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June 3, 2010

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555-0001

Watts Bar Nuclear Plant, Unit 2  
NRC Docket No. 50-391

Subject: **Watts Bar Nuclear Plant (WBN) Unit 2 - Information Regarding Buried Piping/Cable**

The purpose of this letter is to provide the U.S. Nuclear Regulatory Commission (NRC) with information regarding buried piping/cable in connection with WBN Unit 2 in response to a verbal request from the NRC Staff. The enclosure to this letter provides the requested information.

There are no regulatory commitments associated with this submittal. If you have any questions, please contact William Crouch at (423) 365-2004.

Sincerely,

  
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Watts Bar Unit 2 Vice President

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NRR

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Enclosure:

1. Information Regarding Buried Piping/Cable Associated with WBN Unit 2

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## **Enclosure**

Information Regarding Buried Piping/Cable  
Associated with WBN Unit 2

## **Information Regarding Buried Piping/Cable Associated with WBN Unit 2**

### Scope Added by Completion of WBN-2

#### Piping

Completion of Watts Bar Nuclear Plant (WBN) Unit 2 will not introduce any additional Safety Related (SR) or Quality Related (QR) buried piping systems (i.e., piping that is in direct contact with soil) beyond those that are already in service to support Unit 1 operation.

Completion of WBN-2 will introduce additional SR and QR underground piping that is routed through the Unit 2 pipe tunnel; this piping is below grade but is not considered buried piping because it is not in direct contact with soil.

- SR underground piping includes the 24" Refueling Water Storage Tank (RWST) header and the 6" Containment spray test line, which run between the RWST and the Aux Building.
- QR underground piping routed through the Unit 2 Pipe Tunnel includes the 6" Primary Water Makeup pump suction line and the 3" Primary Water Makeup pump recirc line, which run between the Primary Water Storage Tank (PWST) and the Aux Building.

Completion of WBN-2 will introduce additional Non-Quality Related (NQR) buried piping that is not currently in service to support Unit 1.

Underground (not buried) NQR piping that is routed through a pipe trench from the Unit 2 condensate storage tank (CST) to the Turbine Building has already been turned over to Unit 1, and is not part of the scope of work for completion of WBN-2.

#### Cables

In general, Tennessee Valley Authority (TVA) construction practice is that no underground cables are directly buried in soil, regardless of safety class.

There is no underground or buried safety-related cable added by the WBN-2 completion project. Safety-related power cables at WBN that are routed underground include the cables from the Diesel Generator (DG) Building to the Aux Building, cables from the Aux Building to the intake pumping station, and cables from the additional DG Building to the DG Building. These cables are routed through duct banks, and are currently in service to support Unit 1 operation.

Safety-related signal cables from RWST level transmitters (2-LT-63-0050, -0051, -0052, and -0053) to the Aux Building are routed through divisional conduit in the RWST pipe tunnel, and are not considered to be buried cables (reference TVA drawings 45W2635-76 and -92).

## **Information Regarding Buried Piping/Cable Associated with WBN Unit 2**

### Handling of Potential Leakage from New Unit 2 SR and QR Underground Piping

As stated above, underground SR and QR piping being added by completion of WBN-2 is routed through the Unit 2 Pipe Tunnel. The design of the Unit 2 Pipe Tunnel is that any inleakage to the tunnel (i.e., leakage from piping routed through the tunnel) drains back toward the Aux Building through two-3" floor drains, which are routed to the Floor Drain Collector Tank (FDCT) (part of Waste Disposal system).

Plant Operators monitor the FDCT level, and manually start and stop the pumps at pre-determined levels to control the tank level and process the water to Radwaste. An increased frequency in the manual starts would provide indication of a leak, which would prompt the Operators to look for the source.

### Strategy to Address Buried Piping Reliability

Start-up and operation of WBN-2 will rely on SR and QR buried piping systems that are currently in service to support Unit 1, such as Essential Raw Cooling Water (ERCW), Fire Protection, Fuel Oil, and Waste Disposal. WBN-2 will also rely on some NQR buried piping that is already in service to support Unit 1, and some additional Unit 2 NQR buried piping that is not currently in service.

The TVA Nuclear Power Group (NPG) strategy for ensuring reliable operation of buried piping systems is addressed by the Buried Piping Integrity Program (BPIP). The program addresses SR, QR and NQR piping.

The BPIP is described in Standard Program and Process (SPP) -9.15, "Buried Piping Integrity Program." The objective of the BPIP is to provide a comprehensive program to reduce the probability and consequences of buried piping failure.

- The program addresses external (OD) corrosion and/or degradation of buried piping; it is not intended to address internal (ID) corrosion.
- SPP-9.15 applies to safety related, quality related, and non-quality related piping systems.

