongoing work activities. The inspectors observed cleanliness controls, installation, grinding, supporting, cleaning and flushing activities. Specifically, the inspectors reviewed activities associated with WO 08-822009-004R2 for the installation of safety-related ASME Section III, Class III piping assemblies including 24" butterfly valves and crosstie piping assembly. The inspectors also observed the torquing of pipe flanges and quality-related inspections, for Design Change Notice (DCN) 52798, Emergency Raw Cooling Water (ERCW) Modification, and verified that applicable requirements were met including conformance with construction/installation specifications and procedures; personnel were adequately qualified; control of nonconforming items; and implementation of design changes. Additionally, two PERs associated with corrective actions for installation deficiencies were reviewed by the inspectors. Specific documents reviewed are listed in the attachment.

The following samples were inspected:

- IP 49063 Section 02.01 - one sample
- IP 49063 Section 02.02 - one sample
- IP 49063 Section 02.03 - one sample
- IP 49063 Section 02.04 - one sample
- IP 49065 Section 02.02 - one sample
- IP 50073 Section 02.02.c - one sample

b. Observations and Findings

No findings of significance were identified.

The inspectors noted an observation where QC inspection data sheets, used to document inspection attributes for the ERCW work, lacked clarity causing confusion as to what attributes were inspected and completed by QC. PERs 203910 and 204710 were initiated to document this observation.

c. Conclusions

The activities observed, relative to piping installation, QC inspection and ERCW safety-related piping modifications, were adequate and completed in accordance with applicable procedures, drawings and specifications.

**C.1.4 Radiograph Film Interpretation of Safety-Related Welds (TI 2512/32, IP 57090)**

a. Inspection Scope

The inspectors reviewed completed radiographs for three previously completed welds on safety-related piping. These welds represented a portion of the population of historical welds (completed prior to 1988) which require new radiograph examinations (RT) due to various deficiencies associated with the original RT film records. This effort is intended to satisfy a portion of the corrective actions associated with PER 170933 and the Welding CAP. Specific RT film issues previously identified under the Welding CAP included poor film quality, degraded film, inability to read appropriate hole on the image quality indicator (IQI), potential weld indications, lack of 100 percent coverage and other deficiencies. RT film and examination reports were reviewed to determine whether they were prepared, evaluated, and maintained in accordance with applicable commitments and/or requirements.

Specific radiographs reviewed included the following:

<u>Weld ID</u>	<u>Component</u>
2-015A-T001-58	3-inch diameter carbon steel piping
2-015A-T001-49	3-inch diameter carbon steel piping
2-015A-T004-61	4-inch diameter carbon steel reducer

All three welds were located in American Society of Mechanical Engineers (ASME) Section III Class 2 piping in the Unit 2 steam generator blowdown system.

The inspectors reviewed the new RT film and examination reports. Additionally, the inspectors compared the new RT records with the original records completed during 1983 and 1987.

The records were compared to the applicable code (ASME Boiler and Pressure Vessel Code, Section III, 1971 Edition with Addenda through Summer 1973) to verify compliance. Specific documents reviewed are listed in the attachment.

The following samples were inspected:

- IP 57090 Section 02.03.a - one sample
- IP 57090 Section 02.03.d - one sample

b. Observations and Findings

No findings of significance were identified. The inspectors noted that the applicant's non-destructive examination (NDE) Level III examiner had determined that weld 2-015A-T001-58 would require additional future RT examination due to a potential linear indication requiring further evaluation.

c. Conclusions

The inspectors determined that the reviewed radiographs met applicable ASME code requirements and other regulatory requirements.

**C.1.5 Electrical Cable Signal Tracing (IP 51063, TI 2512/016, and TI 2512/028)**

a. Inspection Scope

The inspectors reviewed the applicant's methodology for resolving known deficiencies associated with the Cable CAP Computerized Cable Routing System (CCRS) sub-issue. Specifically, that the CCRS data base did not contain sufficient cable information (installed length did not match design length or routing in CCRS was not correct).

Additionally, the inspectors observed ongoing signal tracing activities to verify cable routing for Appendix R cables. This effort was being conducted to support limited scope walkdown (LSWD) package 1227, which required identification and documentation of the routed cables as designed. The inspectors reviewed the LSWD package and WO 09-0952118-031. The inspectors also compared the actual installation with drawing 45W2766-3.

