Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381-2000

William R. Lagergren, Jr.
Site Vice President, Watts Bar Nuclear Plant

APR 0 2 2002

10 CFR 50.54(f)

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
11555 Rockville Pike,
Rockville, MD 20852

Gentlemen:

In the Matter of	)	Docket No.50-390
Tennessee Valley Authority	)	

WATTS BAR NUCLEAR PLANT (WBN) UNIT 1 - RESPONSE TO NRC BULLETIN 2002-01, "REACTOR PRESSURE VESSEL HEAD DEGRADATION AND REACTOR COOLANT PRESSURE BOUNDARY INTEGRITY," DATED MARCH 18, 2002

This letter provides TVA's 15-day response to the subject bulletin for WBN, which requested information pertaining to the integrity of the reactor coolant pressure boundary including the reactor pressure vessel head and the extent to which inspections have been undertaken to satisfy applicable regulatory requirements. Enclosure 1 provides TVA's response to the requested information in Item 1 for WBN.

In accordance with the requested information for Item 2 contained in the subject bulletin, TVA plans to submit the required response for WBN Unit 1 within 30 days after plant restart following the next inspection of the reactor pressure vessel head to identify any degradation.

In accordance with the requested information for Item 3 contained in the subject bulletin, TVA plans to submit the required response for the remainder of the reactor coolant pressure boundary for WBN Unit 1 within 60 days of the date of the subject bulletin.

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Enclosure 2 contains the list of regulatory commitments contained in this letter. If you have any questions concerning this matter, please contact P. L. Pace at (423) 365-1824.

Sincerely,

W. R. Lagergren
Site Vice President,
Watts Bar Nuclear Plan

Subscribed and sworn to before me
on this 2nd day of April 2002

Loretta J. Masterson
Notary Public

My Commission expires 4/20/2004

Enclosures
cc (Enclosures):
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ENCLOSURE 1

WATTS BAR NUCLEAR PLANT UNIT 1
RESPONSE TO NRC BULLETIN 2002-01
REACTOR PRESSURE VESSEL HEAD DEGRADATION AND
REACTOR COOLANT PRESSURE BOUNDARY INTEGRITY

ENCLOSURE 1

WATTS BAR NUCLEAR PLANT UNIT 1
RESPONSE TO NRC BULLETIN 2002-01
REACTOR PRESSURE VESSEL HEAD DEGRADATION AND
REACTOR COOLANT PRESSURE BOUNDARY INTEGRITY

This letter provides TVA's response to the subject bulletin dated March 18, 2002, for Item 1.

1. Within 15 days of the date of this bulletin, all PWR addresses are required to provide the following:

   A. ***a summary of the reactor pressure vessel head inspection and maintenance programs that have been implemented at your plant,***

   RESPONSE

   Since WBN Unit 1 fuel load (November 1995), TVA has not performed a surface examination of the total reactor vessel head.

   On October 24, 1981, TVA performed a surface examination of the reactor vessel head to control rod drive mechanism (CRDM) nozzle interface during the reactor coolant system Cold Hydrostatic Test. This test required examination of the 83 head penetrations. No leakage was identified. The Preservice Inspection (PSI) took credit for this examination.

   WBN performs visual inspections each refueling outage of the area above the reactor vessel head and a portion of the head itself for evidence of boric acid leakage during reactor vessel and attachment disassembly. Site procedures incorporate steps to inspect for any signs of boric acid residue, corrosion, or active leaks. Procedure requirements include visual inspection of the CRDM eyebolts on the CRDM seismic support platform and instrument port disassembly, inspection of the reactor vessel head flange insulation before removal, and inspection of the head surface from the flange up to the support ring after that insulation is removed. The pressure retaining bolted connections of the reactor vessel and accessible areas of the reactor vessel head are also inspected for any signs of boric acid residue, corrosion, or leakage.

   Following the removal of the CRDM cooling ducts, the disassembly procedure requires inspection of the CRDMs, including 50 percent of the lower canopy seal welds for any boric acid crystals. Although the procedure requirement is to inspect 50 percent of the lower canopy

seal welds, TVA has performed a 100 percent inspection of these welds in each of WBN Unit 1's four refueling outages.