The BPIP plan described in SPP-9.15 is implemented in six steps:

1. Establishing site documents/databases.
2. Risk ranking of in-scope pipe segments.
3. Inspections of in-scope piping systems.
4. Fitness-for-service evaluations of inspection results.
5. Identification of repair options for degraded piping.
6. Prevention and mitigation measures for reducing risk of failure.

## Information Regarding Buried Piping/Cable Associated with WBN Unit 2

Each NPG site has a site implementing procedure, site basis document, and site-specific database. The site-specific documents identify the buried piping systems and segment data, risk ranking of segments, inspection schedule and results, analysis of inspection results, trends, leak history, and repair/replacement history for buried piping.

- WBN site procedure for the BPIP is Technical Instruction (TI) -32.015, "Buried Piping Component Monitoring Program."
- WBN site basis document has been issued defining all buried piping segments/zones and associated risk ranking for Unit 0 (shared) and Unit 1 buried piping required to support Unit 1 operation.
- Definition of segments/zones and risk ranking of the additional buried pipe associated with Unit 2 has not been done. Scoping for the BPIP will have to be done for:
  - SYS027 Condenser Circulating Water (CCW) suction and discharge for Unit 2 CCW pumps.
  - SYS035 Hydrogen (H<sub>2</sub>) Piping (a short segment between Turbine Building Secondary Control Station and Turbine Building).

### Miscellaneous Information

Inspection of selected buried piping locations has been completed using Guided Wave testing. Buried piping system segments inspected include Lube Oil, Fuel Oil, ERCW, High Pressure Fire Protection (HPFP), and Raw Cooling Water (RCW) piping. Unit 2 piping (i.e., piping designated as Unit 2 but already in service to support Unit 1 operation) tested includes Guided Wave scans (G-scans) of the ERCW supply/discharge headers and Fire Protection header from the north end of the Unit 2 Pipe Tunnel, with no indications of unacceptable degradation. Due to the limitations of G-scan technology, the testing was only capable of providing information on a limited length of ERCW buried piping.

The BPIP requires that a direct visual inspection per SPP-9.15 be conducted of any buried piping that is uncovered for maintenance. Since inception of the program, there have been no such opportunities for buried ERCW piping. TVA is currently evaluating further options (other than visual inspection) for examining the buried ERCW piping. NPG has established a Buried Piping Peer Review Team to review buried piping issues including potential adverse trends related to buried piping, Problem Evaluation Reports (PERs), industry Operating Experience, training materials, inspection scope and schedules, and program health reports.

The following table lists WBN Operating Experience with buried piping leaks based on a search of the PER database from 1996 to 2010. As of June 1, 2010, buried piping leaks noted in the table have been repaired with the exception of the diesel fuel oil fill line noted in PER 213442. Interim actions to contain the leak have been completed, and a PER action is in place to obtain an approved repair/replacement plan and repair the pipe.

## Information Regarding Buried Piping/Cable Associated with WBN Unit 2

Watts Bar Nuclear Plant (WBN) Operating Experience with Buried Piping Leaks, Based on a Search of the Problem Evaluation Report (PER) Database from 1996 to 2010:

PER/WO	Date	Description	System
2817	04/18/2000	EVIDENCE OF FUEL OIL IN MANHOLE 29 AND STORM DRAIN EAST OF TURBINE BLDG. EVIDENCE OF SHEEN IN DRAINS. Performed ultrasonic and pressure testing of diesel fuel transfer piping and determined the section of piping between the south side of the Fire Hall and the Main fuel Oil Storage Tanks leaked.	018 Fuel Oil
4037	11/16/2001	A water leak has been discovered bubbling out of the ground between the Unit 1 cooling and the Intake Pumping Station (IPS).	026 Fire Protection
02-000899-000	01/22/2002	Approx. 55 to 60 gallons of water per minute coming from the ground through stand pipe located next to Catch Basin 60. Based on chemistry samples a potential Raw Cooling Water (RCW) pipe leak could exist. Location is North of Switchyard and West of the RCW Strainer Pad.	024 Raw Cooling Water
4648	02/17/2002	'B' TRAIN FIRE HEADER LEAK FOUND IN THE YARD NORTH OF THE COOLING TOWERS. VALVES 0-ISV-26-582 AND 2-ISV-26-573 WERE CLOSED AND CONFIGURED IN WORK ORDER (WO) 02-2058-00 (THIS ACTION STOPPED THE LEAK).	026 Fire Protection
5289	05/28/2002	High Pressure Fire Protection leak on B Train header discovered south of the Unit 1 Cooling Tower. This leak appears to be just west of a previously repaired leak (WO #01-016469-000) on this header. Isolation of the B train header stopped leak.	026 Fire Protection
6650	01/29/2003	Thru-wall leak discovered in the buried two inch service air header in the yard near the Intake Pumping Station.	033 Service Air