Specifically the inspectors reviewed cable tracing activities for cables:

- 2V2741A, routed from 2-MCC-213-A1/14A-A to 2-JB-292-1360-A
- 2V4051B, routed from 2-MCC-213-B1/3E-B to 2-JB-292-3214-B

The inspectors also interviewed personnel performing the signal tracing to verify their knowledge of the activities and reviewed calibration dates for the Rycom utility locator used to verify the cable routing.

Samples inspected are as follows:

- IP 51063 Section 02.02.e - two samples

b. Observations and Findings:

No findings of significance were identified. The applicant had decided to signal trace any safety-related or Appendix R cables which did not have pull cards available (missing QA records). At the time of this inspection, the applicant had not yet determined the full scope of missing cable QA records; however, a limited number of Appendix R cables had been identified for which no pull cards existed. The inspectors had previously observed craft training and demonstration of use of the signal tracing equipment. That review was documented in NRC Inspection Report (IR) 0500391/2009604.

c. Conclusions

The inspected activities associated with electrical systems and components were conducted in accordance with approved specifications and procedures. Based on previous demonstration of equipment use and the above observation of actual signal tracing of cables, the inspectors concluded that the applicant's methodology would provide an acceptable alternate source of cable routing verification.

**T.1 Training and Qualification of Plant Personnel**

**T.1.1 Craft Training (IPs 51063 and 64051)**

a. Inspection Scope

The inspectors observed a classroom training session for hot work fire watches. The inspectors attended and observed ignition source fire watch initial training, Course No. FPT 013.00, reviewed the associated procedures and lesson plans, and held discussions with the instructors. The course included a presentation on industry events and lessons learned. The training also highlighted selected portions of TVA procedure SPP-10.11, Control of Ignition Sources (Hot Work), Revision 3, and TVAN procedure SPP-10.9, Control of Fire Protection Impairments, Revision 3.

The inspectors also observed classroom training sessions associated with electrical maintenance initial training, Course EME033.001, Cable Splicing and Terminations, and verified that electricians were qualified by indoctrination and training program. The inspectors reviewed the associated procedures and lesson plans, and held discussions with the instructors. The training sessions were conducted to provide guidance on implementing procedures 25402-000-GPP-0000-N3303 for cable installation and Modification Addition Instruction (MAI)-3.3, Cable Terminating, Splicing, and Testing for Cables Rated Up to 15,000 Volts, Revision 24. The training sessions included discussions on crimping techniques and tools and using required procedures.

Samples inspected are as follows:

- IP 64051 Section 02.04 - one sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

TVA's program for training of newly hired personnel related to hot work fire watches and cable splicing and termination, was adequate for the current level of construction activities being performed.

### III. Operational Readiness Activities

#### F.1 Fire Protection (IP 64051)

a. Inspection Scope

The inspectors conducted a visual inspection of fire suppression and detection devices inside the Unit 2 reactor building and construction areas within the control building and auxiliary building. The inspectors conducted a walkdown of TVA's established fire protection/prevention controls for Unit 2. The inspectors also verified that fire protection impairment permits (FPIPs) had been established for impairment of installed fire protection features and that hot work permits were posted at the location of any hot work. The inspectors reviewed recently established FPIPs C09-0771, C09-0773, C09-0774, and C09-0775. The inspectors also observed fire prevention aspects associated with welding activities of an auxiliary feedwater system pipe support in the auxiliary building per WO 09-952225-001 for EDCR 52438.

The following samples were inspected:

- IP 64051 Section 02.06 – four samples
- IP 64051 Section 02.07 – ten samples
- IP 64051 Section 02.08 – one sample

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

TVA implemented adequate fire protection measures and controls to support Unit 2 construction activities and minimize impact on Unit 1 operation activities.

### IV. Other Activities

#### OA.1.1 (Closed) Inspection of Watts Bar Nuclear Plant Soil Liquefaction Program (TI 2512/042)

a. Inspection Scope

The Soil Liquefaction SP is related to the potential for soils to liquefy at Watts Bar Units 1 and 2 during a seismic event. Several employee concerns from the 1980's prompted



the initiation of this SP at Watts Bar. The concerns associated with this SP resulted in the identification of the following three issues:

- The use of alternative material
- Incomplete excavation of potentially liquefiable material
- Leakage between the IPS and the adjacent trench (trench B)

The IPS at Watts Bar is a structure and area that is common to both units and was credited for Unit 1 at the time of licensing; therefore, the actions associated with the IPS and the soil liquefaction IP were previously resolved as part of Unit 1 licensing process.