WBN has site procedures for outage leakage examinations to ensure integrity of reactor coolant pressure boundary, a procedure for service sensitive components and inspections of borated water systems for leakage and procedures for inspection of reactor head bolting as well as other pressure retaining component bolting for damage and leakage.

B. ***an evaluation of the ability of your inspection and maintenance programs to identify degradation of the reactor pressure vessel head including, thinning, pitting, or other forms of degradation such as the degradation of the reactor pressure vessel head observed at Davis-Besse,***

RESPONSE

The WBN inspection and maintenance programs monitor and inspect the reactor head vicinity for evidence of boric acid leakage. At each refueling outage, as stated in the response to Item 1A above, the CRDM canopy seals, conoseals, and areas above the head insulation are inspected for the presence of boric acid residue. The reactor vessel head from the flange to the support ring and including the flange bolts is also inspected for traces of boric acid residue, corrosion, or leakage. As noted in Item 1C below, these inspections have identified evidence of borated water leakage of significantly less magnitude than that observed at Davis-Besse. Through these inspections, boric acid residue which has the potential to create degradation such as that seen at Davis-Besse, Turkey Point, or Arkansas Nuclear One (ANO) would likely be identified, evaluated, and corrected.

C. ***a description of any conditions identified (chemical deposits, head degradation) through the inspection and maintenance programs described in 1.A that could have led to degradation and the corrective actions taken to address such conditions,***

RESPONSE

During WBN's first refueling outage (RFO-1), a canopy seal weld leak was identified which showed evidence of a trace of borated water down the CRDM head penetration, G-15, to a location below the top of the head insulation. The shroud and insulation around the penetration were removed to repair the canopy seal weld. A visual inspection was performed of the adjacent head area and no evidence of corrosion damage was identified. The boron residue was cleaned from the area and the canopy seal weld was repaired by approved methods.

WBN has had two other canopy seal pinhole leaks which have not shown evidence of a borated water trace down the side of the penetration and have not resulted in significant boric acid crystal deposits. The canopy seal leaks have been repaired in accordance with approved methodology.

The attached table provides the history of leaks identified in the vicinity of the reactor vessel head at WBN Unit 1.

D. ***your schedule, plans, and basis for future inspections of the reactor pressure vessel head and penetration nozzles. This should include the inspection method(s), scope, frequency, qualification requirements, and acceptance criteria, and***

RESPONSE

WBN plans to perform a remote under insulation inspection of the reactor head at the next refueling outage for evidence of boric acid leakage or leakage associated with CRDM penetration nozzles. This inspection will be a 100 percent head surface remote camera inspection to the extent achievable using current crawler technology. In addition, a best effort CRDM nozzle penetration examination will be performed. These inspections will be performed by a VT-2 Certified Inspector and any questionable indications or evidence of boron will also be inspected by a Metallurgical Engineer.

In the future, the WBN Program will be revised to include limited reactor head surface examinations. These examinations will be conducted on periphery nozzle penetrations and approximately 50 percent of the general head vicinity for evidence of leakage at each refueling outage. If boric acid leakage is identified, WBN will follow site programs for identification and repair of leakage. Each refueling outage, the CRDM canopy seals, conoseals, reactor flange, reactor flange insulation, and areas above the head insulation are inspected for the presence of boric acid residue. Under the ASME Section XI Program, visual examinations which identify any evidence of boric acid leakage, require further investigation, evaluation and corrective measures in accordance with ASME Section XI, IWB-3142, "Acceptance."

In conjunction with each 10 year Inservice Inspection Program interval, the WBN program will be revised to perform a visual inspection of 100 percent of the reactor vessel external head surface.

E. ***your conclusion regarding whether there is reasonable assurance that regulatory requirements are currently being met (see the Applicable Regulatory Requirements, above). This discussion should also explain your basis for concluding that the inspections discussed in response to Item 1.D will provide reasonable assurance that these regulatory requirements will continue to be met. Include the following specific information in this discussion:***

(1) If your evaluation does not support the conclusion that there is reasonable assurance that regulatory requirements are being met, discuss your plans for plant shutdown and inspection.

(2) If your evaluation supports the conclusion that there is reasonable assurance that regulatory requirements are being met, provide your basis for concluding that all regulatory requirements discussed in the Applicable Regulatory Requirements section will continue to be met until the inspections are performed.