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PER/WO	Date	Description	System
6679	01/30/2003	<p>Three of four samples of ground water taken from recently drilled onsite wells on 1/07/03 had detectable levels of tritium. Further investigation identified the Fuel Transfer Canal (FTC) and a 4" buried leaking plant liquid effluent line as the two sources for the tritium.</p> <p>Corrective actions completed:</p> <ul style="list-style-type: none"> <li>• The 4" Radwaste effluent line leak was identified by pressure testing of the failed segment. The leaking segment was replaced in May 2003 and was subsequently re-tested and confirmed to be leak tight.</li> <li>• The 4" Radwaste effluent line was replaced under DCN 51690 in May 2005.</li> <li>• The Fuel Transfer Canal was coated in 2004 to eliminate leakage.</li> </ul> <p>In addition to the corrective actions, WBN site Chemistry performs routine tritium sampling on a monthly basis for groundwater sumps and a quarterly basis for onsite monitoring wells.</p>	077 Waste Disposal
7168	03/27/2003	There is a leak in the B Train High Pressure Fire Protection header south of the cooling tower. WO 03-005718-000 initiated.	026 Fire Protection
66767	08/10/2004	PER generated to document leak found at the New Makeup Deionized (NMDI) building on the discharge line from 0-PMP-959-31. The inservice DI header was found ruptured in the yard near the NMDI building.	959 Demin water storage
76415	02/09/2005	Repair of leaking 6" Demineralized water piping near the Administration Building (Work Order 05-810833-000) cannot be performed as designed without substantial excavation and exposure of adjacent operating systems. Request Engineering to supply an alternate repair method.	059 Demin Water
82059	05/06/2005	There is a leak in the 12 inch B-Train High Pressure Fire Protection header south-east of the Unit 1 Cooling Tower as identified by WO 05-814288-00. This PER is to document this leak as required by SPP-9.7, "Corrosion Control Program," Section 3.3 and Appendix C.	026 Fire Protection
94782	01/05/2006	PER is to document a pipe leak in the yard near the Intake Pumping Station. The leakage has been estimated at 10 gpm.	029 Potable Water

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PER/WO	Date	Description	System
105466	06/20/2006	On 06-13-06 a wet spot with water standing on the surface of the ground was discovered in the Yard area between the Engineering and Quality Building (EQB) and the Modification Shops. This wet soft area was located south of the roadway.	029 Potable Water
105469	06/20/2006	On 06-19-06 a wet area with water standing on the surface of the ground was discovered South of the Emergency Response Building (ERB) at the edge of the excavated area for the Environmental Protection Agency (EPA) Oil Containment Structure that was under construction. This area is East of the roadway between the ERB and the Nitrogen storage Skid just north of the Diesel Oil Storage Tanks. WO 06-816671-000 was initiated to excavate in this area to determine the source of the water.	029 Potable Water
121854	03/19/2007	During the Storm Water Self-Assessment, WBN-CEM-07-002, a non-storm water site assessment was conducted. A potential potable water leak was noted in the vicinity of SW-7, drainage area 3, located at the laydown area east of the north portal.	029 Potable Water
135439	12/21/2007	There is a small underground water leak located in the front of the Emergency Vehicle Storage Building (Fire House). The leak is seeping up at the edge of the concrete pad and road. It appears that the leak is coming from the 6-inch fire protection underground piping. Fire Ops had Chemistry sample the water and could not make a determination on whether or not it was fire water or raw water. <i>(NOTE: Testing later found that this was a Potable Water leak.)</i>	029 Potable Water
175693	07/09/2009	On July 3, 2009, Security informed Operations of two locations where the ground was wet/soft. The general locations are near the southeast corner of the switchyard, east of the access road leading to the Intake Pumping Station. This PER documents WBN Engineering Programs investigation and evaluation of the potential buried piping leak. Documented in WO 09-816751-000.	029 Potable Water

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PER/WO	Date	Description	System
213442	01/20/2010	<p>While excavating soil on the north side of the plant nitrogen skid, Modifications (MODs) personnel noticed a diesel odor and observed free liquid in the hole. MODs personnel stopped work and Environmental personnel were notified immediately. Upon observation, free-standing liquid was found in the excavated hole. Chemistry obtained a sample of the liquid, which indicated that it was approximately 50% fuel oil and 50% water. Environmental confirmed through visual observation that diesel had not reached storm water drains or waters of the United States. Work orders have been initiated to pressure test the fuel oil fill line as well as the underground transfer line to seven-day tanks. <i>(Note: Leak determined to be in fill line and not reportable.)</i></p>	<p>018 Fuel Oil</p>