The NRC staff documented its review of the Watts Bar Unit 2 Soil Liquefaction SP in a letter to TVA dated February 11, 2009. The staff reviewed NUREG-0847, Supplements 9 (Section 2.5.4) and 11 (Section 2.5.4.4). Supplement 9 documented the staff's finding that the program was acceptable for Unit 1. As a result, the staff concluded that this special program is also closed for Unit 2 based on the program being acceptably implemented for Unit 1 and with no other areas of concern being identified.

In addition to the NRC staff review, NRC inspectors conducted an independent review of NRC IR 50-390,391/92-45 which addressed and closed the special program; NUREG-1232, Volume 4, Safety Evaluation Report on Tennessee Valley Authority: Watts Bar Nuclear Performance Plan, Watts Bar Unit 1 (January 1990); and other correspondence including the Soil Liquefaction Closure Report dated July 10, 1992 and an on-site audit report on Watts Bar Seismic Analysis Corrective Action Program Plan dated October 10, 1990, from L. B. Marsh. During the review, the inspectors noted that soil liquefaction was previously inspected and resolved as documented in NRC IR 50-390,391/92-45. In this report, the inspectors verified that the employee concerns had been addressed and all safety issues resolved. The report also documented:

- Review of documentation for the modifications made in the area of the intake pumping station to preclude excessive water runoff
- Review of the corrective action tracking document and closure
- Verification of the work plan documentation and closure
- Verification of FSAR revision
- Review of TVA's QA closure of documents
- Verification of implementation and closure of the documents associated with this issue

The inspectors' review determined that TVA had taken adequate corrective actions to resolve the concern about potential liquefaction at the area around the IPS and, therefore, closed the SP.

b. Observations and Findings

No findings of significance were identified.

c. Conclusions

The issues pertaining to soil liquefaction have been previously addressed and resolved for Units 1 and 2 as documented in the above inspection report, NRC correspondence,

and NUREG-1232. Although NUREG-1232 only addressed Unit 1; the evaluations and methodology reviewed by the NRC staff and discussed in NUREG-1232 are applicable to both Units 1 and 2.

Based on the following, the inspectors confirmed and determined that the Soil Liquefaction SP had been addressed for both units:

- Methodology outlined in the special program for both units is applicable to Unit 2;
- Previous NRC inspections concluded that adequate corrective actions were taken and the SP was closed in IR 50-390 and 391/92-45

As a result of this inspection, no additional inspections of this SP are planned; however, future inspections may be conducted for activities which may impact those structures discussed above.

**OA.1.2(Closed) Inspection of Watts Bar Unit 2 Cable Corrective Action Program Sub-Issue Pulling Cables Through 90-degree Condulets/Mid-Route Flexible Conduits (TI 2512/016)**

a. Inspection Scope

Historically, concerns were raised during WBN Unit 1 construction that there was potential damage to cables pulled through 90° condulets due to the small supporting surface on the inside corners of condulets provided for cables under tension. There were also concerns that when a cable is pulled through a flexible conduit segment bend, in the middle of a conduit run, it could be subjected to very high frictional forces that could tear the cable jacket and insulation. The evaluation of this Cable CAP sub-issue was documented in NUREG-1232 (ADAMS No. ML073450544) and the issues were ultimately resolved for WBN Unit 1.

In an attempt to address the applicability of these issues to WBN Unit 2, TVA evaluated past efforts used to verify that both aspects of the sub-issue had been adequately addressed. This proposed methodology was communicated to the NRC and was subsequently acknowledged as an adequate plan in the NRC's Safety Evaluation for the Cable and Electrical Corrective Action Program Plans (ADAMS No. ML092151155). This plan primarily consisted of a review of the testing performed on Unit 1 and Unit 2 components to verify that all concerns have been addressed for Unit 1 sub-issue closure and subsequently bind Unit 2 sub-issue closure. Specifically, it was identified that, with regards to the 90° condulet issue, 10 of the most susceptible feeder runs (3 of which were in WBN Unit 2) were tested by subjecting them to the thermal and radiation levels that would be expected as a result of a loss-of-coolant-accident (LOCA). The testing successfully demonstrated that the subject cables would be qualified for a 40-year life.