ENCLOSURE 1

WATTS BAR NUCLEAR PLANT UNIT 1
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RESPONSE

WBN has procedures and instructions in place for identifying, evaluating, and correcting conditions which would adversely effect the reactor coolant pressure boundary and supporting systems and which provide for compliance with 10 CFR 50, Appendix B, Criterion V, *Instructions, Procedures, and Drawings*, Criterion IX, *Control of Special Processes,* and Criterion XVI, *Corrective Action*. In addition WBN has an operating head temperature which puts it in the susceptibility category of >30 effective full power years (EFPY) using the Oconee 3 model and WBN has only operated for four fuel cycles (between 5 and 6 EFPY).

TVA's evaluation concluded with reasonable assurance that the regulatory requirements outlined in NRC Bulletin 2002-01, Applicable Regulatory Requirements Section, are currently being met and that the inspections identified in Section 1D of TVA's response will provide reasonable assurance these regulatory requirements will continue to be met. This conclusion is based on the fact that WBN's program has established instructions and procedures to implement the required inspections, evaluations, repairs, and analysis of systems and components to maintain the integrity of the reactor coolant system pressure boundary. Additionally, although WBN reactor pressure vessel CRDM nozzle cracking susceptibility is one of the lowest in the industry, the commitments to perform an inspection of the entire head during the next refueling outage and once each Inservice Inspection interval thereafter, and also to perform partial inspections during the remaining outages, will provide increased confidence that boric acid degradation problems experienced at other plants have not occurred at WBN.

ENCLOSURE 1

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TABLE

WATTS BAR NUCLEAR PLANT UNIT 1
CANOPY SEAL AND RX HEAD PENETRATION EXAMINATION

HISTORY

RFO	INSPECT DATE	CANOPY SEAL EVAL. %	HEAD PENETRATION EVAL. %	RESULTS	COMMENTS/NOTES
PSI	10/1981	100%	100%	0 LEAKS	Reactor Coolant System Cold Hydrostatic Test - Full head surface inspection which included 83 reactor vessel head penetrations.
1	9/1997	100%	0	2 LEAKS	Penetration G-15 canopy seal weld, was repaired by Inconel overlay. Penetration G-15 had residue on the side of the penetration indicating a trace of borated water had run down the penetration to a location below the top of the head insulation. The insulation around the penetration was removed and no visible degradation of the adjacent head area was identified. Penetration F-2 canopy seal weld was repaired by Inconel overlay. Residue was minimal with no evidence of a borated water trace down the penetration toward the head.
2	3/1999	100%	0	1 LEAK	Penetration G-5 canopy seal weld was repaired by Inconel overlay. Residue was minimal with no evidence of a borated water trace down the penetration toward the head.
3	9/2000	100%	0	0 LEAKS	N/A
4	2/2002	100%	0	0 LEAKS	N/A

ENCLOSURE 2

WATTS BAR NUCLEAR PLANT UNIT 1
BULLETIN 2002-01
REACTOR PRESSURE VESSEL HEAD DEGRADATION AND
REACTOR COOLANT PRESSURE BOUNDARY INTEGRITY

LIST OF COMMITMENTS

ENCLOSURE 2

WATTS BAR NUCLEAR PLANT UNIT 1
BULLETIN 2002-01
REACTOR PRESSURE VESSEL HEAD DEGRADATION AND
REACTOR COOLANT PRESSURE BOUNDARY INTEGRITY

LIST OF COMMITMENTS

1. WBN plans to perform a remote under insulation inspection of the reactor head at the next refueling outage for evidence of boric acid leakage or leakage associated with CRDM penetration nozzles. This inspection will be a 100 percent head surface remote camera inspection to the extent achievable using current crawler technology. In addition, a best effort CRDM nozzle penetration examination will be performed. These inspections will be performed by a VT-2 Certified Inspector and any questionable indications or evidence of boron will also be inspected by a Metallurgical Engineer.

2. In the future, the WBN Program will be revised to include limited reactor head surface examinations. These examinations will be conducted on periphery nozzle penetrations and approximately 50 percent of the general head vicinity for evidence of leakage at each refueling outage. If boric acid leakage occurs, WBN will follow the site programs for identification and repair of leakage

3. In conjunction with each 10 year Inservice Inspection Program interval, the WBN program will be revised to perform a visual inspection of 100 percent of the reactor vessel external head surface.