With regards to the mid-route flexible conduits sub-issue, TVA evaluated cables pulled through mid-route flexible conduits, which had been tested for pullby damage, and confirmed that no damage was caused by the interaction between the cable and the mid-route flexible conduits. Additionally, in its submittal for resolving this sub-issue for WBN Unit 2, TVA stated that high-potential testing of Unit 2 cables also confirmed that no damage resulted from pulling cables through mid-route flexible conduit.

Furthermore, TVA has revised its cable installation procedures, which now require that cables not be pulled through flexible conduits unless it is a straight section of a flexible conduit or a flexible conduit with a maximum 15-degree offset.

The inspectors reviewed test records, procedural guidance, and performed interviews to verify that the TVA sub-issue resolution plans were adequately implemented and supported. Specific documents reviewed are listed in the attachment.

b. Observations and Findings

No findings of significance were identified. The inspectors confirmed by review of the WBN Unit 1 CAP Closure Package report, test records, and installation records that Unit 2 cables were included in the historical testing identified above. Furthermore, there is no documentation found to indicate that cables were pulled through 90-degree condulets or that damage occurred to any cables caused solely by pulling cables through mid-route flexible conduits. Additionally, current procedural guidance and management controls are established to preclude any re-occurrence of the problems discussed in the specified sub-issue.

c. Conclusions

Based on the results of this inspection, it is concluded that concerns pertaining to the Cable CAP dealing with this specific sub-issue have been addressed and resolved for Units 1 and 2. No additional inspection of this sub-issue is planned; however, future inspections may be conducted for revised/new cable installation and design activities.

**OA.1.3 Corrective Action Plans and Special Programs Reviews (TI 2512/16, 18, 20, 34, 35, 36, 37, 41)**

The inspectors held discussions with both TVA and Bechtel engineering and licensing personnel regarding the actions planned to resolve the issues associated with the following CAPs and SPs:

- Radiation Monitoring System; TI 2512/041
- Electrical CAP Sub-Issue Flexible Conduit; TI 2512/020
- Conduit Supports CAP; TI 2512/018
- Electrical CAP Sub-Issue Contact and Coil Rating; TI 2512/020
- Cable CAP Sub-Issue Proximity to Hot Pipes; TI 2512/016
- Cable CAP Sub-Issue Splices; TI 2512/016
- Cable CAP Sub-Issue Bend Radius; TI 2512/016
- Cable CAP Sub-Issue Pullbys; TI 2512/016
- Cable CAP Sub-Issue Supports in Vertical Conduits; TI 2512/016
- Cable CAP Sub-Issue Supports in Vertical Trays; TI 2512/016
- Cable Tray and Cable Tray Supports CAP; TI 2512/017
- Containment Cooling SP; TI 2512/034
- Control Room Design Review SP; TI 2512/035
- Master Fuse List SP; TI 2512/037
- Environmental Qualification of Electrical Equipment SP; TI 2512/036

The actions discussed covered the following areas as applicable:

- Walkdowns
- Engineering
- Construction
- Testing

The purpose of these discussions was for the inspectors to gain an understanding of the actions required to close the subject CAP or SP, in order to help them develop inspection plans and preliminary inspection schedules. No specific inspection activities were performed. Rather, the inspectors conducted initial CAP and SP discussions only. Actual inspection activities associated with CAPs and SPs performed during this reporting period are discussed elsewhere in this report and contain the appropriate observations and findings.

## **V. Management Meetings**

### **X.1 Exit Meeting Summary**

On January 15, 2010, the resident inspectors presented the inspection results to Mr. Masoud Bajestani and other members of his staff. Although some proprietary information may have been reviewed during the inspection, no proprietary information was included in this inspection report.

## SUPPLEMENTAL INFORMATION

### KEY POINTS OF CONTACT

#### Applicant personnel

G. Arent, Licensing Manager, Unit 2  
J. Atwell, Project Director, Bechtel  
M. Bajestani, Vice President, Unit 2  
M. Bali, Electrical Design Manager, Bechtel  
R. Baron, Nuclear Assurance Project Manager, TVA, Unit 2  
B. Briody, Maintenance and Modifications Manager, TVA, Unit 2  
P. Byron, Licensing Engineer  
B. Crouch, Lead Mechanical Engineer, TVA, Unit 2  
R. Esnes, Engineering Manager, Washington Group, Inc  
T. Franchuk, Quality Manager, Bechtel  
E. Freeman, Engineering Manager, TVA, Unit 2  
W. Goodman, Procurement Manager, Bechtel  
J. Hannah, Corrective Action Coordinator, Bechtel  
S. Hilmes, Lead Electrical Engineer, TVA, Unit 2  
M. Lackey, ECP Rep, TVA, Unit 2  
R. Kuhn, Quality Assurance Manager, Bechtel  
D. Malone, Quality Assurance, TVA, Unit 2  
J. McCarthy, Licensing Engineer, Unit 2  
R. Moll, Preop Startup Manager, TVA, Unit 2  
D. Myers, Quality Assurance Manager, TVA, Unit 2  
L. Davenport, Contracts/Procurement Manager, TVA, Unit 2  
D. Osborne, Lead Civil Engineer, TVA, Unit 2  
J. Robertson, Acting Engineering Manager, Bechtel  
S. Sawa, Training Manager, Bechtel  
J. Schlessel, Construction Manager, TVA, Unit 2  
P. Theobald, Radcon Supervisor, TVA, Unit 2  
A. Aldridge, Acting Construction Manager, Bechtel  
D. Tinley, Quality Assurance, TVA, Unit 2

### INSPECTION PROCEDURES USED

IP 40504	Part 52, Identification and Resolution of Construction Problems
IP 49063	Safety-Related Piping Work Observation
IP 49065	Safety-Related Piping Record Review
IP 50053	Reactor Vessel and Internals Work Observation
IP 50055	Reactor Vessel and Internals Record Review
IP 50073	Mechanical Components – Work Observation
IP 51053	Electrical Components and Systems Work Observation
IP 51055	Electrical Components and Systems – Record Review
IP 51063	Electrical Cable Work Observation
IP 57090	Nondestructive Examination - RT
IP 64051	Procedures - Fire Prevention/Protection
TI 2512/016	Plant Cable Issues Corrective Action Program
TI 2512/017	Plant Cable Tray and Supports Corrective Action Program
TI 2512/018	Plant Conduit Supports Corrective Action Program
TI 2512/020	Plant Electrical Issues Corrective Action Program
TI 2512/028	QA Records Corrective Action Program
TI 2512/032	Plant Welding Corrective Action Program
TI 2512/034	Plant Containment Cooling Special Program
TI 2512/035	Plant Control Room Design Review Special Program
TI 2512/036	Nuclear Plant Environmental Qualification Special Program
TI 2512/037	Nuclear Plant Master Fuse List Special Program
TI 2512/041	Plant Radiation Monitoring Special Program
TI 2512/042	Plant Soil Liquefaction Special Program

### LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

#### Opened

None

#### Closed

2512/042	TI	Inspection of Watts Bar Nuclear Plant Soil Liquefaction Program (Section OA.1.1)
2512/016 (partial)	TI	Inspection of Watts Bar Unit 2 Cable Corrective Action Program Sub-Issue Pulling Cables Through 90-degree Condulets/Mid-Route Flexible Conduits (Section OA.1.2)

#### Discussed

None

## LIST OF DOCUMENTS REVIEWED

### I. Quality Assurance Program

#### Q.1.1 Identification and Resolution of Construction Problems

##### Procedures/Programs

25402-MGT-000, Corrective Action Program, Rev. 4

##### Oversight/Self-Assessment Documents

NA Audit 25042-WBN-AR-09-0003, Engineering Activities

NA Assessment Report NA-WB-09-029, Quality Assurance Corrective Action Program

Bechtel Housekeeping Surveillance Reports 25402-WBN-QC-09-0145, 25402-WBN-QC-09-0146, 25402-WBN-QC-09-0147, Housekeeping During Valve Refurbishment Activities

NA Surveillance Report 25402-WBN-SR-09-0758, Pipe Support Walkdown Package WBN2-PD-063-2331-01

NA Surveillance Report 25402-WBN-SR-09-0761, Pipe Support Walkdown Package WBN2-PD-063-2331-23

NA Surveillance Report 25402-WBN-SR-09-0764, Field Change Request Quarterly Summary Report, September 2009

NA Surveillance Report 25402-WBN-SR-09-0752, ABSCE/Work Order Reviews

NA Surveillance Report 25402-WBN-SR-09-0748, Control of Welding Filler Material

NA Surveillance Report 25402-WBN-SR-09-0751, Cable CAP – Supports in Vertical Conduits and Cable Trays

NA Surveillance Report 25402-WBN-SR-09-0739, PCI Energy Services Welder Qualification

NA Surveillance Report 25402-WBN-SR-09-0760, Corrective Action 163432-010, Isometric Drawings Review

NA Surveillance Report 25402-WBN-SR-09-0730, Control of Work Orders Designated ABSCE Stop Work Order

NA Surveillance Report 25402-WBN-SR-09-0697, In-Process Pipe Support Modification Work Orders

NA Surveillance Reports 25402-WBN-SR-09-0702 and 25402-WBN-SR-09-0703, Interference with QC Site Wide Stand Down Meetings

### II. Management Oversight and Controls

#### C.1.1 Protection of Installed Plant Equipment During Construction Activities

##### Procedures and Standards

WDP-PD-2, Walkdown Procedure for Piping and Pipe Supports, Rev. 6

#### C.1.3 Safety-Related Piping Work Observation

##### Problem Evaluation Reports

203910, Lack of documentation clarity for inspection attributes

204710, Failure to perform all required inspections

Work Order

WO 08-822009-005, ERCW Train 2A-A per DCN 52798 Stage 1

Procedures

TI-100.014, ASME Section XI Repairs and Replacements, Rev 0

C.1.4 Radiograph Film Interpretation of Safety-Related WeldsProblem Evaluation Reports

170933, Re-review of Unit 2 TVA produced radiographs

**III. Operational Readiness Activities**F.1 Fire ProtectionProcedures and Standards

SPP-10.9, Control of Fire Protection Impairments, Revision 3,  
SPP-10.11, Control of Ignition Sources (Hot Work), Revision 3

**IV. Other Activities**OA.1.2 Inspection of Watts Bar Unit 2 Cable Corrective Action Program Sub-Issue Pulling Cables Through 90-degree Condulets/Mid-Route Flexible Conduits

Technical Evaluation report, TER-C5506-649, dated March 10, 1987, prepared by Franklin Research Center

TVA CAP program plan submitted by letters dated December 20, 1989, and June 15, July 31, October 11, and November 5, 1990 (ADAMS Nos. ML073541157, ML073541204, ML073541237, ML073550196, and ML082380711)

TVA Responses to NRC Comments Resulting from August 1-3, 1990 Meeting (Adams No. ML073550196), dated October 11, 1990

NRC Inspection Reports Nos. 50-390, 391/95-17 and 50-390, 391/94-53

TVA's submittal of May 29, 2008, as supplemented

TVA letter to the NRC dated January 14, 2009 – Watts Bar Nuclear Plant (WBN) – Unit 2 – Response to Request for Additional Information Regarding Cable Issue Corrective Action Program (TAC No. MD9182)

TVA letter to the NRC dated April 6, 2009



**LIST OF ACRONYMS**

ASME	American Society of Mechanical Engineers
CAP	Corrective Action Program
CAQ	condition adverse to quality
CCRS	computerized cable routing system
CFR	Code of Federal Regulations
DCN	design change notice
FME	foreign material exclusion
EDCR	engineering document construction release
FPIP	Fire Protection Impairment Permit
IP	Inspection Procedure (NRC)
IPS	intake pumping station
IQI	image quality indicator
IR	inspection report
LSWD	limited scope walkdown
NA	Nuclear Assurance
NCV	non-cited violation
NDE	non-destructive examination
NRC	Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation (NRC)
NUREG	(NRC) technical report designation
PER	Problem Evaluation Report
PSI	Pre-Service Inspection
QA	quality assurance
QC	quality control
RCS	reactor coolant system
RHR	residual heat removal
RPV	reactor pressure vessel
RT	radiograph test (examination)
SER	Safety Evaluation Report
SI	safety injection
SP	Special Program
SSC	structures, systems, and components
SWBP	sidewall bearing pressure
TI	Temporary Instruction (NRC)
TVA	Tennessee Valley Authority
WBN	WBN Nuclear Plant
WBNPP	Watts Bar Nuclear Performance Plan
WO	work order